Appendix A: PARCC Model Content Frameworks for English Language Arts/Literacy

PARCC MODEL CONTENT FRAMEWORKS

ENGLISH LANGUAGE ARTS/LITERACY

GRADES 3–11

November 2011

Partnership for Assessment of Readiness for College and Careers

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Purpose for the Model Content Frameworks for ELA/Literacy

As part of its proposal to the U.S. Department of Education, the Partnership for Assessment of Readiness for College and Careers (PARCC) committed to developing model content frameworks for English language arts/literacy (ELA/Literacy) to serve as a bridge between the Common Core State Standards and the PARCC assessments.[1]

The PARCC Model Content Frameworks were developed through a state-led process that included ELA content experts in PARCC member states and members of the Common Core State Standards writing team. The Model Content Frameworks are voluntary resources offered by PARCC to help curriculum developers and teachers as they work to implement the standards in their states and districts. The Model Content Frameworks illustrate one of a number of ways the standards could be organized over the course of the school year and are designed with the following purposes in mind:

- Supporting implementation of the Common Core State Standards, and
- Informing the development of item specifications and blueprints for the PARCC assessments in grades 3–8 and high school.

The Model Content Frameworks are intended to be dynamic and responsive to evidence and ongoing input. As such, PARCC hopes they will be used by educators for the remainder of the 2011–12 school year. In spring 2012, PARCC will again solicit feedback on the Model Content Frameworks, and a refined version will be issued to incorporate feedback as needed. In this way, the Model Content Frameworks can evolve to reflect the real-life experiences of educators and students.

Connections to the PARCC Assessment

The proposed PARCC Assessment System will be designed to measure knowledge, skills and understandings essential to achieving college and career readiness. In ELA/Literacy, these include the following areas as defined by the standards:

- *Reading complex texts:* This requires students to read and comprehend a range of grade-level complex texts, including texts from the domains of ELA, science, history/social studies, technical subjects and the arts. Because vocabulary is a critical component of reading comprehension, it will be assessed in the context of reading passages. Both close, analytic reading and comparing and synthesizing ideas across texts are expected.
- *Writing effectively when using and/or analyzing sources:* This requires students to demonstrate the interrelated literacy activities of reading, gathering evidence about what is read, and analyzing and presenting that evidence in writing.
- *Conducting and reporting on research:* This expands on "writing when analyzing sources" to require students to demonstrate their ability to gather resources, evaluate their relevance, and report on information and ideas they have investigated (i.e., conducting research to answer

[1] The Model Content Frameworks, from grade 3 through grade 11, align with the PARCC Assessment System for those grades. A companion document with model content frameworks for grades K–2 will be written in 2012.

questions or to solve problems).

- *Speaking and listening:* This requires students to demonstrate a range of interactive oral communication and interpersonal skills, including (but not limited to) skills necessary for making formal presentations, working collaboratively, sharing findings and listening carefully to the ideas of others.

- *Language use for reading, writing and speaking:* This requires students to have a strong command of grammar and spoken and written academic English.

The importance of these skills is reflected in the emphasis the Model Content Frameworks place on students' needing regular opportunities to grapple with the close, analytic reading of grade-level complex texts and to construct increasingly sophisticated responses in writing. The Model Content Frameworks therefore provide a helpful guide in preparing students for the future PARCC assessments.

Structure of the Model Content Frameworks for ELA/Literacy

The Model Content Framework for each grade level (grades 3–11) is divided into four sections:

1. Narrative Summary of the ELA Standards,

2. The Model Content Framework Chart,

3. Key Terms and Concepts for the Model Content Framework Chart, and

4. Writing and Speaking and Listening Standards Progressions Charts.

As described below, the four sections capture the key emphases within the standards for reading, writing, speaking and listening, and language (including vocabulary). These emphases reflect the research basis for the standards found in Appendix A of the Common Core State Standards. ***These emphases will also be reflected on PARCC assessments.***

Section 1: Narrative Summary of the ELA Standards

The first section highlights the crucial and distinct insights from the ELA/Literacy standards for grades 3–5 and the ELA standards for grades 6–11. This succinct overview of the standards sets the stage for section 2, the Model Content Framework Chart.

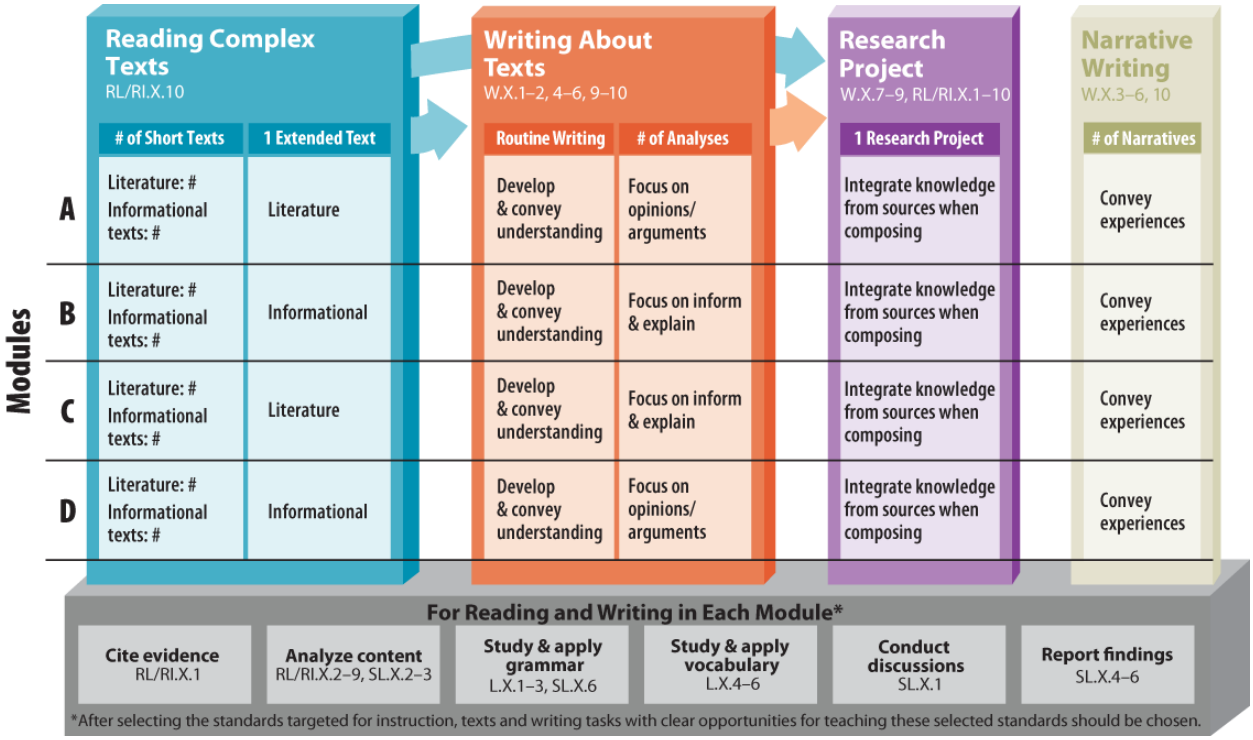
Section 2: The Model Content Framework Chart

The second section presents a visual overview of the standards in a particular grade level, noting crucial reading demands and writing emphases for instructional planning. The module chart (an example of which appears below) offers a model of how the standards for a particular grade level could be organized into four instructional modules to aid states and districts in developing instructional tools. As noted above, the Model Content Frameworks offer one way of organizing the standards — in this instance into quarterly modules. Equally successful models could be based around semesters, trimesters or other school schedules.

The chart is meant to illustrate and provide context for the standards ***but not replace the standards themselves***.

The Model Content Framework Chart reflects the integrated nature of reading, writing and research (as illustrated by the arrows connecting them). Each module suggests both the number and types of texts that students read and analyze. Students then write about these texts either to express an opinion/make an argument or to inform/explain. In addition, research and narrative writing tasks appear in each module. As

indicated by the bar that stretches underneath the chart, reading, writing and research rest on a fundamental skill set that includes citing evidence, analyzing content, using correct grammar, acquiring and applying vocabulary, conducting discussions, and reporting findings.[2]



Sample Model Content Framework Chart

It is important to note that the Model Content Frameworks allow educators the flexibility to order the modules and the content within the modules in any way that suits their desired purposes. Because the knowledge and skills embedded across the four modules address all the standards for a given grade level, the order in which the four modules may be used is not critical. What changes from module to module is the focus and emphasis on the types of texts read and written about; what remains constant across all four modules is the cultivation of students' literacy skills in preparation for college and career readiness as well as the future PARCC assessments.[3]

Section 3: Key Terms and Concepts for the Model Content Framework Chart

This section explains the elements that appear within the Model Content Framework Chart. As noted above, these elements not only play a key role within the standards but also reflect critical emphases that will be addressed within the PARCC Assessment System.

Reading complex texts: The Model Content Frameworks highlight the importance of focusing on the close,

[2] In grades 3–5, the charts also reference the Foundational Skills in Reading.

[3] It should be noted that while the modules above articulate a baseline of essential knowledge and skills derived from the standards, they do not intend to limit the types of texts educators may use.

sustained analysis of complex text.[4] A significant body of research links the close reading of complex text — whether the student is a struggling reader or advanced — to significant gains in reading proficiency and finds close reading to be a key component of college and career readiness.[5]

Close, analytic reading stresses engaging with a text of sufficient complexity directly and examining its meaning thoroughly and methodically, encouraging students to read and reread deliberately. Directing student attention on the text itself empowers students to understand the central ideas and key supporting details. It also enables students to reflect on the meanings of individual words and sentences; the order in which sentences unfold; and the development of ideas over the course of the text, which ultimately leads students to arrive at an understanding of the text as a whole. Close, analytic reading entails the careful gathering of observations about a text and careful consideration about what those observations taken together add up to — from the smallest linguistic matters to larger issues of overall understanding and judgment.

Reading complex text also encompasses the productive comparison and synthesis of ideas. Readers use the meaning developed through the analysis of particular words, phrases, sentences and paragraphs to elaborate on the connections among ideas across multiple texts. Once each source is read and understood, students can give attention to integrating what they have recently read with readings they have previously encountered and knowledge they have previously acquired. By drawing on relevant prior knowledge, students can make comparisons between what they have just read to previous learning and assess how the text expands or challenges that knowledge. Comparison and synthesis of ideas across multiple texts allow students to thoroughly demonstrate reading comprehension as defined by the entirety of the reading standards. This type of reading is also essential when conducting research, when students build and present knowledge through integration, comparison and synthesis of ideas.

Each module in the Model Content Frameworks suggests that educators select a minimum number of grade-level-appropriate short texts of sufficient complexity for close, analytic reading as well as one extended text.[6] While short texts might include a poem, short story or magazine article, extended texts

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[4] Complex text is typified by a combination of longer sentences, a higher proportion of less-frequent words, and a greater number and variety of words with multiple meanings. In higher grade levels, complex text involves higher levels of abstraction, more subtle and multidimensional purposes, and a wider variety of writing styles — all of which place greater demands on working memory. Research is under way to develop clear, common definitions for measuring text complexity that can be consistent across different curricula and publishers. The immediate recommendation is for teachers to select texts that are within the appropriate band of complexity (like those listed in Appendix B of the standards), using currently available quantitative measures, and then make keener distinctions using a blend of qualitative measures (such as a text's levels of meaning or purpose, structure, language conventionality and clarity, and knowledge demands) to determine when to teach a given text. See Appendix A and especially the chart on pages 13 and 14 in the standards for a preliminary list of qualitative measures.

[5] Ericcson, K. A., and W. Kintsch. 1993. "The Role of Deliberate Practice in the Acquisition of Expert Performance." *Psychological Review* 100(3):363–406; Plant, E. A., et al. 2005. "Why Study Time Does Not Predict Grade Point Average Across College Students: Implications of Deliberate Practice for Academic Performance." *Contemporary Educational Psychology* 30; Ericcson, K. A., and W. Kintsch. 1999. "The Role of Long Term Working Memory in Text Comprehension." *Psychologia*; Kintsch, W. 2009. "Learning and Constructivism." *Constructivist Instruction: Success or Failure?* eds. Tobias and Duffy. New York: Routledge; Hampton, S., and E. Kintsch. 2009. "Supporting Cumulative Knowledge Building Through Reading." In *Adolescent Literacy, Field Tested: Effective Solutions for Every Classroom*, eds. Parris, Fisher, and Headley. International Reading Association; Heller, R., and C. Greenleaf. 2007. *Literacy Instruction in the Content Areas: Getting to the Core of Middle and High School Improvement.* Washington, D.C.: Alliance for Excellent Education; The Education Trust. 2006. *Gaining Traction, Gaining Ground: How Some High Schools Accelerate Learning for Struggling Students*; ACT. 2006. *Reading Between the Lines*.

[6] Leveled texts that are below grade-band level in complexity are not a substitute; the standards indicate students should be reading grade-band-level complex text. Flexibility is built in for educators to build progressions of more complex texts within grade-band levels (e.g., grades 4–5, 6–8, 9–12) that overlap to a limited degree with earlier bands, but reading text from the appropriate band level lies at the core of the Model Content Frameworks.

would include novels or book-length informational texts, a magazine with a series of related articles or stories, or even a website with multiple related pages of grade-level complex text to navigate. Choosing short texts that complement the extended text will create coherence in a module.

In lower grades, texts should include content from across the disciplines. In upper grades, other content-area teachers are encouraged to consider how best to implement reading across the disciplines while retaining the appropriate mix of literary and informational texts appropriate to the grade level.[7] To become career and college ready, students must have access to and grapple with works of exceptional content and craft that span many genres, cultures and eras both for the insights they offer and as models for students' own thinking and writing.[8] Texts should be selected from among the best contemporary fiction and nonfiction and from a diverse range of authors and perspectives. These texts should also include classic works that have broad resonance and are alluded to and quoted often, such as foundational literary works, influential political documents, and seminal historical and scientific texts. These complex texts should allow students to draw ample evidence from them and present their analyses in writing and speaking. The texts should also vary in type (including new media texts), length and density, requiring students to slow down or read more quickly depending on their purpose for reading. Not only do students need to be able to read closely, but also they need to be able to read larger volumes of text when necessary for research or other purposes.

In addition, all students need access to a wide range of materials on a variety of topics and genres in order to develop their knowledge and joy of reading. Students' classrooms and school libraries need to provide this wide array of texts to ensure that students have opportunities to independently read texts of their own choosing during and outside of the school day. Independent reading should include texts at a student's independent reading level and texts with complexity levels that are challenging and motivating.

Writing about texts: The Model Content Frameworks reflect the emphasis found in the Writing Standards that students must develop the ability to write effectively and proficiently. While narrative writing is given prominence in early grades, as the grade level increases, the standards (and therefore the Model Content Frameworks) shift the focus to writing arguments or informational pieces that analyze sources (including writing about research students have performed). Studies show that learning to present important information in an organized piece of writing helps students generate a deeper understanding of a text. Indeed, whether taking notes or answering questions about a text, or crafting a summary or an extended response regarding what they have read, students improve both their reading comprehension and their writing skills when writing in response to texts.[9] Thus, each module includes routine writing in response to prompts designed to answer questions and even to brainstorm ideas — the type of writing critical for improving reading comprehension as well as for building writing skills. This writing can take the form of notes, summaries, learning logs, writing to learn tasks, or even a response to a short text selection or an open-ended question.[10]

In addition, each grade-level framework addresses more formal, structured analytic writing that either advances an argument or explains an idea. The Model Content Frameworks are organized with the

[7] In elementary grades, there is a 50/50 balance of literature and nonfiction texts, whereas in high school, informational texts are to be more prominently featured.

[8] An extensive list of grade-level-appropriate complex texts appears in Appendix B of the standards. Though it offers numerous examples, instructors and curriculum planners are encouraged to go beyond this list to select other grade-level complex texts.

[9] Graham, S., and M. A. Hebert. 2010. *Writing to Read: Evidence for How Writing Can Improve Reading.* A Carnegie Corporation Time to Act Report. Washington, D.C.: Alliance for Excellent Education.

[10] In keeping with the standards, such responses should leverage technology, expanding on more traditional modes of written expression to include using digital sources to draft, revise and edit work as well as to conduct research, including evaluating websites for authenticity and credibility.

expectation that students will respond to high-quality, text-dependent prompts about what they have read by framing a debate or informing the reader about what they have learned through writing. Rigorous, text-dependent questions require students to demonstrate that they can follow the details of what is explicitly stated and make valid claims and inferences that square with the evidence in the text. These responses can vary in length based on the questions asked and tasks performed, from answering brief questions to crafting multiparagraph responses in upper grades.

Just as the standards suggest, this should include writing under time constraints as well as engaging in longer writing projects that last several days (including possibly requiring students to make revisions to strengthen a piece of writing over multiple drafts). As a result, this array of writing tasks will prepare students for critical college- and career-readiness skills: presenting credible evidence from texts, crafting coherent and well-developed prose, and writing clearly with sufficient command of academic English.

Research project: The Model Content Frameworks give special prominence to research tasks, reflecting the deep connection research has to building and integrating knowledge while developing expertise on various topics. When possible, research should connect to texts selected for close readings, requiring students to closely read and compare and synthesize ideas across multiple texts. Through a progression of research tasks, students are called on to present their findings in a variety of modes in informal and formal contexts appropriate to the grade level (e.g., through oral presentations, argumentative or explanatory compositions, or multimedia products).

Narrative writing: In addition to the analytic and explanatory writing expected of students, the standards also reflect the need for students to write narratives.[11] From the importance of organization to the nuance of word choice, shaping narratives that reflect real or imagined experiences or events reinforces what students are learning elsewhere. Narratives also provide an additional opportunity for students to reflect on and to emulate what they have read through imaginative writing. The close attention to detail required by students to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks. As students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose. To tell an interesting story effectively or to provide an accurate account of a historical incident requires students to present vivid, relevant details to situate events in a time and place and also to craft a structure that lends a larger shape and significance to those details. As an easily grasped and widely used way to share information and ideas with others, narrative writing is a principal ingredient in writing forms directly relevant to college and career readiness.

For reading and writing in each module: Lastly, each module includes an explanation of the knowledge and skills that may be integrated with all standards, from citing evidence and analyzing content to applying grammar correctly. This section of the chart emphasizes the critical role of building content knowledge by learning and using new vocabulary, engaging in focused formal and informal discussions, and reporting findings in multiple formats. As demonstrated in the standards, each of these skills is an essential element when reading and writing about texts. (In addition for grades 3–5, students acquire and develop foundational reading skills throughout the academic year.)

Cite evidence and analyze content: The reading and writing standards highlighted within the Model Content Frameworks stress that students learn to draw sufficient evidence from a range of different types of complex text from across the disciplines. For example, depending on the text, students may be asked to determine the main idea, the point of view and even the meaning of words and phrases as part of gathering and analyzing evidence.

[11] In grade school, students write narratives 35 percent of the time; that amount is reduced gradually to 20 percent in high school.

Understand and apply grammar: The Model Content Frameworks reflect the standards' expectation that students will gain a strong command of the grammar and usage of spoken and written academic English through extensive practice, which is needed to be college and career ready.[12] The Model Content Frameworks call for students to be able to discern the difference between a formal and an informal speaking occasion and use appropriate diction and tone.

Understand and apply vocabulary: Encouraged in the Model Content Frameworks is a systematic approach to teaching academic vocabulary in context, giving students a sense of the connections and patterns in language and providing them with opportunities to acquire word meanings through reading and listening as well as through writing and speaking.[13] By focusing on academic vocabulary, or Tier 2 words, students will build fluency, improve reading comprehension and be more prepared to access a wide range of complex texts.[14] Students will learn to pay attention to the impact of specific word choices when reading and choose words deliberately to shape their own writing and speaking.

Conduct discussions and report findings: Besides having intrinsic value as modes of communication, listening and speaking are necessary prerequisites of reading and writing well, and research shows that oral language competence is strongly predictive of the ease with which students learn to read and write.[15] The Model Content Frameworks reinforce habits of mind that aid in the mastery of the printed word and directly target speaking and listening skills in a purposeful and systematic way. They direct students to learn how to participate effectively in real, substantive discussions around text-related topics and issues to provide them with opportunities to build confidence and extend knowledge regarding a text by connecting their ideas with those of others through reporting their findings.

Foundational reading skills: In addition to the knowledge and skills noted above, based on a substantial body of research, the Model Content Frameworks address the standards' expectation that students in grades 3–5 acquire and develop an understanding of phonics and word analysis skills and build their fluency through independent reading and opportunities to analyze closely how the syntax and meaning of the text influence expression and phrasing.[16]

Section 4: Writing and Speaking and Listening Standards Progressions Charts

The fourth and final section of the Model Content Framework includes two standards progression charts for each grade level: a Writing Standards Progression Chart and a Speaking and Listening Progression Chart. The charts trace (in side-by-side fashion) the changes to the standards between the previous and current grade levels. Each row of the chart is devoted to highlighting the shifts in a single standard. Below is a

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[12] Weaver, C., et al. May 2006. "Grammar Intertwined Throughout the Writing Process: An 'Inch Wide and a Mile Deep.'" *English Teaching: Practice and Critique* 5(1):77–101.

[13] Reflecting the latest research in vocabulary instruction, the standards divide words into three tiers: everyday words such as "boat" and "red" (Tier 1), academic words such as "principle" and "courage" (Tier 2), and domain-specific terminology such as "photosynthesis" (Tier 3). While Tier 1 words are implicitly learned by students and Tier 3 words are terms specific to a discipline and typically defined within texts, Tier 2 words provide the critical word knowledge needed for understanding all types of texts. See Appendix A of the Common Core State Standards for a more extensive explanation of the research behind vocabulary acquisition.

[14] National Institute of Child Health and Human Development. 2000. *Report of the National Reading Panel. Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction*. NIH Publication No. 00-4769. Washington, D.C.: U.S. Government Printing Office.

[15] Pence, K. L., and L. M. Justice. 2007. *Language Development from Theory To Practice.* Upper Saddle River, N.J.: Prentice-Hall; Sticht, T. G., and J. H. James. 1984. "Listening and Reading." In *Handbook of Reading Research*, eds. Pearson et al., 1:293–317. White Plains, N.Y.: Longman.

[16] National Institute of Child Health and Human Development. 2000. *Report of the National Reading Panel. Teaching Children to Read: An Evidence-Based Assessment of the Scientific Research Literature on Reading and Its Implications for Reading Instruction*. NIH Publication No. 00-4769. Washington, D.C.: U.S. Government Printing Office.

sample of an overview chart for Writing Standard 1 in grade 5:

Grade 4, Standard 1 (W.4.1)	**Grade 5, Standard 1 (W.5.1)**
Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose. b. Provide reasons that are supported by facts and details. c. Link opinion and reasons using words and phrases (e.g., for instance, in order to, in addition). d. Provide a concluding statement or section related to the opinion presented.	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically). d. Provide a concluding statement or section related to the opinion presented.

Literacy Standards for Other Disciplines and the Model Content Frameworks

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. Accordingly, educators in all disciplines bear some responsibility for ensuring the literacy of the students in their classes. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into instructional programming.

The standards for grades 3–5 include expectations regarding reading, writing, speaking, listening and language that apply to a range of subjects, *including but not limited to English language arts*. Accordingly, in the Model Content Frameworks for grades 3–5, some texts will involve reading from across the disciplines. The standards for grades 6–12 include standards for ELA and separate but closely related literacy standards for history/social studies, science and technical subjects. This dual set of standards reflects the primary role ELA teachers have in developing students' literacy skills while acknowledging that teachers in other disciplines play a critical role in developing student literacy. History/social studies, science and technical subject teachers are encouraged to review the Model Content Frameworks collaboratively with ELA teachers to coordinate literacy instruction, especially in the key areas of reading and writing.

Using the Model Content Frameworks to Support All Students

It is critical that all students are able to demonstrate mastery of the skills and knowledge described in the standards. PARCC recognizes the importance of equity, access and fairness in its assessments and aligned materials. To help meet these goals, PARCC will work with its Accessibility, Accommodations and Fairness Technical Working Group — a group of national experts — throughout the development process to ensure the learning experience of all students is aligned to the high expectations of the standards.

Conclusion

Guided by the above considerations, the Model Content Frameworks offered in this document present the standards in an integrated fashion that will be useful for curriculum developers and teachers alike, while providing insight and guidance for the development of the future PARCC Assessment System. By systematically weaving together the standards into modules that progressively develop student understanding from grade 3 through grade 11, the Model Content Frameworks offer one way of envisioning how to emphasize the critical advances in the standards by focusing on essential knowledge and skills that

students must develop for college and career readiness.

PARCC Model Content Framework for ELA/Literacy for Grade 3

Narrative Summary of ELA/Literacy Standards for Grade 3

The Common Core State Standards call for students in grade 3 to proficiently read grade-appropriate complex literature and informational text (RL/RI.3.10) such that they can ask and answer questions by referring explicitly to a text (RL/RI.3.1). Students delve deeply into texts to uncover both the central message and supporting details, identifying the logical connections between sentences and paragraphs in a text. They can compare and contrast two or more works with the same topic, author or character, describing the traits, motivations and feelings of characters or how ideas relate to one another. Additional Standards for Reading Literature (RL.3.2–9) and Standards for Reading Informational Text (RI.3.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

Helping students understand what they read is a crucial element of grade 3. In grades K–2, children begin to master the decoding skills described in the Standards for Reading: Foundational Skills. Students in grade 3 use these emerging skills to negotiate multisyllabic words, which in turn increases their fluency and confidence when reading new and unfamiliar material. Students emerge from grade 3 with an ever-expanding academic vocabulary that they use in their writing and speaking.

In support of the reading standards, students are taught to ask questions of a speaker or classmate to deepen understanding of the material in ways elaborated in the Standards for Speaking and Listening. Students read aloud fluently and offer appropriate elaboration on the ideas of classmates, building on what has been said before.

Two new Writing Standards (W.3.4 and W.3.10) are introduced in grade 3. They call for students to develop and organize writing in a manner appropriate to the task and purpose and to write routinely for a range of timeframes and contexts. Gaining expertise at writing narratives teaches students to describe accurately what happened and helps them recognize and select the most relevant information when reading. Students' readings of history and science texts provide models of connecting and sequencing ideas when writing to inform/explain or to express an opinion. In all student writing, the use of specific facts and descriptive details is emphasized, as is correct spelling and punctuation.

There are two additional instructional priorities to address over the course of grade 3 regarding the foundational skills of reading:

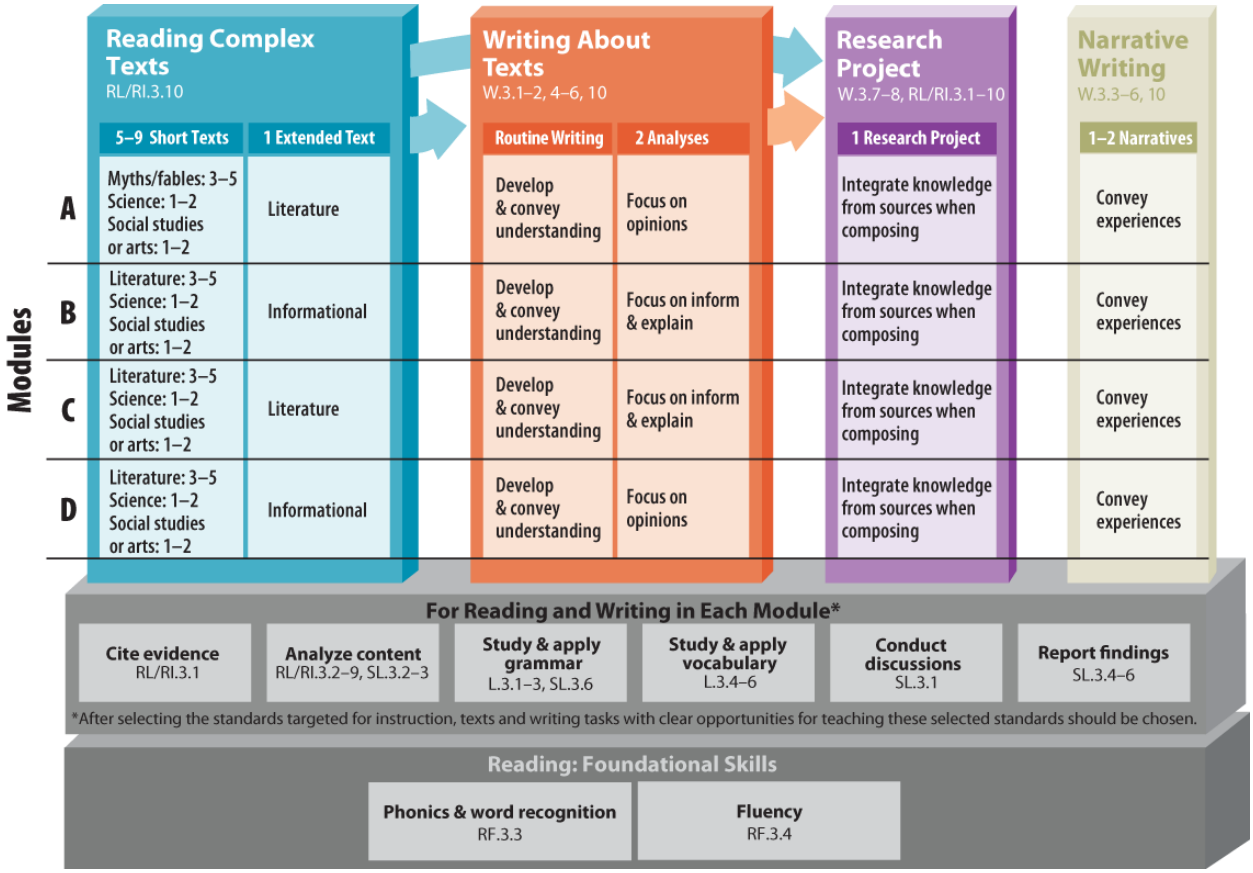
1. Grade 3 is a pivotal year for students to build their word analysis skills so that they are reliably able to make sense of multisyllabic words in books (RF.3.3).

2. Reading fluency assessments administered at the start of the year (and throughout the year as necessary) should be used to determine a student's fluency level. Students who have not yet achieved grade-level fluency and students learning English will need direct fluency instruction. Like their more proficient peers, they will need opportunities to build fluency through independent reading and opportunities to analyze closely how syntax and the meaning(s) of the text influence expression and phrasing (RF.3.4).

ELA/Literacy Model Content Framework Chart for Grade 3

Below is a chart that organizes the standards into four quarter-length modules that include the

knowledge and skills students will learn and apply over the course of the year.[17] As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



[17] The Common Core State Standards K–5 section is written to reflect "the fact that most or all of the instruction students in these grades receive comes from one teacher" (introduction to the Common Core State Standards, page 8). Therefore, most elementary grades are self-contained and thus include reading across the curriculum — hence the higher number of short texts in grades 3–5 than in grades 6–12.

Key Terms and Concepts for Grade 3 ELA/Literacy Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of **50 percent** informational text and **50 percent** literature that students are expected to read, including reading in ELA, science, social studies and the arts.

Five to nine short texts from across the curriculum: Selections would include short texts from across the curriculum of sufficient complexity for close reading (with emphasis in one module on reading myths/fables) that would allow students to draw evidence from the texts and present their analyses in writing as well as through speaking.[18] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, folktales, legends, fables, fantasy, realistic fiction and drama, with a special emphasis on myth, as well as nursery rhymes, narrative poems, limericks and free verse (Common Core State Standards, page 31).
- **Informational texts** include biographies and autobiographies; books about history, social studies, science and the arts; technical texts, including directions, forms and information displayed in graphs, charts or maps; and digital sources on a range of topics written for a broad audience (Common Core State Standards, page 31).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer informational text, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing should be **65 percent analytical** (30 percent opinions and 35 percent to explain/inform) and **35 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[19]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least two analyses per module: All analytic writing should put a premium on using evidence

[18] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

[19] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

(RL/RI.3.1), as well as on crafting works that display some logical integration and coherence (W.3.4, W.3.5 and L.3.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting longer responses, allowing teachers to assess students' ability to paraphrase, infer and ultimately integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to compose one extended project that uses research to address a significant topic, problem or issue. This task should entail integrating knowledge about a topic drawn from one or more texts from the module, taking brief notes on sources, and sorting evidence into provided categories. Students can present their findings in a variety of modes in both informal and more formal contexts.[20]

Narrative Writing

Students are expected to write one or two narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is to be able to discern and cite evidence from the text to support assertions. In grade 3, students should refer explicitly to the text as the basis for answers (RL/RI.3.1).
Analyze content: The content of each text should determine which standards (RL/RI.3.2–9 and SL.3.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.3.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.3.4–6).[21] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage in a range of collaborative discussions (one-on-one, small group, teacher-led), enabling them to ask questions to check their understanding and stay on topic while explaining their own understanding in light of the discussion (SL.3.1).

[20] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.
[21] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

Report findings: Students should tell a story, recount an experience, or report on a topic or text with appropriate facts and descriptive details, speaking clearly, at an appropriate pace (SL.3.4–6).

For Reading Foundation Skills in Each Module

In each module, students are expected to recognize words and read with fluency through the lenses of the following skills rooted in the standards.

Decode words: Students should apply their knowledge of phonics and word analysis to be able to recognize the words they encounter when reading texts (RF.3.3).

Read fluently: Students should be able to read with accuracy and fluency to be able to comprehend texts sufficiently (RF.3.4).

Writing Standards Progression from Grade 2 to Grade 3

In grade 3, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, with guidance and support from adults, they use technology to produce and publish writing. They are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.3.1–3). Specific changes in the Writing Standards from grade 2 to grade 3 are highlighted in the chart below:

Grade 2, Standard 1 (W.2.1)	**Grade 3, Standard 1 (W.3.1)**
Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because, and, also*) to connect opinion and reasons, and provide a concluding statement or section.	Write opinion pieces on topics or texts, supporting a point of view with reasons. a. Introduce the topic or text they are writing about, state an opinion, and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., *because, therefore, since, for example*) to connect opinion and reasons. d. Provide a concluding statement or section.
Grade 2, Standard 2 (W.2.2)	**Grade 3, Standard 2 (W.3.2)**
Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., *also, another, and, more, but*) to connect ideas within categories of information. d. Provide a concluding statement or section.
Grade 2, Standard 3 (W.2.3)	**Grade 3, Standard 3 (W.3.3)**
Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order,	Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Establish a situation and introduce a narrator and/or

and provide a sense of closure.	characters; organize an event sequence that unfolds naturally. b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations. c. Use temporal words and phrases to signal event order. d. Provide a sense of closure.
Grade 2, Standard 4	**Grade 3, Standard 4 (W.3.4)**
(Begins in grade 3)	With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 2, Standard 5 (W.2.5)	**Grade 3, Standard 5 (W.3.5)**
With guidance and support from adults and peers, focus on a topic and strengthen writing as needed by revising and editing.	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 3 on pages 28 and 29.)
Grade 2, Standard 6 (W.2.6)	**Grade 3, Standard 6 (W.3.6)**
With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers.	With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.
Grade 2, Standard 7 (W.2.7)	**Grade 3, Standard 7 (W.3.7)**
Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).	Conduct short research projects that build knowledge about a topic.
Grade 2, Standard 8 (W.2.8)	**Grade 3, Standard 8 (W.3.8)**
Recall information from experiences or gather information from provided sources to answer a question.	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.
Grade 2, Standard 9	**Grade 3, Standard 9**
(Begins in grade 4)	(Begins in grade 4)
Grade 2, Standard 10	**Grade 3, Standard 10 (W.3.10)**

(Begins in grade 3)	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 2 to Grade 3

In grade 3, students speak with growing maturity to convey ideas and information clearly. They are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 2 to grade 3 are highlighted in the chart below:

Grade 2, Standard 1 (SL.2.1)	**Grade 3, Standard 1 (SL.3.1)**
Participate in collaborative conversations with diverse partners about *grade 2 topics and texts* with peers and adults in small and larger groups. a. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). b. Build on others' talk in conversations by linking their comments to the remarks of others. c. Ask for clarification and further explanation as needed about the topics and texts under discussion.	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.
Grade 2, Standard 2 (SL.2.2)	**Grade 3, Standard 2 (SL.3.2)**
Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Grade 2, Standard 3 (SL.2.3)	**Grade 3, Standard 3 (SL.3.3)**
Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of	Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

a topic or issue.	
Grade 2, Standard 4 (SL.2.4)	**Grade 3, Standard 4 (SL.3.4)**
Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.
Grade 2, Standard 5 (SL.2.5)	**Grade 3, Standard 5 (SL.3.5)**
Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.	Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.
Grade 2, Standard 6 (SL.2.6)	**Grade 3, Standard 6 (SL.3.6)**
Produce complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 2 Language standards 1 and 3 on pages 26–27 for specific expectations.)	Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 on pages 28–29 for specific expectations.)

Narrative Summary of ELA/Literacy Standards for Grade 4

The Common Core State Standards call for students in grade 4 to continue to build their stamina and skill to proficiently read challenging, grade-appropriate complex literature and informational text (RL/RI.4.10) such that they can draw on or infer specific details and examples from the text (RL/RI.4.1). Students perform specific tasks targeted in the standards, from describing how focusing on different details affects a text to summarizing both the main and supporting ideas, explaining what happened and why, and recognizing allusions to significant characters found in mythology. They are expected to offer reasons and evidence to support particular points being made in a single text and integrate information from two texts on the same topic or theme (including traditional literature from different cultures). Additional Standards for Reading Literature (RL.4.2–9) and Standards for Reading Informational Text (RI.4.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

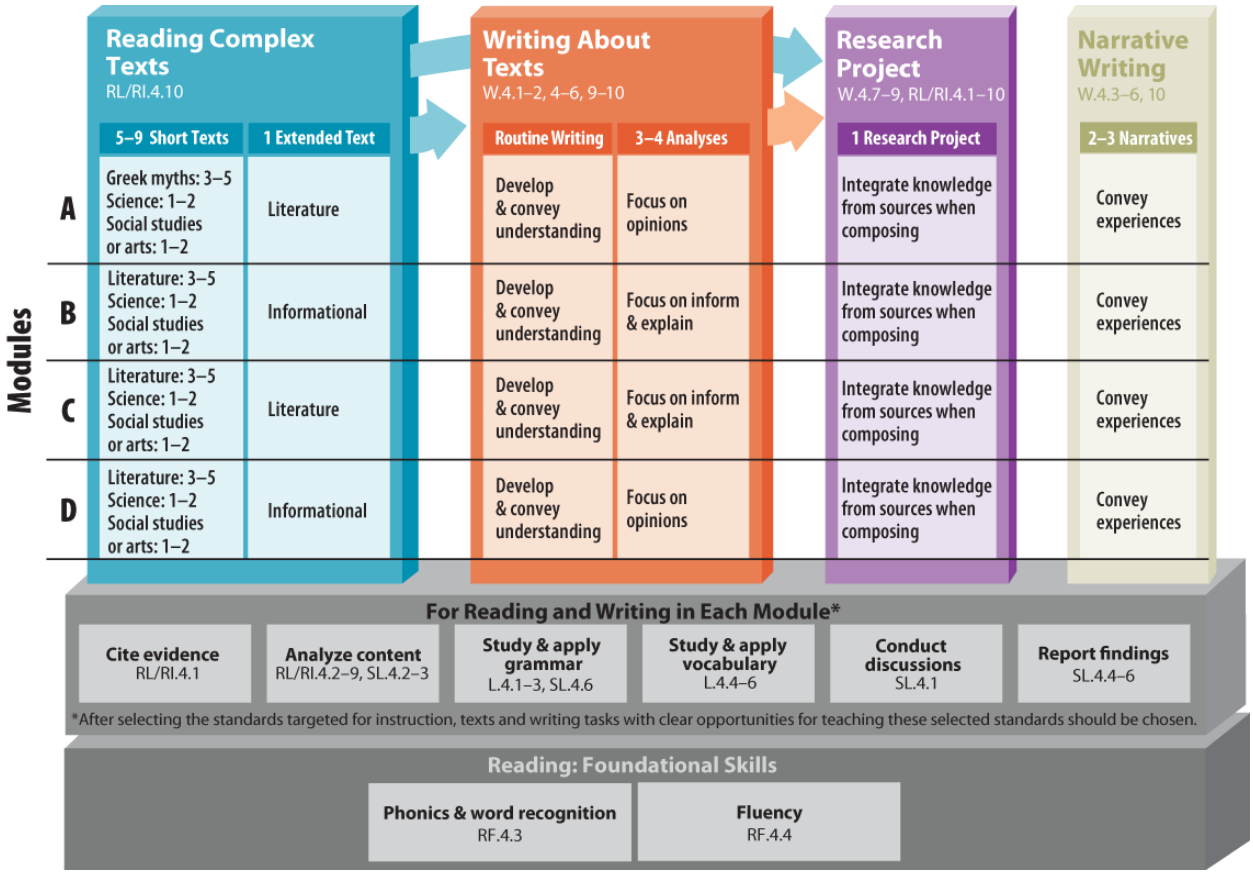
When participating in class, students should both paraphrase accurately and respond effectively with information during discussions in ways elaborated in the Standards for Speaking and Listening. Reading complex texts that range across literature, history, the arts and the sciences will also build the vocabulary skills of students as well as improve their fluency and confidence, leading to success in later grades.

One new Writing Standard that begins in grade 4 supports the close connection between reading and writing (W.4.9). It requires students to draw evidence from literary and informational texts to support analysis, reflection and research. Students should be able to produce a variety of written texts, including opinion pieces, explanations, narratives and short research projects — each of which presents evidence in an organized fashion to clarify the topic under discussion for the intended audience.

The Standards for Reading: Foundational Skills specifies that in addition to the continued development of word analysis skills (RF.4.3), reading fluency assessments administered at the start of the year (and throughout the year as necessary) should be used to determine a student's fluency level. Students not yet fluent and students learning English will need direct fluency instruction. Like their more proficient peers, they will need opportunities to build fluency through independent reading and opportunities to analyze closely how syntax and the meaning(s) of the text influence expression and phrasing (RF.4.4).

ELA/Literacy Model Content Framework Chart for Grade 4

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year.[22] As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 4 ELA/Literacy Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of **50 percent** informational text and **50 percent** literature that students are expected to read, including reading in ELA, science, social studies and the arts.

> *Five to nine short texts from across the curriculum:* Selections would include short texts of sufficient complexity for close reading (with emphasis in one module on reading Greek myths) that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through

[22] The Common Core State Standards K–5 section is written to reflect "the fact that most or all of the instruction students in these grades receive comes from one teacher" (introduction to Common Core State Standards, page 8). Therefore, most elementary grades are self-contained and thus include reading across the curriculum — hence the higher number of short texts in grades 3–5 than in grades 6–12.

speaking.[23] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, folktales, legends, fables, fantasy, realistic fiction and drama, with a special emphasis on myth, as well as nursery rhymes, narrative poems, limericks and free verse (Common Core State Standards, page 31).

- **Informational texts** include biographies and autobiographies; books about history, social studies, science and the arts; technical texts, including directions, forms and information displayed in graphs, charts or maps; and digital sources on a range of topics written for a broad audience (Common Core State Standards, page 31).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer informational text, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas from across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing should be **65 percent analytical** (30 percent opinions and 35 percent to explain/inform) and **35 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[24]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least three to four analyses per module: All analytic writing should put a premium on using evidence (RL/RI.4.1 and W.4.9), as well as on crafting works that display a degree of logical integration and coherence (W.4.4, W.4.5 and L.4.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and ultimately integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research

[23] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

[24] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

to address a significant topic, problem or issue. This entails gathering and integrating relevant information from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module, taking notes and categorizing information as well as providing a list of sources. Students can present their findings in a variety of informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[25]

Narrative Writing

Students are expected to write two to three narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support their assertions. In grade 4, students should refer to details and examples from the text when explaining what the text says explicitly and when drawing inferences from the text (RL/RI.4.1).

Analyze content: The content of each text should determine which standards (RL/RI.4.2–9 and SL.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.

Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.4.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.4.4–6).[26] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage in a range of collaborative discussions (one-on-one, small group, teacher-led), enabling them to build effectively on one another's ideas while clearly explaining their own (SL.4.1).

Report findings: Students should orally tell a story, recount an experience, or report on a topic or text in an organized manner using appropriate facts and relevant, descriptive details to support main ideas or themes while speaking clearly, at an appropriate pace (SL.4.4–6).

For Reading Foundation Skills in Each Module

In each module, students are expected to recognize words and read with fluency through the lenses of the following skills rooted in the standards.

[25] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.

[26] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

Decode words: Students should apply their knowledge of phonics and word analysis to be able to recognize the words they encounter when reading texts (RF.4.3).

Read fluently: Students should be able to read with accuracy and fluency to be able to comprehend texts sufficiently (RF.4.4).

Writing Standards Progression from Grade 3 to Grade 4

In grade 4, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to demonstrate sufficient keyboarding skills to type a minimum of one page in a single sitting. They are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.4.1–3).

Specific changes in the Writing Standards from grade 3 to grade 4 are highlighted in the chart below:

Grade 3, Standard 1 (W.3.1)	**Grade 4, Standard 1 (W.4.1)**
Write opinion pieces on topics or texts, supporting a point of view with reasons. a. Introduce the topic or text they are writing about, state an opinion and create an organizational structure that lists reasons. b. Provide reasons that support the opinion. c. Use linking words and phrases (e.g., *because, therefore, since, for example*) to connect opinion and reasons. d. Provide a concluding statement or section.	Write opinion pieces on topics or texts, supporting a point of view with reasons <u>and information</u>. a. Introduce a topic or text <u>clearly</u>, state an opinion, and create an organizational structure <u>in which related ideas are grouped to support the writer's purpose</u>. b. Provide reasons that are <u>supported by facts and details</u>. c. Link opinion and reasons using words and phrases (e.g., <u>*for instance, in order to, in addition*</u>). d. Provide a concluding statement or section <u>related to the opinion presented</u>.
Grade 3, Standard 2 (W.3.2)	**Grade 4, Standard 2 (W.4.2)**
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic and group related information together; include illustrations when useful to aiding comprehension. b. Develop the topic with facts, definitions, and details. c. Use linking words and phrases (e.g., *also, another, and, more, but*) to connect ideas within categories of information. d. Provide a concluding statement or section.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic <u>clearly</u> and group related information <u>in paragraphs and sections</u>; <u>include formatting (e.g., headings)</u>, illustrations, <u>and multimedia</u> when useful to aiding comprehension. b. Develop the topic with facts, definitions, <u>concrete</u> details, <u>quotations, or other information and examples related to the topic</u>. c. Link ideas within categories of information using words and phrases (e.g., *another, <u>for example</u>, also, <u>because</u>*). d. <u>Use precise language and domain-specific vocabulary to inform about or explain the topic.</u> e. Provide a concluding statement or section <u>related to the information or explanation presented</u>.
Grade 3, Standard 3 (W.3.3)	**Grade 4, Standard 3 (W.4.3)**
Write narratives to develop real or imagined	Write narratives to develop real or imagined

experiences or events using effective technique, descriptive details, and clear event sequences. a. Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations. c. Use temporal words and phrases to signal event order. d. Provide a sense of closure.	experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and description to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words and phrases to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events.
Grade 3, Standard 4 (W.3.4)	**Grade 4, Standard 4 (W.4.4)**
With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 3, Standard 5 (W.3.5)	**Grade 4, Standard 5 (W.4.5)**
With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 3 on pages 28 and 29.)	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on pages 28 and 29.)
Grade 3, Standard 6 (W.3.6)	**Grade 4, Standard 6 (W.4.6)**
With guidance and support from adults, use technology to produce and publish writing (using keyboarding skills) as well as to interact and collaborate with others.	With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.
Grade 3, Standard 7 (W.3.7)	**Grade 4, Standard 7 (W.4.7)**
Conduct short research projects that build knowledge about a topic.	Conduct short research projects that build knowledge through investigation of different aspects of a topic.
Grade 3, Standard 8 (W.3.8)	**Grade 4, Standard 8 (W.4.8)**

Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
Grade 3, Standard 9	**Grade 4, Standard 9 (W.4.9)**
(Begins in grade 4)	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 4 Reading standards* to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions]."). b. Apply *grade 4 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").
Grade 3, Standard 10 (W.3.10)	**Grade 4, Standard 10 (W.4.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 3 to Grade 4

In grade 4, students speak (both in informal discussions and in more formal presentations) with growing maturity to convey ideas and information both clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 3 to grade 4 are highlighted in the chart below:

Grade 3, Standard 1 (SL.3.1)	**Grade 4, Standard 1 (SL.4.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways,	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles.

listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.	c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others. d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
Grade 3, Standard 2 (SL.3.2)	**Grade 4, Standard 2 (SL.4.2)**
Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Grade 3, Standard 3 (SL.3.3)	**Grade 4, Standard 3 (SL.4.3)**
Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	Identify the reasons and evidence a speaker provides to support particular points.
Grade 3, Standard 4 (SL.3.4)	**Grade 4, Standard 4 (SL.4.4)**
Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.	Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
Grade 3, Standard 5 (SL.3.5)	**Grade 4, Standard 5 (SL.4.5)**
Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.	Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
Grade 3, Standard 6 (SL.3.6)	**Grade 4, Standard 6 (SL.4.6)**
Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification. (See grade 3 Language standards 1 and 3 on pages 28–29 for specific expectations.)	Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 and 3 on pages 28–29 for specific expectations.)

Narrative Summary of ELA/Literacy Standards for Grade 5

Guided by the Common Core State Standards, students in grade 5 will read widely and deeply from a range of high-quality, increasingly challenging literature and informational text from diverse cultures and different time periods (RL/RI.5.10) such that they will be able to quote accurately and explicitly to support inferences (RL/RI.5.1). Students delve deeply into texts and build their knowledge base about different subjects through identifying and assessing evidence as well as accurately paraphrasing reading materials by citing key details. They can explain how elements of a story or text interact and describe how different points of view influence the description of events. Students also learn how to trace the development of a topic in texts of the same genre and integrate the information they glean. Additional Standards for Reading Literature (RL.5.2–9) and Standards for Reading Informational Text (RI.5.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

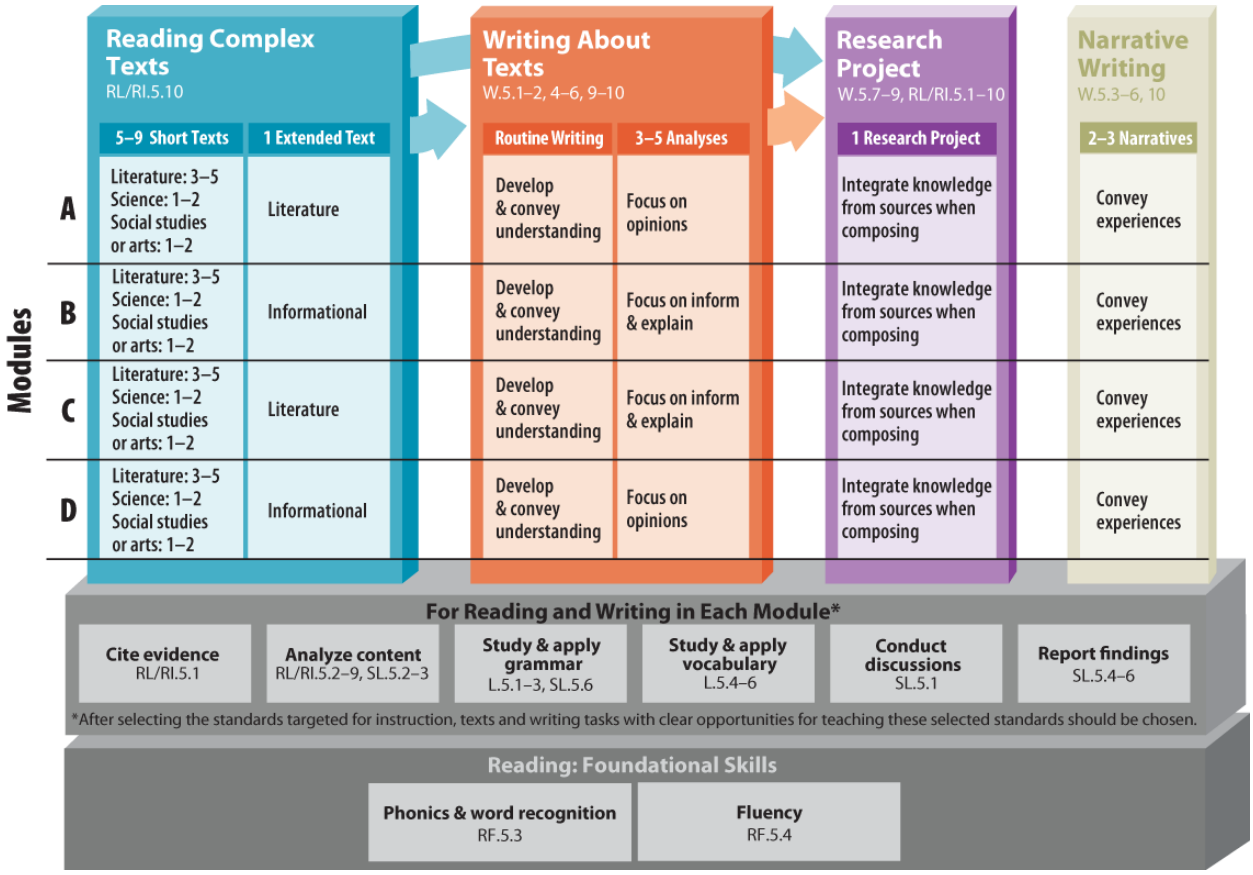
In discussions, not only will students be able to contribute accurate and relevant information and comment on the remarks of others (as specified by the Standards in Speaking and Listening), but also they will be able to synthesize what they read from multiple sources. Gaining practice at acquiring and employing precise words is a critical element of their development this year.

Throughout grade 5, students conduct research and write multiparagraph stories and essays, working on employing detailed descriptions, providing ample evidence and grouping related information as specified by the Writing Standards. Students will respond critically to both literary and informational sources over the course of the year, writing both short- and long-form pieces while honing their appreciation for the nuances of grammar, usage and punctuation. Revision and editing will play a bigger role in their writing as well.

The Standards for Reading: Foundational Skills specifies that in addition to continuing to build their word analysis skills (RF.5.3), the reading fluency of students should be assessed at the start of the year to determine their fluency level and then rechecked during the course of the year. Students not yet fluent and students learning English will need direct fluency instruction. Like their more proficient peers, they will need opportunities to build fluency through independent reading and opportunities to analyze closely how syntax and the meaning(s) of the text influence expression and phrasing (RF.5.4).

ELA/Literacy Model Content Framework Chart for Grade 5

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year.[27] As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 5 ELA/Literacy Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of **50 percent** informational text and **50 percent** literature that students are expected to read, including reading in ELA, science, social studies and the arts.

Five to nine short texts from across the curriculum: Selections would include short texts of sufficient complexity for close reading that would allow students to draw ample evidence from the texts and

[27] The Common Core State Standards K–5 section is written to reflect "the fact that most or all of the instruction students in these grades receive comes from one teacher" (introduction to Common Core State Standards, page 8). Therefore, most elementary grades are self-contained and thus include reading across the curriculum — hence the higher number of short texts in grades 3–5 than in grades 6–12.

present their analyses in writing as well as through speaking.[28] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, folktales, legends, fables, fantasy, realistic fiction, myth and drama, as well as nursery rhymes, narrative poems, limericks and free verse (Common Core State Standards, page 31).

- **Informational texts** include biographies and autobiographies; books about history, social studies, science and the arts; technical texts, including directions, forms and information displayed in graphs, charts or maps; and digital sources on a range of topics written for a broad audience (Common Core State Standards, page 31).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer informational text, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing should be **65 percent analytical** (30 percent opinion and 35 percent to explain/inform) and **35 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[29]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least three to five analyses per module: All analytic writing should put a premium on using evidence (RL/RI.5.1 and W.5.9) as well as on crafting works that display a degree of logical integration and coherence (W.5.4, W.5.5 and L.5.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

[28] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

[29] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

Each module includes the opportunity for students to compose one extended project that uses research to address a significant topic, problem or issue. This entails gathering and integrating relevant information from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected at this stage to have performed research that includes listing sources and summarizing or paraphrasing findings. Students can present their findings in a variety of informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[30]

Narrative Writing

Students are expected to write two to three narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understanding of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support their assertions. In grade 5, students should quote accurately from a text when both explicitly explaining the text and making inferences (RL/RI.5.1).

Analyze content: The content of each text should determine which standards (RL/RI.5.2–9 and SL.5.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.

Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.5.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.5.4–6).[31] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage in a range of collaborative discussions (one-on-one, small group, teacher-led), enabling them to elaborate on the points of others while clearly explaining their own. They should review key ideas expressed and draw conclusions based on the information gained from the discussions (SL.5.1).

Report findings: Students should report on a topic or a text, sequencing ideas logically with appropriate facts and details and an eye toward the needs of the audience by speaking clearly, at an appropriate pace (SL.5.4–6).

[30] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.

[31] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

For Reading Foundation Skills in Each Module

In each module, students are expected to recognize words and read with fluency through the lenses of the following skills rooted in the standards.

Decode words: Students should apply their knowledge of phonics and word analysis to be able to recognize the words they encounter when reading texts (RF.5.3).

Read fluently: Students should be able to read with accuracy and fluency to be able to comprehend texts sufficiently (RF.5.4).

Writing Standards Progression from Grade 4 to Grade 5

In grade 5, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to demonstrate sufficient keyboarding skills to type a minimum of two pages in a single sitting. They are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.5.1–3). Specific changes in the Writing Standards from grade 4 to grade 5 are highlighted in the chart below:

Grade 4, Standard 1 (W.4.1)	**Grade 5, Standard 1 (W.5.1)**
Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer's purpose. b. Provide reasons that are supported by facts and details. c. Link opinion and reasons using words and phrases (e.g., for instance, in order to, in addition). d. Provide a concluding statement or section related to the opinion presented.	Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words, phrases, and clauses (e.g., consequently, specifically). d. Provide a concluding statement or section related to the opinion presented.
Grade 4, Standard 2 (W.4.2)	**Grade 5, Standard 2 (W.5.2)**
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within categories of information using words and phrases (e.g., another, for example, also, because). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented.	Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to

	the information or explanation presented.
Grade 4, Standard 3 (W.4.3)	**Grade 5, Standard 3 (W.5.3)**
Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use dialogue and description to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words and phrases to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events.	Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events.
Grade 4, Standard 4 (W.4.4)	**Grade 5, Standard 4 (W.5.4)**
Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 4, Standard 5 (W.4.5)	**Grade 5, Standard 5 (W.5.5)**
With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4 on pages 28 and 29.)	With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 5 on pages 28 and 29.)
Grade 4, Standard 6 (W.4.6)	**Grade 5, Standard 6 (W.5.6)**
With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting.	With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.
Grade 4, Standard 7 (W.4.7)	**Grade 5, Standard 7 (W.5.7)**
Conduct short research projects that build knowledge through investigation of different	Conduct short research projects that use several sources to build knowledge through investigation

aspects of a topic.	of different aspects of a topic.
Grade 4, Standard 8 (W.4.8)	**Grade 5, Standard 8 (W.5.8)**
Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
Grade 4, Standard 9 (W.4.9)	**Grade 5, Standard 9 (W.5.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 4 Reading standards to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions]."). b. Apply grade 4 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 5 Reading standards to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]"). b. Apply grade 5 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]").
Grade 4, Standard 10 (W.4.10)	**Grade 5, Standard 10 (W.5.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 4 to Grade 5

In grade 5, students speak (both in informal discussions and in more formal presentations) with growing maturity to convey ideas and information both clearly and persuasively. They are simultaneously developing listening skills that allow them to participate effectively and contribute to groups. Specific changes in the Speaking and Listening Standards from grade 4 to grade 5 are highlighted in the chart below:

Grade 4, Standard 1 (SL.4.1)	**Grade 5, Standard 1 (SL.5.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or

or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others. d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.	studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
Grade 4, Standard 2 (SL.4.2)	**Grade 5, Standard 2 (SL.5.2)**
Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Grade 4, Standard 3 (SL.4.3)	**Grade 5, Standard 3 (SL.5.3)**
Identify the reasons and evidence a speaker provides to support particular points.	Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.
Grade 4, Standard 4 (SL.4.4)	**Grade 5, Standard 4 (SL.5.4)**
Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
Grade 4, Standard 5 (SL.4.5)	**Grade 5, Standard 5 (SL.5.5)**
Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.	Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.
Grade 4, Standard 6 (SL.4.6)	**Grade 5, Standard 6 (SL.5.6)**
Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 and 3 on pages 28–29 for specific expectations.)	Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 on pages 28–29 for specific expectations.)

Narrative Summary of ELA Standards for Grade 6

In grade 6, the Common Core State Standards call for students to proficiently read grade-appropriate complex literature and informational text (RL/RI.6.10) while further developing the ability to cite textual evidence to support analyses (RL/RI.6.1). Students focus on examining how authors use reasons to make their points and support arguments with evidence, separating unsupported assertions from those backed by evidence. Students analyze both the structure and content of complex, grade-appropriate texts, determining how sentences and paragraphs within texts influence and contribute to the unfolding of a plot and the development and elaboration of events or ideas. Additional Standards for Reading Literature (RL.6.2–9) and Standards for Reading Informational Text (RI.6.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

According to the Speaking and Listening Standards, students also share their findings in class discussions, practicing how logically to sequence ideas and highlight the themes and key details they find most persuasive. Students' vocabularies expand as they become more attuned to using context, knowledge of Greek and Latin roots and affixes, and word analysis to determine the meaning of academic words.

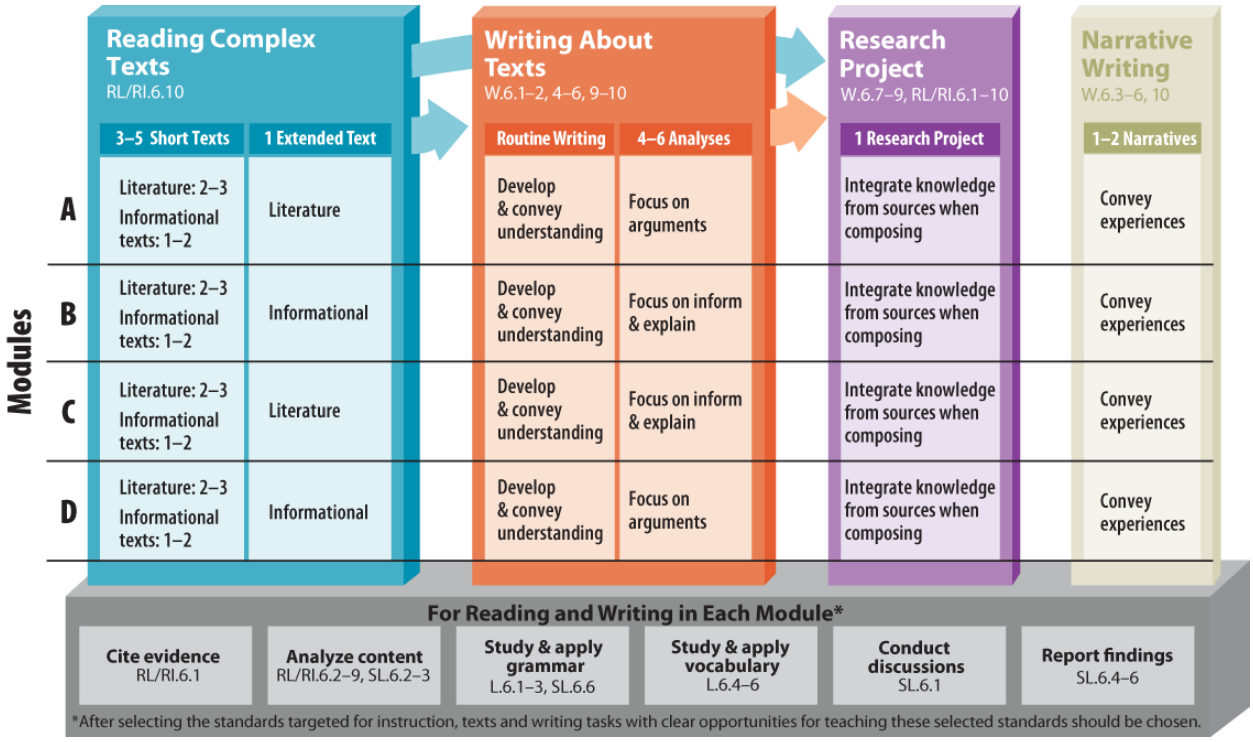
Students in grade 6 are increasingly challenged to sharpen their ability to write and speak with more clarity and coherence, providing clear reasons and relevant evidence. The Writing Standards specify that students will learn how writers try to influence readers while discovering how they can do the same in their own prose. They discover how to answer questions through writing and can use rewriting opportunities to refine their understanding of a text or topic. They also take a critical stance toward sources and apply criteria for identifying reliable information as opposed to mere conjecture.

Literacy Standards for Other Disciplines in Grades 6–8

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into their instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

ELA Model Content Framework Chart for Grade 6

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year. As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 6 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

> *Three to five short texts:* Selections would include short texts of sufficient complexity for close reading that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[32] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the

[32] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics (Common Core State Standards, page 57).

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer literary nonfiction, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas from across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **70 percent analytical** (35 percent argument and 35 percent to explain/inform) and **30 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[33]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.6.1 and W.6.9) as well as on crafting works that display logical integration and coherence (W.6.4, W.6.5 and L.6.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research to address a significant topic, problem or issue. This entails gathering and synthesizing relevant information from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected at

[33] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

this stage to assess the credibility of each source, effectively and accurately quote or paraphrase sources, and include basic bibliographic information in their research. Students can present their findings in a variety of informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[34]

Narrative Writing

Students are expected to write one or two narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support assertions. In grade 6, students should explicitly refer to a text when both explaining it and making inferences (RL/RI.6.1).
Analyze content: The content of each text should determine which standards (RL/RI.6.2–9 and SL.6.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.6.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.6.4–6).[35] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage effectively in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and expressing their own based on evidence. Students ask and respond to specific questions as well as review key ideas expressed and demonstrate understanding through reflection and paraphrasing (SL.6.1).

Report findings: Using appropriate eye contact, adequate volume and clear pronunciation, students orally present claims in a logical, coherent manner to accentuate main ideas or themes.

Writing Standards Progression from Grade 5 to Grade 6

[34] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.
[35] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

In grade 6, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to demonstrate sufficient keyboarding skills to type a minimum of three pages in a single sitting. They are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.6.1–3).

Specific changes in the Writing Standards from grade 5 to grade 6 are highlighted in the chart below:

Grade 5, Standard 1 (W.5.1)	**Grade 6, Standard 1 (W.6.1)**
Write opinion pieces on topics or texts, supporting a point of view with reasons and information. a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which ideas are logically grouped to support the writer's purpose. b. Provide logically ordered reasons that are supported by facts and details. c. Link opinion and reasons using words, phrases, and clauses (e.g., *consequently, specifically*). d. Provide a concluding statement or section related to the opinion presented.	Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s) and organize the reasons and evidence clearly. b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from the argument presented.
Grade 5, Standard 2 (W.5.2)	**Grade 6, Standard 2 (W.6.2)**
Write informative/explanatory texts to examine a topic and convey ideas and information clearly. a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations and multimedia when useful to aiding comprehension. b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic. c. Link ideas within and across categories of information using words, phrases, and clauses (e.g., *in contrast, especially*). d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Provide a concluding statement or section related to the information or explanation presented.	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/ contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from the information or explanation presented.
Grade 5, Standard 3 (W.5.3)	**Grade 6, Standard 3 (W.6.3)**
Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. a. Orient the reader by establishing a situation and	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

introducing a narrator and/or characters; organize an event sequence that unfolds naturally. b. Use narrative techniques, such as dialogue, description and pacing, to develop experiences and events or show the responses of characters to situations. c. Use a variety of transitional words, phrases, and clauses to manage the sequence of events. d. Use concrete words and phrases and sensory details to convey experiences and events precisely. e. Provide a conclusion that follows from the narrated experiences or events.	a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events. e. Provide a conclusion that follows from the narrated experiences or events.
Grade 5, Standard 4 (W.5.4)	**Grade 6, Standard 4 (W.6.4)**
Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 5, Standard 5 (W.5.5)	**Grade 6, Standard 5 (W.6.5)**
With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 5 on pages 28 and 29.)	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 52.)
Grade 5, Standard 6 (W.5.6)	**Grade 6, Standard 6 (W.6.6)**
With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of two pages in a single sitting.	Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.
Grade 5, Standard 7 (W.5.7)	**Grade 6, Standard 7 (W.6.7)**
Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.	Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
Grade 5, Standard 8 (W.5.8)	**Grade 6, Standard 8 (W.6.8)**
Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in	Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and

notes and finished work, and provide a list of sources.	conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
Grade 5, Standard 9 (W.5.9)	**Grade 6, Standard 9 (W.6.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 5 Reading standards* to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]"). b. Apply *grade 5 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]").	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 6 Reading standards* to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics"). b. Apply *grade 6 Reading standards* to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").
Grade 5, Standard 10 (W.5.10)	**Grade 6, Standard 10 (W.6.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 5 to Grade 6

In grade 6, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 5 to grade 6 are highlighted in the chart below:

Grade 5, Standard 1 (SL.5.1)	**Grade 6, Standard 1 (SL.6.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 6 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.	b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed. c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion. d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.
Grade 5, Standard 2 (SL.5.2)	**Grade 6, Standard 2 (SL.6.2)**
Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
Grade 5, Standard 3 (SL.5.3)	**Grade 6, Standard 3 (SL.6.3)**
Summarize the points a speaker makes and explain how each claim is supported by reasons and evidence.	Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.
Grade 5, Standard 4 (SL.5.4)	**Grade 6, Standard 4 (SL.6.4)**
Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
Grade 5, Standard 5 (SL.5.5)	**Grade 6, Standard 5 (SL.6.5)**
Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.	Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.
Grade 5, Standard 6 (SL.5.6)	**Grade 6, Standard 6 (SL.6.6)**
Adapt speech to a variety of contexts and tasks, using formal English when appropriate to task and situation. (See grade 5 Language standards 1 and 3 on pages 28–29 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 52 for specific expectations.)

Narrative Summary of ELA Standards for Grade 7

In grade 7, the Common Core State Standards call for students to demonstrate an emerging sophistication in their ability to read challenging complex texts closely (RL/RI.7.10) such that they can cite multiple instances of specific evidence to support their assertions (RL/RI.7.1). By the end of grade 7, students should be able to recognize the interplay between setting, plot and characters and provide an objective summary of a text apart from their own reaction to it. They become adept at stepping back to compare and contrast different interpretations of a topic, identifying how authors shape their presentation of key information and choose to highlight certain facts over others. In similar fashion, students can trace how an argument develops within a text and assess the validity of the evidence. Additional Standards for Reading Literature (RL.7.2–9) and Standards for Reading Informational Text (RI.7.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

Following the guidelines in the Speaking and Listening Standards, in discussions and in writing, students make their reasoning clear to their listeners and readers, constructively evaluating others' use of evidence while offering several sources to back up their own claims. Their vocabulary has developed to the point where they can distinguish between denotative and connotative meaning and can analyze the effect of specific word choice on tone.

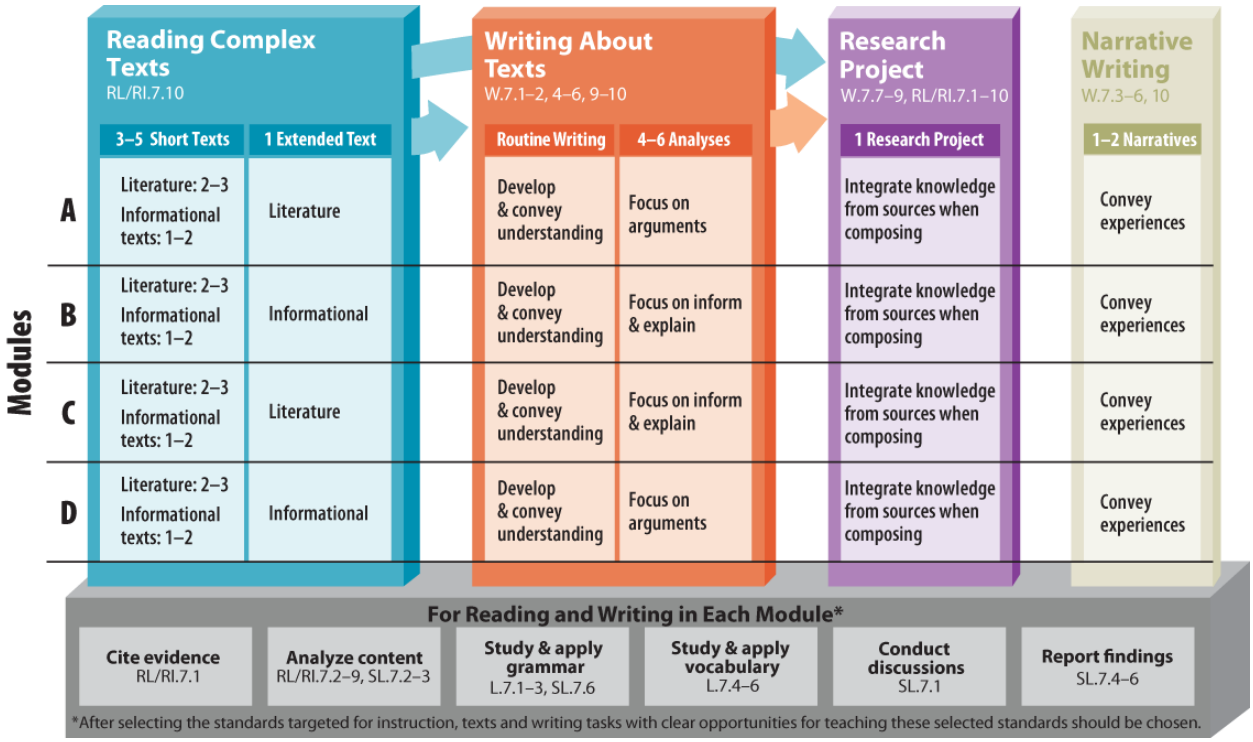
Their growing maturity as writers (as reflected in the expectations of the Writing Standards) means students are able to cite several sources of specific, relevant evidence when supporting their own point of view about texts and topics. Their writing is more structured, with clear introductions and conclusions as well as useful transitions to create cohesion and clarify relationships among ideas. In their writing, they acknowledge the other side of a debate or an alternative perspective while avoiding any trace of plagiarism.

Literacy Standards for Other Disciplines in Grades 6–8

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into their instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

ELA Model Content Framework Chart for Grade 7

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year. As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (though not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 7 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

Three to five short texts: Selections would include short texts of sufficient complexity for close reading that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[36] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics (Common Core State Standards, page 57).

[36] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer literary nonfiction, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas from across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **70 percent analytical** (35 percent argument and 35 percent to explain/inform) and **30 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[37]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.7.1 and W.7.9), as well as on crafting works that display logical integration and coherence (W.7.4, W.7.5 and L.7.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research to address a significant topic, problem or issue. This entails gathering and synthesizing relevant information from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected at this stage to have performed research that assesses the accuracy of sources and uses a standard citation format to acknowledge the conclusions of others. Students can present their findings in a variety of informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[38]

Narrative Writing

[37] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

[38] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.

Students are expected to write one or two narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support assertions. In grade 7, students should cite multiple pieces of evidence when both explicitly explaining the text and making inferences based on it (RL/RI.7.1).
Analyze content: The content of each text should determine which standards (RL/RI.7.2–9 and SL.7.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.7.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.7.4–6).[39] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage effectively in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and expressing their own based on evidence. Students ask and respond to specific questions as well as acknowledge new information and modify their understanding as warranted (SL.7.1).

Report findings: Using appropriate eye contact, adequate volume and clear pronunciation, students orally present claims in a logical, coherent manner with pertinent descriptions and details to accentuate main ideas or themes (SL.7.4–6).

Writing Standards Progression from Grade 6 to Grade 7

In grade 7, students write with increasing sophistication to present the relationships between ideas and information efficiently. Students are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.7.1–3).

Specific changes in the Writing Standards from grade 6 to grade 7 are highlighted in the chart below:

Grade 6, Standard 1 (W.6.1)	**Grade 7, Standard 1 (W.7.1)**
Write arguments to support claims with clear	Write arguments to support claims with clear

[39] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

reasons and relevant evidence. a. Introduce claim(s) and organize the reasons and evidence clearly. b. Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from the argument presented.	reasons and relevant evidence. a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.
Grade 6, Standard 2 (W.6.2)	**Grade 7, Standard 2 (W.7.2)**
Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/ contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from the information or explanation presented.	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/ contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.
Grade 6, Standard 3 (W.6.3)	**Grade 7, Standard 3 (W.7.3)**
Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue,	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or

pacing, and description, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events. e. Provide a conclusion that follows from the narrated experiences or events.	characters. c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language <u>to capture the action and</u> convey experiences and events. e. Provide a conclusion that follows from <u>and reflects on</u> the narrated experiences or events.
Grade 6, Standard 4 (W.6.4)	**Grade 7, Standard 4 (W.7.4)**
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 6, Standard 5 (W.6.5)	**Grade 7, Standard 5 (W.7.5)**
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 52.)	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, <u>focusing on how well purpose and audience have been addressed</u>. (Editing for conventions should demonstrate command of Language standards 1–3 <u>up to and including grade 7</u> on page 52.)
Grade 6, Standard 6 (W.6.6)	**Grade 7, Standard 6 (W.7.6)**
Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.	Use technology, including the Internet, to produce and publish writing <u>and link to and cite sources as well as</u> to interact and collaborate with others, <u>including linking to and citing sources</u>.
Grade 6, Standard 7 (W.6.7)	**Grade 7, Standard 7 (W.7.7)**
Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.	Conduct short research projects to answer a question, drawing on several sources and <u>generating additional related, focused questions for further research and investigation</u>.
Grade 6, Standard 8 (W.6.8)	**Grade 7, Standard 8 (W.7.8)**
Gather relevant information from multiple print	Gather relevant information from multiple print

and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.	and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
Grade 6, Standard 9 (W.6.9)	**Grade 7, Standard 9 (W.7.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 6 Reading standards* to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics"). b. Apply *grade 6 Reading standards* to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 7 Reading standards* to literature (e.g., "Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history"). b. Apply *grade 7 Reading standards* to literary nonfiction (e.g. "Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims").
Grade 6, Standard 10 (W.6.10)	**Grade 7, Standard 10 (W.7.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 6 to Grade 7

In grade 7, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 6 to grade 7 are highlighted in the chart below:

Grade 6, Standard 1 (SL.6.1)	**Grade 7, Standard 1 (SL.7.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 6 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 7 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

b. Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed. c. Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion. d. Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.	b. Follow rules for collegial discussions, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed. d. Acknowledge new information expressed by others and, when warranted, modify their own views.
Grade 6, Standard 2 (SL.6.2)	**Grade 7, Standard 2 (SL.7.2)**
Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
Grade 6, Standard 3 (SL.6.3)	**Grade 7, Standard 3 (SL.7.3)**
Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.	Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.
Grade 6, Standard 4 (SL.6.4)	**Grade 7, Standard 4 (SL.7.4)**
Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
Grade 6, Standard 5 (SL.6.5)	**Grade 7, Standard 5 (SL.7.5)**
Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
Grade 6, Standard 6 (SL.6.6)	**Grade 7, Standard 6 (SL.7.6)**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 52 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 on page 52 for specific expectations.)

Narrative Summary of ELA Standards for Grade 8

In grade 8, the Common Core State Standards call for students to grapple with high-quality, complex nonfiction texts and great works of literature (RL/RI.8.10). Starting in grade 8, the focus of informational texts begins to shift from narrative to exposition. Students who leave grade 8 know how to cite the textual evidence that most strongly supports an analysis or critique (RL/RI.8.1). Students in grade 8 are primed to question an author's assumptions and assess the accuracy of his or her claims, and by the end of grade 8, they are adept at reading closely and uncovering evidence to use in their own writing. Students can, for instance, analyze in writing two or more texts that provide conflicting information on the same topic and identify whether the disagreement is over facts or interpretation. They can analyze how point of view can be manipulated to create specific effects such as dramatic irony and investigate how particular passages within a text connect to one another to advance the plot, reveal a character or highlight an idea. Additional Standards for Reading Literature (RL.8.2–9) and Standards for Reading Informational Text (RI.8.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

The Speaking and Listening Standards detail how students are to draw explicitly on their reading and research in discussions. They respond to questions constructively by offering up relevant evidence, observations and ideas. By grade 8, students have developed a rich vocabulary of academic words, which they use to speak and write with more precision.

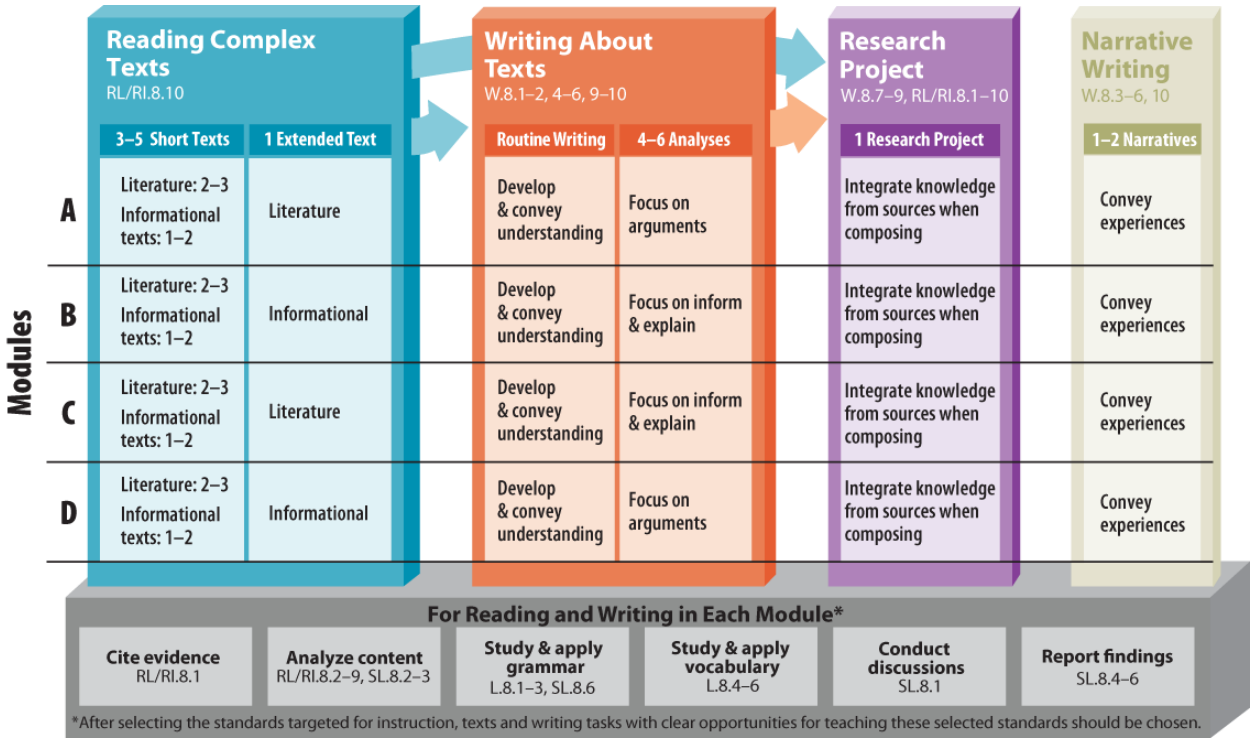
In addition, grade 8 students write with increasing sophistication, focusing on organizing ideas, concepts and information into broader categories; choosing relevant facts well; and using varied transitions to clarify or show the relationships among elements. The Writing Standards specify that students should be able to distinguish their claims from alternate or opposing claims and use words and phrases to clarify the relationships and transitions among claim(s), counterclaims, reasons and evidence.

Literacy Standards for Other Disciplines in Grades 6–8

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

ELA Model Content Framework Chart for Grade 8

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year. As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 8 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

Three to five short texts: Selections would include short texts of sufficient complexity for close reading that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[40] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics (Common Core State Standards, page 57).

[40] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the CCSS.

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer literary nonfiction, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **70 percent analytical** (35 percent argument and 35 percent to explain/inform) and **30 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[41]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.8.1 and W.8.9) as well as on crafting works that display logical integration and coherence (W.8.4, W.8.5 and L.8.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to compose one extended project that uses research to address a significant topic, problem or issue. This task should entail integrating knowledge from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected to perform research that assesses the accuracy of sources and acknowledges the conclusions of others without plagiarizing. Students can present their findings in a variety of modes in both informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[42]

Narrative Writing

[41] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

[42] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.

Students are expected to write one or two narratives per module that reflect real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support assertions. In grade 8, students should cite the textual evidence that most strongly supports their analysis when both explicitly explaining the text and making inferences (RL/RI.8.1).
Analyze content: The content of each text should determine which standards (RL/RI.8.2–9 and SL.8.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.8.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.8.4–6).[43] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should engage effectively in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and expressing their own based on evidence. Students ask and respond to specific questions as well as acknowledge new information and qualify or justify their own views in light of the evidence presented (SL.8.1).

Report findings: Using appropriate eye contact, adequate volume and clear pronunciation, students orally present claims in a logical, coherent manner with valid reasoning and relevant evidence to accentuate main ideas or themes (SL.8.4–6).

Writing Standards Progression from Grade 7 to Grade 8

In grade 8, students write with increasing sophistication to present the relationships between ideas and information efficiently. Students are also expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.8.1–3).

Specific changes in the Writing Standards from grade 7 to grade 8 are highlighted in the chart below:

Grade 7, Standard 1 (W.7.1)	**Grade 8, Standard 1 (W.8.1)**
Write arguments to support claims with clear	Write arguments to support claims with clear

[43] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

reasons and relevant evidence. a. Introduce claim(s), acknowledge alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	reasons and relevant evidence. a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.
Grade 7, Standard 2 (W.7.2)	**Grade 8, Standard 2 (W.8.2)**
Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/ contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.
Grade 7, Standard 3 (W.7.3)	**Grade 8, Standard 3 (W.8.3)**
Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters.

c. Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.	c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, <u>and show the relationships among experiences and events</u>. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.
Grade 7, Standard 4 (W.7.4)	**Grade 8, Standard 4 (W.8.4)**
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 7, Standard 5 (W.7.5)	**Grade 8, Standard 5 (W.8.5)**
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 7 on page 52.)	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 <u>up to and including grade 8</u> on page 52.)
Grade 7, Standard 6 (W.7.6)	**Grade 8, Standard 6 (W.8.6)**
Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.	Use technology, including the Internet, to produce and publish writing <u>and present the relationships between information and ideas efficiently</u> as well as to interact and collaborate with others.
Grade 7, Standard 7 (W.7.7)	**Grade 8, Standard 7 (W.8.7)**
Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.	Conduct short research projects to answer a question <u>(including a self-generated question)</u>, drawing on several sources and generating additional related, focused questions that allow for <u>multiple avenues of exploration</u>.
Grade 7, Standard 8 (W.7.8)	**Grade 8, Standard 8 (W.8.8)**
Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions

of others while avoiding plagiarism and following a standard format for citation.	of others while avoiding plagiarism and following a standard format for citation.
Grade 7, Standard 9 (W.7.9)	**Grade 8, Standard 9 (W.8.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 7 Reading standards* to literature (e.g., "Compare and contrast a fictional portrayal of a time, place, or character and a historical account of the same period as a means of understanding how authors of fiction use or alter history"). b. Apply *grade 7 Reading standards* to literary nonfiction (e.g. "Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims").	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new"). b. Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").
Grade 7, Standard 10 (W.7.10)	**Grade 8, Standard 10 (W.8.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 7 to Grade 8

In grade 8, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 7 to grade 8 are highlighted in the chart below:

Grade 7, Standard 1 (SL.7.1)	**Grade 8, Standard 1 (SL.8.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 7 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions, track	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 8 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions and

progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed. d. Acknowledge new information expressed by others and, when warranted, modify their own views.	decision-making, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas. d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
Grade 7, Standard 2 (SL.7.2)	**Grade 8, Standard 2 (SL.8.2)**
Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.	Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.
Grade 7, Standard 3 (SL.7.3)	**Grade 8, Standard 3 (SL.8.3)**
Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.	Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
Grade 7, Standard 4 (SL.7.4)	**Grade 8, Standard 4 (SL.8.4)**
Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.	Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
Grade 7, Standard 5 (SL.7.5)	**Grade 8, Standard 5 (SL.8.5)**
Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
Grade 7, Standard 6 (SL.7.6)	**Grade 8, Standard 6 (SL.8.6)**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 7 Language standards 1 and 3 on page 52 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 52 for specific expectations.)

PARCC Model Content Framework for ELA/Literacy for Grade 9

Narrative Summary of ELA Standards for Grade 9

In grade 9, the Common Core State Standards challenge students to investigate a wide range of literary genres as well as delve deeply into substantive, complex expository works of nonfiction (RL/RI.9.10) such that they can "read like a detective" and uncover critical clues for building analyses of texts (RL/RI.9.1). Entering high school, students become increasingly aware of the choices authors make and how writers emphasize particular examples or details and stitch them together into a coherent whole. At this stage of their academic careers, students provide objective summaries that incorporate both inferences drawn from the text and citations extracted directly from what they have read. Students study the seminal foundational documents of the United States as well as grasp differing perspectives and points of view embedded in works of world literature. Additional Standards for Reading Literature (RL.9.2–9) and Standards for Reading Informational Text (RI.9.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

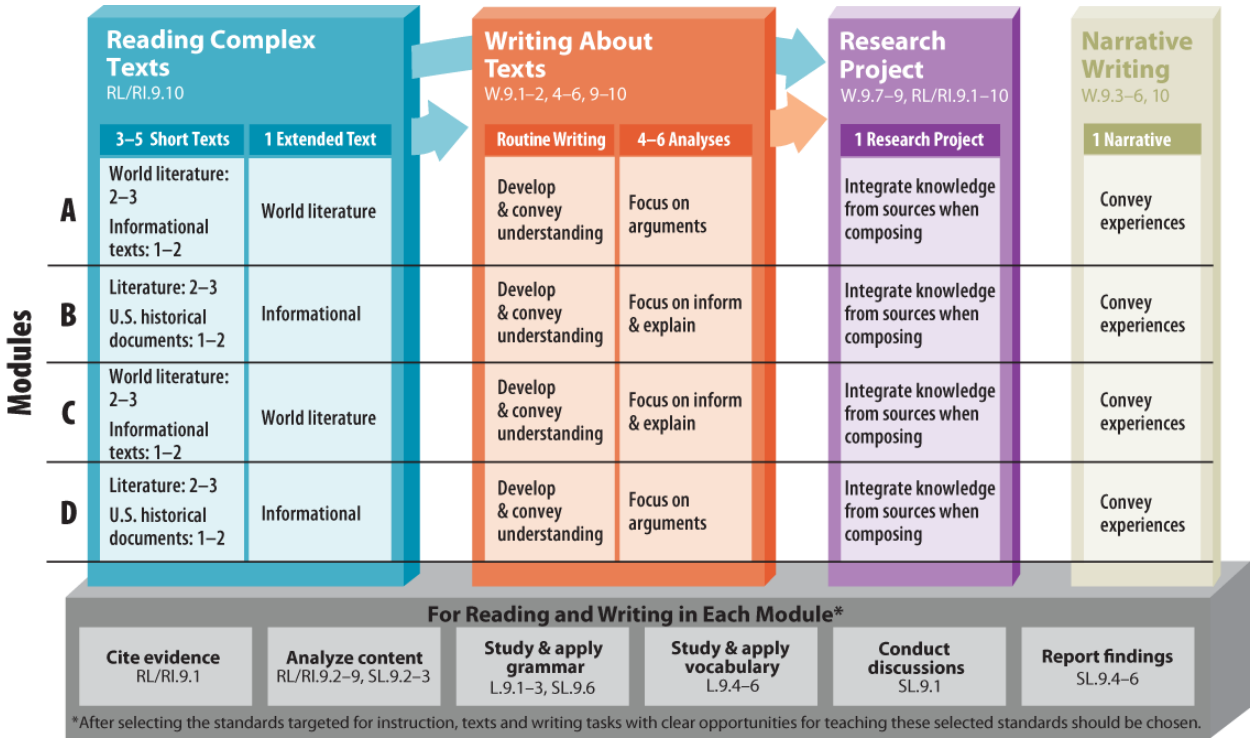
Students in grade 9 emerge with an understanding of the importance of employing academic English in their prose and can differentiate among different modes of speech or language when speaking or crafting prose. The Standards in Speaking and Listening offer details regarding how students can constructively join in conversations and participate in groups to share their insights and ideas both orally and in writing.
The grade 9 Writing Standards specify that students should express themselves in multiple writing formats, from investigative reports and literary analyses to summations and research papers. With regard to research, students in the beginning years of high school should conduct several research projects, using more complex materials and specialized sources than they did in elementary and middle school. Across all writing formats, students are able to develop a central idea; maintain a coherent focus in their writing; and elaborate the points they make with well-documented and relevant examples, facts and details. Through writing and conversation, students internalize the expectations of academic written and spoken English and resolve issues regarding usage by consulting style guides.

Literacy Standards for Other Disciplines in Grades 9–10

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into their instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

ELA Model Content Framework Chart for Grade 9

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year. As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 9 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

Three to five short texts: Selections would include short texts of sufficient complexity for close reading (with emphasis in two modules on reading U.S. historical documents) that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[44] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics

[44] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

(Common Core State Standards, page 57).

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer literary nonfiction, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **80 percent analytical** (40 percent argument and 40 percent to explain/inform) and **20 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[45]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.9.1 and W.9.9) as well as on crafting works that display a high degree of logical integration and coherence (W.9.4, W.9.5 and L.9.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions that incorporate research.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research to address a significant topic, problem or issue. This task should entail integrating knowledge from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected to assess the usefulness of each source, refocus their research during the process when appropriate and integrate the information gathered in a manner that maintains the flow of ideas. Students can present their findings in a variety of modes in informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[46]

[45] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

[46] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.

Narrative Writing

Students are expected to write one narrative per module that reflects real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support their assertions. In grade 9, students should cite the textual evidence that most strongly supports their analysis when both explicitly explaining the text and making inferences (RL/RI.9.1).

Analyze content: The content of each text should determine which standards (RL/RI.9.2–9 and SL.9.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.

Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.9.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.9.4–6).[47] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should initiate and engage in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and clearly expressing their own based on evidence. They should relate the current discussion to broader themes or larger ideas, respond thoughtfully to diverse perspectives to ensure a hearing for a full range of positions on an issue, verify or challenge ideas, and resolve contradictions when possible (SL.9.1).

Report findings: Students should orally present claims and supporting evidence clearly, concisely and logically while ensuring that the development, substance and style are appropriate to purpose, audience and task (SL.9.4–6).

Writing Standards Progression from Grade 8 to Grades 9–10

In grades 9 and 10, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.9–10.1–3).

[47] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

Specific changes in the Writing Standards from grade 8 to grades 9–10 are highlighted in the chart below:

Grade 8, Standard 1 (W.8.1)	**Grades 9–10, Standard 1 (W.9–10.1)**
Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
Grade 8, Standard 2 (W.8.2)	**Grades 9–10, Standard 2 (W.9–10.2)**
Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows from and supports the information or explanation presented.	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation

	presented (e.g., articulating implications or the significance of the topic).
Grade 8, Standard 3 (W.8.3)	**Grades 9–10, Standard 3 (W.9–10.3)**
Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description, and reflection, to develop experiences, events, and/or characters. c. Use a variety of transition words, phrases, and clauses to convey sequence, signal shifts from one time frame or setting to another, and show the relationships among experiences and events. d. Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
Grade 8, Standard 4 (W.8.4)	**Grades 9–10, Standard 4 (W.9–10.4)**
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 8, Standard 5 (W.8.5)	**Grades 9–10, Standard 5 (W.9–10.5)**
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 8 on page 52.)	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 54.)
Grade 8, Standard 6 (W.8.6)	**Grades 9–10, Standard 6 (W.9–10.6)**
Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as	Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information

to interact and collaborate with others.	and to display information flexibly and dynamically.
Grade 8, Standard 7 (W.8.7)	**Grades 9–10, Standard 7 (W.9–10.7)**
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
Grade 8, Standard 8 (W.8.8)	**Grades 9–10, Standard 8 (W.9–10.8)**
Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
Grade 8, Standard 9 (W.8.9)	**Grades 9–10, Standard 9 (W.9–10.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new"). b. Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]"). b. Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").
Grade 8, Standard 10 (W.8.10)	**Grades 9–10, Standard 10 (W.9–10.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grade 8 to Grades 9–10

In grades 9–10, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information both clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 8 to grades 9–10 are highlighted in the chart below:

Grade 8, Standard 1 (SL.8.1)	**Grades 9–10, Standard 1 (SL.9–10.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 8 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas. d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9–10 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.
Grade 8, Standard 2 (SL.8.2)	**Grades 9–10, Standard 2 (SL.9–10.2)**
Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
Grade 8, Standard 3 (SL.8.3)	**Grades 9–10, Standard 3 (SL.9–10.3)**

Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
Grade 8, Standard 4 (SL.8.4)	**Grades 9–10, Standard 4 (SL.9–10.4)**
Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.	Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.
Grade 8, Standard 5 (SL.8.5)	**Grades 9–10, Standard 5 (SL.9–10.5)**
Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Grade 8, Standard 6 (SL.8.6)	**Grades 9–10, Standard 6 (SL.9–10.6)**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 52 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on page 54 for specific expectations.)

Narrative Summary of ELA Standards for Grade 10

In grade 10, the Common Core State Standards call for students to both examine a diverse set of literary genres and pursue their investigation of substantive, complex expository works of nonfiction (RL/RI.10.10) such that they become adept investigators and can analyze the meaning of both literary and nonfiction works (RL/RI.10.1).[48] By grade 10, students firmly grasp how authors craft their prose and how writers make their argument(s) cohere. Students are adept at comparing and contrasting how ideas, themes or concepts are presented in two different artistic mediums in which different details are emphasized. Students are asked to analyze the seminal foundational documents of the United States as well as grasp differing perspectives and points of view embedded in works of world literature. Additional Standards for Reading Literature (RL.10.2–9) and Standards for Reading Informational Text (RI.10.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

Through discussion and writing, students have a deepening grasp of academic English and can utilize the right mode of speech or language when speaking or crafting prose. The Standards in Speaking and Listening offer insights into how students in grade 10 can participate in a variety of settings through constructively listening and sharing their ideas both orally and in writing.

At this point, the Writing Standards specify that grade 10 students confidently express themselves in diverse writing formats and prose settings, from investigative reports and literary analyses to summations and research papers. With regard to research, students in the beginning years of high school should conduct several research projects, using more complex materials and specialized sources than they did in elementary and middle school. Across all writing formats, students are able to develop a central idea; maintain a coherent focus in their writing; and elaborate the points they make with well-documented and relevant examples, facts and details. Through writing and conversation, students internalize the expectations of academic written and spoken English and resolve issues regarding usage by consulting style guides.

Literacy Standards for Other Disciplines in Grades 9–10

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

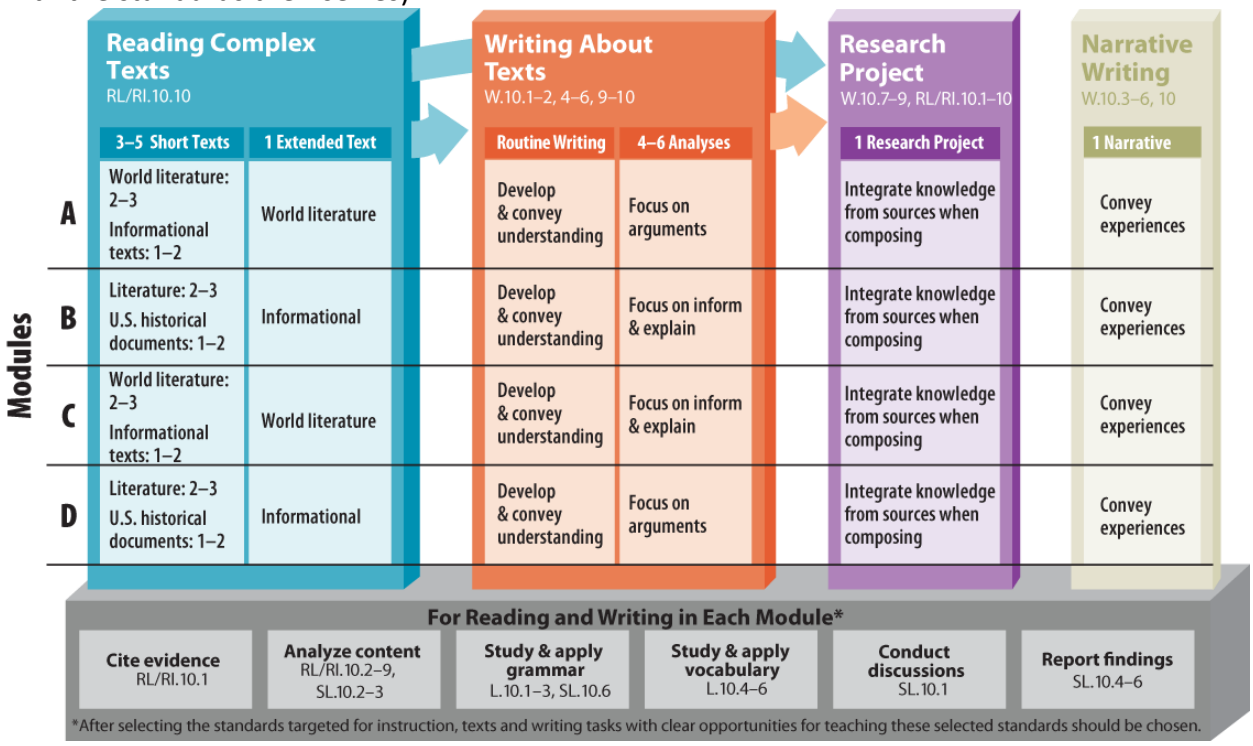
ELA Model Content Framework Chart for Grade 10

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year.[49] As noted in the introduction, these

[48] It should be noted that the standards use individual grade levels in kindergarten through grade 8 to provide useful specificity; the standards use two-year bands in grades 9–12 to allow schools, districts and states flexibility in high school course design.

[49] The Common Core State Standards K–5 section is written to reflect "the fact that most or all of the instruction students in these grades receive comes from one teacher" (introduction to Common Core State Standards, page 8). Therefore, most

modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context for the standards (but not replace engaging with the standards themselves).



Key Terms and Concepts for Grade 10 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

Three to five short texts: Selections would include short texts of sufficient complexity for close reading (with emphasis in two modules on reading U.S. historical documents) that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[50] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge needed to read and comprehend other texts students will study. (Shorter

elementary grades are self-contained and thus include reading across the curriculum — hence the higher number of short texts in grades 3–5 than in grades 6–12.

[50] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics (Common Core State Standards, page 57).

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel or a play) or longer literary nonfiction, depending on the focus of the module. Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **80 percent analytical** (40 percent argument and 40 percent to explain/inform) and **20 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[51]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.10.1 and W.10.9) as well as on crafting works that display a high degree of logical integration and coherence (W.10.4, W.10.5 and L.10.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and ultimately integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include comparative analysis and compositions incorporating research.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research to address a significant topic, problem or issue. This should entail integrating knowledge from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected at this stage to assess the usefulness of each source, refocus their research when appropriate during the process and integrate the information

[51] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

gathered in a manner that maintains the flow of ideas. Students can present their findings in a variety of modes in informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[52]

Narrative Writing

Students are expected to write one narrative per module that reflects real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g. short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards.

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support their assertions. In grade 10, students should cite the textual evidence that most strongly supports their analysis when both explicitly explaining the text and making inferences (RL/RI.10.1).
Analyze content: The content of each text should determine which standards (RL/RI.10.2–9 and SL.10.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.10.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.10.4–6).[53] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should initiate and engage in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and clearly expressing their own based on evidence. They should relate the current discussion to broader themes or larger ideas, respond thoughtfully to diverse perspectives to ensure a hearing for a full range of positions on an issue, verify or challenge ideas, and resolve contradictions when possible (SL.10.1).
Report findings: Students should orally present claims and supporting evidence clearly, concisely and logically while ensuring that the development, substance and style are appropriate to purpose, audience and task (SL.10.4–6).

Writing Standards Progression from Grade 8 to Grades 9–10

[52] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.
[53] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

In grades 9 and 10, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.9–10.1–3).
Specific changes in the Writing Standards from grade 8 to grades 9–10 are highlighted in the chart below:

Grade 8, Standard 1 (W.8.1)	**Grades 9–10, Standard 1 (W.9–10.1)**
Write arguments to support claims with clear reasons and relevant evidence. a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text. c. Use words, phrases and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons and evidence. d. Establish and maintain a formal style. e. Provide a concluding statement or section that follows from and supports the argument presented.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims and create an organization that establishes clear relationships among claim(s), counterclaims, reasons and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases and clauses to link the major sections of the text, create cohesion and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
Grade 8, Standard 2 (W.8.2)	**Grades 9–10, Standard 2 (W.9–10.2)**
Write informative/explanatory texts to examine a topic and convey ideas, concepts and information through the selection, organization and analysis of relevant content. a. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables) and multimedia when useful to aiding comprehension. b. Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. c. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. d. Use precise language and domain-specific vocabulary to inform about or explain the topic. e. Establish and maintain a formal style. f. Provide a concluding statement or section that follows	Write informative/explanatory texts to examine and convey complex ideas, concepts and information clearly and accurately through the effective selection, organization and analysis of content. a. Introduce a topic; organize complex ideas, concepts and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables) and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion and clarify the relationships among complex ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic.

from and supports the information or explanation presented.	e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
Grade 8, Standard 3 (W.8.3)	**Grades 9–10, Standard 3 (W.9–10.3)**
Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details and well-structured event sequences. a. Engage and orient the reader by establishing a context and point of view and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically. b. Use narrative techniques, such as dialogue, pacing, description and reflection, to develop experiences, events and/or characters. c. Use a variety of transition words, phrases and clauses to convey sequence, signal shifts from one time frame or setting to another and show the relationships among experiences and events. d. Use precise words and phrases, relevant descriptive details and sensory language to capture the action and convey experiences and events. e. Provide a conclusion that follows from and reflects on the narrated experiences or events.	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection and multiple plot lines, to develop experiences, events and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details and sensory language to convey a vivid picture of the experiences, events, setting and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
Grade 8, Standard 4 (W.8.4)	**Grades 9–10, Standard 4 (W.9–10.4)**
Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)
Grade 8, Standard 5 (W.8.5)	**Grades 9–10, Standard 5 (W.9–10.5)**
With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 8 on page 52.)	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 54.)

Grade 8, Standard 6 (W.8.6)	Grades 9–10, Standard 6 (W.9–10.6)
Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.	Use technology, including the Internet, to produce, publish and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.
Grade 8, Standard 7 (W.8.7)	**Grades 9–10, Standard 7 (W.9–10.7)**
Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
Grade 8, Standard 8 (W.8.8)	**Grades 9–10, Standard 8 (W.9–10.8)**
Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.
Grade 8, Standard 9 (W.8.9)	**Grades 9–10, Standard 9 (W.9–10.9)**
Draw evidence from literary or informational texts to support analysis, reflection and research. a. Apply *grade 8 Reading standards* to literature (e.g., "Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new"). b. Apply *grade 8 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced").	Draw evidence from literary or informational texts to support analysis, reflection and research. a. Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]"). b. Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").
Grade 8, Standard 10 (W.8.10)	**Grades 9–10, Standard 10 (W.9–10.10)**

Write routinely over extended time frames (time for research, reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes and audiences.	Write routinely over extended time frames (time for research, reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes and audiences.

Speaking and Listening Standards Progression from Grade 8 to Grades 9–10

In grades 9–10, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information both clearly and persuasively. Students are simultaneously developing listening skills that allow them to participate effectively and contribute to groups.

Specific changes in the Speaking and Listening Standards from grade 8 to grades 9–10 are highlighted in the chart below:

Grade 8, Standard 1 (SL.8.1)	**Grades 9–10, Standard 1 (SL.9–10.1)**
Engage effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on *grade 8 topics*, *texts and issues*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed. c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations and ideas. d. Acknowledge new information expressed by others and, when warranted, qualify or justify their own views in light of the evidence presented.	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups and teacher-led) with diverse partners on *grades 9–10 topics*, *texts and issues*, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.

Grade 8, Standard 2 (SL.8.2)	Grades 9–10, Standard 2 (SL.9–10.2)
Analyze the purpose of information presented in diverse media and formats (e.g., visually, quantitatively, orally) and evaluate the motives (e.g., social, commercial, political) behind its presentation.	Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.
Grade 8, Standard 3 (SL.8.3)	**Grades 9–10, Standard 3 (SL.9–10.3)**
Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.	Evaluate a speaker's point of view, reasoning and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.
Grade 8, Standard 4 (SL.8.4)	**Grades 9–10, Standard 4 (SL.9–10.4)**
Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning and well-chosen details; use appropriate eye contact, adequate volume and clear pronunciation.	Present information, findings and supporting evidence clearly, concisely and logically such that listeners can follow the line of reasoning and the organization, development, substance and style are appropriate to purpose, audience and task.
Grade 8, Standard 5 (SL.8.5)	**Grades 9–10, Standard 5 (SL.9–10.5)**
Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Grade 8, Standard 6 (SL.8.6)	**Grades 9–10, Standard 6 (SL.9–10.6)**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 8 Language standards 1 and 3 on page 52 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on page 54 for specific expectations.)

PARCC Model Content Framework for ELA/Literacy for Grade 11

Narrative Summary of ELA Standards for Grade 11

The Common Core State Standards in grade 11 call for students to be able to understand and analyze substantive, complex expository works of literary nonfiction as well as a diverse spectrum of stories, poems, plays and novels (RL/RI.11.10) such that they can produce ample amounts of evidence to support inferences (RL/RI.11.1). Students also perform a variety of complex reading tasks focused on recurrent themes in American literature and foundational works of American political philosophy, from grasping the subtleties of an author's point of view to perceiving when a text leaves matters ambiguous. Students become skilled at determining how multiple themes or ideas combine and intertwine to produce a complex narrative or explanation as well as evaluating the premises, arguments and rhetoric present in seminal texts from American history. Additional Standards for Reading Literature (RL.11.2–9) and Standards for Reading Informational Text (RI.11.2–9) offer detailed expectations for student academic performance in preparation for college and careers.

Students will demonstrate their listening skills by synthesizing the comments and claims of others and exercising outstanding teamwork when functioning in groups. The Standards in Speaking and Listening detail the ways in which students in grade 11 will distinguish themselves as approaching college and career

readiness by being able to respond thoughtfully when encountering diverse perspectives and by skillfully presenting findings both orally and in writing.

In grade 11, students begin to excel at making oral and written arguments that are logical and well-reasoned, objectively assessing the evidence on all sides of an issue. At this point, the Writing Standards specify that students should possess the fluency, flexibility and focus to produce high-quality drafts under tight deadlines and be equally proficient at editing and revising their written work (over multiple drafts if needed).

Literacy Standards for Other Disciplines in Grade 11

Central to the vision for literacy embedded within the standards and the Model Content Frameworks is the idea that instruction in reading, writing, speaking, listening and language is a *shared responsibility* within schools. All fields of study demand analysis of complex texts and strong oral and written communication skills using discipline-specific discourse. Because each discipline acquires, develops and shares knowledge in distinct ways, educators in each field must take ownership of building robust instruction around discipline-specific literacy skills to better prepare students for college and careers. The Model Content Frameworks provide all educators with foundational ideas for incorporating disciplinary literacy skills and practice into their instructional programming. Accordingly, the Model Content Frameworks require educators in all disciplines to bear some responsibility for ensuring the literacy of the students in their classes.

ELA Model Content Framework Chart for Grade 11

Below is a chart that organizes the standards into four quarter-length modules that include the knowledge and skills students will learn and apply over the course of the year. As noted in the introduction, these modules are offered as optional models to consider when constructing a year-long course of instruction. The chart is meant to illustrate and provide context (but not replace engaging with the standards themselves).

Modules	Reading Complex Texts RL/RI.11.10		Writing About Texts W.11.1–2, 4–6, 9–10		Research Project W.11.7–9, RL/RI.11.1–10	Narrative Writing W.11.3–6, 10
	3–5 Short Texts	1 Extended Text	Routine Writing	4–6 Analyses	1 Research Project	1 Narrative
A	American literature: 2–3 U.S. historical documents: 1–2	American literature	Develop & convey understanding	Focus on arguments	Integrate knowledge from sources when composing	Convey experiences
B	American literature: 2–3 U.S. historical documents: 1–2	U.S. foundational text	Develop & convey understanding	Focus on inform & explain	Integrate knowledge from sources when composing	Convey experiences
C	American literature: 2–3 Informational texts: 1–2	American literature	Develop & convey understanding	Focus on inform & explain	Integrate knowledge from sources when composing	Convey experiences
D	American literature: 2–3 U.S. historical documents: 1–2	Informational text	Develop & convey understanding	Focus on arguments	Integrate knowledge from sources when composing	Convey experiences

For Reading and Writing in Each Module*

Cite evidence RL/RI.11.1	Analyze content RL/RI.11.2–9, SL.11.2–3	Study & apply grammar L.11.1–3, SL.11.6	Study & apply vocabulary L.11.4–6	Conduct discussions SL.11.1	Report findings SL.11.4–6

*After selecting the standards targeted for instruction, texts and writing tasks with clear opportunities for teaching these selected standards should be chosen.

Key Terms and Concepts for Grade 11 ELA Model Content Framework Chart

Reading Complex Texts

Exposing students to grade-level texts of appropriate complexity lies at the heart of each module. The modules reflect the balance of informational texts (literary nonfiction in ELA classes) and literature that students are expected to read. Fulfilling the ELA standards for grades 6–12 requires much greater attention to a specific category of informational text — literary nonfiction — than has been traditionally taught. Because the ELA classroom must focus on literature (stories, drama and poetry) as well as literary nonfiction, a great deal of informational reading in grades 6–12 must take place in other classes to meet the demands of the standards.

Three to five short texts: Selections would include short texts of sufficient complexity for close reading (with emphasis on reading American literature and U.S. historical documents) that would allow students to draw ample evidence from the texts and present their analyses in writing as well as through speaking.[54] Educators can create coherence within the curriculum as a whole by choosing short texts to complement the extended text described below, by focusing instruction on similar standards and skills across multiple genres, and by choosing informational texts that build the background knowledge

[54] The recommended number of texts in each module closely corresponds to the recommended percentage of different kinds of texts (literary versus informational) in the Common Core State Standards.

needed to read and comprehend other texts students will study. (Shorter texts could account for about three to four weeks of instruction.)

- **Literature** includes adventure stories, historical fiction, mysteries, myths, science fiction, realistic fiction, allegories, parodies, satire, drama, graphic novels, one-act and multi-act plays, narrative poems, lyrical poems, free-verse poems, sonnets, odes, ballads, and epics (Common Core State Standards, page 57).

- **Informational texts/literary nonfiction** include the subgenres of exposition, argument and functional text in the form of personal essays; speeches; opinion pieces; essays about art or literature; biographies; memoirs; journalism; and historical, scientific, technical or economic accounts (including digital sources) written for a broad audience (Common Core State Standards, page 57).

One extended text: This should be an extended, full-length work of literature (such as a novel, a play or longer literary nonfiction), depending on the focus of the module (e.g., an American novel, play or U.S. foundational text). Like the others, this text would be aligned with the complexity and range specifications of the standards. As with shorter texts, students would perform a close, analytic reading of the extended text; compare and synthesize ideas across other related texts; conduct text-focused discussions; and produce written work aligned with the standards. (Such a study could take around two to three weeks of concentrated focus on a single text.)

Writing about Texts

The balance of student writing at this level is **80 percent analytical** (40 percent argument and 40 percent to explain/inform) and **20 percent narrative,** with a mix of on-demand and review-and-revision writing assignments. Building student competence and confidence with technology should be part of instruction.[55]

Routine writing: Routine writing, such as short constructed-responses to text-dependent questions, builds content knowledge and provides opportunities for reflection on a specific aspect of a text or texts. Routine written responses to such text-dependent questions allow students to build sophisticated understandings of vocabulary, text structure and content and to develop needed proficiencies in analysis.

At least four to six analyses per module: All analytic writing should put a premium on using evidence (RL/RI.11.1 and W.11.9), as well as on crafting works that display a high degree of logical integration and coherence (W.11.4, W.11.5 and L.11.1–3). These responses can vary in length based on the questions asked and task performed, from answering brief questions to crafting multiparagraph responses, allowing teachers to assess students' ability to paraphrase, infer and integrate the ideas they have gleaned from what they have read. Over the course of the year, analytic writing should include *at least* one comparative analysis and one paper incorporating research that focuses on texts that students have read closely.

Research Project

Each module includes the opportunity for students to produce one extended project that uses research to address a significant topic, problem or issue. This task may entail gathering and synthesizing relevant

[55] To help curriculum developers and teachers plan, a Writing Standards Progression Chart is found at the end of this grade-level Model Content Framework. The chart traces (in side-by-side fashion) the changes to the Writing Standards between the previous and current grades.

information from several additional literary or informational texts in various media or formats on a particular topic or question drawn from one or more texts from the module. Students are expected at this stage to assess the strengths and limitations of each source in terms of the task, integrate the information gathered in a manner that maintains the flow of ideas, and avoid overreliance on any one source. Students can present their findings in a variety of informal and more formal argumentative or explanatory contexts, either in writing or orally. (Research aligned with the standards could take one to two weeks of instruction.)[56]

Narrative Writing

Students are expected to write one narrative per module that reflects real or imagined experiences or events. Narrative writing offers students opportunities to express personal ideas and experiences; author literature; and deepen understandings of literary concepts, structures and genres (e.g., short stories, anecdotes, poetry, drama) through purposeful imitation. It also provides an additional opportunity for students to reflect on what they read through imaginative writing. The close attention to detail required to craft an effective and coherent narrative calls on a skill set similar to that being developed by other writing tasks, and as students mature as writers, their skill with narrative techniques also advances their analytic and explanatory prose.

For Reading and Writing in Each Module

In each module, students are expected to take a close look at the texts they encounter through the lenses of the following skills rooted in the standards:

Cite evidence: The goal of close, analytic reading is for students to be able to discern and cite evidence from the text to support their assertions. In grade 11, students should cite strong and thorough textual evidence that supports their analysis when both explicitly explaining the text and making inferences based on it, including where the text leaves matters uncertain (RL/RI.11.1).
Analyze content: The content of each text should determine which standards (RL/RI.11.2–9 and SL.11.2–3) to target, allowing teachers to focus instruction and ensure that all the standards have been taught by the end of the year.
Study and apply grammar: While grammar is meant to be a normal, everyday part of what students do, students should be taught explicit lessons in grammar as they read, write and speak, guided by L.11.1–3.

Study and apply vocabulary: To focus vocabulary instruction on words that students would be encouraged to use in writing and speaking, students should be given 5–10 Tier 2 academic words per week for each text (L.11.4–6).[57] Students require multiple exposures to targeted vocabulary words in authentic contexts to retain an understanding of the words' meaning(s) and use the words effectively when writing and speaking.

Conduct discussions: Students should initiate and engage in a range of collaborative discussions (one-on-one, small group, teacher-led), building on others' ideas and expressing their own clearly with evidence, guided by democratic rules. Students should probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify or challenge ideas and conclusions; respond thoughtfully to diverse perspectives; and synthesize comments and resolve contradictions when possible (SL.11.1).

[56] Ongoing incorporation of research for shorter tasks should also be a regular component of instruction.
[57] For a definition of Tier 2 words, see the introduction to the Model Content Frameworks and Appendix A, pages 33–35.

Report findings: Students should orally present claims and supporting evidence conveying a clear and distinct perspective while ensuring that alternative or opposing perspectives are addressed and that the development, substance and style are appropriate to purpose, audience and task (SL.11.4–6).

Writing Standards Progression from Grades 9–10 to Grades 11–12

In grades 11–12, students write with increasing sophistication to present the relationships between ideas and information efficiently. Additionally, students are expected to meet the grade-specific grammar and conventions standards and retain or further develop the skills and understandings mastered in preceding grades (refer to L.11–12.1–3).

Specific changes in the Writing Standards from grades 9–10 to grades 11–12 are highlighted in the chart below:

Grades 9–10, Standard 1 (W.9–10.1)	**Grades 11–12, Standard 1 (W.11–12.1)**
Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that establishes clear relationships among claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly, supplying evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level and concerns. c. Use words, phrases, and clauses to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. a. Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence. b. Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases. c. Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims. d. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. e. Provide a concluding statement or section that follows from and supports the argument presented.
Grades 9–10, Standard 2 (W.9–10.2)	**Grades 11–12, Standard 2 (W.11–12.2)**
Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details,	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. a. Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension. b. Develop the topic thoroughly by selecting the most

quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language and domain-specific vocabulary to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).	significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic. c. Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts. d. Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic. e. Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing. f. Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
Grades 9–10, Standard 3 (W.9–10.3)	**Grades 11–12, Standard 3 (W.11–12.3)**
Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole. d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.	Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences. a. Engage and orient the reader by setting out a problem, situation, or observation and its significance, establishing one or multiple point(s) of view, and introducing a narrator and/or characters; create a smooth progression of experiences or events. b. Use narrative techniques, such as dialogue, pacing, description, reflection, and multiple plot lines, to develop experiences, events, and/or characters. c. Use a variety of techniques to sequence events so that they build on one another to create a coherent whole and build toward a particular tone and outcome (e.g., a sense of mystery, suspense, growth, or resolution). d. Use precise words and phrases, telling details, and sensory language to convey a vivid picture of the experiences, events, setting, and/or characters. e. Provide a conclusion that follows from and reflects on what is experienced, observed, or resolved over the course of the narrative.
Grades 9–10, Standard 4 (W.9–10.4)	**Grades 11–12, Standard 4 (W.11–12.4)**
Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

Grades 9–10, Standard 5 (W.9–10.5)	**Grades 11–12, Standard 5 (W.11–12.5)**
Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 9–10 on page 54.)	Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grades 11–12 on page 54.)
Grades 9–10, Standard 6 (W.9–10.6)	**Grades 11–12, Standard 6 (W.11–12.6)**
Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
Grades 9–10, Standard 7 (W.9–10.7)	**Grades 11–12, Standard 7 (W.11–12.7)**
Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
Grades 9–10, Standard 8 (W.9–10.8)	**Grades 11–12, Standard 8 (W.11–12.8)**
Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the usefulness of each source in answering the research question; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and following a standard format for citation.	Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation.
Grades 9–10, Standard 9 (W.9–10.9)	**Grades 11–12, Standard 9 (W.11–12.9)**
Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grades 9–10 Reading standards* to literature (e.g., "Analyze how an author draws on and transforms source material in a specific work [e.g., how	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply *grades 11–12 Reading standards* to literature (e.g., "Demonstrate knowledge of eighteenth-, nineteenth- and early-twentieth-century foundational

Shakespeare treats a theme or topic from Ovid or the Bible or how a later author draws on a play by Shakespeare]"). b. Apply *grades 9–10 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning").	works of American literature, including how two or more texts from the same period treat similar themes or topics"). b. Apply *grades 11–12 Reading standards* to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., *The Federalist*, presidential addresses]").
Grades 9–10, Standard 10 (W.9–10.10)	**Grades 11–12, Standard 10 (W.11–12.10)**
Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences.

Speaking and Listening Standards Progression from Grades 9–10 to Grades 11–12

In grade 11, students speak (both in formal presentations and in informal discussions) with growing maturity to convey ideas and information both clearly and persuasively. They are simultaneously developing listening skills that allow them to participate effectively and contribute to groups. Specific changes in the Speaking and Listening Standards from grades 9–10 to grades 11–12 are highlighted in the chart below:

Grades 9–10, Standard 1 (SL.9–10.1)	**Grades 11–12, Standard 1 (SL.11–12.1)**
Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 9–10 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed. c. Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion;	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grades 11–12 topics*, *texts*, *and issues*, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. b. Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed. c. Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions;

and clarify, verify, or challenge ideas and conclusions. d. Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.	and promote divergent and creative perspectives. d. Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
Grades 9–10, Standard 2 (SL.9–10.2)	**Grades 11–12, Standard 2 (SL.11–12.2)**
Integrate multiple sources of information presented in diverse media or formats (e.g., visually, quantitatively, orally) evaluating the credibility and accuracy of each source.	Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.
Grades 9–10, Standard 3 (SL.9–10.3)	**Grades 11–12, Standard 3 (SL.11–12.3)**
Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, identifying any fallacious reasoning or exaggerated or distorted evidence.	Evaluate a speaker's point of view, reasoning, and use of evidence and rhetoric, assessing the stance, premises, links among ideas, word choice, points of emphasis, and tone used.
Grades 9–10, Standard 4 (SL.9–10.4)	**Grades 11–12, Standard 4 (SL.11–12.4)**
Present information, findings, and supporting evidence clearly, concisely, and logically such that listeners can follow the line of reasoning and the organization, development, substance, and style are appropriate to purpose, audience, and task.	Present information, findings, and supporting evidence, conveying a clear and distinct perspective, such that listeners can follow the line of reasoning, alternative or opposing perspectives are addressed, and the organization, development, substance, and style are appropriate to purpose, audience, and a range of formal and informal tasks.
Grades 9–10, Standard 5 (SL.9–10.5)	**Grades 11–12, Standard 5 (SL.11–12.5)**
Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.	Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
Grades 9–10, Standard 6 (SL.9–10.6)	**Grades 11–12, Standard 6 (SL.11–12.6)**
Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grades 9–10 Language standards 1 and 3 on page 54 for specific expectations.)	Adapt speech to a variety of contexts and tasks, demonstrating a command of formal English when indicated or appropriate. (See grades 11–12 Language standards 1 and 3 on page 54 for specific expectations.)

ITN 2012-31

PARCC ITEM DEVELOPMENT

APPENDIX B: Supporting Documents for ELA/Literacy

Attachment 1—Assessment Claims for ELA/Literacy
Attachment 2—ELA Graphic for Grades 3-5
Attachment 3—ELA Graphic for Grades 6-11
Attachment 4—Task Generation Model for Engaging with Literature Task (grades 3–5)
Attachment 5—Task Generation Model for Literature Analysis Task (grades 6–8)

Attachment 6—Task Generation Model for Literary Analysis Task
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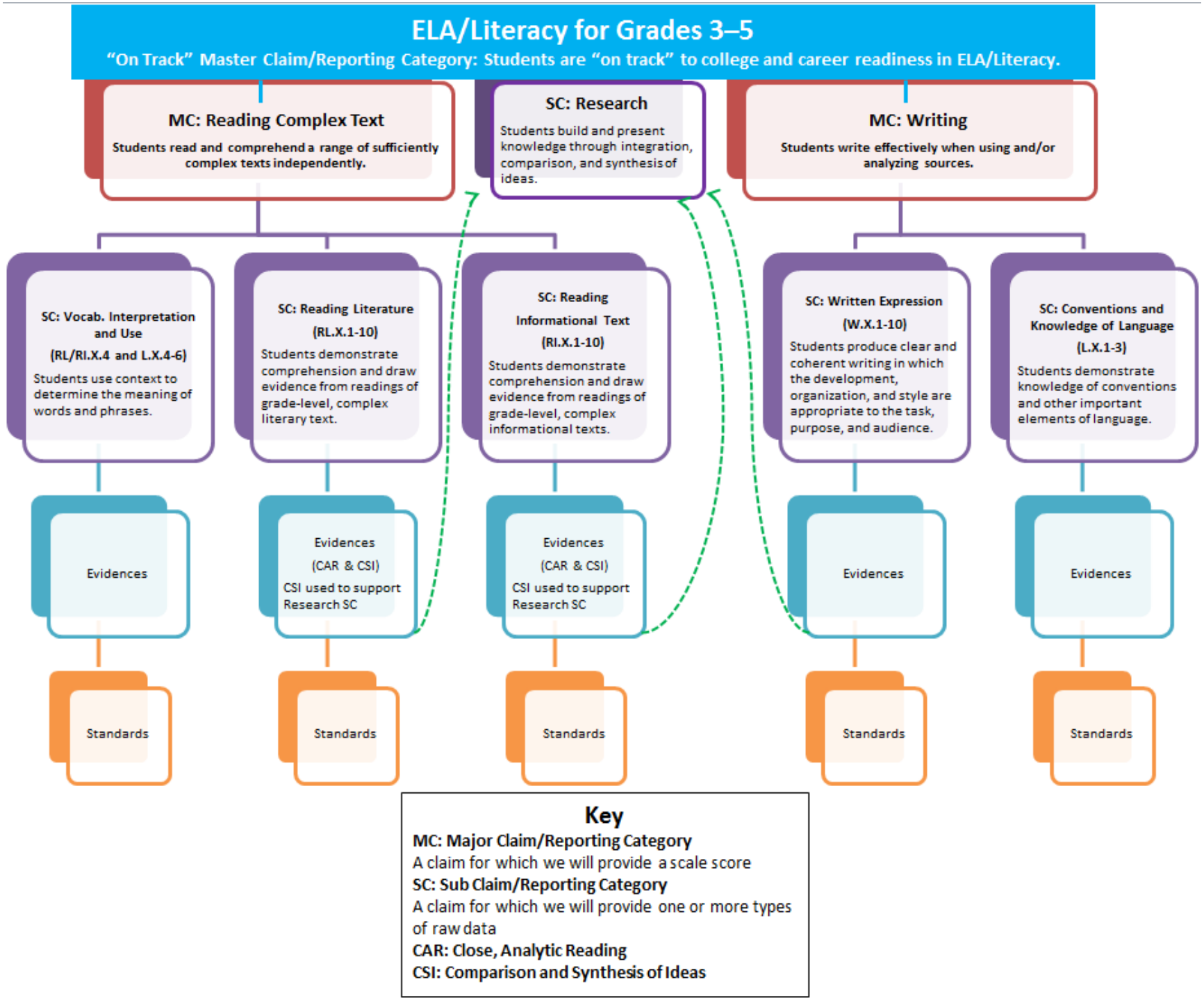
Assessment Claims for ELA/Literacy

All claims were derived directly from the Common Core State Standards and were identified to reflect the knowledge and skills expected of students who will take the PARCC summative assessments. All claims were guided by the purpose and intended uses of the PARCC results.

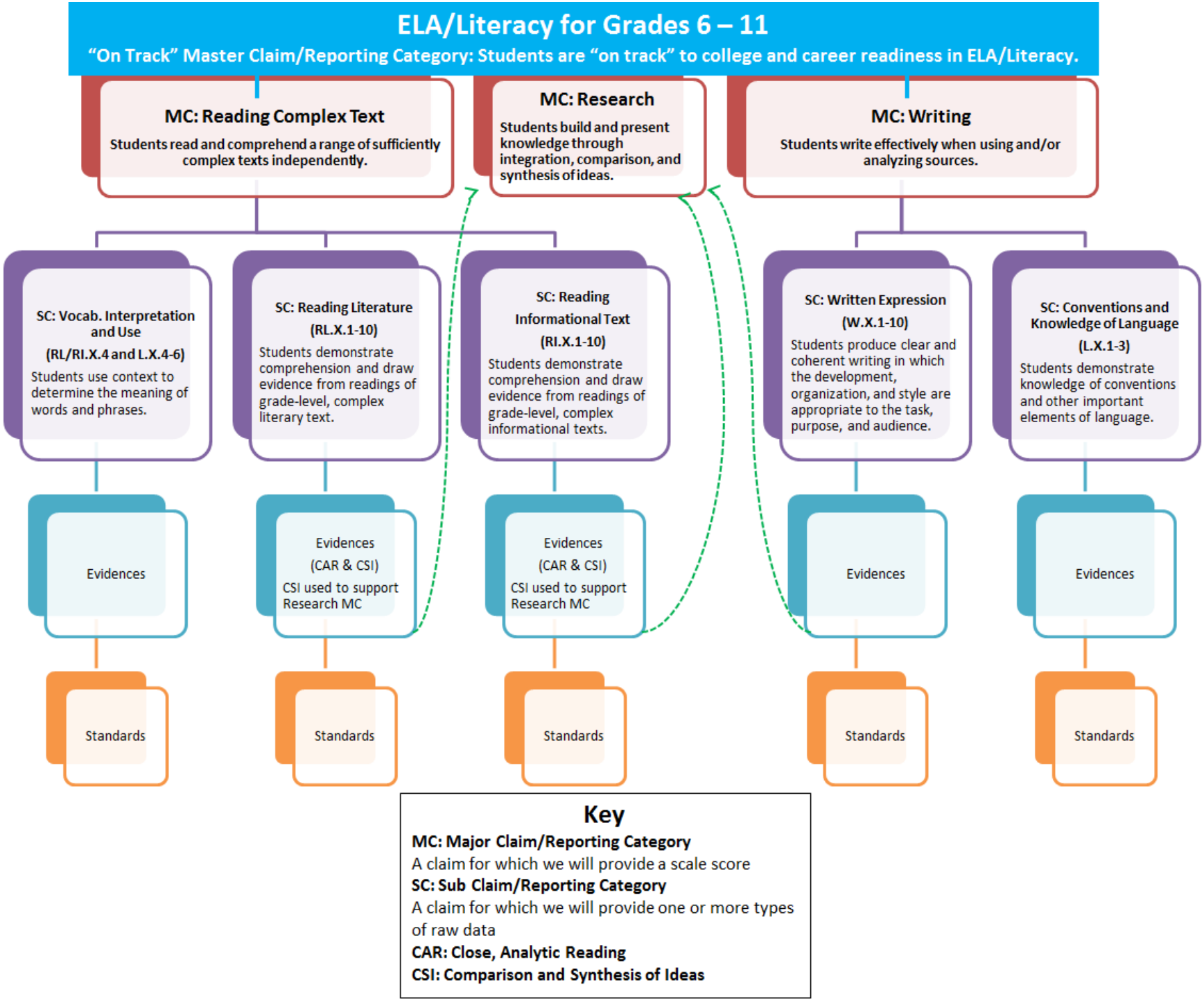
The claims for ELA/Literacy are organized as a hierarchy that elaborates the various arguments that assessment results represent about individual student achievement. The Master Claim is the overarching performance goal for the PARCC summative assessment: the degree to which the student is college and career ready (or "on track"). In ELA/Literacy, the Master Claim is supported by Major Claims in Reading, Writing and Research (see **SECTION 7.3.2** for a detailed discussion of claims).

The intent is that the Major Claims will be supported by sufficient evidence and measurement information to produce scaled scores. The Master Claims and Major Claims in ELA/Literacy are supported by a number of Sub Claims. Sub Claims are more specific than either Master Claims or Major Claims. Evidence statements are typically reflections of the evidence required to support Sub Claims, which are then aggregated or subsumed to support the Master and Major Claims in ELA/Literacy.

Attachment 2



Attachment 3



Task Generation Model for Engaging with Literature Task
Grades 3-5[58]

Task Type	**Engaging with Literature**
Grade *Circle grades for which this task model may be used*	*3 4 5*
Number of Texts	**2**
Type(s) of Texts *The characteristics of texts in each task generation model may change, but all texts must be a literature text.*	**1 Extended Literature Text** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured* **1 Additional Literature Text (short)** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured*
Number of and Purpose for Prose Constructed-Response Items	**1 Narrative** *Describe how a text serves as a stimulus for a narrative writing eliciting evidences aligned to the writing and language standards* **1 Analytic** *Describe how the text(s) serves as a stimulus for an analytic writing eliciting evidences aligned to the writing and language standards*
Number of EBSR and/or TEC Reading Items	**6 Total EBSR and/or TECR Reading Items** • 4 Close, Analytic Reading (CAR) Items • 2 Vocabulary Items
Scenario *Changes for every task generation model and shows how the texts selected, writings to be produced, standards to be measured, and the order of the items work together to produce a literary analysis task.*	*Describe clearly a scenario which elicits various student actions (reading, answering questions, writings) that cohere logically, creating a performance-based literary task.*

[58] For each grade level, the Contractor will develop three task generation models for engaging with literature or literary analysis. Two task generation models should be designed such that tasks are both delivered online and responded to online. One task generation model should be designed such that tasks are delivered online and responded to using paper and pencil. For each item in the section labeled "Total Items Needed for this Task Generation Model," the Contractor will present an item generation model. Item generation models should be informed by the item specifications.

Sub Claim(s)	Standard(s)	Evidence(s)
Reading Sub Claim I: **Reading Literature** Students demonstrate comprehension and draw evidence from readings of grade-level, complex literary text.	• *Reading Standards 2–9* *The specific standards are variables that must be listed here.* • *Reading Standard 1 is the foundation for Standards 2–9 • *Reading Standard 10 is implicitly assessed because students must read and comprehend grade-level, complex text to successfully respond to items.	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Reading Sub Claim III: **Vocabulary Interpretation and Use** Students use context to determine the meaning of words and phrases	• Reading Standard 4 • Language Standards 4–6	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim I: **Written Expression** Students produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.	*The specific Writing Standards to be measured should be listed here.*	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim II: **Conventions and Knowledge of Language** Students demonstrate knowledge of conventions and other important elements of language.	Language Standards 1–3	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Total Items Needed for this Task Generation Model: 8 ***Order of Student Actions in this Task Generation Model:*** *Describe the order of student actions for this task model, including texts to be read and items requiring response. This order should be logically connected to the scenario described above. For each item, be sure to include the item type or item generation model (if completed).*		

Task Generation Model for Literature Analysis Task
Grades 6–8[59]

Task Type	**Literature Analysis**
Grade *Circle grades for which this task model may be used*	*6 7 8*
Number of Texts	**2**
Type(s) of Texts *The characteristics of texts in each task generation model may change, but all texts must be literature texts.*	**1 Extended Literature Text** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured* **1 Additional Literature Text (short)** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured*
Number of and Purpose for Prose Constructed-Response Items	**1 Narrative** *Describe how the text serves as a stimulus for a narrative writing eliciting evidences aligned to the writing and language standards* **1 Analytic** *Describe how the text(s) serves as a stimulus for an analytic writing eliciting evidences aligned to the writing and language standards*
Number of EBSR and/or TEC Reading Items	**6 Total EBSR and/or TECR Reading Items** • 4 Close, Analytic Reading (CAR) Items • 2 Vocabulary Items
Scenario *Changes for every task generation model and shows how the texts selected, writings to be produced, standards to be measured, and the order of the items work together to produce a literary analysis task.*	*Describe clearly a scenario which elicits various student actions (reading, answering questions, writings) that cohere logically, creating a performance-based literary task.*

[59] For each grade level, the Contractor will develop three task generation models for engaging with literature or literary analysis. Two task generation models should be designed such that tasks are both delivered online and responded to online. One task generation model should be designed such that tasks are delivered online and responded to using paper and pencil. For each item in the section labeled "Total Items Needed for this Task Generation Model," the Contractor will present an item generation model. Item generation models should be informed by the item specifications.

Sub Claim(s)	Standard(s)	Evidence(s)
Reading Sub Claim I: **Reading Literature** Students demonstrate comprehension and draw evidence from readings of grade-level, complex literary text.	• *Reading Standards 2–9* *The specific standards are variables that must be listed here.* • *Reading Standard 1 is the foundation for Standards 2–9 • *Reading Standard 10 is implicitly assessed because students must read and comprehend grade-level, complex text to successfully respond to items.	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Reading Sub Claim III: **Vocabulary Interpretation and Use** Students use context to determine the meaning of words and phrases	• Reading Standard 4 • Language Standards 4–6	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim I: **Written Expression** Students produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.	*The specific Writing Standards to be measured should be listed here.*	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim II: **Conventions and Knowledge of Language** Students demonstrate knowledge of conventions and other important elements of language.	Language Standards 1–3	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Total Items Needed for this Task Generation Model: 8 ***Order of Student Actions in this Task Generation Model:*** *Describe the order of student actions for this task model, including texts to be read and items requiring response. This order should be logically connected to the scenario described above. For each item, be sure to include the item type or item generation model (if completed).*		

Attachment 6

Task Generation Model for Literary Analysis Task
Grades 9-11[60]

Task Type	**Literary Analysis**
Grade *Circle grades for which this task model may be used*	*9 10 11*
Number of Texts	**2**
Type(s) of Texts *The characteristics of texts in each task generation model may change, but at least one text must be a literature text.*	**1 Extended Literature Text** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured* **1 Additional Text (short)** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured* *This additional text may be literature or literary non-fiction.*
Number of and Purpose for Prose Constructed-Response Items	**1 Narrative** *Describe how the literature text serves as a stimulus for a narrative writing eliciting evidences aligned to the writing and language standards* **1 Analytic** *Describe how one text (or both texts) serve as a stimulus for an analytic writing eliciting evidences aligned to the writing and language standards*
Number of EBSR and/or TEC Reading Items	**6 Total EBSR and/or TECR Reading Items** • 4 Close, Analytic Reading (CAR) Items • 2 Vocabulary Items
Scenario *Changes for every task generation model and shows how the texts selected, writings to be produced, standards to be measured, and the order of the items work together to produce a literary analysis task.*	*Describe clearly a scenario which elicits various student actions (reading, answering questions, writings) that cohere logically, creating a performance-based literary analysis task.*

[60] For each grade level, the Contractor will develop three task generation models for engaging with literature or literary analysis. Two task generation models should be designed such that tasks are both delivered online and responded to online. One task generation model should be designed such that tasks are delivered online and responded to using paper and pencil. For each item in the section labeled "Total Items Needed for this Task Generation Model," the Contractor will present an item generation model. Item generation models should be informed by the item specifications.

Attachment 6

Sub Claim(s)	Standard(s)	Evidence(s)
Reading Sub Claim I: **Reading Literature** Students demonstrate comprehension and draw evidence from readings of grade-level, complex literary text. **Reading Sub Claim II:** **Reading Informational Text** Students demonstrate comprehension and draw evidence from readings of grade-level, complex informational text.	• *Reading Standards 2–9* *The specific standards are variables that must be listed here.* • *Reading Standard 1 is the foundation for Standards 2–9 • *Reading Standard 10 is implicitly assessed because students must read and comprehend grade-level, complex text to successfully respond to items.	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Reading Sub Claim III: **Vocabulary Interpretation and Use** Students use context to determine the meaning of words and phrases	• Reading Standard 4 • Language Standards 4–6	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim I: **Written Expression** Students produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.	*The specific Writing Standards to be measured should be listed here.*	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim II: **Conventions and Knowledge of Language** Students demonstrate knowledge of conventions and other important elements of language.	Language Standards 1–3	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Total Items Needed for this Task Generation Model: 8 ***Order of Student Actions in this Task Generation Model:*** *Describe the order of student actions for this task model, including texts to be read and items requiring response. This order should be logically connected to the scenario described above. For each item, be sure to include the item type or item generation model (if completed).*		

Task Generation Model for Research Simulation Task[61]

Task Type	**Research**
Grade *Circle grades for which this task model may be used*	*3 4 5 6 7 8 9 10 11*
Number of Texts	**4**
Type(s) of Texts *The characteristics of texts in each task generation model may change, but all texts must be informational.*	**1 Informational Anchor Text** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured* **3 Additional Informational Texts** *Describe the genre of text and the specific characteristics needed to elicit evidences aligned to the reading standards to be measured. One of these texts should be multimedia.*
Number of and Purpose for Prose Constructed-Response Items	**1 Recounting of the Main Idea(s) and Key Details (grade 3)/1 Summary (grades 4–11)** *Describe how the informational anchor text serves as a stimulus for a recounting of the main idea(s) and key details (grade 3)/summary (grades 4–11) eliciting evidences aligned to the writing and language standards* **1 Analytic** *Describe how the four texts read throughout the task serve as stimuli for an analytic writing eliciting evidences aligned to the writing and language standards*
Number of EBSR and/or TEC Reading Items	**6–9 Total EBSR and/or TECR Reading Items** • 3–6 Reading Items (both CAR and CSI) • 3 Vocabulary Items
Scenario *Changes for every task generation model and shows how the texts selected, writings to be produced, standards to be measured, and the order of the items work together to produce a research task.*	*Describe clearly a scenario which elicits various student actions (reading, answering questions, writings) that cohere logically, creating a performance-based research task.*

[61] For each grade level, the Contractor will develop three task generation models for research simulation. Two task generation models should be designed such that tasks are both delivered online and responded to online. One task generation model should be designed such that tasks are delivered online and responded to using paper and pencil. For each item in the section labeled "Total Items Needed for this Task Generation Model," the Contractor will present an item generation model. Item generation models should be informed by the item specifications.

Sub Claim(s)	Standard(s)	Evidence(s)

Reading Sub Claim II:
Reading Informational Text
Students demonstrate comprehension and draw evidence from readings of grade-level, complex informational text.
	• *Reading Standards 2–9*
	  ○ *The specific standards are variables that must be listed here.*
	  ○ *May use Literacy Standards for History/Social Studies, Science, and Technical Subjects (grades 6–11).*
	• *Reading Standard 1 is the foundation for Standards 2–9
	• *Reading Standard 10 is implicitly assessed because students must read and comprehend grade-level, complex text to successfully respond to items.
		A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.

Reading Sub Claim III: **Vocabulary Interpretation and Use** Students use context to determine the meaning of words and phrases	• Reading Standard 4 • Language Standards 4–6	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim I: **Written Expression** Students produce clear and coherent writing in which the development, organization, and style are appropriate to the task, purpose, and audience.	*The specific Writing Standards to be measured should be listed here.*	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Writing Sub Claim II: **Conventions and Knowledge of Language** Students demonstrate knowledge of conventions and other important elements of language.	Language Standards 1–3	*A range of possible evidence statements for this claim will be provided prior to the start of task development. The Contractor will list the specific evidences elicited by this task generation model.*
Total Items Needed for this Task Generation Model: 8–11 ***Order of Student Actions in this Task Generation Model:*** *Describe the order of student actions for this task model, including texts to be read and items requiring response. This order should be logically connected to the scenario described above. For each item, be sure to include the item type or item generation model (if completed).*		

Attachment 8

Item Generation Model[62]

Grade—*Circle One*	*3 4 5 6 7 8 9 10 11*
Item Format—*Circle One*	1. Evidence-Based Selected-Response (EBSR) 2. Technology-Enhanced Constructed-Response (TECR) 3. Prose Constructed-Response (PCR)
Scope of the Assessment: Claim(s)/Standards/Evidences	*List the claims, standards, and evidences to be measured by this item generation model*
Assessment Component—*Circle all that apply*	1. Mid-Year Assessment 2. Performance-Based Assessment 3. End-of-Year Assessment
Delivery Mode—*Circle all that apply*	1. Online 2. Paper-pencil
Response Mode—*Circle all that apply*	1. Online 2. Paper-pencil
Task Generation Model Connection—*Circle one*	1. Engaging with Literature/Literature Analysis/Literary Analysis Task 2. Research Simulation Task 3. Not connected to either MYA or PBA task generation model
Text Requirements for Item—Circle all that apply	1. Item requires students to read an informational text 2. Item requires students to read a literary text 3. Item requires Close Analytic Reading (CAR) 4. Item requires Comparison and Synthesis of Ideas (CSI)
Other text requirements for this item generation model: *Describe any required text features for this item generation model (e.g., genre specifications, # of sections, headings, or sub-headings required, # of Tier 2 vocabulary terms, text discipline specifications).*	
Minimum/Maximum Points for the Item	*List the range of points students can earn in response to items generated through this model*
Type of Scoring Materials and Requirements for Scoring	*Identify the type of scoring materials and requirements needed for scoring of items generated through this model*
Cognitive Complexity/Performance Level Descriptor Connections	*The Contractor will be provided with Performance-Level Descriptors (PLDs) and levels of cognitive complexity (e.g., might have a range from 1 to 4, where 1 is least complex and representative of the lowest PLD and 4 is most complex and representative of the highest PLD). In this box, the range of complexity and PLD will be designated.*
Item Notes: *Describe how this item model supports the achievement of a particular goal, or describe considerations for future item development using this model.*	

[62] Contractors will need to develop a means to label each distinct item generation model developed and a unique identifier for each item developed that connects the item to the item generation model. The tagging of each item should allow a means to connect each item's metadata features to the item generation model that produces those features.

Preliminary Blueprint for Grades 3–11 Performance-Based Assessment (34–49 points towards CCR)

Day 1—Session 1: Research Simulation Task

Reading Passages:
One (1) informational anchor text (approximately 15–20 minutes of reading)

Prose Constructed-Response:

- In grade 3, one (1) recounting of the anchor text's key details and main idea (approximately 15–30 minutes)
- In grades 4–5, one (1) summary of the anchor text (approximately 15–30 minutes)
- In grade 6, one (1) summary of the anchor text distinct from personal opinions or judgments (approximately 15–30 minutes)
- In grades 7–11, one (1) objective summary of the anchor text (approximately 15–30 minutes)

Passage Description	Prose Constructed-Response
One informational anchor text	Recounting (Grades 3)/Summary (Grades 4–11, see grade-level distinctions above)
	Expression: 3–5 Conv.: 2–3

Total Points Supporting Claims in Day 1—Session 1
Reading: 0
Writing: 5–8
Research: Written Expression

Day 1—Session 2: Research Simulation Task

(Topically/thematically connected to Session 1 to allow for Session 2 writing task)

Reading Passages:
Three (3) informational (shorter) texts related to the anchor text (approximately 30 minutes of reading) (one multimedia)

EBSR and/or TECR Reading Items:
Two (2) to three (3) per passage = six (6) to nine (9) total points (approximately 10 minutes)

Prose Constructed-Response Item:
One (1) analytic essay responding to the research prompt; must incorporate evidence from at least two of the four texts read in the research task (approximately 45–90 minutes)

Passage Description	EBSR and/or TECR Reading Items	Prose Constructed-Response
3 Informational (shorter) texts (one is multimedia)	6–9 Reading Points	Analytic
	Reading Info: 3–6 (split CAR and CSI) Vocab.: 3	Expression: 4–6 Conv.: 2–3

Total Points Supporting Claims in Day 1—Session 2
Reading: 6–9
Writing: 6–9
Research: All CSI + Written Expression

Day 2 – Engaging with Literature Task (grades 3–5)/Literature Analysis Task (grades 6–8)/Literary Analysis Task (grades 9–11)

Reading Passages:
For grades 3–8, one (1) shorter piece of literature and one (1) extended piece of literature

For grades 9–11, one (1) shorter piece of literature and one (1) extended piece of literature *or* literary nonfiction

EBSR and/or TECR Reading Items:
Two (2) to three (3) per passage = four (4) to six (6) total points (approximately 5 minutes)

Prose Constructed-Response Items:

- One (1) narrative using/responding to a literary text (approximately 15–30 minutes); and
- One (1) analytic essay analyzing the one or more texts (approximately 45–90 minutes)

Passage Description	EBSR and/or TECR Reading Items	Prose Constructed-Response	
a. One shorter literary text **b.** One extended literary text	6 Reading Points	Narrative	Analytic
	Reading Lit. CAR: 4 Vocab.: 2	Expression: 3–5 Conventions: 2–3	Expression: 4–6 Conventions: 2–3

Total Points Supporting Claims in Day 2
Reading: 6
Writing: 11–17
Research: 0

Preliminary Blueprint for Grades 3–11 End-of-Year Assessment (at least 50 points towards CCR)

Passage Description	EBSR and/or TEC Reading Items
Six (6) texts • One text may be multimedia • % of Literature to % Informational to change based on grade level (see ELA/Literacy Technical Plan)	At least 50 reading points • 6–9 points per passage • At least 10 points towards Vocabulary from total reading points • Opportunities for both CAR and CSI

Total Points Supporting Claims from Performance-Based Assessment (34–49 points towards CCR)	Total Points Supporting Claims from End-of-Year Assessment (at least 50 points towards CCR)	Total Points Supporting Claims from Summative Assessment (84–99 points towards CCR)
Reading: 12–15 **Writing: 22–34** • Expression: 14–22 • Conventions and Knowledge of Language: 8–12 **Research:** All CSI + Written Expression from Research Task	**Reading: 50** **Writing: 0** **Research:** All CSI	**Reading: 62–65** • CAR: 80% of non-vocabulary reading questions • CSI: 20% of non-vocabulary reading questions • Vocab.: Must be at least 10–15 points **Writing: 22–34** **Research:** All CSI + Written Expression from Research Task

Evidence Statements for Reading Informational Text: Standard 1
Grades 3–11

Standard					
RI.11.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.11.1.P1.CAR	Cited textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.11.1.P2.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.11.1.P3.CAR	Cited textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	P		
RI.11.1.P4.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly, including determining where the text leaves matters uncertain	CAR	P		
RI.11.1.F1.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
RI.11.1.F2.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain	CAR	F		
Standard					
RI.10.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.10.1.P1.CAR	Cited textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.10.1.P2.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.10.1.F1.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
Standard					
RI.9.1 Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.9.1.P1.CAR	Cited textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.9.1.P2.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly	CAR	P		

RI.9.1.F1.CAR	Cited strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
Standard					
RI.8.1 Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.8.1.P1.CAR	Cited textual evidence that supports an analysis of what the text says explicitly	CAR	P		
RI.8.1.P2.CAR	Cited textual evidence that most strongly supports an analysis of what the text says explicitly	CAR	P		
RI.8.1.F1.CAR	Cited textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
Standard					
RI.7.1 Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.7.1.P1.CAR	Cited pieces of textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.7.1.P2.CAR	Several cited pieces of textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.7.1.F1.CAR	Several cited pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
Standard					
RI.6.1 Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.6.1.P1.CAR	Cited textual evidence to support analysis of what the text says explicitly	CAR	P		
RI.6.1.F1.CAR	Cited textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text	CAR	F		
Standard					
RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.5.1.P1.CAR	Quote(s) from a text when explaining what the text says explicitly	CAR	P		
RI.5.1.P2.CAR	Quote(s) from a text when explaining what the text says explicitly and when drawing inferences from the text	CAR	P		
RI.5.1.P3.CAR	Accurate quote(s) from a text when explaining what the text says explicitly	CAR	P		

RI.5.1.F1.CAR	Accurate quote(s) from a text when explaining what the text says explicitly and when drawing inferences from the text	CAR	F		
Standard					
RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.4.1.P1.CAR	References to details and examples in a text when explaining what the text says explicitly	CAR	P		
RI.4.1.F1.CAR	References to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text	CAR	F		
Standard					
RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.					
Coding	**Evidence Statements** – Student work is characterized by…	**Layer**	**Coverage**	**Item Model(s)**	**Task Features**
RI.3.1.P1.CAR	Questions and answers that demonstrate understanding of a text	CAR	P		
RI.3.1.F1.CAR	Questions and answers that demonstrate understanding of a text, with explicit references to the text as the basis for the answers	CAR	F		

ITN 2012-31

PARCC Item Development

Appendix C: PARCC Model Content Frameworks for Mathematics

PARCC MODEL CONTENT FRAMEWORKS

MATHEMATICS

GRADES 3–11

October 2011

Partnership for Assessment of Readiness for College and Careers

Table of Contents

Purpose for the Model Content Frameworks for Mathematics

As part of its proposal to the U.S. Department of Education, the Partnership for Assessment of Readiness for College and Careers (PARCC) committed to developing model content frameworks for mathematics to serve as a bridge between the Common Core State Standards and the PARCC assessments.[63]

The PARCC Model Content Frameworks were developed through a state-led process that included mathematics content experts in PARCC member states and members of the Common Core State Standards writing team. The Model Content Frameworks are voluntary resources offered by PARCC to help curriculum developers and teachers as they work to implement the standards in their states and districts. They are designed with the following purposes in mind:

- Supporting implementation of the Common Core State Standards, and
- Informing the development of item specifications and blueprints for the PARCC assessments in grades 3–8 and high school.

The Model Content Frameworks are intended to be dynamic and responsive to evidence and ongoing input. As such, PARCC hopes they will be used by educators for the remainder of the 2011–12 school year. In spring 2012, PARCC will again solicit feedback on the Model Content Frameworks, and a refined version will be issued to incorporate feedback as needed. In this way, the Model Content Frameworks can evolve to reflect the real-life experiences of educators and students.

Connections to the PARCC Assessment

The PARCC Assessment System will be designed to measure the knowledge, skills and understandings essential to achieving college and career readiness. In mathematics, this includes conceptual understanding, procedural skill and fluency, and application and problem solving, as defined by the standards. Each of these works in conjunction with the others to promote students' achievement in mathematics. To measure the full range of the standards, the assessments will include tasks that require students to connect mathematical content and mathematical practices.

The Model Content Frameworks for Mathematics reflect these priorities by providing detailed information about selected practice standards, fluencies, connections and content emphases. These emphases will be reflected in the PARCC Assessment System.

The Model Content Frameworks do not contain a suggested scope and sequence by quarter.[64] Rather, they provides examples of key content dependencies (where one concept ought to come before another), key instructional emphases, opportunities for in-depth work on key concepts and connections to critical practices. These last two components, in particular, intend to support local and state efforts to deliver instruction that connects content and practices while achieving the standards' balance of conceptual understanding, procedural skill and fluency, and application.

Overall, the PARCC Assessment System will include a mix of items, including short- and extended-response items, performance-based tasks, and technology-enhanced items.[65] In mathematics, the

[63] The Model Content Frameworks, from grade 3 through grade 11, align with the PARCC Assessment System for those grades. A companion document with model content frameworks for grades K–2 will be written in 2012.

[64] See http://tinyurl.com/PARCCletter62411 for more information.

[65] Additional PARCC procurement documents, including the Item Specifications, will provide significantly greater detail about item types and how they will elicit evidence of student mastery of the Common Core State Standards in Mathematics.

assessment system will be designed to measure students' understanding of key big ideas indicated in the standards, with emphasis on both the content standards and the practice standards. Questions asked will measure student learning within and across various mathematical domains and practices. The questions will cover the full range of mathematics, including conceptual understanding, procedural fluency and the varieties of expertise described by the practice standards. Mathematical understanding, procedural skill and the ability to apply what one knows are equally important and can be assessed using mathematical tasks of sufficient richness, which PARCC will include in its assessment system.

It is critical that all students are able to demonstrate mastery of the skills and knowledge described in the standards. PARCC recognizes the importance of equity, access and fairness in its assessments and aligned materials. To help meet these goals, PARCC will work with its Accessibility, Accommodations and Fairness Technical Working Group — a group of national experts — throughout the development process to ensure that the learning experience of all students is aligned to the high expectations of the standards.

Structure of the Model Content Frameworks for Mathematics

The Model Content Framework for Mathematics for each grade is written with the expectation that students develop content knowledge, conceptual understanding and expertise with the Standards for Mathematical Practice. A detailed description of all features of the standards would be significantly lengthier and denser. For that reason, the analyses given here are intended to be valuable starting points. The Model Content Frameworks for Mathematics provide guidance for grades 3–8 and high school across a number of areas:

- *Examples of key advances from the previous grade;*
- *Fluency expectations or examples of culminating standards;*
- *Examples of major within-grade dependencies;*
- *Examples of opportunities for connections among standards, clusters or domains;*
- *Examples of opportunities for in-depth focus;*
- *Examples of opportunities for connecting mathematical content and mathematical practices; and*
- *Content emphases by cluster.*

Descriptions of each element are provided in "Grade-by-Grade Standards Analyses Introduction" (pages 11–14).

Principles Regarding the Common Core State Standards for Mathematics

Focus and Coherence

The two major evidence-based principles on which the standards are based are ***focus*** and ***coherence.*** **Focus** is necessary so that students have sufficient time to think, practice and integrate new ideas into their growing knowledge structure. Focus is also a way to allow time for the kinds of rich classroom discussion and interaction that support the Standards for Mathematical Practice.

The second principle, **coherence,** arises from mathematical connections. Some of the connections in the standards knit topics together at a single grade level (such as area models and multiplication in grade 3). Most connections, however, play out across two or more grade levels to form a progression of increasing knowledge, skill or sophistication. The standards are woven of these progressions. Likewise, instruction at any given grade would benefit from being informed by a sense of the overall progression students are following across the grades.

Another set of connections is found between the content standards and the practice standards. These connections are absolutely essential to support the development of students' broader mathematical understanding. To reflect the standards, the Model Content Frameworks emphasize that mathematics is not a checklist of fragments to be mastered, but that doing and using mathematics involves connecting content and practices.

Focus is critical to ensure that students learn the most important content completely, rather than succumb to an overly broad survey of content. Coherence is critical to ensure that students see mathematics as a logically progressing discipline, which has intricate connections among its various domains and requires a sustained practice to master. Focus shifts over time, as seen in the following:

- In grades K–5, the focus is on the addition, subtraction, multiplication and division of whole numbers, fractions and decimals, with a balance of concepts, skills and problem solving. Arithmetic is viewed as an important set of skills and also as a thinking subject that, done thoughtfully, prepares students for algebra. Measurement and geometry develop alongside number and operations and are tied specifically to arithmetic along the way.

- In middle school, multiplication and division develop into powerful forms of ratio and proportional reasoning. The properties of operations take on prominence as arithmetic matures into algebra. The theme of quantitative relationships also becomes explicit in grades 6–8, developing into the formal notion of a function by grade 8. Meanwhile, the foundations of high school deductive geometry are laid in the middle grades. Finally, the gradual development of data representations in grades K–5 leads to statistics in middle school: the study of shape, center and spread of data distributions; possible associations between two variables; and the use of sampling in making statistical decisions.

- In high school, algebra, functions, geometry and statistics develop with an emphasis on modeling. Students continue to take a thinking approach to algebra, learning to see and make use of structure in algebraic expressions of growing complexity. As this description suggests, mathematical content in all grades is best approached in the ways envisioned by the Standards for Mathematical Practice.

The standards focus on crucial material so that students can have more time to discuss, reflect upon and practice it. The standards treat mathematics as a coherent subject to promote the sense-making that fuels mastery. The principles of focus and coherence are the twin engines that must be carried forward in implementation efforts and substantiated in curricula and assessments.

Connecting Content and Practices

The Standards for Mathematical Content and Standards for Mathematical Practice are meant to be connected, as noted in the Common Core State Standards for Mathematics (page 8):

> *Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.*

The word *connect* in this passage is important. Separating the practices from the content is not helpful and is not what the standards require. The practices do not exist in isolation; the vehicle for engaging in the practices is mathematical content.

The Standards for Mathematical Practice should be embedded in classroom instruction, discussions and activities. They describe the kind of mathematics teaching and learning to be fostered in the classroom. To promote such an environment, students should have opportunities to work on carefully designed standards-

based mathematical tasks that can vary in difficulty, context and type. Carefully designed standards-based mathematical tasks will reveal students' content knowledge and elicit evidence of mathematical practices. Mathematical tasks are an important opportunity to connect content and practices. To be consistent with the standards as a whole, assessment as well as curriculum and classroom activities must include a balance of mathematical tasks that provide opportunities for students to develop the kinds of expertise described in the practices.[66]

Higher Expectations: Conceptual Understanding, Fluency and Application

The standards are a rigorous set of expectations. According to these standards, it is not enough for students to learn procedures by rote. Nor, on the other hand, is it enough for students to "understand the concepts" without being able to apply them to solve problems. Nor, finally, is it enough for students to learn the important procedures of mathematics without attaining skill and fluency in them.

[66] To align with strong instruction, PARCC assessments will include several types of tasks. The task types will allow for integration of the content and practice standards. Task types will include shorter items and longer, constructed items, which will vary in technical difficulty. While they are not part of this document, PARCC is currently developing prototype assessment tasks that will be made available in the near future.

Conceptual understanding: A number of individual content standards use the word *understand* in connection with important mathematical concepts. As the standards state (page 4),

> *There is a world of difference between a student who can summon a mnemonic device to expand a product such as (a + b)(x + y) and a student who can explain where the mnemonic comes from. The student who can explain the rule understands the mathematics, and may have a better chance to succeed at a less familiar task such as expanding (a + b + c)(x + y).*

Conceptual understanding will be assessed using both short tasks and performance-based tasks as part of PARCC's commitment to measure the full range of the standards.

Procedural skill and fluency: As the standards state (page 4), "conceptual understanding and procedural skill are equally important." Thus, at various grade levels, specific content standards use the word *fluently.* These standards will be assessed as part of PARCC's commitment to measure the full range of the standards.

Wherever the word *fluently* appears in a content standard, the word means *quickly and accurately*. It means more or less the same as when someone is said to be fluent in a foreign language. To be fluent is to flow: Fluent isn't halting, stumbling or reversing oneself. A key aspect of fluency in this sense is that it is not something that happens all at once in a single grade but requires attention to student understanding along the way. It is important to ensure that sufficient practice and extra support are provided at each grade to allow all students to meet the standards that call explicitly for fluency.

Application: One of the mathematical practices is Modeling (**MP.4**), which sets an expectation that students will "apply the mathematics they know to problems arising in everyday life, society and the workplace." Modeling is further developed as a conceptual category in high school, where it is explicitly linked to mathematical content standards using the star symbols (see pages 72 and 73 of *Common Core State Standards for Mathematics*). Furthermore, many individual content standards refer explicitly to real-world problems. The ability to apply mathematics will be assessed as part of PARCC's commitment to measure the full range of the standards.

Guidance Regarding the Use of Resources in Mathematics

In the early phases of implementation, it is wise to consider the degree to which existing materials align to the standards. This is often done via "cross-walking" exercises. Such exercises are sometimes approached simplistically as a process of topic-matching. However, it is critical to note that individual content standards are carefully crafted statements — they do not simply name topics. Coverage of topics is therefore not a guarantee of alignment, and coverage may even affect alignment negatively when it is wide and/or shallow. Cluster headings often unify the standards in the cluster by communicating their joint intent. Aligning to the standards requires taking into account the guidance to be gained from cluster headings, grade-level introductions, indicators of opportunities for modeling or use of an applied approach, and so forth. In the context of a multigrade progression, alignment also means treating the content in ways that take into account the previous stage of the progression and anticipate the next.

One the primary purposes of the Model Content Frameworks for Mathematics is to provide educators with guidance on the implementation of the Common Core State Standards, particularly with respect to the needs of states and districts as they develop, obtain or revise materials to meet the standards. Therefore, a number of important criteria are suggested for reviewing existing resources or for the development of additional curricular or instructional materials if needed. These are presented in the form of a list that could support "strongly agree" to "strongly disagree" responses in any given case:

- Materials help students meet the indicated Standards for Mathematical Content. Materials also equip teachers and students to develop the varieties of expertise described in the Standards for Mathematical Practice.

- Materials are mathematically correct.
- Materials are motivating to students. The beauty and applied power of the subject is evident. Materials are engaging for a diverse body of students. This engagement exists side by side with the practice and hard thinking that is often necessary for learning mathematics.
- Materials reflect the standards by connecting content and practices while demanding conceptual understanding, procedural skill and fluency, and application.

  Specific aspects of achieving this balance include:

  Balance of tasks and activities: Activities, tasks and problems for students exhibit balance along various dimensions. For example, some activities and tasks target procedural skill and fluency alone; others target conceptual understanding; others application; and still others skill, understanding and application in equal measure. Some exercises are brief practice exercises; others require longer chains of reasoning. Some are abstract; others are contextual. Well-chosen tasks demonstrate the importance of mathematics in daily living for students, including connecting to other areas of students' interest, such as population growth and history, data and sports, and financial decision making.

  Balance in how time is spent: There is time for whole-class or group discussion and debate, time for solitary problem solving and reflection, and time for thoughtful practice and routine skill building. Individual problem solving and explanation of mathematical thinking may be intertwined several times during a class.

  Common sense in achieving balance: Not every task, activity or workweek has to be balanced in these ways. It is reasonable to have phases of narrow intensity, during which tasks, activities and time are concentrated in a single mode.
- Materials draw the teacher's attention explicitly to nuances in the content being addressed and to specific opportunities for teachers to foster mathematical practices in the study of that content.
- Materials give teachers workable strategies for helping students who have special needs, such as students with disabilities, English language learners and gifted students.
- Materials give teachers strategies for involving students in reading, writing, speaking and listening as necessary to meet the mathematics standards — for example, to understand the meanings of specialized vocabulary, symbols, units and expressions to support students in attending to precision (**MP.6**) or to engage in mathematical discourse using both informal language and precise language to convey ideas, communicate solutions and support arguments (**MP.3**).

Notice that "coverage" is not in the above list. Materials that are excellent but narrow in scope still have value; they can be combined with other like resources and supplemented as necessary. This is better than settling for a single mediocre resource that claims to cover all content.

Additional Resources

Members of the working group and writing team for the Common Core State Standards for Mathematics are developing some resources to inform the development of curriculum and instruction aligned to the standards.

PARCC Resources

In the future, PARCC intends to build additional supplementary materials to further illustrate implementation

of the standards, which may include model instructional units and sample tasks. In general, these materials will likely focus on areas of the standards that are particularly new to educators to support transition efforts. For example, the reader will note that grade 8 of the Model Content Frameworks includes a key opportunity for such work to occur around linear equations, the geometry of lines and proportional reasoning. As the materials become available, they will be published for voluntary use at http://parcconline.org.

Progressions

The progressions are being developed by members of the Common Core State Standards working group and writing team through the University of Arizona's Institute for Mathematics and Education. Progressions are narratives of the standards that describe how student skill and understanding in a particular domain develop from grade to grade. One of the primary uses of the progressions is to give educators and curriculum developers information that can help them develop materials for instruction aligned to the standards. http://ime.math.arizona.edu/progressions/.

Illustrative Mathematics

Under the guidance of members of the working group as well as other national experts in mathematics and mathematics education, The Illustrative Mathematics Project will illustrate the range and types of mathematical work that students will experience in a faithful implementation of the Common Core State Standards and by publishing other tools that support implementation of the standards. http://illustrativemathematics.org.

Common Core Tools

Additional tools that continue to be developed are posted from time to time on http://commoncoretools.wordpress.com, a blog moderated by Dr. William McCallum, distinguished professor and head of mathematics at the University of Arizona and mathematics lead for the Common Core State Standards for Mathematics.

Grade-by-Grade Standards Analyses Introduction

The following pages provide insights into the standards for grades 3–8. The reader is advised to have a copy of *Common Core State Standards for Mathematics* available for use in conjunction with this document. The Model Content Frameworks paraphrase standards and in some cases refer to them by code only; readers will need to refer to the standards document for exact language.

Description of Components

For each grade, analysis is provided in several categories. Please note: The words *examples* and *opportunities* in the following categories emphasize that the analysis provided in each category is not exhaustive. For example, there are many opportunities to connect mathematical content and practices in every grade, there are many opportunities for in-depth focus in every grade, and so on. A comprehensive description of these features of the standards would be hundreds of pages long. ***The analyses given here should be thought of as valuable starting points.***

Examples of Key Advances from the Previous Grade

- Highlights some of the major grade-to-grade steps in the progression of increasing knowledge and skill detailed in the standards. Note that each key advance in mathematical content also corresponds to a widening scope of problems that students can solve. Examples of key advances are highlighted to stress the need to treat topics in ways that take into account where students have been in previous grades and where they will be going in subsequent grades.[67]

Fluency Expectations or Examples of Culminating Standards

- Highlights individual standards that set expectations for fluency or that represent culminating masteries. Fluency standards are highlighted to stress the need to provide sufficient supports and opportunities for practice to help students meet these expectations. Culminating standards are highlighted to help give a sense of where important progressions are headed.

- Fluency is not meant to come at the expense of understanding but is an outcome of a progression of learning and sufficient thoughtful practice. It is important to provide the conceptual building blocks that develop understanding in tandem with skill along the way to fluency; the roots of this conceptual understanding often extend one or more grades earlier in the standards than the grade when fluency is finally expected.

Examples of Major Within-Grade Dependencies

- Highlights cases in which a body of content within a given grade depends conceptually or logically upon another body of content within that same grade. Examples of within-grade dependencies are highlighted to stress the need to organize material coherently within each given grade. (Because of space limitations, only examples of large-scale dependencies are described here, but coherence is important for dependencies that exist at finer grain size as well.)

Examples of Opportunities for Connections among Standards, Clusters or Domains

- Highlights opportunities for connecting content in assessments, as well as in curriculum and

[67] See the *Progressions* documents for additional information about progressions in the standards, http://ime.math.arizona.edu/progressions/.

instruction. Examples of connections are highlighted to stress the need to avoid approaching the standards as merely a checklist.

Examples of Opportunities for In-Depth Focus

- Highlights some individual standards that play an important role in the content at each grade. The indicated mathematics might be given an especially in-depth treatment, as measured, for example, by the type of assessment items; the number of days; the quality of classroom activities to support varied methods, reasoning and explanation; the amount of student practice; and the rigor of expectations for depth of understanding or mastery of skills.[68]

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

- Provides some examples of how students may engage in the mathematical practices as they learn the mathematics of the grade.[69] These examples are provided to stress the need to connect content and practices, as required by the standards.

- In addition to the concrete examples provided in each grade, the following are some general comments about connecting content and practices:

  - Connecting content and practices happens in the context of ***working on problems.*** The very first Standard for Mathematical Practice is to make sense of problems and persevere in solving them (**MP.1**).

  - Particularly in grades K–8, making sense of problems (**MP.1**) involves the pervasive use of ***visual representations as tools*** (**MP.5**) for understanding and explaining computation and problem solving with precision (**MP.2, 6**). Problem solving and explaining often require looking for and making use of structure (**MP.7**) and sometimes involve looking for and expressing regularity in repeated reasoning (**MP.8**).

  - As the above point suggests, the Standards for Mathematical Practice interact and overlap with each other, and several may be used together in solving a given problem. ***They are not a checklist.***

Content Emphases by Cluster

- Describes content emphases in the standards at the cluster level for each grade. These are provided because curriculum, instruction and assessment at each grade must reflect the focus and emphasis of the standards.

Not all of the content in a given grade is emphasized equally in the standards. The list of content standards for each grade is not a flat, one-dimensional checklist; this is by design. There are sometimes strong differences of emphasis even within a single domain. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most

[68] Note, however, that a standard can be individually important even though the indicated mathematics may require relatively little teaching time.

[69] See the *Progressions* documents for additional examples, http://ime.math.arizona.edu/progressions/.

critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice. Without such focus, attention to the practices would be difficult and unrealistic, as would best practices like formative assessment.

Therefore, to make relative emphases in the standards more transparent and useful, the Model Content Frameworks designate clusters as **Major**, **Additional** and **Supporting** for the grade in question. As discussed further in Appendix C, some clusters that are not major emphases in themselves are designed to *support* and strengthen areas of major emphasis, while other clusters that may not connect tightly or explicitly to the major work of the grade would fairly be called *additional*.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical education and will therefore be eligible for inclusion on the PARCC assessment. The assessments will mirror the message that is communicated here: Major Clusters will be a majority of the assessment, Supporting Clusters will be assessed through their success at supporting the Major Clusters and Additional Clusters will be assessed as well. The assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given in each grade for ways to connect the Supporting Clusters to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it in ways that foster greater focus and coherence.

Finally, the following are some recommendations for using the cluster-level emphases:

Do …

- Use the guidance to inform instructional decisions regarding time and other resources spent on clusters of varying degrees of emphasis.
- Allow the focus on the major work of the grade to open up the time and space to bring the Standards for Mathematical Practice to life in mathematics instruction through sense-making, reasoning, arguing and critiquing, modeling, etc.
- Evaluate instructional materials taking the cluster-level emphases into account. The major work of the grade must be presented with the highest possible quality; the supporting work of the grade should indeed support the major focus, not detract from it.
- Set priorities for other implementation efforts taking the emphases into account, such as staff development; new curriculum development; or revision of existing formative or summative testing at the state, district or school level.

Don't …

- Neglect any material in the standards. (Instead, use the information provided to connect Supporting Clusters to the other work of the grade.)
- Sort clusters from Major to Supporting, and then teach them in that order. To do so would strip the coherence of the mathematical ideas and miss the opportunity to enhance the major work of the grade with the supporting clusters.
- Use the cluster headings as a replacement for the standards. All features of the standards matter — from the practices to surrounding text to the particular wording of individual content standards.

Guidance is given at the cluster level as a way to talk about the content with the necessary specificity yet without going so far into detail as to compromise the coherence of the standards.

Examples of Key Advances from Grade 2 to Grade 3

- Students in grade 3 begin to enlarge their concept of number by developing an understanding of fractions as numbers. This work will continue in grades 3–6, preparing the way for work with the complete rational number system in grades 6 and 7.

- Students in grades K–2 worked on number; place value; and addition and subtraction concepts, skills and problem solving. Beginning in grade 3, students will learn concepts, skills and problem solving for multiplication and division. This work will continue in grades 3, 4 and 5, preparing the way for work with ratios and proportions in grades 6 and 7.

Fluency Expectations or Examples of Culminating Standards

3.OA.7 Students fluently multiply and divide within 100. By the end of grade 3, they know all products of two one-digit numbers from memory.

3.NBT.2 Students fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (Although **3.OA.7** and **3.NBT.2** are both fluency standards, these two standards do not represent equal investments of time in grade 3. Note that students in grade 2 were already adding and subtracting within 1000, just not fluently. That makes **3.NBT.2** a relatively small and incremental expectation. By contrast, multiplication and division are new in grade 3, and meeting the multiplication and division fluency standard **3.OA.7** with understanding is a major portion of students' work in grade 3.)

Examples of Major Within-Grade Dependencies

- Students must begin work with multiplication and division (**3.OA**) at or near the very start of the year to allow time for understanding and fluency to develop. Note that area models for products are an important part of this process (**3.MD.7**). Hence, work on concepts of area (**3.MD.5–6**) should likely begin at or near the start of the year as well.

Examples of Opportunities for Connections among Standards, Clusters or Domains

- Students' work with partitioning shapes (**3.G.2**) relates to visual fraction models (**3.NF**).

- Scaled picture graphs and scaled bar graphs (**3.MD.3**) can be a visually appealing context for solving multiplication and division problems.

Examples of Opportunities for In-Depth Focus

3.OA.3 Word problems involving equal groups, arrays and measurement quantities can be used to build students' understanding of and skill with multiplication and division, as well as to allow students to demonstrate their understanding of and skill with these operations.

3.OA.7 Finding single-digit products and related quotients is a required fluency for grade 3. Reaching fluency will take much of the year for many students. These skills and the understandings that support them are crucial; students will rely on them for years to come as they learn to multiply and divide with multidigit whole numbers and to add, subtract, multiply and divide with fractions. After multiplication and division situations have been established,

reasoning about patterns in products (e.g., products involving factors of 5 or 9) can help students remember particular products and quotients. Practice — and if necessary, extra support — should continue all year for those who need it to attain fluency.

3.NF.2 Developing an understanding of fractions as numbers is essential for future work with the number system. It is critical that students at this grade are able to place fractions on a number line diagram and understand them as a related component of their ever-expanding number system.

3.MD.2 Continuous measurement quantities such as liquid volume, mass and so on are an important context for fraction arithmetic (cf. **4.NF.4c, 5.NF.7c, 5.NF.3**). In grade 3, students begin to get a feel for continuous measurement quantities and solve whole-number problems involving such quantities.

3.MD.7 Area is a major concept within measurement, and area models must function as a support for multiplicative reasoning in grade 3 and beyond.

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- Students learn and use strategies for finding products and quotients that are based on the properties of operations; for example, to find 4×7, they may recognize that $7 = 5 + 2$ and compute $4 \times 5 + 4 \times 2$. This is an example of seeing and making use of structure (**MP.7**). Such reasoning processes amount to brief arguments that students may construct and critique (**MP.3**).

- Students will analyze a number of situation types for multiplication and division, including arrays and measurement contexts. Extending their understanding of multiplication and division to these situations requires that they make sense of problems and persevere in solving them (**MP.1**), look for and make use of structure (**MP.7**) as they model these situations with mathematical forms (**MP.4**), and attend to precision (**MP.6**) as they distinguish different kinds of situations over time (**MP.8**).

Content Emphases by Cluster[70]

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical

[70] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

education and will therefore be eligible for inclusion on the PARCC assessment. However, the assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given following the table on the next page for ways to connect the Supporting to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it, in ways that foster greater focus and coherence.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Operations and Algebraic Thinking	
■	**Represent and solve problems involving multiplication and division.**
■	**Understand properties of multiplication and the relationship between multiplication and division.**
■	**Multiply and divide within 100.**
■	**Solve problems involving the four operations, and identify and explain patterns in arithmetic.**
Number and Operations in Base Ten	
○	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**
Number and Operations — Fractions	
■	**Develop understanding of fractions as numbers.**
Measurement and Data	
■	**Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.**
▣	**Represent and interpret data.**
■	**Geometric measurement: understand concepts of area and relate area to multiplication and addition.**
○	**Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.**
Geometry	
▣	**Reason with shapes and their attributes.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Represent and interpret data: Students multiply and divide to solve problems using information presented in scaled bar graphs (**3.MD.3**). Pictographs and scaled bar graphs are a visually appealing context for one- and two-step word problems.

- Reason with shapes and their attributes: Work toward meeting **3.G.2** should be positioned in support of area measurement and understanding of fractions.

Examples of Key Advances from Grade 3 to Grade 4

- In grade 3, students studied multiplication in terms of equal groups, arrays and area. In grade 4, students extend their concept of multiplication to make multiplicative comparisons (**4.OA.1**).[71]

- Students in grade 4 apply and extend their understanding of the meanings and properties of addition and subtraction of whole numbers to extend addition and subtraction to fractions (**4.NF.3**).[72]

- Fraction equivalence is an important theme within the standards that begins in grade 3. In grade 4, students extend their understanding of fraction equivalence to the general case, $a/b = (n \times a)/(n \times b)$ (**3.NF.3** $\rightarrow$ **4.NF.1**).[73] They apply this understanding to compare fractions in the general case (**3.NF.3d** $\rightarrow$ **4.NF.2**).

- Students in grade 4 apply and extend their understanding of the meanings and properties of multiplication of whole numbers to multiply a fraction by a whole number (**4.NF.4**).

- Students in grade 4 begin using the four operations to solve word problems involving measurement quantities such as liquid volume, mass and time (**4.MD.2**).

- Students combine their understanding of the meanings and properties of multiplication and division with their understanding of base-ten units to begin to multiply and divide multidigit numbers (**4.NBT.5–6**; this builds on work done in grade 3, cf. **3.NBT.3**).

- Students generalize their previous understanding of place value for multidigit whole numbers (**4.NBT.1–3**). This supports their work in multidigit multiplication and division, carrying forward into grade 5, when students will extend place value to decimals.

Fluency Expectations or Examples of Culminating Standards

4.NBT.4 Students fluently add and subtract multidigit whole numbers using the standard algorithm.

Examples of Major Within-Grade Dependencies

- Students' work with decimals (**4.NF.5–7**) depends to some extent on concepts of fraction equivalence and elements of fraction arithmetic. Students express fractions with a denominator of 10 as an equivalent fraction with a denominator of 100; comparisons of decimals require that students use similar reasoning to comparisons with fractions.

- Standard **4.MD.2** refers to using the four operations to solve word problems involving

[71] In an additive comparison problem (grades 1–2), the underlying question is *what amount would be added to one quantity to result in the other?* In a multiplicative comparison problem, the underlying question is *what factor would multiply one quantity to result in the other?*

[72] This work is limited to equal denominators in grade 4 to give students more time to build their understanding of fraction equivalence, before adding and subtracting unlike denominators in grade 5.

[73] Students who can generate equivalent fractions can also develop strategies for adding fractions with different denominators, but this is not a requirement in grade 4.

measurement quantities such as liquid volume, mass, time and so on. Some parts of this standard could be met earlier in the year (such as using whole-number multiplication to express measurements given in a larger unit in terms of a smaller unit — see also **4.MD.1**), while others might be met only by the end of the year (such as word problems involving addition and subtraction of fractions or multiplication of a fraction by a whole number — see also **4.NF.3d** and **4.NF.4c**).

- Standard **4.MD.7** refers to word problems involving unknown angle measures. Before this standard can be met, students must understand concepts of angle measure (**4.MD.5**) and, presumably, gain some experience measuring angles (**4.MD.6**). Before that can happen, students must have some familiarity with the geometric terms that are used to define angles as geometric shapes (**4.G.1**).

Examples of Opportunities for Connections among Standards, Clusters or Domains

- The work that students do with units of measure (**4.MD.1–2**) and with multiplication of a fraction by a whole number (**4.NF.4**) can be connected to the idea of "times as much" in multiplication (**4.OA.1**).

- Addition of fractions (**4.NF.3**) and concepts of angle measure (**4.MD.5a and 4.MD.7**) are connected in that a one-degree measure is a fraction of an entire rotation and that adding angle measures together is adding fractions with a denominator of 360.

Examples of Opportunities for In-Depth Focus

4.NBT.5 When students work toward meeting this standard, they combine prior understanding of multiplication with deepening understanding of the base-ten system of units to express the product of two multidigit numbers as another multidigit number. This work will continue in grade 5 and culminate in fluency with the standard algorithms in grade 6.

4.NBT.6 When students work toward meeting this standard, they combine prior understanding of multiplication and division with deepening understanding of the base-ten system of units to find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors. This work will develop further in grade 5 and culminate in fluency with the standard algorithms in grade 6.

4.NF.1 Extending fraction equivalence to the general case is necessary to extend arithmetic from whole numbers to fractions and decimals.

4.NF.3 This standard represents an important step in the multigrade progression for addition and subtraction of fractions. Students extend their prior understanding of addition and subtraction to add and subtract fractions with like denominators by thinking of adding or subtracting so many unit fractions.

4.NF.4 This standard represents an important step in the multigrade progression for multiplication and division of fractions. Students extend their developing understanding of multiplication to multiply a fraction by a whole number.

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect

content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- When students decompose numbers into sums of multiples of base-ten units to multiply them (**4.NBT.5**), they are seeing and making use of structure (**MP.7**). As they illustrate and explain the calculation by using physical or drawn models, they are modeling (MP.4), using appropriate drawn tools strategically (MP.5) and attending to precision (MP.6) as they use base-ten units in the appropriate places.

- To compute and interpret remainders in word problems (**4.OA.3**), students must reason abstractly and quantitatively (**MP.2**), make sense of problems (MP.1), and look for and express regularity in repeated reasoning (MP.8) as they search for the structure (MP.7) in problems with similar interpretations of remainders.

Content Emphases by Cluster[74]

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical education and will therefore be eligible for inclusion on the PARCC assessment. However, the assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given following the table for ways to connect the Supporting to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it, in ways that foster greater focus and coherence.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Operations and Algebraic Thinking	
■	**Use the four operations with whole numbers to solve problems.**
▣	**Gain familiarity with factors and multiples.**
○	**Generate and analyze patterns.**
Number and Operations in Base Ten	
■	**Generalize place value understanding for multi-digit whole numbers.**
■	**Use place value understanding and properties of operations to perform multi-digit arithmetic.**
Number and Operations — Fractions	
■	**Extend understanding of fraction equivalence and ordering.**
■	**Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.**
■	**Understand decimal notation for fractions, and compare decimal fractions.**

[74] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

Measurement and Data

- **Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**
- **Represent and interpret data.**
- **Geometric measurement: understand concepts of angle and measure angles.**

Geometry

- **Draw and identify lines and angles, and classify shapes by properties of their lines and angles.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Gain familiarity with factors and multiples: Work in this cluster supports students' work with multidigit arithmetic as well as their work with fraction equivalence.
- Represent and interpret data: The standard in this cluster requires students to use a line plot to display measurements in fractions of a unit and to solve problems involving addition and subtraction of fractions, connecting it directly to the Number and Operations — Fractions clusters.

Examples of Key Advances from Grade 4 to Grade 5

- In grade 5, students will integrate decimal fractions more fully into the place value system (**5.NBT.1–4**). By thinking about decimals as sums of multiples of base-ten units, students begin to extend algorithms for multidigit operations to decimals (**5.NBT.7**).
- Students use their understanding of fraction equivalence and their skill in generating equivalent fractions as a strategy to add and subtract fractions, including fractions with unlike denominators.
- Students apply and extend their previous understanding of multiplication to multiply a fraction or whole number by a fraction (**5.NF.4**). They also learn the relationship between fractions and division, allowing them to divide any whole number by any nonzero whole number and express the answer in the form of a fraction or mixed number (**5.NF.3**). And they apply and extend their previous understanding of multiplication and division to divide a unit fraction by a whole number or a whole number by a unit fraction.[75]
- Students extend their grade 4 work in finding whole-number quotients and remainders to the case of two-digit divisors (**5.NBT.6**).
- Students continue their work in geometric measurement by working with volume as an attribute of solid figures and as a measurement quantity (**5.MD.3–5**).
- Students build on their previous work with number lines to use two perpendicular number lines to define a coordinate system (**5.G.1–2**).

Fluency Expectations or Examples of Culminating Standards

5.NBT.5 Students fluently multiply multidigit whole numbers using the standard algorithm.

Examples of Major Within-Grade Dependencies

- Understanding that in a multidigit number, a digit in one place represents $1/10$ of what it represents in the place to its left (**5.NBT.1**) is an example of multiplying a quantity by a fraction (**5.NF.4**).

[75] Students able to multiply fractions in general can develop strategies to divide fractions in general by reasoning about the relationship between multiplication and division. But the division of a fraction by a fraction is not a requirement in this grade.

Examples of Opportunities for Connections among Standards, Clusters or Domains

- The work that students do in multiplying fractions extends their understanding of the operation of multiplication. For example, to multiply $a/b \times q$ (where q is a whole number or a fraction), students can interpret $a/b \times q$ as meaning a parts of a partition of q into b equal parts (**5.NF.4a**). This interpretation of the product leads to a product that is less than, equal to or greater than q depending on whether $a/b < 1$, $a/b = 1$ or $a/b > 1$, respectively (**5.NF.5**).

- Conversions within the metric system represent an important practical application of the place value system. Students' work with these units (**5.MD.1**) can be connected to their work with place value (**5.NBT.1**).

Examples of Opportunities for In-Depth Focus

5.NBT.1 The extension of the place value system from whole numbers to decimals is a major intellectual accomplishment involving understanding and skill with base-ten units and fractions.

5.NBT.6 The extension from one-digit divisors to two-digit divisors requires care. This is a major milestone along the way to reaching fluency with the standard algorithm in grade 6 (**6.NS.2**).

5.NF.2 When students meet this standard, they bring together the threads of fraction equivalence (grades 3–5) and addition and subtraction (grades K–4) to fully extend addition and subtraction to fractions.

5.NF.4 When students meet this standard, they fully extend multiplication to fractions, making division of fractions in grade 6 (**6.NS.1**) a near target.

5.MD.5 Students work with volume as an attribute of a solid figure and as a measurement quantity. Students also relate volume to multiplication and addition. This work begins a progression leading to valuable skills in geometric measurement in middle school.

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- When students break divisors and dividends into sums of multiples of base-ten units (**5.NBT.6**), they are seeing and making use of structure (**MP.7**) and attending to precision (**MP.6**). Initially for most students, multidigit division problems take time and effort, so they also require perseverance (**MP.1**) and looking for and expressing regularity in repeated reasoning (MP.8).

- When students explain patterns in the number of zeros of the product when multiplying a number by powers of 10 (**5.NBT.2**), they have an opportunity to look for and express regularity in repeated reasoning (**MP.8**). When they use these patterns in division, they are making sense of problems (MP.1) and reasoning abstractly and quantitatively (MP.2).

- When students show that the volume of a right rectangular prism is the same as would be found by multiplying the side lengths (**5.MD.5**), they also have an opportunity to look for and express

regularity in repeated reasoning (**MP.8**). They attend to precision (MP.6) as they use correct length or volume units, and they use appropriate tools strategically (MP.5) as they understand or make drawings to show these units.

Content Emphases by Cluster[76]

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical education and will therefore be eligible for inclusion on the PARCC assessment. However, the assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given following the table on the next page for ways to connect the Supporting to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it, in ways that foster greater focus and coherence.

[76] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Operations and Algebraic Thinking	
○	**Write and interpret numerical expressions.**
○	**Analyze patterns and relationships.**
Number and Operations in Base Ten	
■	**Understand the place value system.**
■	**Perform operations with multi-digit whole numbers and with decimals to hundredths.**
Number and Operations — Fractions	
■	**Use equivalent fractions as a strategy to add and subtract fractions.**
■	**Apply and extend previous understandings of multiplication and division to multiply and divide fractions.**
Measurement and Data	
▣	**Convert like measurement units within a given measurement system.**
▣	**Represent and interpret data.**
■	**Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.**
Geometry	
○	**Graph points on the coordinate plane to solve real-world and mathematical problems.**
○	**Classify two-dimensional figures into categories based on their properties.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Convert like measurement units within a given measurement system: Work in these standards supports computation with decimals. For example, converting 5 cm to 0.05 m involves computation with decimals to hundredths.

- Represent and interpret data: The standard in this cluster provides an opportunity for solving real-world problems with operations on fractions, connecting directly to both Number and Operations — Fractions clusters.

Examples of Key Advances from Grade 5 to Grade 6

- Students' prior understanding of and skill with multiplication, division and fractions contribute to their study of ratios, proportional relationships and unit rates (**6.RP**).
- Students begin using properties of operations systematically to work with variables, variable expressions and equations (**6.EE**).
- Students extend their work with the system of rational numbers to include using positive and negative numbers to describe quantities (**6.NS.5**), extending the number line and coordinate plane to represent rational numbers and ordered pairs (**6.NS.6**), and understanding ordering and absolute value of rational numbers (**6.NS.7**).
- Having worked with measurement data in previous grades, students begin to develop notions of statistical variability, summarizing and describing distributions (**6.SP**).

Fluency Expectations or Examples of Culminating Standards

6.NS.2 Students fluently divide multidigit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.

6.NS.3 Students fluently add, subtract, multiply and divide multidigit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations — Fractions.

6.NS.1 Students interpret and compute quotients of fractions and solve word problems involving division of fractions by fractions. This completes the extension of operations to fractions.

Examples of Major Within-Grade Dependencies

- Equations of the form $px = q$ (**6.EE.7**) are unknown-factor problems; the solution will sometimes be the quotient of a fraction by a fraction (**6.NS.1**).
- Solving problems by writing and solving equations (**6.EE.7**) involves not only an appreciation of how variables are used (**6.EE.6**) and what it means to solve an equation (**6.EE.5**) but also some ability to write, read and evaluate expressions in which letters stand for numbers (**6.EE.2**).
- Students must be able to place rational numbers on a number line (**6.NS.7**) before they can place ordered pairs of rational numbers on a coordinate plane (**6.NS.8**). The former standard about ordering rational numbers is much more fundamental.

Examples of Opportunities for Connections among Standards, Clusters or Domains

- Students' work with ratios and proportional relationships (**6.RP**) can be combined with their work in representing quantitative relationships between dependent and independent variables (**6.EE.9**).
- Plotting rational numbers in the coordinate plane (**6.NS.8**) is part of analyzing proportional relationships (**6.RP.3a, 7.RP.2**) and will become important for studying linear equations (**8.EE.8**)

and graphs of functions (**8.F**).[77]

- Students use their skill in recognizing common factors (**6.NS.4**) to rewrite expressions (**6.EE.3**).

- Writing, reading, evaluating and transforming variable expressions (**6.EE.1**–**4**) and solving equations and inequalities (**6.EE.7–8**) can be combined with use of the volume formulas $V = lwh$ and $V = Bh$ (**6.G.2**).

- Working with data sets can connect to estimation and mental computation. For example, in a situation where there are 20 different numbers that are all between 8 and 10, one might quickly estimate the sum of the numbers as $9 \times 20 = 180$.

Examples of Opportunities for In-Depth Focus

6.RP.3 When students work toward meeting this standard, they use a range of reasoning and representations to analyze proportional relationships.

6.NS.1 This is a culminating standard for extending multiplication and division to fractions.

6.NS.8 When students work with rational numbers in the coordinate plane to solve problems, they combine and consolidate elements from the other standards in this cluster.

6.EE.3 By applying properties of operations to generate equivalent expressions, students use properties of operations that they are familiar with from previous grades' work with numbers — generalizing arithmetic in the process.

6.EE.7 When students write equations of the form $x + p = q$ and $px = q$ to solve real-world and mathematical problems, they draw on meanings of operations that they are familiar with from previous grades' work. They also begin to learn algebraic approaches to solving problems.[78]

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- Reading and transforming expressions involves seeing and making use of structure (**MP.7**). Relating expressions to situations requires making sense of problems (MP.1) and reasoning abstractly and quantitatively (MP.2).

- The sequence of steps in the solution of an equation is a logical argument that students can

[77] While not required by the standards, it might be considered valuable to expose students to time series data and to time graphs as an appealing way to work with rational numbers in the coordinate plane (**6.NS.8**). For example, students could create time graphs of temperature measured each hour over a 24-hour period in a place where, to ensure a strong connection to rational numbers, temperature values might cross from positive to negative during the night and back to positive the next day.

[78] For example, suppose Daniel went to visit his grandmother, who gave him \$5.50. Then he bought a book costing \$9.20 and had \$2.30 left. To find how much money he had before visiting his grandmother, an algebraic approach leads to the equation $x + 5.50 - 9.20 = 2.30$. An arithmetic approach without using variables at all would be to begin with 2.30, then add 9.20, then subtract 5.50. This yields the desired answer, but students will eventually encounter problems in which arithmetic approaches are unrealistically difficult and algebraic approaches must be used.

construct and critique (**MP.3**). Such arguments require looking for and making use of structure (MP.7) and, over time, expressing regularity in repeated reasoning (MP.8).

- Thinking about the point (1, *r*) in a graph of a proportional relationship with unit rate *r* involves reasoning abstractly and quantitatively (**MP.2**). The graph models with mathematics (MP.4) and uses appropriate tools strategically (MP.5).

- Area, surface area and volume present modeling opportunities (**MP.4**) and require students to attend to precision with the types of units involved (MP.6).

- Students think with precision (**MP.6**) and reason quantitatively (**MP.2**) when they use variables to represent numbers and write expressions and equations to solve a problem (**6.EE.6–7**).

- Working with data gives students an opportunity to use appropriate tools strategically (**MP.5**). For example, spreadsheets can be powerful for working with a data set with dozens or hundreds of data points.

Content Emphases by Cluster[79]

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

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In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given following the table for ways to connect the Supporting to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it, in ways that foster greater focus and coherence.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Ratios and Proportional Reasoning	
■	**Understand ratio concepts and use ratio reasoning to solve problems.**
The Number System	
■	**Apply and extend previous understandings of multiplication and division to divide fractions by fractions.**
○	**Compute fluently with multi-digit numbers and find common factors and multiples.**
■	**Apply and extend previous understandings of numbers to the system of rational numbers.**
Expressions and Equations	
■	**Apply and extend previous understandings of arithmetic to algebraic expressions.**
■	**Reason about and solve one-variable equations and inequalities.**

[79] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

- **Represent and analyze quantitative relationships between dependent and independent variables.**

Geometry

- **Solve real-world and mathematical problems involving area, surface area and volume.**

Statistics and Probability

- **Develop understanding of statistical variability.**
- **Summarize and describe distributions.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Solve real-world and mathematical problems involving area, surface area and volume: In this cluster, students work on problems with areas of triangles and volumes of right rectangular prisms, which connects to work in the Expressions and Equations domain. In addition, another standard within this cluster asks students to draw polygons in the coordinate plane, which supports other work with the coordinate plane in The Number System domain.

Examples of Key Advances from Grade 6 to Grade 7

- In grade 6, students learned about negative numbers and the kinds of quantities they can be used to represent; they also learned about absolute value and ordering of rational numbers, including in real-world contexts. In grade 7, students will add, subtract, multiply and divide within the system of rational numbers.

- Students grow in their ability to analyze proportional relationships. They decide whether two quantities are in a proportional relationship (**7.RP.2a**); they work with percents, including simple interest, percent increase and decrease, tax, markups and markdowns, gratuities and commission, and percent error (**7.RP.3**); they analyze proportional relationships and solve problems involving unit rates associated with ratios of fractions (e.g., if a person walks $1/2$ mile in each $1/4$ hour, the unit rate is the complex fraction $\frac{1}{2} / \frac{1}{4}$ miles per hour or 2 miles per hour) (**7.RP.1**); and they analyze proportional relationships in geometric figures (**7.G.1**).

- Students solve a variety of problems involving angle measure, area, surface area and volume (**7.G.4–6**).

Fluency Expectations or Examples of Culminating Standards

7.EE.3 Students solve multistep problems posed with positive and negative rational numbers in any form (whole numbers, fractions and decimals), using tools strategically. This work is the culmination of many progressions of learning in arithmetic, problem solving and mathematical practices.

7.EE.4 In solving word problems leading to one-variable equations of the form $px + q = r$ and $p(x + q) = r$, students solve the equations fluently. This will require fluency with rational number arithmetic (**7.NS.1–3**), as well as fluency to some extent with applying properties operations to rewrite linear expressions with rational coefficients (**7.EE.1**).

7.NS.1–2 Adding, subtracting, multiplying and dividing rational numbers is the culmination of numerical work with the four basic operations. The number system will continue to develop in grade 8, expanding to become the real numbers by the introduction of irrational numbers, and will develop further in high school, expanding to become the complex numbers with the introduction of imaginary numbers. Because there are no specific standards for rational number arithmetic in later grades and because so much other work in grade 7 depends on rational number arithmetic (see below), fluency with rational number arithmetic should be the goal in grade 7.

Examples of Major Within-Grade Dependencies

- Meeting standard **7.EE.3** in its entirety will involve using rational number arithmetic (**7.NS.1–3**) and percents (**7.RP.3**). Work leading to meeting this standard could be organized as a recurring activity that tracks the students' ongoing acquisition of new skills in rational number arithmetic and percents.

- Because rational number arithmetic (**7.NS.1–3**) underlies the problem solving detailed in **7.EE.3** as well as the solution of linear expressions and equations (**7.EE.1–2, 4**), this work should likely begin at or near the start of the year.

- The work leading to meeting standards **7.EE.1–4** could be divided into two phases, one centered on addition and subtraction (e.g., solving $x + q = r$) in relation to rational number addition and subtraction (**7.NS.1**) and another centered on multiplication and division (e.g., solving $px + q = r$ and $p(x + q) = r$) in relation to rational number multiplication and division (**7.NS.2**).

Examples of Opportunities for Connections among Standards, Clusters or Domains

- Students use proportional reasoning when they analyze scale drawings (**7.G.1**).

- Students use proportional reasoning and percentages when they extrapolate from random samples and use probability (**7.SP.6, 8**).

Examples of Opportunities for In-Depth Focus

7.RP.2 Students in grade 7 grow in their ability to recognize, represent and analyze proportional relationships in various ways, including by using tables, graphs and equations.

7.NS.3 When students work toward meeting this standard (which is closely connected to **7.NS.1** and **7.NS.2**), they consolidate their skill and understanding of addition, subtraction, multiplication and division of rational numbers.

7.EE.3 This is a major capstone standard for arithmetic and its applications.

7.EE.4 Work toward meeting this standard builds on the work that led to meeting **6.EE.7** and prepares students for the work that will lead to meeting **8.EE.7**.

7.G.6 Work toward meeting this standard draws together grades 3–6 work with geometric measurement.

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- When students compare arithmetic and algebraic solutions to the same problem (**7.EE.4a**), they are identifying correspondences between different approaches (**MP.1**).

- Solving an equation such as $4 = 8(x - {}^{1}/_{2})$ requires students to see and make use of structure (**MP.7**), temporarily viewing $x - {}^{1}/_{2}$ as a single entity.

- When students notice when given geometric conditions determine a unique triangle, more than one triangle or no triangle (**7.G.2**), they have an opportunity to construct viable arguments and critique the reasoning of others (**MP.3**). Such problems also present opportunities for using appropriate tools strategically (**MP.5**).

- Proportional relationships present opportunities for modeling (**MP.4**). For example, the number of people who live in an apartment building might be taken as proportional to the number of stories in the building for modeling purposes.

Content Emphases by Cluster[80]

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[80] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

Ratios and Proportional Reasoning	
■	**Analyze proportional relationships and use them to solve real-world and mathematical problems.**
The Number System	
■	**Apply and extend previous understandings of operations with fractions to add, subtract, multiply and divide rational numbers.**
Expressions and Equations	
■	**Use properties of operations to generate equivalent expressions.**
■	**Solve real-life and mathematical problems using numerical and algebraic expressions and equations.**
Geometry	
○	**Draw, construct and describe geometrical figures and describe the relationships between them.**
○	**Solve real-life and mathematical problems involving angle measure, area, surface area and volume.**
Statistics and Probability	
▣	**Use random sampling to draw inferences about a population.**
○	**Draw informal comparative inferences about two populations.**
▣	**Investigate chance processes and develop, use, and evaluate probability models.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Use random sampling to draw inferences about a population: The standards in this cluster represent opportunities to apply percentages and proportional reasoning. To make inferences about a population, one needs to apply such reasoning to the sample and the entire population.

- Investigate chance processes and develop, use and evaluate probability models: Probability models draw on proportional reasoning and should be connected to the major work in those standards.

Examples of Key Advances from Grade 7 to Grade 8

- Students build on previous work with proportional relationships, unit rates and graphing to connect these ideas and understand that the points (x, y) on a nonvertical line are the solutions of the equation $y = mx + b$, where m is the slope of the line as well as the unit rate of a proportional relationship (in the case $b = 0$). Students also formalize their previous work with linear relationships by working with functions — rules that assign to each input exactly one output.

- By working with equations such as $x^2 = 2$ and in geometric contexts such as the Pythagorean theorem, students enlarge their concept of number beyond the system of rationals to include irrational numbers. They represent these numbers with radical expressions and approximate these numbers with rationals.

Fluency Expectations or Examples of Culminating Standards

8.EE.7 Students have been working informally with one-variable linear equations since as early as kindergarten. This important line of development culminates in grade 8 with the solution of general one-variable linear equations, including cases with infinitely many solutions or no solutions as well as cases requiring algebraic manipulation using properties of operations. Coefficients and constants in these equations may be any rational numbers.

8.G.9 When students learn to solve problems involving volumes of cones, cylinders and spheres — together with their previous grade 7 work in angle measure, area, surface area and volume (**7.G.4–6**) — they will have acquired a well-developed set of geometric measurement skills. These skills, along with proportional reasoning (**7.RP**) and multistep numerical problem solving (**7.EE.3**), can be combined and used in flexible ways as part of modeling during high school — not to mention after high school for college and careers.[81]

Examples of Major Within-Grade Dependencies

- An important development takes place in grade 8 when students make connections between proportional relationships, lines and linear equations (**8.EE**, **second cluster**). Making these connections depends on prior grades' work, including **7.RP.2** and **6.EE.9**. There is also a major dependency within grade 8 itself: The angle-angle criterion for triangle similarity underlies the fact that a nonvertical line in the coordinate plane has equation $y = mx + b$.[82] Therefore, students must do work with congruence and similarity (**8.G.1–5**) before they are able to justify the connections among proportional relationships, lines and linear equations. Hence the indicated geometry work should likely begin at or near the very start of the year.[83]

- Much of the work of grade 8 involves lines, linear equations and linear functions (**8.EE.5–8**; **8.F.3–4**; **8.SP.2–3**). Irrational numbers, radicals, the Pythagorean theorem and volume (**8.NS.1–2**; **8.EE.2**; **8.G.6–9**) are nonlinear in nature. Curriculum developers might choose to address linear and

[81] See "Appendix A: Lasting Achievements in K–8."
[82] See page 12 of the *Progression for Expressions and Equations:* http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf.
[83] Note that the Geometry cluster "Understand congruence and similarity using physical models, transparencies or geometry software" supports high school work with congruent triangles and congruent figures.

nonlinear bodies of content somewhat separately. An exception, however, might be that when addressing functions, pervasively treating linear functions as separate from nonlinear functions might obscure the concept of function *per se*. There should also be sufficient treatment of nonlinear functions to avoid giving students the misleading impression that all functional relationships are linear (see also **7.RP.2a**).

Examples of Opportunities for Connections among Standards, Clusters or Domains

- Students' work with proportional relationships, lines, linear equations and linear functions can be enhanced by working with scatter plots and linear models of association in bivariate measurement data (**8.SP.1–3**).

Examples of Opportunities for In-Depth Focus

8.EE.5 When students work toward meeting this standard, they build on grades 6–7 work with proportions and position themselves for grade 8 work with functions and the equation of a line.

8.EE.7 This is a culminating standard for solving one-variable linear equations.

8.EE.8 When students work toward meeting this standard, they build on what they know about two-variable linear equations, and they enlarge the varieties of real-world and mathematical problems they can solve.

8.F.2 Work toward meeting this standard repositions previous work with tables and graphs in the new context of input/output rules.

8.G.7 The Pythagorean theorem is useful in practical problems, relates to grade-level work in irrational numbers and plays an important role mathematically in coordinate geometry in high school.

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

Mathematical practices should be evident *throughout* mathematics instruction and connected to all of the content areas highlighted above, as well as all other content areas addressed at this grade level. Mathematical tasks (short, long, scaffolded and unscaffolded) are an important opportunity to connect content and practices. Some brief examples of how the content of this grade might be connected to the practices follow.

- When students convert a fraction such as $1/7$ to a decimal, they might notice that they are repeating the same calculations and conclude that the decimal repeats. Similarly, by repeatedly checking whether points are on a line through (1, 2) with slope 3, students might abstract the equation of the line in the form $(y - 2)/(x - 1) = 3$. In both examples, students look for and express regularity in repeated reasoning (MP.8).

- The Pythagorean theorem can provide opportunities for students to construct viable arguments and critique the reasoning of others (e.g., if a student in the class seems to be confusing the theorem with its converse) (MP.3).

- Solving an equation such as $3(x - 1/2) = x + 2$ requires students to see and make use of structure (MP.7).

- Much of the mathematics in grade 8 lends itself to modeling (MP.4). For example, standard **8.F.4**

involves modeling linear relationships with functions.

- Scientific notation (**8.EE.4**) presents opportunities for strategically using appropriate tools (**MP.5**). For example, the computation $(1.73 \times 10^{-4}) \cdot (1.73 \times 10^{-5})$ can be done quickly with a calculator by squaring 1.73 and then using properties of exponents to determine the exponent of the product by inspection.

Content Emphases by Cluster[84]

Not all of the content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical education and will therefore be eligible for inclusion on the PARCC assessment. However, the assessments will strongly focus where the standards strongly focus.

In addition to identifying the Major, Additional and Supporting Clusters for each grade, suggestions are given following the table on the next page for ways to connect the Supporting to the Major Clusters of the grade. Thus, rather than suggesting even inadvertently that some material not be taught, there is direct advice for teaching it, in ways that foster greater focus and coherence.

[84] Refer to pages 12–14 for further explanation of the cluster-level emphases. Refer also to the Common Core State Standards for Mathematics for the standards that fall within each cluster.

Key: ■ Major Clusters; ▣ Supporting Clusters; ○ Additional Clusters

The Number System

▣ **Know that there are numbers that are not rational, and approximate them by rational numbers.**

Expressions and Equations

■ **Work with radicals and integer exponents.**

■ **Understand the connections between proportional relationships, lines and linear equations.**

■ **Analyze and solve linear equations and pairs of simultaneous linear equations.**

Functions

■ **Define, evaluate and compare functions.**

▣ **Use functions to model relationships between quantities.**

Geometry

■ **Understand congruence and similarity using physical models, transparencies or geometry software.**

■ **Understand and apply the Pythagorean Theorem.**

○ **Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.**

Statistics and Probability

▣ **Investigate patterns of association in bivariate data.**

Examples of Linking Supporting Clusters to the Major Work of the Grade

- Know that there are numbers that are not rational, and approximate them by rational numbers: Work with the number system in this grade (**8.NS.1–2**) is intimately related to work with radicals (**8.EE.2**), and both of these may be connected to the Pythagorean theorem (**8.G**, **second cluster**) as well as to volume problems (**8.G.9**), e.g., in which a cube has known volume but unknown edge lengths.

- Use functions to model relationships between quantities: The work in this cluster involves functions for modeling linear relationships and rate of change/initial value, which supports work with proportional relationships and setting up linear equations.

- Investigate patterns of association in bivariate data: Looking for patterns in scatterplots and using linear models to describe data are directly connected to the work in the Expressions and Equations clusters. Together, these represent a connection to the Standard for Mathematical Practice, MP.4: Model with mathematics.

Introduction to the High School Standards Analysis

The Standards for Mathematical Practice are common to both high school and grades K–8, but the Standards for Mathematical Content are organized differently in high school than in grades K–8. In grades K–8, the content standards are organized in a yearly sequence. In high school, the content standards are organized not by year but rather by conceptual category (Functions, Algebra, etc.).

The Model Content Frameworks provide an analysis of the high school standards using terms similar to those used for the grades 3–8 standards analyses. This is done by providing insight into the high school standards using possible courses: Algebra I-Geometry-Algebra II and Mathematics I-Mathematics II-Mathematics III. These potential courses provide a broad overview of content emphasis and connections, as well as the role that the Standards for Mathematical Practice could play. They should not be seen as fully formed courses.

Previous drafts of the Model Content Frameworks for mathematics provided little or no detail about high school courses based on the standards. This version adds more detail about possible courses, including suggesting areas of emphasis in the course introductions, the section on key advances and the section on connections to practices for each course, but it does not specify full details of the courses. The Model Content Frameworks provide initial, high-level guidance.[85]

There are two sections to the high school standards analysis:

1. **General analysis** of the high school standards: analysis that bears on all courses and/or is independent of any particular organization of the standards into courses.

2. **Course-specific analysis** of the high school standards: analysis presented with a view toward two possible high school course sequences.

Please note: The reader is advised to have a copy of *Common Core State Standards for Mathematics* available for use in conjunction with this document. The Model Content Frameworks paraphrase the standards and in some cases refer to standards by code only; readers will need to refer to the standards document for exact language.

[85] Note that the courses outlined in the Model Content Frameworks were informed by, but are not identical to, Appendix A of the Common Core State Standards.

Examples of Opportunities for Connections among Standards, Clusters, Domains or Conceptual Categories

- The standards identify a number of connections among conceptual categories.
    - *Connections among Algebra, Functions and Modeling*. Expressions can define functions; determining an output value for a particular input sometimes involves evaluating an expression. Equivalent expressions on the same domain define the same function. Asking when two different functions have the same value for the same input leads to an equation (e.g., for what x does $x^3 = 2x + 5$?); graphing the two functions allows for finding approximate solutions of the equation. Converting a verbal description to an equation, inequality or system of these is an essential skill in modeling. Because functions often describe relationships among quantities, they are frequently used in modeling. Sometimes functions are defined by a recursive process, which can be modeled effectively using a spreadsheet or other technology.
    - *Connections between Geometry and Algebra*. The correspondence between numerical coordinates and geometric points allows methods from algebra to be applied to geometry and vice versa. The solution set of an equation becomes a geometric curve, making visualization a tool for doing and understanding algebra. Geometric shapes can be described by equations, making algebraic manipulation a tool for geometric understanding, modeling and proof. Geometric transformations provide examples of how the notion of function can be used in geometric contexts; conversely, the effect of replacing f(x) by f(x) + k, k f(x), f(kx) and f(x + k) for specific positive and negative values of k can be interpreted geometrically in terms of transformations on the graphs of the functions.
    - *Connections among Statistics, Functions and Modeling*. Functions may be used to describe data; if the data suggest a linear relationship, the relationship can be modeled with a regression line, and its strength and direction can be expressed through a correlation coefficient.
- The standards also identify a number of connections among standards, clusters and domains.
    - *Connections among standards within Algebra and Functions*. A solid understanding of the correspondence between an equation in two variables and its Cartesian graph is the underpinning for the techniques for graphing lines and quadratics, and it helps students understand what is meant by the "graph of a function." Creating equations and building functions helps students interpret these same objects.
    - *Connections among standards within Geometry.* The progression from congruence to area to similarity can be used to put each of these topics on a logical footing: The basic assumptions that congruent figures have the same area and that area is invariant under finite dissection bring coherence to the formulas for calculating areas of polygonal regions. These formulas, along with results such as the fact that triangles with equal bases and heights have the same area, can be used to prove properties of dilations and similarity. The triangle similarity criteria are necessary to develop the trigonometry of right triangles.

- *Connections among standards within Statistics and Probability and Functions.* Study of linear associations in statistics and probability (S-ID.6c, 7) builds on students' understanding of linear relationships (cf. F-LE.1). Exploration of quadratic relationships in data on two measurement variables (S-ID.6) depends on understanding key features of a quadratic function and being able to interpret them in terms of a context (F-IF.4).

Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices

- When students use algebra and functions to model a situation, the symbolic calculations they use and the conclusions they draw from those calculations are examples of decontextualizing and contextualizing (reasoning abstractly and quantitatively, **MP.2**). For example, students looking for a general method of comparing two rate plans with different rates and startup costs ($R_1 = ax + b$, $R_2 = cx + d$) might find the crossover point by working symbolically to solve the equation $ax + b = cx + d$, obtaining the formal solution $x_{\text{crossover}} = (d - b)/(a - c)$. Still thinking symbolically, students can notice that the expression for $x_{\text{crossover}}$ is undefined when $a = c$. Returning to the context, students can see that this makes sense: Two rate plans with the same rate never cross; the better plan in this case is always the one with the lower startup cost. Returning again to the symbolic equation, students can see that in the case of equal rates ($a = c$), the equation for the crossover point reduces to $b = d$, an equation that is true for all x if and only if the two plans have the same startup cost … in which case they are the same plan.

- When students transform expressions purposefully, they are looking for and making use of structure (**MP.7**).

- When modeling a situation, students often can get started by working repetitively with numerical examples and then look for and express regularity in that repeated reasoning by writing equations or functions (**MP.8**).

- Throughout high school, students construct viable arguments and critique the reasoning of others (**MP.3**). As in geometry, important questions in advanced algebra cannot be answered definitively by checking evidence. Results about all objects of a certain type — the factor theorem for polynomials, for example — require general arguments. And deciding whether two functions are equal on an infinite set cannot be settled by looking at tables or graphs; it requires a deeper argument.

- Capturing a situation with precise language (**MP.6**) can be a critical step toward modeling that situation mathematically. For example, when investigating loan payments, if students can articulate something like, "What you owe at the end of a month is what you owed at the start of the month, plus $1/12$ of the yearly interest on that amount, minus the monthly payment," they are well along a path that will let them construct a recursively defined function for calculating loan payments.

- There are many opportunities in high school to use appropriate tools strategically (**MP.5**). For example:

  - Students might use graphing calculators or software to gain understanding of the important fact that the graph of an equation in two variables often forms a curve (which could be a line) (**A-**

REI.10). Students might also use graphing calculators and/or graphing software to gain understanding of the important technique of looking for solutions to equations of the form f(x) = g(x) by graphing the solutions of the equations y = f(x) and y = g(x) in the coordinate plane and looking for intersections of the graphs (**A-REI.11**).

- Students might use graphing calculators or software to experiment with cases of replacing a function f(x) by f(x) + k, k f(x), f(kx) and f(x + k) for specific positive and negative values of k (**F-BF.3**).
- Students might use spreadsheets or similar technology in modeling situations to compute and display recursively defined functions (e.g., a function that gives the balance B_n on a credit card after *n* months given the interest rate, starting balance and regular monthly payment) (**F-BF.1a; F-LE**).
- Students might use a computer algebra system to transform or experiment with algebraic expressions (A-APR.6).
- When making mathematical models, technology is valuable for varying assumptions, exploring consequences and comparing predictions with data (Common Core State Standards, page 72).
- Technology is usually necessary to work effectively with large data sets or with simulations having many iterations.
- As students progress in mathematics, they learn techniques that are valuable in a variety of settings. For example, the quadratic formula is a tool in the student's toolkit once it has ceased to become the target of instruction in itself. From then on, it is readily available to the student for use in applications or in reasoning about quadratic equations.

Examples of Content Standards that Apply to Two or More High School Courses

In the high school Standards for Mathematical Content, there are a number of individual content standards or clusters of standards that specify enduring understandings or recurrent themes, such as Seeing Structure in Expressions (**A-SSE**). Such standards have relevance throughout high school; they are not well thought of as "belonging" to any single high school course. In the charts that follow, several such standards are identified, and a few observations are made about how each standard particularly relates to two or more high school courses in both course sequences.

The standards:

A-REI.4: Solve quadratic equations in one variable.

a. Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form that has the same solutions. Derive the quadratic formula from this form.

b. Solve quadratic equations by inspection (e.g., for), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as *a* ± *bi* for real numbers *a* and *b*.

A-APR: Understand the relationship between zeros and factors of polynomials.

Algebra I (and Mathematics II)	Geometry (and Mathematics II)	Algebra II (and Mathematics III)
Students develop an array of techniques for solving quadratic equations, and they reason about the connections among them, which are based on the idea that different forms of an expression or equation facilitate seeing different features (A-SSE.3). They learn the method of completing the square, interpret it geometrically and use it to derive the quadratic formula, the method that is both general and efficient. Of the techniques for solving quadratic equations, factoring is the most versatile for solving polynomial equations. Factoring depends on the "zero product property" of the real numbers: If a product is 0, at least one of the factors must be 0. In this course, the technique of solving polynomial equations via factoring is applied to quadratic equations. But the principle is perfectly general. Thus, the connection between the linear factors of a polynomial and the zeros of the corresponding polynomial function is a theme that is central to the coherence of high school mathematics. And even in Algebra I, students can solve higher degree equations if they are given a head start on factorizations. For example, they can solve Note: Complex solutions are not emphasized in this course.	While these standards will not generally be emphasized in a Geometry course, completing the square arises again in equations of circles (G-GPE.1). Also, the factorization of a polynomial can reveal structural properties in geometric contexts. An example of this interplay comes from the problem of maximizing the area of a rectangle given a fixed perimeter. One approach to showing that a square does the job is to show how an rectangle can be dissected to fit inside a square of side-length ——. Abstracting from numerical examples, students are led to the algebraic identity —— —— This can be established by a variety of methods, including the factorization of the left-hand side as a difference of squares. This identity shows how far off a given rectangle is from the corresponding square, and it shows precisely when the "error" —— is 0. The identity can even be used to establish the arithmetic-geometric mean inequality: for non-negative real numbers *a* and *b*, —— , with equality if and only if *a* = *b*.	Students complete this standard by including in their repertoire the set of complex numbers, and they continue to use the all these techniques when quadratic factors arise in more general contexts of solving polynomial equations graphing polynomial functions. Factoring remains an important technique more broadly. This course introduces the operation of division with remainder for polynomials in one variable. An analysis of division has several applications that are core to advanced algebra. The most important application is to the factor and remainder theorems (A-APR.2). These theorems are the advancement of the study of solving quadratic equations as they apply to polynomials more generally. The factor theorem deepens the connection between factors of polynomials and solutions to equations that is stated in Algebra I. One of its many applications is that it can be used to show that a polynomial of degree *n* has at most *n* roots, and this implies the important result that a polynomial function of degree *n* is completely determined by *n* + 1 points on its graph.

The standards:

A-SSE.2: Use the structure of an expression to identify ways to rewrite it. *For example, see as , thus recognizing it as a difference of squares that can be factored as .*

A-SSE.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines.

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

c. Use the properties of exponents to transform expressions for exponential functions. ***For example the expression can be rewritten as to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.***

Algebra I	Geometry	Algebra II
Once students are accustomed to extending the basic rules of arithmetic to algebraic expressions, they can start to develop the knack for transforming expressions meaningfully. Consider the following expressions: Simplifying the first expression is a rote skill often called "collecting like terms." But all of these expressions allow use of the distributive property in exactly the same way. Seeing these as examples of the same idea is seeing structure through "chunking." And the last example is helpful grounding for factoring quadratics. By encouraging this habit, as students gain experience, they will begin to see a difference of squares embedded in , will see as and will see as , a quadratic in 5*x*. Writing as by completing the square shows that (for all real values of *x*) the expression is always greater than or equal to 25 and that it assumes that value only when . Factoring it as shows that the expression is zero only when or .	In geometry, students can see the structure of an expression in the classic geometric demonstrations of the Pythagorean theorem or the geometric justifications of completing the square. As another example, students can use geometric dissections to interpret and justify area formulas. Doing so for a trapezoid with base lengths and and with height *h* might lead to several different-looking expressions, such as: , , , These are algebraically equivalent, as students can show. Conversely, students can generate different forms of an expression and find dissections that lead to them.	The standards for Arithmetic with Polynomials and Rational Expressions (A-APR) can bring deeper insight into many of the ideas introduced in Algebra I about seeing structure in expressions. Examples like the one given in A-SSE.2 can be used to establish function equality. For example, the fact that implies that the two apparently different functions and are in fact the same function. The chunking technique finds many applications in Algebra II, ranging from factoring higher degree polynomials to establishing trigonometric identities. Completing the square from Algebra I can be put into a larger landscape. Completing the square and change of variable allows Algebra I students to see any quadratic as a transformation of . The same idea might allow Algebra II students to reduce any cubic to , or . These standards are about more than developing the skill of changing from one prescribed form to another; just as important is to develop the ability to see which transformation will produce something useful, which is part of the thrust of MP.7: Look for and make use of structure.

The standards:

A-SSE.2: Use the structure of an expression to identify ways to rewrite it. ***For example, see as , thus recognizing it as a difference of squares that can be factored as .***

A-SSE.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

a. Factor a quadratic expression to reveal the zeros of the function it defines.

b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

c. Use the properties of exponents to transform expressions for exponential functions. ***For example the expression can be rewritten as to***

reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

Mathematics I	Mathematics II	Mathematics III
Once students are accustomed to extending the basic rules of arithmetic to algebraic expressions, they can start to develop the knack for transforming expressions meaningfully. Consider the following expressions: Simplifying the first expression is a rote skill often called "collecting like terms." But all of these expressions allow use of the distributive property in exactly the same way. Seeing these as examples of the same idea is seeing structure through "chunking." And the last example is helpful grounding for factoring quadratics. In geometry contexts, students can use geometric dissections to interpret and justify area formulas. Doing so for a trapezoid with base lengths and and with height *h* might lead to several different-looking expressions, such as: , , , These are algebraically equivalent, as students can show. Conversely, students can generate different forms of an expression and find dissections that lead to them.	By encouraging the habit of seeing structure, as students gain experience, they will begin to see a difference of squares embedded in , will see as and will see as , a quadratic in 5*x*. Writing as by completing the square shows that (for all real values of *x*) the expression is always greater than or equal to 25 and that it assumes that value only when . Factoring it as shows that the expression is zero only when or . In geometry, students can see the structure of an expression in the classic geometric demonstrations of the Pythagorean theorem or the geometric justifications of completing the square.	The standards for Arithmetic with Polynomials and Rational Expressions (A-APR) can bring deeper insight into many of the ideas introduced in Algebra I about seeing structure in expressions. Examples like the one given in A-SSE.2 can be used to establish function equality. For example, the fact that implies that the two apparently different functions and are in fact the same function. The chunking technique finds many applications in Algebra II, ranging from factoring higher degree polynomials to establishing trigonometric identities. Completing the square from Algebra I can be put into a larger landscape. Completing the square and change of variable allows Algebra I students to see any quadratic as a transformation of . These standards are about more than developing the skill of changing from one prescribed form to another; just as important is to develop the ability to see which transformation will produce something useful, which is part of the thrust of MP.7: Look for and make use of structure.

The standards:
F-BF.3: Identify the effect on the graph of replacing *f(x)* by *f(x) + k, k f(x), f(kx)*, and *f(x + k)* for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Mathematics I (and Algebra I)	Mathematics II (and Algebra I)	Mathematics III (and Algebra II)
When students work with linear functions, they generally will not address this standard explicitly. Nonetheless, students can gain further insights into linear functions and pave the way for this standard by constructing tables, drawing graphs by hand and using graphing technology to compare the graph of the line $y = x$ with graphs of the lines $y = x + k$ and $y = kx$ for various values of k. Students can describe the comparisons using language of	As students begin to explore quadratic functions, they construct tables, draw graphs by hand and use graphing technology to compare the graph of x^2 to the graphs of $x^2 + k$, ax^2 and $(x - h)^2$, for various values of k, a and h. They express the comparisons using language of transformations (e.g., vertical shift or stretch) and use tables, graphs and expressions to explain why the transformations occur. They explain, in	While studying various types of functions (F-IF.7a–e), interpreting key features of graphs in modeling settings (F-IF.4), writing function expressions in different forms (F-IF.8, A-SSE.3) and comparing functions represented in different ways (F-IF.9), students describe and explain graphs of functions as transformations of related functions, and they adjust parameters in a family of functions to choose a model that fits

transformations (e.g., vertical shift or stretch), and more important, they can use tables, graphs and expressions to explain why the transformations occur. They can then see how these two types of transformations together generate the slope-intercept form of a line. And they may contrast the slope-intercept form with the form $y = m(x - h)$ to begin to consider horizontal shifts.

Students may extend these observations, as appropriate, to other functions studied in the course. For example, students may apply their observations to transformations of simple exponential functions, such as 2^x (over the integers), noting the analogous effects of adding a constant or multiplying by a constant.

Note: Questions and explanations about transformations do not need to be expressed with the generality of function notation. The point here is the habit of seeing and explaining the transformations.

particular, why the horizontal translation is h to the right (and why the form is typically written with $x - h$ rather than $x + h$).

Students use these three transformations together to motivate the vertex form of a quadratic: $y = a(x - h)^2 + k$, and they explain why the maximum or minimum occurs when $x = h$. They estimate values of k, h and a given the graphs, and they graph quadratic functions by completing the square to put expressions into vertex form (part of F-IF.8a).

In this course, students begin to use function notation to describe these transformations of graphs and extend these observations and explanations to other families of functions considered in the course, such as absolute value, square root and piecewise functions.

reasonably by eye.

Students explore situations in which two different sequences of transformations result in the same function. For example, they interpret $2^{3(x+2)}$ as 2^x shifted to the left 2 units and "shrunk" along the x-axis by a factor of $1/3$. They also interpret it as $8^x * 2^6$, a function with a larger base (which thus grows more quickly) along with a vertical stretch. They explain symbolically and graphically why these are the same.

Students use technology to explore the effects of parameter changes in trigonometric functions such as , and they note that their previous observations apply, affecting the amplitude, vertical shift and horizontal shift of the function. They explore the form to understand changes in the period of the function as a horizontal stretch.

Students explore graphs of polynomials with only even-degree terms to motivate the definition of an even function, $f(\ \ x) = f(x)$, and they explore polynomials with only odd-degree terms to motivate the definition of an odd function, $f(\ \ x) = \ \ f(x)$. They use whether a function is odd or even to predict symmetry in the graph and vice versa.

The standards:

F-IF.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers*. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*

F-BF.2: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

F-LE.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Algebra I (and Mathematics I)

Students talk about sequences as functions, using function notation, either recursively or with explicit expressions, and translating between forms. For example, if a sequence is defined by f(0) = 3, f(n + 1) = f(n) + 5 for n > 0, students use graphs, tables and reasoning to determine an explicit expression f(n) = 5n + 3, where n is a whole number, for the same function.

Although students recognize sequences as functions with domains that are subsets of the integers and they plot sequences as dots to distinguish from functions with continuous

Mathematics II

Although these standards are not a focus of this course, students continue to interpret sequences as functions, as appropriate.

Algebra II (and Mathematics III)

Students are now more formal about their use of the word *sequence,* always specifying the domain, whether described as a sequence or as a function. To recognize that the domain is a crucial part of the description of a function, students begin considering the equality of functions: Two functions are equal if and only if they have the same domain as well as the same output value for each input value in the domain. Thus, when a sequence and a function over the real line are given by the same expression, they are not equal as functions.

Students regularly extend and restrict the domains of functions. For

Note: Problems involving sequences should provide enough structure so that the sequence is well defined.

domains, this course need not insist upon proficient use and interpretation of the domain of a function. To remain consistent with the role of the number and quantity concepts highlighted in this course, it is suggested that the domain for exponential function be constrained to the integers. Much of the comparison between linear functions and exponential functions takes place over whole-number domains, based on graphs, tables and real-world contexts, and with frequent translation between recursive and explicit formulas. This is the heart of F-BF.2 and F-BF.3 but without the terminology ***arithmetic sequence*** and ***geometric sequence.***		example, they ask, "Can a sequence be extended to the non-negative real line?" The question is essentially about "connecting the dots" on the graph, and students can consider whether such extension makes sense in given contexts. (This work paves the way for interpolation and extrapolation in modeling settings.) A key example is extending exponential functions from whole-number (or integers) domains by defining rational exponents so the rules continue to work (N-RN.1) and then assuming that the rules continue to work for real exponents. In this course, students recognize arithmetic and geometric sequences (and as special cases of linear and exponential functions, respectively), which completes these standards. Students use their knowledge of sequences to study series, focusing on arithmetic series (and treating the sequence of partial sums as an example of a quadratic function) and on geometric series, as in A-SSE.4.

Each course is introduced with a high-level narrative. This narrative gives a sense of overall course goals. The description is not intended to be exhaustive.
Course-specific analysis is then provided in the following categories:

Examples of Key Advances from Previous Grades or Courses

- This category highlights some of the major steps in the progression of increasing knowledge and skill from year to year. Note that each key advance in mathematical content also corresponds to a widening scope of problems that students can solve. Examples of key advances are highlighted to stress the need for curricula to treat topics in ways that take into account where students have been in previous grades or courses and where they will be going in subsequent courses.

Fluency Recommendations

- The high school standards do not set explicit expectations for fluency, but fluency is important in high school mathematics. For example, fluency in algebra can help students get past the need to manage computational details so that they can observe structure and patterns in problems. Such fluency can also allow for smooth progress beyond the college and career readiness threshold toward readiness for further study/careers in science, technology, engineering and mathematics (STEM) fields. Therefore, this section makes recommendations about fluencies that can serve students well as they learn and apply mathematics. These fluencies are highlighted to stress the need for curricula to provide sufficient supports and opportunities for practice to help students gain fluency. Fluency is not meant to come at the expense of understanding; it is an outcome of a progression of learning and thoughtful practice. Curricula must provide the conceptual building blocks that develop in tandem with skill along the way to fluency.

Discussion of Mathematical Practices in Relation to Course Content

- This category highlights some of the mathematical practices and describes how they play a role in each course. These examples are provided to stress the need to connect content and practices, as required by the standards.

- In addition to the examples provided in each course, the following are some general comments about connecting content and practices:

    - Connecting content and practices happens in the context of ***working on problems.*** The very first Standard for Mathematical Practice is to make sense of problems and persevere in solving them (**MP.1**).

    - The Standards for Mathematical Practice interact and overlap with each other. ***They are not a checklist.***

    - Modeling with mathematics is a theme in all high school courses. Modeling problems in high school center on problems arising in everyday life, society and the workplace. Such problems may draw upon mathematical content knowledge and skills articulated in the standards prior to or during the current course. (For more information on modeling in high school, see pages 72 and 73 of the *Common Core*

State Standards in Mathematics.)

Please Note

- The words *examples* and *opportunities* in the above categories emphasize that the analysis provided in each category is not exhaustive. For example, there are many opportunities to connect mathematical content and practices in every course, there are many opportunities for in-depth focus in every grade, and so on. A comprehensive description of these features of the standards would be hundreds of pages long. ***The analyses given here should be thought of as starting points.***

- Always refer back to the *Common Core State Standards for Mathematics* for exact language about student expectations.

Students in Algebra I fully master linear equations and linear functions, especially the algebra-geometry interplay regarding slope and graphs. Students also work intensively to master quadratic functions, both from an algebraic and formal perspective as well as in the context of modeling. The work that students do with quadratic functions is connected with and reinforces their work in quadratic equations, polynomial arithmetic and seeing structure in expressions. From an applications perspective, quadratic functions provide opportunities for solving problems involving maxima and minima, an important aspect of modeling. Working intensively with linear and quadratic expressions, equations and functions in Algebra I enables students to focus and master this material.

At the same time, however, students in Algebra I encounter general principles and techniques that apply much more generally than in the linear or quadratic case — for example, learning that the graph of an equation in two variables often forms a curve, which could be a line (**A-REI.10**). Thus, although most of Algebra I focuses on linear and quadratic equations and functions, the course does include concepts that apply more generally and therefore need to be illustrated beyond the linear and quadratic case. Exponential functions may be discussed in this context but studied in depth later in Algebra II.

Within the domain of Statistics and Probability, Algebra I students work with data on a single count or measurement variable as well as data on two categorical and quantitative variables. Connecting their statistical work with their work in algebra and functions, they also interpret linear models.

To summarize, the critical areas in Algebra I include mastery of linear equations and inequalities, formalization and extension of function concepts (including function notation, domain and range, and exploration of many types of functions, including sequences), linear regression models, quadratic and exponential expressions (including rational exponents), and quadratic functions.

The Standards for Mathematical Practice apply throughout the Algebra I course and, when connected meaningfully with the content standards, allow for students to experience mathematics as a coherent, useful and logical subject. Details about the content and practice standards follow in this analysis.

Examples of Key Advances from Grades K–8

- Having already extended arithmetic from whole numbers to fractions (grades 4–6) and from fractions to rational numbers (grade 7), students in grade 8 encountered particular irrational numbers such as $\sqrt{5}$ or π. In Algebra I, students will begin to understand the real number *system*. For more on the extension of number systems, see page 58 of the standards.

- Students in grade 8 worked with integer exponents. In Algebra I, students will extend the properties of exponents to positive real numbers raised to rational powers (**N-RN.1, 2**).

- Students in middle grades worked with measurement units, including units obtained by multiplying and dividing quantities. In Algebra I, students apply these skills in a more sophisticated fashion to solve problems in which reasoning about units adds insight (**N-Q**).

- Themes beginning in middle school algebra continue and deepen during high school. As early as grades 6 and 7, students began to use the properties of operations to generate equivalent expressions (**6.EE.3**, **7.EE.1**). By grade 7, they began to recognize that rewriting expressions in different forms could be useful in problem solving (**7.EE.2**). In Algebra I, these aspects of algebra

carry forward as students continue to use properties of operations to rewrite expressions, gaining fluency and engaging in what has been called "mindful manipulation."[86]

- Students in grade 8 extended their prior understanding of proportional relationships to begin working with functions, with an emphasis on linear functions. In Algebra I, students will master linear and quadratic functions. Students encounter other kinds of functions to ensure that general principles are perceived in generality, as well as to enrich the range of quantitative relationships considered in problems.

- Students in grade 8 connected their knowledge about proportional relationships, lines and linear equations (**8.EE.5, 6**). In Algebra I, students solidify their understanding of the analytic geometry of lines. They understand that in the Cartesian coordinate plane:

  - The graph of any linear equation in two variables is a line.

  - Any line is the graph of a linear equation in two variables.

- As students acquire mathematical tools from their study of algebra and functions, they apply these tools in statistical contexts (e.g., **S-ID.6**). In a modeling context, they might informally fit a quadratic function to a set of data, graphing the data and the model function on the same coordinate axes. They also draw on skills they first learned in middle school to apply basic statistics and simple probability in a modeling context. For example, they might estimate a measure of center or variation and use it as an input for a rough calculation.

- Algebra I techniques open a huge variety of word problems that can be solved that were previously inaccessible or very complex in grades K–8. This expands problem solving from grades K–8 dramatically.

Discussion of Mathematical Practices in Relation to Course Content

Two overarching practices relevant to Algebra I are:

- **Make sense of problems and persevere in solving them** (**MP.1**).

- **Model with mathematics** (**MP.4**).

Indeed, other mathematical practices in Algebra I might be seen as contributing specific elements of these two. The intent of the following set is not to decompose the above mathematical practices into component parts but rather to show how the mathematical practices work together.

[86] See, for example, "Mindful Manipulation," in *Focus in High School Mathematics: Reasoning and Sense Making* (National Council of Teachers of Mathematics, 2009).

- **Reason abstractly and quantitatively** (MP.2). This practice standard refers to one of the hallmarks of algebraic reasoning, the process of decontextualization and contextualization. Much of elementary algebra involves creating abstract algebraic models of problems (**A-CED, F-BF**) and then transforming the models via algebraic calculations (**A-SSE, A-APR, F-IF**) to reveal properties of the problems.

- **Use appropriate tools strategically** (**MP.5**). Spreadsheets, a function modeling language, graphing tools and many other technologies can be used strategically to gain understanding of the ideas expressed by individual content standards and to model with mathematics.

- **Attend to precision** (MP.6). In algebra, the habit of using precise language is not only a mechanism for effective communication but also a tool for understanding and solving problems. Describing an idea precisely (**A-CED, A-REI**) helps students understand the idea in new ways.

- **Look for and make use of structure** (MP.7). For example, writing
  a practice many teachers refer to as "chunking,'' highlights the structural similarity between this expression and $z^2 + 5z + 6$, leading to a factorization of the original: $((7x) + 3) ((7x) + 2)$ (**A-SSE, A-APR**).

- **Look for and express regularity in repeated reasoning** (MP.8). Creating equations or functions to model situations is harder for many students than working with the resulting expressions. An effective way to help students develop the skill of describing general relationships is to work through several specific examples and then express what they are doing with algebraic symbolism (A-CED). For example, when comparing two different text messaging plans, many students who can compute the cost for a given number of minutes have a hard time writing general formulas that express the cost of each plan for *any* number of minutes. Constructing these formulas can be facilitated by methodically calculating the cost for several different input values and then expressing the steps in the calculation, first in words and then in algebraic symbols. Once such expressions are obtained, students can find the break-even point for the two plans, graph the total cost against the number of messages sent and make a complete analysis of the two plans.

Fluency Recommendations

A/G Algebra I students become fluent in solving characteristic problems involving the analytic geometry of lines, such as writing down the equation of a line given a point and a slope. Such fluency can support them in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

A-APR.1 Fluency in adding, subtracting and multiplying polynomials supports students throughout their work in algebra, as well as in their symbolic work with functions. Manipulation can be more mindful when it is fluent.

A-SSE.1b Fluency in transforming expressions and chunking (seeing parts of an expression as a single object) is essential in factoring, completing the square and other mindful algebraic calculations.

Students bring many geometric experiences with them to high school; in this course, they begin to use more precise definitions and develop careful proofs. Although there are many types of geometry, this course focuses on Euclidean geometry, studied both with and without coordinates. This course begins with an early definition of congruence and similarity with respect to transformations, then moves on through the triangle congruence criteria and other theorems regarding triangles, quadrilaterals and other geometric figures. Students then move on to right triangle trigonometry and the Pythagorean theorem, which they may extend to the Laws of Sines and Cosines (+). An important aspect of the Geometry course is the connection of algebra and geometry when students begin to investigate analytic geometry in the coordinate plane. In addition, students in Geometry work with probability concepts, extending and formalizing their initial work in middle school. They compute probabilities, drawing on area models. Area models for probability can serve to connect this material to the other aims of the course.

To summarize, high school Geometry corresponds closely to the Geometry conceptual category in the high school standards. Thus, the course involves working with congruence (G-CO), similarity (G-SRT), right triangle trigonometry (in G-SRG), geometry of circles (G-C), analytic geometry in the coordinate plane (G-GPE), and geometric measurement (G-GMD) and modeling (G-MG). The Standards for Mathematical Practice apply throughout the Geometry course and, when connected meaningfully with the content standards, allow for students to experience mathematics as a coherent, useful and logical subject. Details about the content and practice standards follow in this analysis.

Examples of Key Advances from Previous Grades or Courses

- Because concepts such as rotation, reflection and translation were treated in the grade 8 standards mostly in the context of hands-on activities, and with an emphasis on geometric intuition, high school Geometry will put equal weight on precise definitions.

- In grades K–8, students worked with a variety of geometric measures (length, area, volume, angle, surface area and circumference). In high school Geometry, students apply these component skills in tandem with others in the course of modeling tasks and other substantial applications (**MP.4**).

- The skills that students develop in Algebra I around simplifying and transforming square roots will be useful when solving problems that involve distance or area and that make use the Pythagorean theorem.

- In grade 8, students learned the Pythagorean theorem and used it to determine distances in a coordinate system (**8.G.6–8**). In high school Geometry, students will build on their understanding of distance in coordinate systems and draw on their growing command of algebra to connect equations and graphs of circles (**G-GPE.1**).

- The algebraic techniques developed in Algebra I can be applied to study analytic geometry. Geometric objects can be analyzed by the algebraic equations that give rise to them. Some basic geometric theorems in the Cartesian plane can be proven using algebra.

Discussion of Mathematical Practices in Relation to Course Content

- **Reason abstractly and quantitatively** (**MP.2**). Abstraction is used in geometry when, for example, students use a diagram of a specific isosceles triangle as an aid to reason about *all* isosceles triangles (G-CO.9). Quantitative reasoning in geometry involves the real numbers in an essential way: Irrational numbers show up in work with the Pythagorean theorem (G-SRT.8), area

formulas often depend (subtly and informally) on passing to the limit and real numbers are an essential part of the definition of dilation (G-SRT.1). The proper use of units can help students understand the effect of dilation on area and perimeter (N-Q.1).

- **Construct viable arguments and critique the reasoning of others** (**MP.3**). While all of high school mathematics should work to help students see the importance and usefulness of deductive arguments, geometry is an ideal arena for developing the skill of creating and presenting proofs (G-CO.9.10). One reason is that conjectures about geometric phenomena are often about infinitely many cases at once — for example, *every* angle inscribed in a semicircle is a right angle — so that such results cannot be established by checking every case (G-C.2).

- **Use appropriate tools strategically** (**MP.5**). Dynamic geometry environments can help students look for invariants in a whole class of geometric constructions, and the constructions in such environments can sometimes lead to an idea behind a proof of a conjecture.

- **Attend to precision** (**MP.6**). Teachers might use the activity of creating definitions as a way to help students see the value of precision. While this is possible in every course, the activity has a particularly visual appeal in geometry. For example, a class can build the definition of *quadrilateral* by starting with a rough idea ("four sides"), gradually refining the idea so that it rules out figures that do not fit the intuitive idea. Another place in geometry where precision is necessary and useful is in the refinement of conjectures so that initial conjectures that are not correct can be salvaged — two angle measures and a side length do not determine a triangle, but a certain configuration of these parts leads to the angle-side-angle theorem (G-CO.8).

- **Look for and make use of structure** (**MP.7**). Seeing structure in geometric configurations can lead to insights and proofs. This often involves the creation of auxiliary lines not originally part of a given figure. Two classic examples are the construction of a line through a vertex of a triangle parallel to the opposite side as a way to see that the angle measures of a triangle add to 180 degrees and the introduction of a symmetry line in an isosceles triangle to see that the base angles are congruent (G-CO.9.10). Another kind of hidden structure makes use of area as a device to establish results about proportions, such as the important theorem (and its converse) that a line parallel to one side of a triangle divides the other two sides proportionally (G-SRT.4).

Fluency Recommendations

G-SRT.5	Fluency with the triangle congruence and similarity criteria will help students throughout their investigations of triangles, quadrilaterals, circles, parallelism and trigonometric ratios. These criteria are necessary tools in many geometric modeling tasks.
G-GPE.4, 5, 7	Fluency with the use of coordinates to establish geometric results, calculate length and angle, and use geometric representations as a modeling tool are some of the most valuable tools in mathematics and related fields.
G-CO.12	Fluency with the use of construction tools, physical and computational, helps students draft a model of a geometric phenomenon and can lead to conjectures and proofs.

Building on their work in Algebra I with linear and quadratic functions, students in Algebra II expand their repertoire by working with rational and exponential expressions; polynomial, exponential and logarithmic functions; trigonometric functions with real number domain; and sequences and series. Students work closely with the expressions that define the functions and continue to expand and hone their abilities to model situations and solve equations. Exponential functions, trigonometric functions, and sequences and series all provide opportunities for modeling. As students encounter more and more varied mathematical expressions and functions, general principles they encountered in Algebra I remain relevant, unifying the material in the course.

Students in Algebra II continue their work with Statistics and Probability. They explore and investigate the randomness underlying statistical experiments and make inferences and justify conclusions from sample surveys, experiments and observational studies. They also use probability to evaluate the outcomes of more complex situations than they previously encountered in Geometry.

The critical areas in Algebra II include polynomials (including the structural similarities between the system of polynomials and the system of integers) and polynomial equations, unit circle trigonometry, families of functions (the culmination of all of the types of functions that have been studied and the addition of trigonometric and logarithmic functions), and statistical and probabilistic modeling. The Standards for Mathematical Practice apply throughout the Algebra II course and, when connected meaningfully with the content standards, allow for students to experience mathematics as a coherent, useful and logical subject. Details about the content and practice standards follow in this analysis.

Examples of Key Advances from Previous Grades or Courses

- In Algebra I, students added, subtracted and multiplied polynomials. In Algebra II, students divide polynomials with remainder, leading to the factor and remainder theorems. This is the underpinning for much of advanced algebra, including the algebra of rational expressions.

- Themes from middle school algebra continue and deepen during high school. As early as grade 6, students began thinking about solving equations as a process of reasoning (**6.EE.5**). This perspective continues throughout Algebra I and Algebra II (**A-REI**).[87] "Reasoned solving" plays a role in Algebra II because the equations students encounter can have extraneous solutions (**A-REI.2**).

- In Algebra I, students met quadratic equations with no real roots. In Algebra II, they extend the real numbers to complex numbers, and one effect is that they now have a complete theory of quadratic equations: Every quadratic equation with complex coefficients has (counting multiplicities) two roots in the complex numbers.

- In grade 8, students learned the Pythagorean theorem and used it to determine distances in a coordinate system (**8.G.6–8**). In Geometry, students proved theorems using coordinates (**G-GPE.4–7**). In Algebra II, students will build on their understanding of distance in coordinate systems and draw on their growing command of algebra to connect equations and graphs of conic sections (e.g., **G-GPE.1**).

[87] See, for example, "Reasoned Solving," in *Focus in High School Mathematics: Reasoning and Sense Making* (National Council of Teachers of Mathematics, 2009).

- In Geometry, students began trigonometry through a study of right triangles. In Algebra II, they extend the three basic functions to the entire unit circle.

- As students acquire mathematical tools from their study of algebra and functions, they apply these tools in statistical contexts (e.g., **S-ID.6**). In a modeling context, they might informally fit an exponential function to a set of data, graphing the data and the model function on the same coordinate axes.

Discussion of Mathematical Practices in Relation to Course Content

While all of the mathematical practice standards are important in all three courses, four are especially important in the Algebra II course:

- **Construct viable arguments and critique the reasoning of others** (**MP.3**). As in geometry, there are central questions in advanced algebra that cannot be answered definitively by checking evidence. There are important results about *all* functions of a certain type — the factor theorem for polynomial functions, for example — and these require general arguments (A-APR.2). Deciding whether two functions are equal on an infinite set cannot be settled by looking at tables or graphs; it requires arguments of a different sort (F-IF.8).

- **Attend to precision** (**MP.6**). As in the previous two courses, the habit of using precise language is not only a tool for effective communication but also a means for coming to understanding. For example, when investigating loan payments, if students can articulate something like, "What you owe at the end of a month is what you owed at the start of the month, plus $^1/_{12}$ of the yearly interest on that amount, minus the monthly payment," they are well along a path that will let them construct a recursively defined function for calculating loan payments (A-SSE.4).

- **Look for and make use of structure** (**MP.7**). The structure theme in Algebra I centered on seeing and using the structure of algebraic expressions. This continues in Algebra II, where students delve deeper into transforming expressions in ways that reveal meaning. The example given in the standards — that $x^4 - y^4$ can be seen as the difference of squares — is typical of this practice. This habit of seeing subexpressions as single entities will serve students well in areas such as trigonometry, where, for example, the factorization of $x^4 - y^4$ described above can be used to show that the functions $\cos^4 x - \sin^4 x$ and $\cos^2 x - \sin^2 x$ are, in fact, equal (A-SSE.2).

  In addition, the standards call for attention to the structural similarities between polynomials and integers (A-APR.1). The study of these similarities can be deepened in Algebra II: Like integers, polynomials have a division algorithm, and division of polynomials can be used to understand the factor theorem, transform rational expressions, help solve equations and factor polynomials.
- **Look for and express regularity in repeated reasoning** (**MP.8**). Algebra II is where students can do a more complete analysis of sequences (F-IF.3), especially arithmetic and geometric sequences, and their associated series. Developing recursive formulas for sequences is facilitated by the practice of abstracting regularity for how you get from one term to the next and then giving a precise description of this process in algebraic symbols (F-BF.2). Technology can be a useful tool here: Most Computer Algebra Systems allow one to model recursive function definitions in notation that is close to standard mathematical notation. And spreadsheets make natural the process of taking successive differences and running totals (MP.5).

The same thinking — finding and articulating the rhythm in calculations — can help students analyze mortgage payments, and the ability to get a closed form for a geometric series lets them make a complete analysis of this topic. This practice is also a tool for using difference tables to find simple functions that agree with a set of data.

Algebra II is a course in which students can learn some technical methods for performing algebraic calculations and transformations, but sense-making is still paramount (MP.1). For example, analyzing Heron's formula from geometry lets one connect the zeros of the expression to the degenerate triangles. As in Algebra I, the modeling practice is ubiquitous in Algebra II, enhanced by the inclusion of exponential and logarithmic functions as modeling tools (MP.4). Computer algebra systems provide students with a tool for modeling all kinds of phenomena, experimenting with algebraic objects (e.g., sequences of polynomials), and reducing the computational overhead needed to investigate many classical and useful areas of algebra (MP.5).

Fluency Recommendations

A-APR.6 This standard sets an expectation that students will divide polynomials with remainder by inspection in simple cases. For example, one can view the rational expression —— as

—— ——— = ——.

A-SSE.2 The ability to see structure in expressions and to use this structure to rewrite expressions is a key skill in everything from advanced factoring (e.g., grouping) to summing series to the rewriting of rational expressions to examine the end behavior of the corresponding rational function.

F-IF.3 Fluency in translating between recursive definitions and closed forms is helpful when dealing with many problems involving sequences and series, with applications ranging from fitting functions to tables to problems in finance.

Students formalize and deepen their knowledge of linear equations and inequalities, creating expressions, equations and inequalities to represent linear relationships and constraints and using these to solve problems with graphical, numeric and algebraic methods while explaining the reasoning behind their solutions. This knowledge is then extended to exponential expressions and equations, moving from a constant rate of growth to a proportional rate of growth. Students create expressions and equations to represent exponential relationships and use them to solve problems approximately and, in simple cases, algebraically.

Students also formalize and deepen their knowledge of linear functions and begin working with exponential functions. Modeling plays a central role in students' development of knowledge with both linear and exponential functions; exploring a range of contexts that can be modeled with linear and exponential relationships will provide both motivation and meaning to their work. Students understand key features of both classes of functions, including their respective rates of growth, and can represent them in a variety of ways. Students interpret key features of these functions in terms of a context and use this understanding to write function rules for exponential and linear functions. Students also relate linear and exponential models to arithmetic and geometric progressions, including writing them recursively — a skill that comes into play when writing functions to model a situation.

Students advance their work with congruence and transformations. They use tools and methods based on transformations and congruence, such as paper folding and use of dynamic geometry environments, to construct geometric objects and demonstrate geometric properties and relationships.

Within the conceptual area of Statistics and Probability, students represent data on a single count or measurement variable in a variety of ways to better understand measures of center and spread. They explore associations between two measurement variables using a scatter plot, and they begin to use linear models to better understand those associations when appropriate. Throughout their work in Mathematics I, students define quantities and use units appropriately as a way to guide their solutions, as well as use and interpret scales in graphs and data displays, attending to appropriate levels of accuracy.

Examples of Key Advances from Grades K–8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.

- Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions.

- Work with congruence and similarity motions that was begun in grades 6–8 progresses. Students also consider sufficient conditions for congruence of triangles.

- Work with the bivariate data and scatter plots in grades 6–8 is extended to working with lines of

best fit.

Discussion of Mathematical Practices in Relation to Course Content

- **Modeling with mathematics** (**MP.4**) should be a particular focus as students see the purpose and meaning for working with linear and exponential equations and functions.

- **Using appropriate tools strategically** (**MP.5**) is also important as students explore those models in a variety of ways, including with technology. For example, students might be given a set of data points and experiment with graphing a line that fits the data.

- As Mathematics I continues to develop a foundation for more formal reasoning, students should engage in the practice of **constructing viable arguments and critiquing the reasoning of others** (**MP.3**).

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

G High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs).

S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Students extend their work in algebra with a major emphasis on quadratic relationships. They create expressions and equations to represent situations involving quadratic relationships. They recognize the key features of a quadratic expression and rewrite a quadratic expression in various forms to reveal information about a situation involving a quadratic relationship. They solve quadratic equations using a variety of methods, including using a table or graph to approximate solutions and using algebraic techniques, such as factoring and completing the square, to find exact solutions. They derive and use the quadratic formula. Students graphically explore solving a system of a linear equation and a quadratic equation, and they extend their algebraic techniques to the solution.

Students also extend their work in functions to quadratic and other functions. Students write a function rule representing a quadratic relationship and can also represent that relationship using a table of values or a graph. They explore transformations of the graph of a quadratic function, including horizontal and vertical translations and stretches, looking at the correspondence between changes to the formula and their effects on the graph. They understand important features of a quadratic function, transform function rules into forms that reveal those features and interpret those features in terms of a context. They explore the growth rate of a quadratic function and compare it to linear and exponential functions.

In Statistics and Probability, students consider using a broader range of functions to model a relationship between two quantitative variables and assess the fit of the model. They also begin an exploration of probability, including understanding independence and conditional probability and using rules of probability for computing probabilities of compound events.

Students extend their work with congruence to similarity. When solving problems, investigating geometric properties and demonstrating results, they can use synthetic, transformational and coordinate approaches. They use precise definitions of geometric objects to support their reasoning. Students' proofs focus on explaining their reasoning rather than following a particular form.

Examples of Key Advances from Mathematics I

- Students extend their previous work with linear and exponential expressions, equations, systems of equations and inequalities to quadratic relationships.
- A parallel extension occurs from linear and exponential functions to quadratic functions, where students also begin to analyze functions in terms of transformations.
- Building on their work with transformations, students produce increasingly formal arguments about geometric relationships.

Discussion of Mathematical Practices in Relation to Course Content

- **Modeling with mathematics** (**MP.4**) should be a particular focus as students see the purpose and meaning for working with quadratic equations and functions, including **using appropriate tools strategically** (**MP.5**).

- As students explore a variety of ways to represent quadratic expressions, they should **look for and make use of structure** (**MP.7**).

- As their ability to create and use formal mathematical arguments grows, increased emphasis is placed on students' ability to **attend to precision** (**MP.6**), as well as to **construct viable arguments and critique the reasoning of others** (**MP.3**).

Fluency Recommendations

F/S Fluency in graphing functions (including linear, quadratic and exponential) and interpreting key features of the graphs in terms of their function rules and a table of value, as well as recognizing a relationship (including a relationship within a data set), fits one of those classes. This forms a critical base for seeing the value and purpose of mathematics, as well as for further study in mathematics.

A-APR.1 Fluency in adding, subtracting and multiplying polynomials supports students throughout their work in algebra, as well as in their symbolic work with functions. Manipulation can be more mindful when it is fluent.

G-SRT.5 Fluency with the triangle congruence and similarity criteria will help students throughout their investigations of triangles, quadrilaterals, circles, parallelism and trigonometric ratios. These criteria are necessary tools in geometric modeling.

In the conceptual area of Algebra, students extend their consideration of polynomials, understanding them as a system analogous to the integers and using the structure of an expression to rewrite it in useful ways. They understand the relationship between factors and zeros. They also explore rational expressions. Students reason about and solve a wide range of equations, using graphs or tables of values to approximate solutions or using inspection, factoring or other algebraic techniques when appropriate.

Students analyze an increasingly wide range of functions, including polynomial, trigonometric, logarithmic, rational and other functions. They represent these relationships in different ways and compare functions represented in different ways. They explore and compare key features of these families of functions and express function rules in ways that reveal those features. Students understand logarithmic functions as the inverse of exponential functions and can use inverse functions to solve simple equations. As their understanding of modeling grows, students increasingly use unit analysis as a way to understand problems.

In the conceptual area of Geometry, students consider the relationships between two- and three-dimensional objects. They also apply geometric concepts in modeling situations.

In the conceptual area of Statistics and Probability, the focus is on inferential statistics. Students understand the role of randomization in statistics and can make inferences and justify conclusions from surveys, experiments and observational studies.

Examples of Key Advances from Mathematics II

- Students begin to see polynomials as a system that has mathematical coherence, not just as a set of expressions of a specific type. An analogy to the integers can be made (including operations, factoring, etc.). Subsequently, polynomials can be extended to rational expressions, analogous to the rational numbers.

- The understandings that students have developed with linear, exponential and quadratic functions are extended to considering a much broader range of classes of functions.

- In statistics, students begin to look at the role of randomization in statistical design.

Discussion of Mathematical Practices in Relation to Course Content

- **Modeling with mathematics** (**MP.4**) continues to be a particular focus as students see a broader range of functions, including **using appropriate tools strategically** (**MP.5**).

- **Constructing viable arguments and critiquing the reasoning of others** (**MP.3**) continues to be a focus, as does **attention to precision** (MP.6), because students are expected to provide increasingly precise arguments.

- As students continue to explore a range of algebraic expressions, including polynomials, they should **look for and make use of structure** (**MP.7**).

- Finally, as students solidify the tools they need to continue their study of mathematics, a focus on **making sense of problems and persevering in solving them** (**MP.1**) is an essential component for their future success.

Fluency Recommendations

A/F Students should look at algebraic manipulation as a meaningful enterprise, in which they seek to understand the structure of an expression or equation and use properties to transform it into forms that provide useful information (e.g., features of a function or solutions to an equation). This perspective will help students continue to usefully apply their mathematical knowledge in a range of situations, whether their continued study leads them toward college or career readiness.

M Seeing mathematics as a tool to model real-world situations should be an underlying perspective in everything students do, including writing algebraic expressions, creating functions, creating geometric models and understanding statistical relationships. This perspective will help students appreciate the importance of mathematics as they continue their study of it.

N-Q In particular, students should recognize that much of mathematics is concerned with understanding quantities and their relationships. They should pick appropriate units for quantities being modeled, using them as a guide to understand a situation, and be attentive to the level of accuracy that is reported in a solution.

F-BF.1.3 In particular, being able to write a rule to represent a relationship between two quantities is essential to continued meaningful use of algebra. Moreover, students should understand the effects of parameter changes and be able to apply them to create a rule modeling the function.

Modeling is a conceptual category in high school (pages 72 and 73 of *Common Core State Standards for Mathematics*) as well as a practice standard (**MP.4**). The practice standard for modeling reads in part as follows:

> *In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another.*

According to this description, numerical or algebraic word problems can be considered modeling tasks when the emphasis is on using mathematics to understand or reason about the context. However, the quoted text also describes an arc across the grades. During middle grades and certainly by high school, tasks with a strong modeling component will have more of the hallmarks that are described on pages 72 and 73 of the standards, such as a need to attend to issues of precision, a need to select relevant variables, engagement in the steps in the modeling cycle or opportunities to use technology.

Appendix A: Lasting Achievements in K–8[88]

Most of the K–8 content standards trace explicit steps A → B → C in a progression. This can sometimes make it seem as if any given standard exists only for the sake of the next one in the progression. There are, however, culminating or capstone standards (sometimes called "pinnacles") – most of them in the middle grades – that remain important far beyond the particular grade level in which they appear. This is signaled in the standards themselves (page 84):

> *The evidence concerning college and career readiness shows clearly that the knowledge, skills, and practices important for readiness include a great deal of mathematics prior to the boundary defined by (+) symbols in these standards. Indeed, some of the highest priority content for college and career readiness comes from grades 6–8. This body of material includes powerfully useful proficiencies such as applying ratio reasoning in real-world and mathematical problems, computing fluently with positive and negative fractions and decimals, and solving real-world and mathematical problems involving angle measure, area, surface area, and volume. Because important standards for college and career readiness are distributed across grades and courses, systems for evaluating college and career readiness should reach as far back in the standards as grades 6–8. It is important to note as well that cut scores or other information generated by assessment systems for college and career readiness should be developed in collaboration with representatives from higher education and workforce development programs, and should be validated by subsequent performance of students in college and the workforce.*

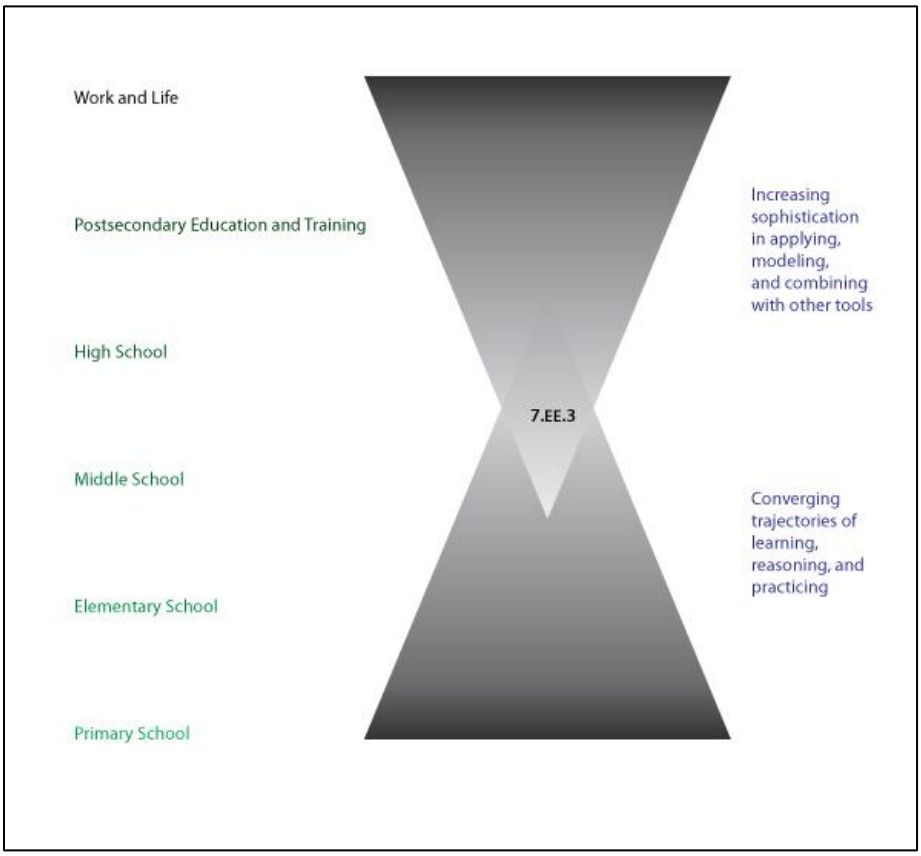
One example of a standard that refers to skills that remain important well beyond middle school is 7.EE.3:

> *Solve multistep real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.* For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

Other lasting achievements from K–8 would include working with proportional relationships and unit rates (6.RP.3; 7.RP.1, 2); working with percentages (6.RP.3e; 7.RP.3); and working with area, surface area and volume (7.G.4, 6).

As indicated in the quotation from the standards, skills like these are crucial tools for college, work and life. They are not meant to gather dust during high school but are meant to be applied in increasingly flexible ways, for example to meet the high school standards for Modeling. The illustration below shows how these skills fit in with both the learning progressions in the K–8 standards and the demands of the high school standards and readiness for careers and a wide range of college majors.

[88] Excerpted from http://commoncoretools.wordpress.com/2011/06/15/essay-by-jason-zimba-on-pinnacle-standards/.



As shown in the figure, standards like 7.EE.3 are best thought of as descriptions of component skills that will be applied flexibly during high school in tandem with others in the course of modeling tasks and other substantial applications. This aligns with the demands of postsecondary education for careers and for a wide range of college majors. Thus, when students work with these skills in high school, they are not working below grade level, nor are they reviewing. Applying securely held mathematics to open-ended problems and applications is a *higher*-order skill valued by colleges and employers alike.

Appendix B: Starting Points for Transition to the Common Core State Standards

Identified in this section are a few particularly rich areas of mathematical content that can be used by assessment designers, teachers, principals, state and district staff members, and teacher educators as starting points to coordinate and concentrate efforts to transition to the Common Core State Standards. Special attention should be given to how well current materials treat these areas. Organizing implementation work according to progressions is recommended because the instructional approach to any given topic should be informed by its place in an overall flow of ideas. Many of these same areas are the focus of the item prototyping currently under way as part of the development of the PARCC Assessment System.

Please note that particular mathematical practices with which to begin are not listed because doing so may unintentionally lead to a misunderstanding of the nature of mathematical practice itself. The mathematical practices are neither a to-do list nor like filing cabinets into which one can sort behaviors. When a student working on a real-world geometry problem in class questions whether another student's drawing is precise enough, the question involves issues of precision as well as modeling, not to mention communication and argument. In short, a single classroom question or behavior might reflect several practices at once.

The following suggestions are not meant to reorganize the standards into a new structure. In fact, a glance will show that the list is incomplete. By providing a focused list of suggested starting points, the risk of taking on too much and doing none of it well is minimized.

- Counting and Cardinality and Operations and Algebraic Thinking (particularly in the development of an understanding of quantity): grades K–2.
- Operations and Algebraic Thinking: multiplication and division in grades 3–5, tracing the evolving meaning of multiplication from equal groups and array/area thinking in grade 3 to all multiplication situations in grade 4 (including multiplicative comparisons) and from whole numbers in grade 3 to decimals and fractions in grades 5 and 6.
- Number and Operations in Base Ten: addition and subtraction in grades 1–4.
- Number and Operations in Base Ten: multiplication and division in grades 3–6.
- Number and Operations – Fractions: fraction addition and subtraction in grades 4–5, including related development of fraction equivalence in grades 3–5.
- Number and Operations – Fractions: fraction multiplication and division in grades 4–6.
- The Number System: grades 6–7.
- Expressions and Equations: grades 6–8, including how this extends prior work in arithmetic.
- Ratio and Proportional Reasoning: its development in grades 6–7, its relationship to functional thinking in grades 6–8, and its connection to lines and linear equations in grade 8.

- Geometry: work with the coordinate plane in grades 5–8, including connections to ratio, proportion, algebra and functions in grades 6–high school.
- Geometry: congruence and similarity of figures in grades 8–high school, with emphasis on real-world and mathematical problems involving scales and connections to ratio and proportion.
- Modeling: focused on equations and inequalities in high school, development from simple modeling tasks such as word problems to richer, more open-ended modeling tasks.
- Seeing Structure in Expressions: from expressions appropriate to grades 8–9 to expressions appropriate to grades 10–11.
- Statistics and Probability: comparing populations and drawing inferences in grades 6–high school.
- Units as a cross-cutting theme in the areas of measurement, geometric measurement, base-ten arithmetic, unit fractions and fraction arithmetic, including the role of the number line.

Many of these stressed areas are likely to be glossed over as "something that is already in the curriculum" — yet the standards require more. ***As noted in the standards, these or any content areas are best approached in the ways envisioned by the Standards for Mathematical Practice.*** The reason for greater focus is to give students and teachers more time — time to discuss, reason with, reflect upon and practice mathematics. These identified areas of mathematics are sufficiently rich to allow the mathematical practices to come alive.

The standards are a challenging vision for higher mathematics performance. By suggesting starting points, the aim is in part to define some content boundaries to help focus the innovation in the creation of new materials and to drive innovation in assessment items.

Appendix C: Rationale for the Grades 3–8 Content Emphases by Cluster

A close reading of the standards turns up many surface features and concrete details that speak to the standards' emphases. These features and details show some of the ways in which the standards are designed to foster greater focus and coherence in mathematics instruction. For example:

The content domains vary from grade to grade. This is perhaps the most obvious structural feature of the content standards. Traditionally, state standards for mathematics have been organized into content strands that are worded identically for every grade K–8 (if not K–12). By contrast, the content domains in Common Core State Standards vary. This communicates immediately that content emphases shift across the grade bands.

Some content domains are more specific than the traditional content strands.

- Number and Operations in Base Ten (NBT), Number and Operations — Fractions (NF) and The Number System (NS) are all top-level domains. Traditionally, these are often substrands within a larger category such as Number and Operations.

- Expressions and Equations (EE) and Functions (F) are both top-level domains. Traditionally, these have both belonged to a larger category such as Patterns, Functions and Algebra. Ratios and Proportional Relationships is a top-level domain in middle school, whereas this work is usually categorized under Patterns, Functions and Algebra (or under several strands).

Domain names with greater specificity tend to concentrate attention more directly on the priorities of the grade. In the rare case when a state has set priorities, it has been done using framing language; here is a quote from the 2001 *Massachusetts Mathematics Curriculum Framework*:

> *Mathematics in the middle school centers on understanding and computing with rational numbers, and on the study of ratio and proportion (what they are and how they are used to solve problems)*.

This language states with admirable clarity two of the main priorities for middle school. However, those two priorities are not major headings in the framework itself — so it is easy for them to become lost in the list of discrete grade-level requirements. By contrast, the Common Core State Standards make both of these priorities inescapable using the top-level domain structure (NS and RP).

Some domains are **not** more specific than the traditional strands. The grades K–8 domains of Geometry (G), Measurement and Data (MD), and Statistics and Probability (SP) are no more specific than usual. To the extent that greater specificity in top-level categories suggests greater concentration and emphasis, generality in top-level categories suggests comparatively less concentration and emphasis.

Arithmetic accounts for more than three out of five domains in grades K–5. In the traditional picture of content strands, at most two of four strands involve substantial work in arithmetic in early grades: Number and Operations and, to a lesser extent, Algebra. That would tend to suggest that arithmetic in early grades is no more important than the rest of what happens in mathematics in early grades — perhaps even less important, as the Algebra strand traditionally includes a great deal of work outside of arithmetic (e.g., work in extending patterns). But in the early grades of the Common Core State Standards, three out of five domains are almost wholly concerned with arithmetic.[89] Thus, arithmetic is immediately positioned as a

[89] The term *arithmetic* is not being used here to mean computation of sums, differences, products and quotients. That is one important part of arithmetic. But arithmetic in the standards is a large and rich subject that equally involves conceptual understanding, procedural skill and fluency, and problem solving with the basic operations. Moreover, the standards progressions in arithmetic are crafted in such a way as to build a sturdy foundation for algebra in middle school. From the "Progression in Operations and Algebraic Thinking" (May 29, 2011, draft, page 2): "The Progression in Operations and Algebraic

supermajority of instruction at the top level of the content organization.

Work in other K–5 domains also supports arithmetic. Further indications of the strong focus on arithmetic can be seen not only in the obvious domains of Counting and Cardinality (CC), Operations and Algebraic Thinking (OA), NBT and NF but also in other domains. For example, standards relating to area and volume explicitly refer to addition, multiplication and their properties (see **3.MD.7** and **5.MD.5**). Also, standards for data representation contain a number of explicit references to major themes in arithmetic. For example, standard **2.MD.10** reads:

> *Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.*

The explicit mention of specific, grade-appropriate word problems is not typical of traditional state standards belonging to the Statistics, Data Analysis and Probability strand. That **2.MD.10** does make such explicit references means that it would be a substantial misinterpretation of this standard to say simply that it is "a standard about picture graphs and bar graphs," as such standards have typically come to be known. Rather, this standard orients picture graphs and bar graphs toward the major work of grade 2. (See Table 1 of the *Progression* for K–3 Categorical Data and 2–5 Measurement Data for further connections of this kind.)

As another example, the word *pattern* first appears in the content standards in grade 3 with standard **3.OA.9**:

> *Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.*

The terms *arithmetic*, *addition*, *multiplication* and *properties of operations* do not typically appear in state standards that are "about patterns." That all of these terms do appear in **3.OA.9** makes it a substantial misinterpretation of this standard to say simply that it is "a standard about patterns," as such standards have come to be known. Rather, the standard directs patterns toward the larger purposes of the OA domain. The word *pattern* also appears in the Standards for Mathematical Practice (**MP.7**), and just as with **3.OA.9**, every example given in the practice standard again portrays patterns (and more generally structure) being put to some use, instead of forming a separate object of study that detracts from focus.

Some clusters are explicitly connected to others; some clusters stand more alone. Some clusters in any given grade naturally stand somewhat apart from others. Examples of these would include:

- Many Geometry clusters, such as those relating to hierarchies of shapes, congruence or similar subjects. These are typically connected more weakly to arithmetic clusters than arithmetic clusters are connected to each other.

- The first cluster in 6.SP, "Develop understanding of statistical variability." This introduces into the standards the statistical notions of variability and distribution, center and spread. These are, strictly

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Thinking deals with the basic operations—the kinds of quantitative relationships they model and consequently the kinds of problems they can be used to solve as well as their mathematical properties and relationships. Although most of the standards organized under the OA heading involve whole numbers, the importance of the Progression is much more general because it describes concepts, properties, and representations that extend to other number systems, to measures, and to algebra. For example, if the mass of the sun is x kilograms, and the mass of the rest of the solar system is y kilograms, then the mass of the solar system as a whole is the sum $x + y$ kilograms. In this example of additive reasoning, it doesn't matter whether x and y are whole numbers, fractions, decimals, or even variables. Likewise, a property such as distributivity holds for all the number systems that students will study in K–12, including complex numbers."

speaking, not mathematical ideas,[90] so it is natural that they do not connect tightly to, say, applying properties of operations to generate equivalent expressions.

- The Statistics and Probability clusters in 7.SP, which introduce into the standards the notions of randomness, probability, random sampling and comparison of populations.

This is not to say that one might not devise connections to these clusters, if desired; rather it is to say that in other cases, connections are explicit and unavoidable in the standards. For example, 6.EE.9 ties its cluster explicitly to 6.RP; 7.G.1 ties its cluster explicitly to 7.RP; and 8.SP.3 ties its cluster explicitly to 8.F.
A close reading of the *Progressions* also turns up some surface features and concrete details that shed light on some emphases in the standards. Some clusters receive more extensive discussion than others. For example, consider the three clusters in grade 4 OA:

Use the four operations with whole numbers to solve problems.
Gain familiarity with factors and multiples.
Generate and analyze patterns.

Standards are not traditionally written at "uniform grain size" but are often interpreted as such. Some things are quick to state but take a long time in the classroom; others take many words to describe but are simpler to address instructionally. One might have inferred that each of these three clusters was intended to have equal emphasis at grade 4. However, a careful reading of the full body of OA standards dispels this notion. So does even a superficial reading of the *Progression* for OA. There, for instance, we find that:

- Three times as many references are made to standards in the first cluster as are made to standards in the next two clusters combined (6-1-1);

- Four additional references are made to standards in other domains that connect directly to standards in the first cluster, while no such additional references are made in either of the next two clusters (4-0-0);

- More words are used to explain the standards in the first cluster than are used to explain the standards in the next two clusters combined; and

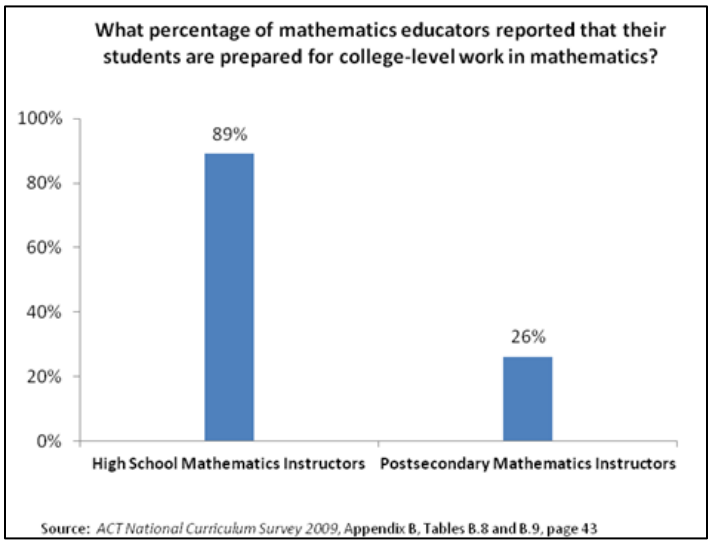
- Both of the illustrative problems provided in the margin relate directly to the first cluster, while no effort was expended on providing illustrative problems that relate directly to either of the next two clusters.

These visible details — any of which, in principle, might have gone the other way — begin to reveal the relative emphases in the standards.

[90] From the Guidelines for Assessment and Introduction in Statistics Education project report, section on "The Difference between Statistics and Mathematics," page 6: "A major objective of statistics education is to help students develop statistical thinking. Statistical thinking, in large part, must deal with this omnipresence of variability; statistical problem solving and decision making depend on understanding, explaining and quantifying the variability in the data. It is this focus on variability in data that sets apart statistics from mathematics."

Appendix D: Considerations for College and Career Readiness

In grades K–8, the Model Content Frameworks provide cluster-level emphases to help ensure that implementation efforts preserve the focus and coherence of the standards and that students remain on track to college and career readiness. Cluster-level emphases have not been provided for high school courses because the Model Content Frameworks themselves do not include full details about course-by-course content choices. However, general guidance is provided in this appendix about some of the most important aspects of the standards in relation to college and career readiness.



Surveys have shown repeatedly that high school mathematics instructors and postsecondary mathematics instructors tend to differ in their views about the importance of particular knowledge and skills as prerequisites for success in entry-level, credit-bearing college mathematics courses (ACT 2006, 2009). When postsecondary instructors in these surveys are asked to rate the importance of various mathematics topics to college readiness, they tend to make sharper distinctions than do high school instructors. Postsecondary instructors in these surveys tend to value mastery of fundamentals over broad topic coverage.

This sentiment has been echoed during PARCC's ongoing discussions with higher education stakeholders. In those discussions, postsecondary instructors have stressed the importance of deeper learning of fundamental mathematics. That includes being able to approach problems in the ways described in the Standards for Mathematical Practice. Postsecondary instructors also stressed the importance of being able to solve complex problems using securely held knowledge and skills. The ability to flexibly apply what one already knows to a nonroutine or complex problem is an important aspect of readiness for college and careers.[91] Although PARCC's stakeholder discussions do not themselves have the scientific weight of a well-designed national survey, it is reassuring to see the same themes reinforced in both settings.

Educators in high school can help bridge this gap. To that end, educators can devote particular energy to the following aspects of the standards, which play a prominent role in college and career readiness:

- The Standards for Mathematical Practice, viewed in connection with mathematical content.
- Modeling and rich applications (see pages 72 and 73 in the standards), which can be integrated into mathematics curriculum, instruction and assessment.
    - Note in particular the standards in high school marked with a star symbol (★). Star symbols identify potential opportunities to integrate content with the modeling practice.
    - Note also that modeling is a sophisticated practice; this means that modeling and other complex tasks will naturally draw upon securely held knowledge and skills. Many tasks in high

[91] See also "Appendix A: Lasting Achievements in K–8."

school will demand flexible application of content knowledge first gained in grades 6–8 to solve complex problems. (See page 84 of the standards.)

- The following particular clusters of high school standards, which have wide relevance as prerequisites for a range of postsecondary college and career pathways:
  - Number and Quantity: Quantities:
    - Reason quantitatively and use units to solve problems.
  - Number and Quantity: The Real Number System:
    - Extend the properties of exponents to rational exponents.
    - Use properties of rational and irrational numbers.
  - Algebra: Seeing Structure in Expressions:
    - Interpret the structure of expressions.
    - Write expressions in equivalent forms to solve problems.
  - Algebra: Arithmetic with Polynomials and Rational Expressions:
    - Perform arithmetic operations on polynomials.
  - Algebra: Creating Equations:
    - Create equations that describe numbers or relationships.
  - Algebra: Reasoning with Equations and Inequalities:
    - Understand solving equations as a process of reasoning and explain the reasoning.
    - Solve equations and inequalities in one variable.
    - Represent and solve equations and inequalities graphically.
  - Functions: Interpreting Functions:
    - Understand the concept of a function and use function notation.
    - Analyze functions using different representations.
    - Interpret functions that arise in applications in terms of a context.
  - Functions: Building Functions:
    - Build a function that models a relationship between two quantities.
  - Geometry: Congruence:

        - Prove geometric theorems.
    - Statistics and Probability: Interpreting Categorical and Quantitative Data:
        - Summarize, represent and interpret data on a single count or measurement variable.

PARCC will be creating a portfolio of assessments for high school courses. Student scores from these assessments will contribute to an overall determination of college and career readiness valid for informing postsecondary educational decisions such as college admissions. The overall determination will respond to evidence about college and career readiness by addressing mastery of fundamentals as well as the ability to solve complex problems by applying securely held knowledge and skills.

In the best view, the college- and career-ready line in the standards can be seen as a milepost, not a finish line; it is a line best crossed with velocity. In particular, students who wish to pursue science, technology, engineering or mathematics majors, or who wish to do college-level work in high school such as Advanced Placement or International Baccalaureate courses, must progress well beyond the initial threshold of college and career readiness as defined by the standards.

ITN 2012-31

PARCC ITEM DEVELOPMENT

APPENDIX D: Supporting Design Documents for Mathematics

Building upon the *PARCC Model Content Frameworks* in mathematics (see Appendix C), this Mathematics Assessment Design Appendix presents an initial evidence-based design for the PARCC assessment system for mathematics. The design will be updated prior to the start of task development.

I. Assessment Claims in Mathematics
II. Overview of the Four Assessment Components
III. Example Draft High-Level Blueprints for Grades 3, 4, 8 and High School Algebra 1/Mathematics 1 Courses[92]
IV. Operationalizing Assessment of the Mathematical Practices
V. Practice-Forward Tasks
VI. Integrative Tasks
VII. Definitions

[92] Revised blueprints for all grades and courses will be provided to contractors before the start of item development.

I. Assessment Claims in Mathematics

In evidence-centered design, assessment is viewed as a process in which *student work on assessment tasks* constitutes *evidence for assessment claims* that are explicit from the beginning. Claims are the foundation for an assessment system that meets the challenge of assessing the rich construct of mathematics defined by the *Common Core State Standards*.

The claims for mathematics have been informed by the substantial analyses of the mathematics standards presented in the PARCC Model Content Frameworks. Some of the considerations that went into this design included:

1. Measuring the full range of the standards, to a greater extent than large-scale assessment has been doing;
2. Connecting content and practices;
3. Carrying forward into assessment the major design principles of the standards of focus and coherence;
4. Building on the standards analysis in the *PARCC Model Content Frameworks*, in terms of (a) emphases, (b) balances and (c) perspectives;
5. Opening the doors to innovation, especially in item quality and format, including innovative computer based tasks;
6. Keeping cost and logistical factors under control;
7. And in terms of the larger theory of action in the consortium, promoting quality work in classrooms.

The claims are organized as a hierarchy that elaborates the various arguments that assessment results represent about individual student achievement. The Master Claim is the overarching performance goal for the PARCC summative assessment: the degree to which the student is college and career ready (or "on track"). There are no Major Claims in Mathematics as there are in ELA/Literacy; however, tasks involving Major Content may produce scaled scores. One (1) Master Claim in Mathematics is supported five (5) specific Sub Claims. Evidence statements are typically reflections of the evidence required to support Sub Claims, which are then aggregated or subsumed to support the Master Claim.

The Master Claim represents the composite scaled scores that will be used to classify students into performance levels. The five Sub Claims are associated with score information of various kinds, such as raw scores or item scores. Raw scores may also be reported in Major Content categories (e.g., Operations and Algebraic Thinking).

Claims in Mathematics

Master Claim: On Track for College and Career Readiness. The degree to which a student is college and career ready (or "on-track" to being ready) in mathematics. The student solves grade-level/course-level problems in mathematics as set forth in the Standards for Mathematical Content with connections to the Standards for Mathematical Practice.
Sub Claim A: Major Content with Connections to Practices. The student solves problems involving the Major Content[93,94] for her grade/course with connections to the Standards for Mathematical Practice.

Sub Claim B: Additional and Supporting Content with Connections to Practices. The student solves problems involving the Additional and Supporting Content[95] for her grade/course with connections to the Standards for Mathematical Practice.

Sub Claim C: Highlighted Practices MP.3,6 with Connections to Content: expressing mathematical reasoning. The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.

Sub Claim D: Highlighted Practice MP.4 with Connections to Content: modeling/application. The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or, for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), *engaging particularly in the Modeling practice*, and where helpful making sense of problems and persevering to solve them (MP.1), reasoning abstractly and quantitatively (MP.2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).

Sub Claim E: Fluency in applicable grades (3-6): The student demonstrates fluency as set forth in the Standards for Mathematical Content in her grade.

[93] Terms underlined with a dotted line are terms that are defined in the Definitions section of this appendix.
[94] For the purposes of the PARCC Mathematics assessments, the Major Content in a grade/course is determined by that grade level's Major Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics (with designations for high school courses to come in the final Frameworks). Note that tasks on PARCC assessments providing evidence for this claim will sometimes require the student to apply knowledge, skills and understandings from across several Major Clusters.
[95] The Additional and Supporting Content in a grade/course is determined by that grade level's Additional and Supporting Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics.

The claims in mathematics are illustrated by Figure E.1 and are discussed in the remainder of this section. All of the claims apply to the full range of grades and courses (3-HS), except for Sub Claim E about fluency, which only applies to grades 3-6.[96]

Evidence Statements

In evidence-centered design, claims are furnished with *evidence statements*:

Evidence statements for the Master Claim. Sub Claims A-E serve as evidence statements for the Master Claim.

Evidence statements for Sub Claims A, B and E. Most of the evidence statements for these Sub Claims will be identical with individual Common Core State Standards for Mathematics (CCSSM) content standards, or in some cases, parts thereof (e.g., in some cases an evidence statement might be a single lettered item belonging to a content standard). In addition, some of the evidence statements will be identical with individual CCSSM content cluster headings,[97] and some will correspond to grade+domain or course+domain combinations (e.g., 5.NBT), stating that students can solve grade-level or course-level problems by combining the knowledge, skills and understandings articulated in the domain.[98,99]

Evidence statements for Sub Claims C and D. Evidence statements for these Sub Claims are provided alongside the Sub Claims themselves further below in this section.

[96] CCSSM includes explicit fluency standards in grades K-7. Fluency standards dealing with arithmetic are found in grades K-6, and the Sub Claim about fluency applies to these in grades 3-6. Note that the *PARCC Model Content Frameworks* identify valuable fluencies in high school; this might or might not lead to the fluency claim being present in high school by the time the design is finalized.

[97] These evidence statements will correspond with integrative tasks at the cluster level; see section VI of this Appendix.

[98] These evidence statements will correspond with integrative tasks at the domain level; see section VI of this Appendix.

[99] Sub Claims A and B assert that students can connect content and practices; see sections IV and V of this Appendix for the approach to operationalizing assessment of the practices on the PARCC mathematics assessments.

Figure D.1

Claims Structure: Mathematics

Master Claim: On-Track for college and career readiness. The degree to which a student is college and career ready (or "on-track" to being ready) in in mathematics. The student solves grade-level/course-level problems in mathematics as set forth in the Standards for Mathematical Content with connections to the Standards for Mathematical Practice.

Total Exam Score Points: ~90 (Grades 3-8), ~105 (HS)

Sub-Claim A: Major Content* with Connections to Practices

The student solves problems involving the Major Content* for her grade/course with connections to the Standards for Mathematical Practice.

Sub-Claim C: Highlighted Practices MP.3,6 with Connections to Content (expressing mathematical reasoning)

The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.

Sub-Claim E: Fluency in applicable grades (3-6)

The student demonstrates fluency as set forth in the Standards for Mathematical Content in her grade.

~ 60 pts (3-8), ~68 pts (HS)

Sub-Claim B: Additional & Supporting Content with Connections to Practices**

The student solves problems involving the Additional and Supporting Content** for her grade/course with connections to the Standards for Mathematical Practice.

~ 18 pts (3-8), ~21 pts (HS)

Sub-Claim D: Highlighted Practice MP.4 with Connections to Content (modeling/application)

The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), *engaging particularly in the Modeling practice*, and where helpful making sense of problems and persevering to solve them (MP. 1), reasoning abstractly and quantitatively (MP. 2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).

~ 12 pts (3-8), ~16 pts (HS)

For each claim, scores reported will differ:

- *Master claim:* scale score with cutpoint for on-track designation
- *Sub-claims*: raw scores
- *Other*: descriptive data, including item release and item scores with item analysis and student work returned

*For the purposes of the PARCC Mathematics assessments, the Major Content in a grade/course is determined by that grade level's Major Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics (with designations for high school courses to come in the final Frameworks). Note that tasks on PARCC assessments providing evidence for this claim will sometimes require the student to apply knowledge, skills, and understandings from across several Major Clusters.

**The Additional and Supporting Content in a grade/course is determined by that grade level's Additional and Supporting Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics.

Master Claim: On Track for College and Career Readiness

The degree to which a student is college and career ready (or "on track" to being ready) in mathematics. The student solves grade-level/course-level problems in mathematics as set forth in the Standards for Mathematical Content with connections to the Standards for Mathematical Practice.

How the Claim Derives from the Standards

- *The degree to which a student is college and career ready (or "on-track" to being ready) in mathematics.*

On p. 4 of the CCSSM, it is noted that the standards "provide clear signposts along the way to the goal of college and career readiness for all students." An assessment well aligned to such standards will provide students, parents, teachers, schools and policymakers with information about how students are progressing toward college and career readiness.

The metaphor of signposts used in the above quotation from the standards evokes the coherent mathematical progressions in the standards. "[T]he development of these Standards began with research-based learning progressions detailing what is known today about how students' mathematical knowledge, skill, and understanding develop over time" (p. 4). Thus, the *on-track/not on-track* portion of the Master Claim derives from the progression-oriented design of the mathematics standards themselves.

- *The student solves grade-level/course-level problems in mathematics as set forth in the Standards for Mathematical Content with connections to the Standards for Mathematical Practice.*

The Standards for Mathematical Content and Standards for Mathematical Practice are meant to be connected, as noted in CCSSM (p. 8):

> Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.

The Master Claim carries this directive forward into the assessment design itself. Connecting content and practices is also part of Sub Claims A-D, described next.

Sub Claim A: Major Content with Connections to Practices

The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.

How the Claim Derives from the Standards

The very first paragraph of the CCSSM reads as follows (p. 3):

> For over a decade, research studies of mathematics education in high-performing countries have pointed to the conclusion that the mathematics curriculum in the United States must become substantially more focused and coherent in order to improve mathematics achievement in this country. To deliver on the promise of common standards, the standards must address the problem of a curriculum that is "a mile wide and an inch deep." These Standards are a substantial answer to that challenge.

The *PARCC Model Content Frameworks* also describe the focus and coherence of the standards (p. 6):

> **Focus and Coherence**

The two major evidence-based principles on which the standards are based are ***focus*** and ***coherence***. **Focus** is necessary so that students have sufficient time to think, practice and integrate new ideas into their growing knowledge structure. Focus is also a way to allow time for the kinds of rich classroom discussion and interaction that support the Standards for Mathematical Practices.

The second principle, **coherence,** arises from mathematical connections. Some of the connections in the standards knit topics together at a single grade level (such as area models and multiplication in grade 3). Most connections, however, play out across two or more grade levels to form a progression of increasing knowledge, skill or sophistication. The standards are woven of these progressions. Likewise, instruction at any given grade would benefit from being informed by a sense of the overall progression students are following across the grades.

Another set of connections is found between the content standards and the practice standards. These connections are absolutely essential to support the development of students' broader mathematical understanding. To reflect the standards, the Model Content Frameworks emphasize that mathematics is not a checklist of fragments to be mastered, but that doing and using mathematics involves connecting content and practices.

Focus is critical to ensure that students learn the most important content completely, rather than succumbing to an overly broad survey of content. Coherence is critical to ensure that students see mathematics as a logically progressing discipline, which has intricate connections among its various domains and requires a sustained practice to master. Focus shifts over time, as seen in the following:

- In grades K-5, the focus is on the addition, subtraction, multiplication and division of whole numbers, fractions and decimals, with a balance of concepts, skills and problem solving. Arithmetic is viewed as an important set of skills and also as a thinking subject that, done thoughtfully, prepares students for algebra. Measurement and geometry develop alongside number and operations and are tied specifically to arithmetic along the way.

- In middle school, multiplication and division develop into powerful forms of ratio and proportional reasoning. The properties of operations take on prominence as arithmetic matures into algebra. The theme of quantitative relationships also becomes explicit in grades 6-8, developing into the formal notion of a function by grade 8. Meanwhile, the foundations of high school deductive geometry are laid in the middle grades. Finally, the gradual development of data representations in grades K-5 leads to statistics in middle school: the study of shape, center and spread of data distributions; possible associations between two variables; and the use of sampling in making statistical decisions.

- In high school, algebra, functions, geometry and statistics develop with an emphasis on modeling. Students continue to take a thinking approach to algebra, learning to see and make use of structure in algebraic expressions of growing complexity. As this description suggests, mathematical content in all grades is best approached in the ways envisioned by the Standards for Mathematical Practice.

The standards focus on crucial material so that students can have more time to discuss, reflect upon and practice it. The standards treat mathematics as a coherent subject to promote the sense-making that fuels mastery. The principles of focus and coherence are the twin engines that must be carried forward in implementation efforts and substantiated in curricula and assessments.

The *PARCC Model Content Frameworks* describe content emphases in the standards at the cluster level in order to allow curriculum, instruction and assessment to reflect the focus and emphasis of the standards (pp. 12 and 13):

Not all of the content in a given grade is emphasized equally in the standards. The list of content

> standards for each grade is not a flat, one-dimensional checklist; this is by design. There are sometimes strong differences of emphasis even within a single domain. Some clusters require greater emphasis than the others based on the depth of the ideas, the time that they take to master and/or their importance to future mathematics or the demands of college and career readiness. In addition, an intense focus on the most critical material at each grade allows depth in learning, which is carried out through the Standards for Mathematical Practice. Without such focus, attention to the Practices would be difficult and unrealistic, as would best practices like formative assessment.
>
> Therefore, to make relative emphases in the standards more transparent and useful, the Model Content Frameworks designate clusters as **Major**, **Additional** and **Supporting** for the grade in question. As discussed further in Appendix C, some clusters that are not major emphases in themselves are designed to *support* and strengthen areas of major emphasis, while other clusters that may not connect tightly or explicitly to the major work of the grade would fairly be called *additional*.

These cluster-level designations define the content boundaries for Sub Claims A and B. Thus, Sub Claim A refers to the Major Content in a grade or course as determined by Major Clusters identified in the *PARCC Model Content Frameworks* (with designations for high school courses to come in the final Frameworks). Note that tasks on PARCC assessments providing evidence for Sub Claim A will sometimes require the student to apply knowledge, skills and understandings from across several Major Clusters (see Integrative Tasks, section VI of this Appendix). Note also that Sub Claim A importantly refers to connecting content and practices. See sections IV and V of this Appendix for the approach to operationalizing assessment of the practices on the PARCC mathematics assessments.

Focus is the first condition of faithfully implementing the standards. Sub Claim A reflects this and communicates the fact that if students are not succeeding in the major work of the grade, then they are not succeeding period – and they are not on track to college and career readiness.

Sub Claim B: Additional and Supporting Content with Connections to Practices

The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.

How the Claim Derives from the Standards

Sub Claim B refers to the Additional and Supporting Content in a grade or course as determined by Additional Clusters and Supporting Clusters identified in the *PARCC Model Content Frameworks* (with designations for high school courses to come in the final Frameworks). The role of Sub Claim B is to highlight this content, which cannot be neglected. As the *PARCC Model Content Frameworks* state (page 13),

> To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. All standards figure in a mathematical education and will therefore be eligible for inclusion on the PARCC assessment.

Note that Sub Claim A importantly refers to connecting content and practices. See Sections V and VI of this Appendix for the approach to operationalizing assessment of the practices on the PARCC mathematics assessments.

Sub Claim C: Highlighted Practices MP.3,6 with Connections to Content: expressing mathematical reasoning

The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others and/or attending to precision when making mathematical statements.

How the Claim Derives from the Standards

The coherence of the standards is meant to allow students to experience mathematics as a logically progressing discipline in which everything makes sense. By expressing mathematical reasoning, students show that they are making sense of mathematics as they learn the subject.

Note that Sub Claim C importantly refers to connecting content and practices. When students express reasoning, their reasoning is *about* something – and that something is mathematical content, as articulated in the Standards for Mathematical Content.

In particular, many individual content standards set explicit expectations that students will explain the mathematics, justify a conclusion or prove a statement. Such content standards are natural connection points between content and practice in relation to Sub Claim C. See also Sections IV and V of this Appendix for the approach to operationalizing assessment of the practices on the PARCC mathematics assessments.

Standard for Mathematical Practice MP.3 reads, "Construct viable arguments and critique the reasoning of others." The word *construct* is important here, and it leads to the presence of the word *expressing* in the text of Sub Claim C. Answering just about any problem in mathematics requires mathematical reasoning to a greater or lesser degree; but standard MP.3 and Sub Claim C make the reasoning itself the target of assessment.

Standard for Mathematical Practice MP.6 reads, "Attend to precision." Here is the paragraph of discussion that follows the statement of the standard, with some of the terms highlighted:

> Mathematically proficient students try to communicate precisely to others. They try to use clear **definitions** in discussion with others and in their own **reasoning**. They state the **meaning** of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated **explanations** to each other. By the time they reach high school they have learned to **examine claims** and make explicit use of **definitions**.

The words emphasized here in boldface – *definitions*, *reasoning*, *meaning*, *explanations*, *examine claims* – begin to reveal how Standard for Mathematical Practice MP.6 connects to Sub Claim C for expressing mathematical reasoning. Once the significance of these terms is pointed out, they illuminate the remaining parts of the paragraph as well. For example, 'stating the meaning of symbols' is important when using algebra to solve a word problem. As noted in the *Progression* for Expressions and Equations in grades 6-8,[100]

> In choosing variables to represent quantities, students specify a unit; rather than saying "let G be gasoline", they say "let G be the number of gallons of gasoline."MP.6

The difference between "let G be gasoline" and "let G be the number of gallons of gasoline" is a difference in precision, to be sure, but it is also a difference between the kind of statement on which mathematical reasoning can be based and the kind of statement that cannot support mathematical reasoning.

Likewise, 'using the equal sign consistently and appropriately' is less about notational conformity than about recognizing that *equations are propositions*, propositions in which "equals" functions as a verb.

[100] http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf, accessed 11/20/2011.

(When a student wants to write 1 in answer to the question __ + 4 = 5 + 7, this is more than a notational difficulty.)

And so on with other examples. Thus, the first sentence in the paragraph below standard MP.6 is often read as being about communication, but a reading of the entire text shows that the stress in the first sentence is on the word *precisely*. 'Labeling axes' too is a form of this, in which the need is to ensure that the commitments pictured in a graph are true – and are in fact commitments. Being neither true nor false, an unlabeled graph is certainly not true and is arguably worse than false.

Thus in its deeper implications, Standard for Mathematical Practice MP.6 is about having a concern for the truth. It asks students to care whether a proposition they say or write is true or false – and it asks them to lose the habit of making statements that are neither. It is the grey zone of this last alternative that gives the practice of attending to precision its name; until a proposition is stated precisely, one cannot even evaluate it.

Evidence Statements for Sub Claim C

Many individual content standards explicitly require explanations or justifications, and thereby serve as specific evidence statements for Sub Claim C. Tasks generating evidence for Sub Claim C will generally require students to do the following, separately or in combination, in connection with specified content standards:

Approximately grades 3-5:

1. Base explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student in her response.)

2. Distinguish correct explanation/reasoning from that which is flawed, and – if there is a flaw in the argument – explain what it is. (For example, some flawed 'student' reasoning is presented and the task is to correct and improve it.)

3. Present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately. (For example, rubrics award less than full credit for the presence of nonsense statements such as 1 + 4 = 5 + 7 = 12, even if the final answer is correct.)[101]

Approximately grades 6-8: Any of the above, plus:

4. State the meaning of symbols introduced in the solution of a problem. (Even if the final answer is correct, rubrics award less than full credit for introducing symbols the meaning of which is not explained, or for defining symbols by nonsense statements such as "let G be gasoline.")

5. Test propositions or conjectures with specific examples.

6. Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.

Approximately High School: Any of the above, plus:

7. State logical assumptions being used.

8. Determine conditions under which an argument does and does not apply.

[101] As a high school example, rubrics might award less than full credit for failing to discard extraneous (mathematically false) solutions to equations, even when the problem does not prompt the student to do so.

Sub Claim D: Highlighted Practice MP.4 with Connections to Content: modeling/application.

The student solves real-world problems with a degree of difficulty appropriate to the grade/course by applying knowledge and skills articulated in the standards for the current grade/course (or, for more complex problems, knowledge and skills articulated in the standards for previous grades/courses), engaging particularly in the Modeling practice, and where helpful making sense of problems and persevering to solve them (MP.1), reasoning abstractly and quantitatively (MP.2), using appropriate tools strategically (MP.5), looking for and making use of structure (MP.7), and/or looking for and expressing regularity in repeated reasoning (MP.8).

How the Claim Derives from the Standards

As noted in the PARCC Model Content Frameworks (p. 8),

> One of the Mathematical Practices is that of Modeling (**MP.4**), which sets an expectation that students will "apply the mathematics they know to problems arising in everyday life, society and the workplace." Modeling is further developed as a conceptual category in high school, where it is explicitly linked to mathematical content standards using the star symbols (see pages 72 and 73). Furthermore, many individual content standards refer explicitly to real-world problems. The ability to apply mathematics will be assessed as part of PARCC's commitment to measure the full range of the standards.

Modeling can be a sophisticated practice. This implies that modeling and complex applications on PARCC assessments will sometimes draw upon securely held knowledge and skills. In particular, many modeling tasks in high school will demand flexible application of content knowledge first gained in grades 6-8 to solve complex problems. This is consistent with the standards, which state (p. 84):

> The evidence concerning college and career readiness shows clearly that the knowledge, skills, and practices important for readiness include a great deal of mathematics prior to the boundary defined by (+) symbols in these standards. Indeed, some of the highest priority content for college and career readiness comes from grades 6-8. This body of material includes powerfully useful proficiencies such as applying ratio reasoning in real-world and mathematical problems, computing fluently with positive and negative fractions and decimals, and solving real-world and mathematical problems involving angle measure, area, surface area, and volume. Because important standards for college and career readiness are distributed across grades and courses, systems for evaluating college and career readiness should reach as far back in the standards as grades 6-8. It is important to note as well that cut scores or other information generated by assessment systems for college and career readiness should be developed in collaboration with representatives from higher education and workforce development programs, and should be validated by subsequent performance of students in college and the workforce.

Evidence Statements for Sub Claim D

Many individual content standards involve modeling and application, and thereby serve as specific evidence statements for Sub Claim D. Tasks generating evidence for Sub Claim D will generally require students to do the following, separately or in combination, in connection with specified content standards:

Approximately grades 3-5:

1. Solve contextual word problems involving ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., a multiplication division in grade 3 or addition and subtraction of fractions in grade 4.)

2. Solve multi-step contextual word problems in which the problem is not broken into steps or sub-parts.

3. Engage in related practices, particularly: making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using math diagrams as tools (MP.5); looking for and making use of structure (MP.7); looking for and expressing regularity in repeated reasoning (MP.8).

Approximately grades 6-8: Any of the above, plus:

4. Autonomously apply a known technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature.)

5. Use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity.

6. Engage in related practices, particularly making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using appropriate tools strategically (MP.5); and looking for and making use of structure (MP.7).

Approximately High School: Any of the above, plus:

7. Select from a data source, analyze the data and draw reasonable conclusions from it, often resulting in an evaluation or recommendation. (The purpose of these tasks is not to provide a setting for the student to demonstrate breadth in data analysis skills, such as box-and-whisker plots and the like. Rather, the purpose is for the student to draw conclusions in a realistic setting, generally using elementary techniques.)

8. Execute some or all of the modeling cycle (see pp. 72 and 73 of the CCSSM.)

9. Engage in related practices, particularly making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using appropriate tools strategically (MP.5); and looking for and making use of structure (MP.7).

By high school, modeling tasks can involve noticeable elements of ambiguity in order to reflect real-world problems. In the world outside of the mathematics classroom, assumptions must be *made*; they are not given. If students are only ever taught to solve fully-framed problems in which all nontrivial assumptions have been made *for* the student – never *by* the student – then students are not being taught to use math in "everyday life, society, and the workplace" (CCSSM, p. 7).

Sub Claim E: Fluency in applicable grades (3-6)

The student demonstrates fluency as set forth in the Standards for Mathematical Content in her grade.

How the Claim Derives from the Standards

The standards state that "conceptual understanding and procedural skill are equally important" (p. 4). As the *PARCC Model Content Frameworks* note (p. 7),

> The standards are a rigorous set of expectations. According to these standards, it is not enough for students to learn procedures by rote. Nor on the other hand is it enough for students to "understand the concepts" without being able to apply them to solve problems. Nor, finally, is it enough according to these standards for students to learn the important procedures of mathematics without attaining skill and fluency in them.

Thus (p. 8),

> at various grade levels, there are specific content standards that use the word "fluently." These

standards will be assessed as part of PARCC's commitment to measure the full range of the standards. Wherever the word *fluently* appears in a content standard, the word means *quickly and accurately*. It means more or less the same as when someone is said to be fluent in a foreign language. To be fluent is to flow: Fluent isn't halting, stumbling or reversing oneself. A key aspect of fluency in this sense is that it is not something that happens all at once in a single grade, but requires attention to student understanding along the way. It is important to ensure that sufficient practice and extra support are provided at each grade to allow all students to meet the standards that call explicitly for fluency.

The standards call for equal intensity in the pursuit of conceptual understanding of mathematics, skill and fluency in mathematical procedures, and ability to apply mathematics to problems arising outside of the mathematics classroom.

II. Overview of the Four Assessment Components

As amended to the design described in the proposal, there will be four (4) assessment components in math during the school year. Below are brief overviews of each of the assessment components.

- Assessment Component 1: Diagnostic. Diagnostic assessments designed to pinpoint students' strengths and weaknesses relative to particular Common Core State Standards in the areas of reading, writing and mathematics. The assessments will be available for administration throughout the school year. For each content area, the diagnostics will include:

    - a computer-based component that measures knowledge and skills that can be measured using machine-scorable items;

    - a bank of performance tasks that measure knowledge and skills that are best measured using constructed-response items along with scored student responses for each of the tasks in the bank to assist teachers in scoring; and

    - an online professional development module designed to assist teachers in using reports generated by the diagnostic assessments effectively.

The assessment can serve to locate a student's approximate grade level and also assess Standards more deeply within that range. The Diagnostic assessments can include progression-sensitive tasks which are designed to be highly informative about students' location along a specified content progression in the CCSSM.

Diagnostic assessment results will not be included in summative assessment results. However, it might be possible to design this component to include information about whether students who did not achieve proficiency in their previous grade have made progress towards or have attained proficiency on those standards in their current grade. The Diagnostic assessment will provide teachers with information that can serve as an indicator of student status relative to the Common Core State Standards.

- Assessment Component 2: Mid-Year Assessment. The Mid-Year Assessments are designed to inform curriculum, instruction and professional development. Like the Performance-Based Assessment, the Mid-Year Assessments will involve rich performance-based tasks. The Mid-Year Assessment is designed to be given at approximately 50 percent instructional time and will provide instructionally useful feedback to teachers and students in time to help prepare them for the kinds of tasks on Assessment Component 3. Accordingly, the assessment blueprint will be similar to the Performance-Based Assessment comprised of short, medium and extended tasks that would be scored with a combination of machine and hand scoring. States and/or districts may locally choose to administer portions of the assessment or the full assessment. To assist schools in implementing the Mid-Year Assessments, PARCC will develop an online tool designed to train teachers to score student responses to the assessments' performance-based tasks and build their understanding of PARCC performance expectations.

    Additionally, the Mid-Year Assessment component will provide an opportunity to measure the same constructs as the Performance-Based Assessment component, while allowing continued innovations to be explored.

    Results of these assessments will not contribute to summative assessment results. However, states will have the option of including them in summative results provided that does not affect comparability, especially as curriculum sequences will vary. In those cases, the state will report two sets of summative results: One set based on the required summative components (see components 3 and 4 below) and another set based on the required components and the optional

Mid-Year Assessments. Some states may require this component for all schools; others may give districts the option to participate.

- Assessment Component 3: Performance-Based Assessment. in grades 3-8 and high school involving rich performance-based tasks, administered as close to the end of year as possible (approximately 75-80 percent instructional time). The assessment will be scored in time to be incorporated into the End-of-Year summative score for each student. The Performance-Based Assessment will not itself generate a scale score.

  PARCC will release 100 percent of tasks on the Performance-Based Assessment along with item analysis and item-level scores, as an important vehicle to provide more concrete feedback to students, teachers and parents, and in order to vividly communicate the focus and rigorous expectations of the Standards.
- Assessment Component 4: End-of-Year Assessment. Grades 3-8 End-of-Year assessments will be comprised of innovative, computer-based machine-scorable items complementing the Performance-Based Assessment to assess the full range of Standards in mathematics, including those competencies that are only appropriate for assessment at the end of the year, such as the one or two Standards in various grades that call for fluency. The assessments will be administered at approximately 90 percent of instructional time.

- High School: End-of-course (EOC) assessments in high school mathematics, which will be comprised of innovative, computer-based machine-scorable items. States will have the option of selecting a traditional mathematics course sequence or an integrated mathematics sequence; each complete sequence will measure the full range of high school mathematics standards. There has been some interest in creating a modularized version of the EOC mathematics exams, to address interest in greater customization of sequencing and pacing. Consideration of this will continue as the development of the procurements continues.

  PARCC will include the End-of-Year results in the determination of students' overall scale scores and on-track designations. Scale scores and on-track designations will be reported within one week of administration of the End-of-Year test (e.g., in time to be included on student report cards). PARCC will release a portion of tasks on the End-of-Year assessment along with the item-level scores, in order to provide more concrete feedback to students, teachers and parents, and in order to vividly communicate the focus and rigorous expectations of the standards.
  The common form of the End-of-Year test (in conjunction with the Performance-Based Assessment) entirely determines grade-level proficiency (and perhaps also whether a student met another grade's proficiency standard). An additional adaptive component may be offered to provide supplemental performance information for students at the extremes. It is the hypothesis that this adaptive component would be completely derivative of other investments.

Design for focus and coherence. Consistent with the design of the CCSSM, the previous iteration of the assessment design adopted by the Leadership Team, and the extended discussion of emphases in the standards in the P*ARCC Model Content Frameworks*, the Mathematics Assessment System as a whole and in each component will focus heavily on the major content[102] of each grade. Specifically, the Performance-Based Assessment will be worth 40-50 percent of the raw points counted toward the summative score and will focus entirely within the major content of the grade, while the end of course assessment will be worth 50-60 percent of the raw points counted toward the summative score and will

[102] For the purposes of the PARCC Mathematics assessments, the Major Content in a grade/course is determined by that grade level's Major Clusters as identified in the PARCC Model Content Frameworks for Mathematics (with designations for high school courses to come in the final Frameworks). Problems on PARCC assessments providing evidence for this claim will sometimes require the student to apply knowledge, skills and understandings from across several Major Clusters in a domain.

focus at least 50 percent within the major content of the grade. (See the *PARCC Model Content Frameworks* for details about emphases in each grade.)

Task Types

The PARCC assessments for mathematics will involve three primary types of tasks: Type I, II and III. Each task type is described in the table below on the basis of several factors, principally the length of the task and the purpose of the task in generating evidence for certain Sub Claims. These task types are used in the preliminary draft blueprints in the next section.

Table D.2 Task Types and Descriptions

Task Type	Description	Task Subtypes
Type I	Tasks that generate evidence for Sub Claims A, B and/or E, and that do not generate evidence for Sub Claims C or D • Machine scorable including innovative, computer-based formats. • Balance of conceptual understanding, procedural knowledge and brief applications. • Can be practice-forward (these will often involve MP.5 or MP.7)	*Single-prompt tasks:* I.1 Single-prompt tasks worth 1 point[103] I.2 Single-prompt tasks worth 2 points *Multi-prompt tasks:* 1.3 Two-prompt tasks worth 2 points 1.4 Three-prompt tasks worth 3 points 1.5 Four-prompt tasks worth 4 points 1.6 Five- or six-prompt tasks worth 5 or 6 points
Type II	Tasks that generate evidence for Claim C • Tasks are hand scored, or machine scored with innovative computer-based formats, or a combination. • Each task calls for written arguments/justifications, critique of reasoning, or precision in mathematical statements (MP.3, 6). • Tasks may be practice-forward in other ways as well.	*Single-prompt tasks:* II.1 Single-prompt tasks worth 3 points II.2 Single-prompt tasks worth 4 points II.3 Single-prompt tasks worth 5 or 6 points II.4 Single-prompt tasks worth 7 or 8 points *Multi-prompt tasks:* II.5 Two-prompt tasks worth 6 to 8 points (point distribution by prompt: 3+3, 3+4, 3+5, or 4+4) II.6 Three-prompt tasks worth 5 or 6 points (point distribution by prompt: 1+1+3 or 1+1+4) II.7 Four-prompt tasks worth 6 to 8 points (point distribution by prompt: 1+1+1+3, 1+1+1+4, 1+1+1+5)

[103] Tasks of type I.1 are often simply called "1-point tasks.'

Task Type	Description	Task Subtypes
Type III	Tasks that generate evidence for Claim D • Tasks are hand scored, or machine scored with innovative computer-based formats, or a combination. • Each task involves a given real-world context or scenario. • Tasks are practice-forward, highlighting Modeling (MP.4) and potentially involving some or all of MP.1, 2, 5, 7, 8.	*Single-prompt tasks:* II.1 Single-prompt tasks worth 3 points II.2 Single-prompt tasks worth 4 points II.3 Single-prompt tasks worth 5 or 6 points II.4 Single-prompt tasks worth 7 or 8 points *Multi-prompt tasks:* II.5 Two-prompt tasks worth 6 to 8 points (point distribution by prompt: 3+3, 3+4, 3+5, or 4+4) II.6 Three-prompt tasks worth 5 or 6 points (point distribution by prompt: 1+1+3 or 1+1+4) II.7 Four-prompt tasks worth 6 to 8 points (point distribution by prompt: 1+1+1+3, 1+1+1+4, 1+1+1+5)

III. Example Preliminary Draft High-Level Blueprints for Grades 3, 4, 8 and High School Algebra 1 / Mathematics 1 Courses

Updated blueprints for all grades and courses will be provided to contractors before the start of item development along with task models. Preliminary draft example blueprints for the Performance Based Assessment and End-of-Year Assessments are included in this section. Note that in any given grade or course, the Mid-Year Assessment blueprint is expected to resemble the Performance-Based Assessment (PBA) blueprint.

Table D.3. **Grade 3**, PBA
Table D.4. **Grade 3**, End-of-Year
Table D.5. **Grade 4**, PBA
Table D.6. **Grade 4**, End-of-Year
Table D.7. **Grade 8**, PBA
Table D.8. **Grade 8**, End-of-Year
Table D.9. **Algebra 1 / Mathematics 1**, PBA
Table D.10. **Algebra 1 / Mathematics 1**, End-of-Year

In these tables, a **row** specifies a certain **collection of tasks** on the assessment component in question. Thus, in the case of the PBA blueprints (for which there are three rows), each row describes an identifiable sub-component of the PBA component. (However, the tables do not specify how tasks are to be distributed across testing sessions or how tasks are to be sequenced in time during administration of the PBA.)

Each PBA blueprint has the following columns:

Claims. All claims (Figure D.1) for which evidence is being generated by the specified collection of tasks. Not every task in the collection will generate evidence for every claim listed, but every task in the collection will generate evidence for at least one of the claims listed.

Innovative Characteristics. All innovative characteristics (**APPENDIX F to the ITN**) relevant to the specified collection of tasks. Not every task in the collection will embody every characteristic listed, but every task in the collection will embody at least one of the characteristics listed.

Scope of Assessment. Defines the content scope for the given collection of tasks, by reference to the Standards for Mathematical Content. In general, there are not enough score points available to assess every part of the content scope every year; weighted sampling will be necessary. Weights will be provided to contractors prior to the start of item development.

Task Type. Identifies the type of tasks that will comprise the collection of tasks for the assessment sub-component. Table D.2 describes the three task types.

Approximate Number of Points in Section. The total approximate number of score points for the operational tasks in the given collection. **This does not include tasks that will be necessary for equating and field testing.**

Each End-of-Year blueprint has the following columns:

Claims. All claims (Figure D.1) for which evidence is being generated by the specified collection of tasks. Not every task in the collection will generate evidence for every claim listed, but every task in the collection will generate evidence for at least one of the claims listed.

Innovative Characteristics. All innovative characteristics (**APPENDIX F to the ITN**) relevant to the specified collection of tasks. Not every task in the collection will embody every characteristic listed, but every task in the collection will embody at least one of the characteristics listed.

Task Type. Identifies the type of tasks that will comprise the collection of tasks for the assessment sub-component. Table D.2 describes the three task types.

Approximate Number of Points in Section. The total approximate number of score points for the operational tasks in the given collection. **This does not include tasks that will be necessary for equating and field testing.**

Domain Point Totals (EOY). The approximate number of score points attributable to each content domain.

Note that all score point estimates throughout the entire assessment design are **approximate** (indicated by the ~ symbol) and represent the preliminary design. It is also possible that score points will vary from grade to grade to a greater extent than is currently indicated in these blueprints.

Ongoing consultation within PARCC, informed by research (e.g., prototyping project, data from current state assessments) will likely lead to continued refinements.

Table D.3 Grade 3, Performance Based Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Scope of Assessment[104]	Task Type[105] (Table D.2)	Approximate Number of Points in Section
A	1, 2, 3, 5, 8, 9	3.OA: 1; 2; 3; 4; 5; 7 (fluency only within limits); 8 // 3.NF: 1; 2; 3a-c // 3.MD: 5; 6	Type I	~12 points
A, C	6, 9	3.OA: 5; 6; 8 (solve & represent); 8 (solve & assess reasonableness) // 3.NF: 3b; 3d // 3.MD: 7	Type II	~12 points
A, D	7, 9	Real-world problems with degree of difficulty appropriate to grade 3, requiring application of knowledge and skills articulated in the standards listed above; or, for more complex problems, in 2.OA: A; B // 2.NBT // 2.MD: B	Type III	~12 points

[104] Weighted sampling from within these boundaries; not everything need be represented every year.
[105] Total cost of hand scoring the form must be less than a stated amount (TBD).

Table D.4 Grade 3, End-of-Year Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Task Type (Table D.2)	Approximate Number of Points in Section	Domain Point Totals (EOY)
A, B, E	1, 2, 3, 5, 8, 9	Type I	~54 points	OA ~ 21 NBT ~ 6 NF ~ 5 MD ~ 18 G ~ 4

Table D.5 Grade 4, Performance Based Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Scope of Assessment[106]	Task Type[107] (Table D.2)	Approximate Number of Points in Section
A	1, 2, 3, 4, 5, 8, 9	4.OA: 1, 2, 3 // 4.NBT: integrative tasks in first cluster; 1; 2 // 4.NF: integrative tasks in first cluster; 3b; 3d; 4a-c	Type I	~12 points
A, C	6, 9	4.OA: 3 // 4.NBT: integrative tasks in first cluster; 1; 5 (no two-digit × two-digit); 6 (dividends at most three-digit) // 4.NF: integrative tasks in the domain; 1; 2; integrative tasks in second cluster; 3b; 3d; 4a-c	Type II	~12 points
A, D	7, 9	Real-world problems with degree of difficulty appropriate to grade 4, requiring application of knowledge and skills articulated in the standards listed above; or, for more complex problems, in 3.OA // 3.MD // 3.G	Type III	~12 points

[106] Weighted sampling from within these boundaries; not everything need be represented every year.
[107] Total cost of hand scoring the form must be less than a stated amount (TBD).

Table D.6: Grade 4, End-of-Year Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Task Type (Table D.2)	Approximate Number of Points in Section	Domain Point Totals (EOY)
A, B, E	1, 2, 3, 5, 8, 9	Type I	~54 points	OA ~ 12 NBT ~ 12 NF ~ 14 MD ~ 10 G ~ 6

Table D.7 Grade 8, Performance Based Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Scope of Assessment[108]	Task Type[109] (Table D.2)	Approximate Number of Points in Section
A	1, 2, 3, 4, 5, 8, 9	8.EE: 1; 2; 5; integrative tasks in second cluster; 7; 8 // 8.F: 1; 2; 3 // 8.G: 1; 3; 7; 8	Type I	~12 points
A, C	6, 9	8.EE: Integrative tasks in first cluster; integrative tasks in second cluster; 6; 7a; 8a; 8b (estimating solutions by graphing) // 8.F: 3 (proving nonlinear examples) // 8.G: 2; 4; 5; 6	Type II	~12 points
A, D	7, 9	Real-world problems with degree of difficulty appropriate to grade 8, requiring application of knowledge and skills articulated in the standards listed above; or, for more complex problems, in 7.RP // 7.NS: 3 // 7.EE // 7.G // 7.SP: 1; 2; 3; 4; 5; 6; 7	Type III	~12 points

[108] Weighted sampling from within these boundaries; not everything need be represented every year.
[109] Total cost of hand scoring the form must be less than a stated amount (TBD).

Table D.8 Grade 8, End-of-Year Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Task Type (TABLE D.2)	Approximate Number of Points in Section	Domain Point Totals (EOY)
A, B	1, 2, 3, 5, 8, 9	Type I	~54 points	NS ~ 3 EE ~ 23 F ~ 9 G ~ 11 SP ~ 8

Table D.9 Algebra 1 / Mathematics 1, Performance Based Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Scope of Assessment	Task Type[110] (Table D.2)	Approximate Number of Points in Section
A	1, 2, 3, 5, 8, 9	Major Content and specific assessment targets TBD	Type I	~10 points
A, C	6, 9	Major Content and specific assessment targets TBD	Type II	~16 points
A, D	7, 9	Major Content and specific assessment targets TBD	Type III	~16 points

Table D.10: Algebra 1 / Mathematics 1, End-of-Year Assessment Blueprint – Preliminary Draft – Operational portion (equating and field testing items not yet included)

Claims	Innovative Characteristics (APPENDIX F)	Task Type (Table D.2)	Approximate Number of Points in Section	Domain Point Totals (EOY)
A, B	1, 2, 3, 5, 8, 9	Type I	~63 points	TBD (at least 50% Major Content)

[110] Total cost of hand scoring the form must be less than a stated amount (TBD).

IV. Operationalizing Assessment of the Standards for Mathematical Practice

The *PARCC Model Content Frameworks* describe the importance of connecting content and practices (p. 7):

- The Standards for Mathematical Content and Standards for Mathematical Practice are meant to be connected, as noted in the Common Core State Standards for Mathematics (p. 8).
- Designers of curricula, assessments and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.
- The word connect in this passage is important. Separating the practices from the content is not helpful and is not what the standards require. The practices do not exist in isolation; the vehicle for engaging in the practices is mathematical content.
- The Standards for Mathematical Practice should be embedded in classroom instruction, discussions and activities. They describe the kind of mathematics teaching and learning to be fostered in the classroom. To promote such an environment, students should have opportunities to work on carefully designed standards-based mathematical tasks that can vary in difficulty, context and type. Carefully designed standards-based mathematical tasks will reveal students' content knowledge and elicit evidence of mathematical practices. Mathematical tasks are an important opportunity to connect content and practices.

The following principles underlie PARCC's approach to operationalizing assessment of the Standards for Mathematical Practice:

a. **Practices function differently** from content in curriculum and instruction – for example, one can teach content without practices but not practices without content. Because content and practices function differently in curriculum and instruction, they should not be treated equivalently in assessment either.

b. Practices should be **authentically connected to specific content**, as opposed to being connected mechanistically or being separated from content altogether.

c. Practices should be **involved in all assessment components**, not just the performance assessment.

d. Assessment of the practices **should be well specified** to enable contractors to deliver a quality product that lives up to the standards.

e. **Practices are challenging** to learn, to teach and to assess. Habits of mind such as precision and perseverance, and capacities such as logical argument, are among the deepest values of education. The practices "describe varieties of expertise that mathematics educators at all levels should seek to develop in their students" (CCSSM, p. 6) – and expertise in any discipline develops over long timeframes through sustained hard work and dedication.

The Practices will be well represented on the PARCC Assessment. In part, this is because the practices are to some extent already threaded through the Standards for Mathematical Content. Thus, content standards can be divided with fair accuracy into three classes:

i. Content standards in which one or more practices is **explicit**. Such content standards are called practice-integrated. Contractors will be provided with a list of practice-integrated content standards prior to the start of development.

   Example: Practice standard MP.3 is explicit in any content standard that requires the student to justify a conclusion. Any content standard that requires the student to justify a conclusion is a practice-integrated content standard.

ii. Content standards in which one or more practices is **implicit**. Such content standards are called practice-related. Contractors will be provided with a list of practice-related content standards prior to the start of development. Examples of connections between content and practices the *PARCC Model Content Frameworks* will serve as the starting point for this list.

   Example: In grade 3, a one-step multiplication and division word problem (3.OA.3) is a modeling exercise (MP.4) because grade 3 students are just learning what multiplication and division mean (see the *PARCC Model Content Frameworks*). Standard 3.OA.3 is a practice-related content standard.

iii. Content standards that are not associated with particular practices any obvious way.

To ensure that the Practices are well represented, each year's assessment (taking into account both the Performance-Based Assessment and End-of-Year components) will satisfy the following constraints:

1. Practice coverage: For each Standard for Mathematical Practice, there will be one or more practice-forward tasks on the assessment.

   As stated in the Definitions, a practice-forward task is one that aligns to a practice-integrated content standard, or one that is otherwise intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. Each targeted practice or its absence is observable in the student's response, whether directly through observing student work or indirectly through an incorrect answer to a problem in which the practice would have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice. (See further discussion of practice-forward tasks in the next section.)

2. Content integration: In each content domain, there will be at least one task on every test associated with one or more Standards for Mathematical Practice, via either a practice-forward task or a task aligned to a practice-related content standard.

3. Distribution: Different Standards for Mathematical Practice will appear with differing frequencies on assessments. The pattern of authentic connections to the content will tend to vary across practices, across content domains and across grades given the specifics of the content standards themselves. This flow will drive the distribution of Practices on the test.

   Weight minimum: A specified minimum percentage of the total raw points on the test will come from tasks that are practice-forward or that align to practice-related content standards. Points from practice-forward tasks will fall within a specified range of percentages. (The specified minimum percentage and the specified range of percentages will be determined by an analysis of connections between content and practices, and will be provided to vendors prior to the start of item development.)

V. Practice-Forward Tasks

As stated in the Definitions section, a practice-forward task is a task that aligns to a practice-integrated content standard, or one that is otherwise intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. Each targeted practice or its absence is observable in the student's response, whether directly through observing student work or indirectly through an incorrect answer to a problem in which the practice would have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice.

General examples of practice-forward tasks might include:

- Tasks that require execution of the modeling cycle in high school (MP.4; see CCSSM pp. 72,73)
- Tasks that require the student to justify or prove a statement, or critique such reasoning (MP.3)
- Tasks that reward seeing structure in an algebraic expression and using the structure to rewrite it for a purpose (MP.7).

As a more specific example,[111] consider an Algebra II level task such as solving the equation .

A student in Algebra II would probably not be familiar with such an equation as a curricular topic. It is reasonable to say that the student will fail or succeed based on the ability to look for and make use of structure (MP.7). Therefore, if the student gives the correct solution, this in itself provides indirect evidence that the practice was brought to bear in solving the problem. If the student fails to give the correct solution, this in itself provides indirect evidence that the practice was not brought to bear in solving the problem. (Evidence of a more direct kind would be available if the response format captured the student's work on the problem.) For these reasons, the task of solving the equation would be considered a practice-forward tasks for MP.7.

Consistent with the directive in the standards to connect content and practices (CCSSM, p. 6), a practice-forward tasks must be tightly tied to specified content that is articulated in the Standards for Mathematical Content. For example, the Algebra II task above would carry a reference to those content standards in CCSSM that articulate the knowledge and skills necessary for the problem – in this case,

Interpret the structure of expressions / A-SSE.1.b.
Understand solving equations as a process of reasoning and explain the reasoning / A-REI.1.
Construct and compare linear, quadratic and exponential models and solve problems / F-LE.4.
Solve equations and inequalities in one variable / A-REI.4.

Including practice-forward tasks in the assessment design is not intended to permit loose interpretations of the Standards. These tasks must be carefully crafted to strike a delicate balance: They illustrate the practices in connection with stated CCSSM expectations without amounting to additional requirements beyond what the standards require. The Algebra II example above is meant to show an outer limit in this regard.

Assessing with practice-forward tasks can be thought of as creating conditions in which certain behaviors identified in the practice standards will prove advantageous, and then making inferences based on the student response about whether those behaviors did or did not actually take place during the student's problem-solving process. Such an inference is rather unlike the ones that today's large-scale educational

[111] Dorofeyev et al., Provisional State Education Standard for General Secondary Education in Mathematics, Ministry of Education of the Russian Federation (Moscow, 1993, p. 46). Trans. Bradley Stewart. Example drawn from the task library of the Illustrative Mathematics Project, http://illustrativemathematics.org.

tests are centered around. It is an inference about what did or did not happen, not an inference about whether a student has more or less of some hypothesized latent trait.

Practice-forward tasks may be of any length (from ~1 minute or less, up to the longest task contemplated in the design). The format of the answer may be of various kinds (from yes/no or single-number answers to diagrams, written explanations, or proofs). Practice-forward tasks may be machine or hand scored, though the Consortium particularly seeks to spur innovation in machine-scorable practice-forward tasks .

Practice-forward tasks can appear not only on the Performance-Based Assessment but also on the End-of-Year Assessment. In the latter case, the task must be machine-scorable. (Tasks on the Performance-Based Assessment may also be machine-scorable.)

Practice-forward tasks are not the only tasks that assess the practices. The connection between 3.OA.3 and MP.4 (described earlier) that makes 3.OA.3 a practice-related content standard is one of many important such connections between mathematical content and practices that, in a sense, have already been built into the Standards for Mathematical Content.

Contractors will be required to provide many practice-forward tasks to satisfy the constraints in principle (6) above. Contractors must provide each practice-forward tasks with an account justifying the characterization of the task as practice-forward for the practices in question. Contractors must also cite those content standards in the CCSSM that articulate the knowledge and skills necessary for the problem, and ensure that the tasks do not introduce extra requirements over and above what the standards require.

What are the mathematical practices?

From the CCSSM, p. 6:

> *The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.*

The practices are also sometimes referred to as mathematical habits of mind. The word *habit* is important here. The nature of expertise is such that in general, it does not require prompting. A problem that asks a student to look for a pattern or structure does not summatively assess the *practice of looking* for patterns and structure. In general, practices are things one does without prompting, when valuable to do so. However, this is not to say that practice-forward tasks can never be scaffolded, or can never directly ask the student to carry out a task such as constructing a viable argument (MP.3) or a mathematical model (MP.4).

Some problems are "all or nothing" in that they effectively *require* the student to engage in a practice in order to solve the problem at all (as in the example of solving the equation). In other problems, it is *moderately* advantageous to engage in a practice. (For example, to solve $3(x - 1) = 3$, one doesn't really *need* to "chunk" the $(x - 1)$ to find the solution.) Only the first type of problem summatively assesses the practice itself.

Example draft analysis of a Standard for Mathematical Practice: MP.1

Prior to the start of item development, contractors will be provided with an analysis of each Standard for Mathematical Practice that can guide development of practice-forward tasks . An initial draft analysis is presented below for MP.1: Make sense of problems and persevere in solving them.

Note that although practices can be discussed individually, they often intersect in various ways and can appear together. It should be stressed that a practice-forward task for one Standard for Mathematical Practice might very well simultaneously be a practice-forward task for others as well.

Brief overview of MP.1: Make sense of problems and persevere in solving them

This Standard for Mathematical Practice refers to two acts: making sense of problems and persevering in solving them. To be practice-forward for MP.1, a problem need not demand both.

Making sense of problems. This requires a problem sufficiently complex to demand the behavior in question. This usually means one of two things: (1) the problem involves ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., multiplication or division in grade 3 or addition and subtraction of fractions in grade 4); or (2) the statement of the problem itself is complex, lengthy, abstract, or confusing. In the latter case, these features might be intrinsic features of the task designed to elicit the practice, as opposed to being simple flaws.

Persevering in solving problems. Perseverance is not a lighthearted notion. To persevere is to persist in spite of counterinfluences, opposition or discouragement. Problems that are intriguing, amusing or briefly answered likely do not assess perseverance. Rather, to involve perseverance, the reward of the problem should be the more mature pleasure of having wanted to quit yet having persisted anyway.

General Examples of Practice-Forward Tasks, Problems, or Situations for MP.1 (not a complete list)

- Word problems involving ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., a multiplication division in grade 3 or addition and subtraction of fractions in grade 4.)
- Problems in which the statement of the problem itself is designed to erect a barrier to jumping in and working the problem immediately. For example, problems posed using abstract statements that must be parsed carefully before they make sense, or problems with several givens.
- For perseverance: problems that take 10 to 20 minutes to solve; problems that require a large number of routine and fairly easy steps; problems in which each step leads to a more difficult problem.

Some Non-Examples *(not a complete list)*

- Problems that prompt the student to engage in the practice.
- For perseverance, problems that take little time to answer, or are intriguing or amusing.

Further illustrations can be found in **APPENDIX F**.

VI. Integrative Tasks

As stated in the Definitions section, an integrative task is one that may best be coded to a cluster heading, domain or grade course rather than a specific standard. If specific standard(s) can be identified they would also be noted.. This circumstance might arise from a task with several sub-parts that each assess an individual standard, or it might arise from synthesis of individual standards.

Important connections are often not left to chance in the CCSSM but are made the explicit target of individual content standards (e.g., 3.MD.7). Not every cluster or domain will be assessed using integrative tasks. One might say that integrative tasks are to the assessment design what windshield wipers are to a car. You wouldn't want to own a car without windshield wipers – nor would it be sensible to turn on the windshield wipers every time you drive. Similarly, you wouldn't assess using integrative tasks unless it is valuable given the content. That is, some integrative tasks are necessary in order to measure the construct of the CCSSM as written. This is inevitable in any faithful articulation of mathematics. A subject such as algebra, for example, is not just its ingredients – it is a system. The distributive property and the commutative property are like two rules in one game. Traditionally, assessment in practice has been overwhelmingly at the rule level; the question of integrative tasks is the question of whether and how we might teach and assess the game also.

The presence of integrative tasks in the assessment design is not intended to permit loose interpretations of the standards. Such tasks are used where necessary to measure plausible and immediate implications of what is written in the standards, without ever slipping into the imposition of additional requirements.

Illustrations can be found in **APPENDIX F**.

VII. Definitions

Additional and Supporting Content. The Additional and Supporting Content in a grade/course is determined by that grade level's Additional and Supporting Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics.

Integrative Task. A task that may best be coded to a cluster heading, domain or grade course rather than a specific standard. If specific standard(s) can be identified they would also be noted.. This circumstance might arise from a task with several sub-parts that each assess an individual standard, or it might arise from synthesis of individual standards.

Not every cluster or domain will be assessed using integrative tasks. One might say that integrative tasks are to the assessment design what windshield wipers are to a car. You wouldn't want to own a car without windshield wipers – nor would it be sensible to turn on the windshield wipers every time you drive.

The presence of integrative tasks in the assessment design is not intended to permit loose interpretations of the standards. Such tasks are used where necessary to measure plausible and immediate implications of what is written in the standards, without ever slipping into the imposition of additional requirements.

Major Content. The major content in a grade/course is determined by that grade level's Major Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics (with designations for high school courses to come in the final Frameworks). Note that tasks on PARCC assessments providing evidence for Sub Claim A about Major Content will sometimes require the student to apply knowledge, skills and understandings from across several Major Clusters.

Practice-Forward Tasks: A practice-forward task is a task that aligns to a practice-integrated content standard, or one that is otherwise intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. Each targeted practice or its absence is observable in the student's response, whether directly through observing student work or indirectly through an incorrect answer to a problem in which the practice would have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice

General examples of practice-forward tasks might include:

- Tasks that require execution of the modeling cycle in high school (MP.4; see CCSSM pp. 72,73)
- Tasks that require the student to justify or prove a statement, or critique such reasoning (MP.3)
- Tasks that reward seeing structure in an algebraic expression and using the structure to rewrite it for a purpose (MP.7).

Practice-Integrated Content Standard. A content standard or part thereof in which one or more practices is explicit. Examples: practice standard MP.3 is explicit in content standards 3.NF.3b and in part of 4.NF.2; practice standard MP.4 is explicit in part of content standard F-BF.2.

Practice-Related Content Standard. A content standard or part thereof in which one or more practices is implicit. Examples: practice standards MP.1, 2, 7 and 8 are implicit in content standard 4.NBT.5 (see PARCC Model Content Framework, p. 21).

Progression-Sensitive Task. A task intentionally designed or intentionally selected to be informative about students' location along a specified content progression in CCSSM. Progression-sensitive tasks trace coherent progressions in the standards and can play an important role in the assessment design. Example:

Write 1/2 + 1/3 + 1/4 as a fraction. This computation is likely beyond the reach of a typical student who meets the grade 4 standards, yet likely within the reach of a typical student who meets the grade 5 standards.

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PARCC Item Development

Appendix E—Supporting Research on Accessible Design

Respondents should refer to the following research and selected websites for a deeper understanding of PARCC's commitment to developing accessible items for students with disabilities and English learners:

- Abedi, J., & Gandara, P. (2006). Performance of English Language Learners as a Subgroup in Large-Scale Assessment: Interaction of Research and Policy. *Educational Measurement: Issues and Practices*. December 2006, Vol. 26, Issue 5, 36-46.

- Acosta, B.D., Rivera, C., & Willner L.N. (2008). *Best Practices in State Assessment Policies for Accommodating English Language Learners: A Delphi Study*. Arlington, Va.: The George Washington University, Center for Equity and Excellence in Education.

- American Educational Research Association, American Psychological Association, & National Council on Measurement in Education (1999). *Standards for educational and psychological testing.* Washington, D.C.: American Educational Research Association.

- Dolan, R. P. and T. E. Hall (2001). Universal Design for Learning: Implications for large-scale assessment. *IDA Perspectives, 27(4)*, 22-25. Retrieved October 17, 2010 from http://4.17.143.133/udl/UDLImplicationsforLarge-ScaleAssessment2518.cfm.

- Edyburn, D.L. (2007). Technology enhanced reading performance: Defining a research agenda. *Reading Research Quarterly*, 42(1), 146-152.

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- Center for Implementing Technology in Education (CITEd) (www.cited.org)
- National Center on Accessing the General Curriculum (www.cast.org/research/projects/ncac.html)
- National Education Technology Plan (http://www.ed.gov/technology/netp-2010)
- Toolkit for Universal Design for Learning, OSEP Ideas That Work, U.S. Office of Special Education Programs (www.osepideasthatwork.org/udl/)

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PARCC Item Development

Appendix F: Illustrations of Innovative Task Characteristics

The Consortium seeks a number of innovations to assessment that can help achieve the intended goals of the PARCC Assessment System in mathematics. Table F.a lists eight innovative characteristics in mathematical tasks which the Consortium particularly seeks. Note that a single task might embody several innovative characteristics at once; and note that not every task on the assessment will embody every innovation. Discussion of each innovative characteristic is given immediately following Table F.a.

Table F.a: Innovations in Mathematical Tasks Especially Desired by the PARCC

Innovative Characteristic	Relevant Sub Claims	Desired Features of Tasks	Development Priorities
1. Quality assessment of individual content standards with machine scoring of responses entered by computer interface	A, B	• Well aligned to the standard in question; demonstrates the task developer's understanding of the standard and its role in the grade or course. • Progression-sensitive; demonstrates the task developer's understanding of progressions in the content standards. • Minimizes or avoids common drawbacks of selected-response, e.g., possibility of guessing; possibility of using a choice-elimination strategy where doing so is not central to the task; restriction to problems with a unique answer (sometimes mathematically unnatural or, in the context of applications, sometimes artificial). • Embodies important CCSSM shifts for the particular content involved in the standard.	• Content priorities: individual content standards in progressions identified in Appendix B of the *PARCC Model Content Frameworks*; individual content standards in clusters designated Major Clusters in grades 3-8 in the *PARCC Model Content Frameworks*; individual high school content standards in clusters identified in Appendix D of the *PARCC Model Content Frameworks*.
2. Practice-forward tasks	A, B	• Intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. • Each targeted practice or its absence is observable in the student's response, whether directly in student work or indirectly through an incorrect answer to a problem in which the practice would have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice.	• PARCC is strongly interested in tasks for which student responses are entered by computer interface; tasks for which student responses are machine scored; and tasks with both of these characteristics. • Content/practice priorities from the standards will be provided to contractors prior to the start of development. See also **Appendix D** of this ITN.
3. Tasks assessing conceptual understanding with machine scoring of responses entered by computer interface	A, B	• An important special case of characteristic (1) is to assess conceptual understanding, where the standards explicitly call for it. • It might be that many or most of these are short tasks that are computationally non-intensive and easy to answer quickly, if the student understands the concept in question, but difficult to answer at all if the student doesn't understand the concept.	• Individual content standards that contain the words "understand" or "interpret."

Innovative Characteristic	Relevant Sub Claims	Desired Features of Tasks	Development Priorities
4. Integrative tasks with machine scoring of responses entered by computer interface	A, B, C	• A task that may best be coded to a cluster heading, domain heading, or grade/course title, rather than a specific standard. If specific standard(s) can be identified they would also be noted. • Measure plausible and immediate implications of what is written in the standards, without ever slipping into the writing of additional requirements. Integrative tasks are not intended to permit loose interpretations of the standards.	• To be provided to contractors prior to the start of development. For more information, see the discussion of integrative tasks in **Appendix D** of this ITN.
5. Fluency assessment with machine scoring of responses entered by computer interface	A, E	• An important special case of characteristic (1) is to assess fluency (accurate and reasonably fast computation), where the standards explicitly call for it.	• 3.OA.7, 4.NBT.4, 5.NBT.5, 6.NS.2
6. Expressing mathematical reasoning	A, C	• Tasks that call for written arguments/ justifications, critique of reasoning, or precision in mathematical statements (MP.3, MP.6). • Tasks may be practice-forward in other ways as well.	• PARCC is strongly interested in tasks for which student responses are entered by computer interface; tasks for which student responses are machine scored; and tasks having both of these characteristics. • Content priorities will be provided to contractors prior to the start of development. For more information, see sample draft blueprints for PBA assessments in the following section, as well as the discussion of Sub Claim C in **Appendix D** of this ITN.
7. Modeling / application	D	• Tasks that involve real-world contexts or scenarios and require the student to: apply knowledge and skills articulated in specified standards; engage particularly in the Modeling practice (MP.4); and where helpful make sense of problems and persevere to solve them (MP.1), reason abstractly and quantitatively (MP.2), use appropriate tools strategically (MP.5), look for and make use of structure (MP.7), and/or look for and express regularity in repeated reasoning (MP.8) • Each task consists of several related questions, or a single prompt with a longer response required, or a combination. • Tasks are practice-forward, highlighting Modeling (MP.4) and potentially involving some or all of MP.1, 2, 5, 7, 8.	• PARCC is strongly interested in tasks for which student responses are entered by computer interface; tasks for which student responses are machine scored; and tasks having both of these characteristics. • Content priorities will be provided to contractors prior to the start of development. For more information, see sample draft blueprints for PBA assessments in the following section as well as the discussion of Sub Claim D in **Appendix D** of this ITN.

Innovative Characteristic	Relevant Sub Claims	Desired Features of Tasks	Development Priorities
8. Technology-enhanced tasks	A, B, C, D, E	• Technology enhancements may be important to attain innovations 1 through 7. • The chief role of technology enhancement is to measure the widest possible range of the standards in a cost-effective way.	• Technology enhancements supporting accessibility (e.g., the ability to hover over a word to see and/or hear its definition, etc.). • Transformative formats making possible what couldn't be done at all with paper (e.g., running a simulation to improve a model, gamelike environments, drawing/constructing diagrams or visual models, etc.). • Capturing complex student responses through a device interface (e.g., using drawing tools, symbol palettes, etc.). • Machine scorable tasks that allow for partial credit even though they are not broken into parts.

Distinguishing between *innovative* and *difficult*

Standards-based assessments are not designed for the purpose of differentiating students relative to one another. Rather, the purpose is to ascertain whether each individual student has met an objective standard. Tasks should generally be no more difficult than necessary to meet the standard, nor so easy as to fall short of the standards or compromise the Claims being made, including the Master Claim of being on-track to college readiness. The important drive toward innovation should not become a drive toward more and more difficult tasks that go beyond what the standards require.

A. Illustrations of Innovative Task Characteristics

Distinguishing between *illustrations* and *contract deliverables*

Illustrations of innovative characteristics in the ITN and/or in its appendices are not intended as literal previews of future PARCC assessment tasks. Rather, they are included in the ITN in order to illustrate terms and ideas, signal shifts called for in the standards, and signal PARCC's interest in innovation. **They are not representative of contract deliverables; nor are they models for respondents' submissions**. **See SECTION 8.7 for contract deliverables, and SECTION 8.5.6 for required task elements,**

- Illustrations of innovative characteristics in the ITN and/or its appendices are often simply prompts, without the accompanying rubrics or other elements that are necessary in bidder task submissions. Furthermore, because many of the illustrations in the ITN are drawn from pre-existing sources, many align partially but not fully to the standards; by contrast, tasks delivered under contract must be carefully aligned to CCSSM. tasks, .

- Illustrations of innovative characteristics in the ITN and/or its appendices highlight aspects of mathematical content and mathematical practice that are important for assessing the full range of the standards. Because of that focus, they generally illustrate *at most* incremental technology enhancements. This circumstance is **not** intended however to limit the range of innovative technology enhancements in respondents' submissions. Note that respondents may refer to the original PARCC proposal for additional illustrations of technology enhancement in mathematical tasks. However, even those illustrations should not be interpreted as limiting innovative responses to this ITN.

- PARCC is currently working with partners to develop prototype tasks for the PARCC assessments to serve as models for task developers. Illustrations of innovative characteristics in the ITN and/or its appendices are not intended to replace these prototypes. Selected samples of prototype tasks will be made available to the contractor prior to the start of development.

Actual tasks on PARCC assessments will satisfy norms of quality including but not limited to the following: freedom from errors, bias, and construct-irrelevant language complexity; grade-level appropriateness; and careful alignment to the standards. Accessibility for all students is central to PARCC's Assessment System.

1. Quality assessment of individual content standards with machine scoring of responses entered by computer interface

   a. Well aligned to the standard in question; demonstrates the task developer's understanding of the standard and its role in the grade or course. As an example, consider standard 3.OA.3:

      > Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

      Some multiplication problems assess this standard better than others, and some multiplication problems do not assess the standard at all. The comparison in **Table F.b**. shows some of the issues involved.

Table F.b. Comparison of two grade 3 multiplication problems (3.OA.3)

Original	Better Aligned
Each shirt costs $4. How much do 3 shirts cost? Show your work. b. The small factors of 3 and 4 make feasible a "count-all" strategy which does not meet the standard. The standard requires students to multiply. c. The standard refers to situations involving equal groups, arrays, and measurement quantities. The situation above is not manifestly one that involves equal groups. While the student might invent groups of 3 objects by drawing pictures of dollar bills, dollar bills are not present in the situation itself. This is also not an array situation. And finally, even if it could be thought of as a measurement situation, such situations should emphasize length and area in grade 3 (see 3.MD.7 and Table 2 on p. 89 of CCSSM; mass and volume are present in 3.MD.2). This task is not "wrong," but it does not tap into the central meaning of a product at this grade (see 3.OA.1). d. Standard 3.OA.3 does not require students to show their work.	Each shirt has 6 buttons. How many buttons are needed to make 7 shirts? e. The larger factors in the problem make "counting-all" a poor strategy. Assessment of 3.OA.3 should focus on products and related quotients from the three harder quadrants of the multiplication table, with the easiest quadrant ($a \times b$ where $0 \leq a, b \leq 5$) appearing primarily in multi-step problems. f. The situation here is manifestly 7 groups with 6 things in each group. g. Note that the groups of objects in such questions should also sometimes be in arrays. The hardest kinds of problems for this standard should involve measurement quantities, with an emphasis on length and area. See Table 2 on page 89 of the standards for more information. h. For additional information see the *Progression* for K-5 Operations and Algebraic Thinking. Available at http://ime.math.arizona.edu/progressions/#products.

b. Progression-sensitive; demonstrates the task developer's understanding of progressions in the content standards.
A progression-sensitive task is intentionally designed or intentionally selected to be informative about students' location along a specified content progression in CCSSM. For example, the problem of writing – – – as a fraction (**5.NF.1**) is likely beyond the reach of a typical student who meets the grade 4 standards, yet is likely within the reach of a typical student who meets the grade 5 standards. Progression-sensitive tasks trace coherent progressions in the standards and can play an important role in the assessment design.

c. Minimizes or avoids common drawbacks of selected-response: e.g., the possibility of guessing; the possibility of using a choice-elimination strategy where doing so is not central to the task; the restriction to problems with a unique answer (which is sometimes mathematically unnatural or, in the context of applications, sometimes artificial). See **Table F.c** below and on the following two pages.

Table F.c: Minimizing or avoiding common drawbacks of selected response

Original	Illustrative Contrast	Comments
If $3(y - 1) = 8$, then what is y?	What are two different equations with the same solution as $3(y - 1) = 8$?	The original has one correct answer, but the illustrative contrast (**7.EE**) has more than one correct answer. The ability to set problems with more than one correct answer may make greater mathematical richness possible in assessment. The original is also a direct command to demonstrate a basic skill. Such problems are worthwhile, but an assessment well aligned to the CCSSM construct cannot be limited to such problems. Note that the illustrative contrast is closer to one of the standards' recurrent goals for equations, that of reasoning with them (see A-REI and 6.EE.5).

Original	Illustrative Contrast	Comments
$y + 2z = 1$ $3y + z = 8$ If these equations are true, what are y and z? a . (1, 0) b . (2, 2) c. (3, –1) d. (1, 8)	*Illustration 1*. (first cluster in **A-REI**) $3x + 2y + 2z = 19$ $3x + y + z = 14$ If these equations are true, which of the following is the value of $y + z$? a . –5 b . –4 c. 0 d. 5 *Illustration 2*. (**3.OA.7**) Mark each equation true or false. ☐ ☐ ☐ ☐ ☐	In the original, choice elimination is a good strategy. In illustration 1, although the answer can be found by guessing, choice elimination is not feasible because the desired quantity is not isolated in the given equations. Rather, the student can look for and make use of structure (MP.7) to solve the problem—say, by seeing the value of subtracting the second equation from the first, or by rewriting as a two-variable system, $A + 2B = 19$ and $A + B = 14$, where A stands for $3x$ and B stands for the desired $y + z$. In illustration 2, which involves fluency, it is difficult to guess correctly because of the number of combinations of responses possible.

Original	Illustrative Contrast	Comments
Consider the triangle *ABC* with coordinates *A*(0,3), *B*(−1,0), *C*(2,1). The center of the circumscribed circle is which of the following? a) – – b) – – c) – – d) – –	Consider the triangle ABC with coordinates A $(0,3)$, B $(-1,0)$ and C $(2,1)$. **1.** The center of the circumscribed circle is __ __ (**G-GPE**)	In the illustration (modified from the Japanese University Entrance Examination, JUEE), a format is used that allows for machine scoring of rich mathematical tasks while avoiding guessing and choice elimination strategies. The JUEE can ask multi-step questions in a machine scorable format and see how far students are able to progress before they cannot complete a step. In the JUEE, the examinee circles the symbol that goes in each blank. In a computer-based version of the task, blanks could be filled in by typing, drag-and-drop, pull-down menus, or by some other means.

Original	Illustrative Contrast	Comments
A bird flew 20 miles in 100 minutes at constant speed. At that speed, how long would it take the bird to fly 6 miles?	Illustration 1. (**6.RP.3**) A bird flew 20 miles in 100 minutes at constant speed. At that speed: (a) How long would it take the bird to fly 6 miles? (b) How far would the bird fly in 15 minutes? (c) How fast is the bird flying in miles per hour? (d) What is the bird's pace in minutes per mile? Illustration 2. (**A-CED.4**, **N-Q.1**) If a company spills chemicals in the local waterway, the company must pay a fine. The fine is given by a formula that is written in the state law: $D = 0.508\, G\, S\, (A + B + C)$ In this formula, • D is the amount of the fine in dollars. • G is the number of gallons of material spilled. • S is an environmental factor in the range from 1 to 5 that takes into account wildlife characteristics in the spill area. • A, B and C are chemical factors that take into account how damaging the spilled material is. Each chemical factor ranges from 1 (least damaging) to 5 (most damaging). a) A company spilled kerosene in an area with environmental factor $S = 2$. Kerosene has chemical factors $A = 1.4$, $B = 2.4$, and $C = 1.3$. The company paid a $10 million fine. • How many gallons of kerosene were spilled? • How many dollars did the company pay for each gallon of kerosene spilled? b) Rearrange the formula in the state law to write a formula that gives the number of dollars charged per gallon of spill. c) What is the maximum possible fine in dollars per gallon of spill?	There will be many 1-point tasks on the PARCC Mathematics assessments, but the assessments will not be limited to them. In the classroom, a good problem situation is seldom abandoned after a single question about it has been answered. Multi-part problems can be valuable in making the assessment more closely resemble quality classroom work. Tasks with several prompts should be constructed in such a way that incorrect answers on early parts do not make it impossible for the student to earn credit on later parts. Moreover, the first prompt should often be easy, to allow test-anxious or less-advanced students to gain access to the task. This also establishes that the student knows something about the domain in question. Illustration 1 shows how it is possible to "round out" an important topic like rate reasoning by touching on a number of its key facets. Illustration 2 shows how it is possible to investigate a richer contextual situation by asking several related questions about it.

d. Embodies important CCSSM shifts relating to the particular content involved in the standard. A few of these content-specific shifts are shown in Table **F.d,** with specific illustrations for some of these in **Table F.e.**

Table F.d: A few important CCSSM shifts relating to particular content

Away from	Toward
Conceiving of fractions as *pictures*	Conceiving of fractions as *numbers* e. Many standards tie the system of whole numbers to the system of fractions (e.g., 3.NF.1 is phrased in a way that includes whole numbers as a special case; 3.NF.2 applies to whole numbers as a special case; 3.NF.c explicitly ties whole numbers and fractions together). f. Fraction and decimal concepts in the standards are not limited to area models. (There is no sensible way to multiply two pieces of pizza.) Tape diagrams are mentioned as visual fraction models in the standards (p. 87). Number lines are prevalent in the fraction standards, present as early as grade 3. Number lines should be increasingly prevalent in higher grades, including in grade 4, where fraction equivalence is a major concern; in grade 5, where word problems with fractional answers can ask "Between which two whole numbers does your answer lie?"; in grade 6, where signed number concepts are introduced; in grade 7, where students calculate distance on the number line; and in grade 8, where students begin working with irrational numbers.
Mechanically simplifying or expanding expressions	Using properties of operations to *rewrite* expressions, as specified in the standards; and *mindfully manipulating* expressions based on seeing their structure, as specified in the standards. (This applies not just to variable expressions but also to numerical expressions.)
"Integer algebra" in middle school and high school	Rational number algebra in middle school, and real number algebra during high school
In middle school, limiting to word problems that invite "forward methods" of arithmetic	Word problems that invite algebraic approaches
Solving equations as a series of mechanical steps	Solving equations as a process of reasoning

Table F.e: Illustrations for some important CCSSM shifts relating to particular content

Shift Being Illustrated	Original	Illustration	Comment
In middle school, away from limiting to word problems that invite "forward methods" of arithmetic, and toward word problems that invite algebraic approaches.	Donna buys 40 apples at 35 cents each. She eats 2 apples and sells the rest for 45 cents each. How much money does she make? Multi-step problem for modeling/application (Claim C) for grade ~5 – ~6, drawing on content articulated in **5.NBT**	Donna buys some apples at 35 cents each. She eats 2 apples and sells the rest for 45 cents each. She makes $4.40. How many apples did she buy? **7.EE.4**	The original is a good multi-step problem that invites "forward methods" of arithmetic: $40 \times 0.35 = 14.00$, and $40 - 2 = 38$, and $38 \times 0.45 = 17.10$, and $17.10 - 14.00 = 3.10$. Her profit is $3.10. The transition from arithmetic to algebra involves problems such as the illustration that invite an algebraic approach: Let a be the number of apples Donna bought. Then the amount she paid for the apples in dollars was $a \times 0.35$, or $0.35a$. The amount she took in from selling the apples in dollars was $(a - 2) \times 0.45$, or $0.45a - 0.9$. So the amount of money she made was $(0.45a - 0.9) - 0.35a = 0.45a - 0.35a - 0.9 = 0.1a - 0.9$. But this is known to be 4.40, so $0.1a - 0.9 = 4.40$. Solve for a to find $a = 53$.
Away from mechanically simplifying or expanding expressions, and toward using properties of operations to *rewrite* expressions, as specified in the standards, and toward *mindfully manipulating* expressions with a purpose based on seeing their structure, as specified in the standards.	Expand $(x - 2)(x - 3)$.	*Illustration 1.* **6.EE.2** What is the value of $3x + y + 3 - 3(x + y)$ when $x = 18.22$ and $y = -1$? *Illustration 2.* **A-SSE** Find a value for k and a value for n so that $(x - 2)(x - 3) = x^2 + kx + n$.	The original is a direct command to demonstrate a basic skill. Such problems are worthwhile, but tasks on the PARCC assessments cannot be limited to them. The illustrations both ask the student to look for and make use of structure (MP.7) In the first illustration, it is advantageous to expand and rearrange terms before evaluating, yet the task does not prompt the student to do so. The second illustration is like the first in that no explicit command is given to carry out a procedure of factoring, expanding, collecting like terms, putting into standard form, etc.
Away from "integer algebra" in middle school, toward rational number algebra in middle school.	If $3(x - 5) = 45$ then what is x?	If – – then what is x?	The illustration connects algebra more directly to the rational number system.

2. Practice-forward tasks

Refer to *Appendix D* for information about how PARCC will operationalize assessment of the Standards for Mathematical Practice. Note in particular that the following principles underlie PARCC's approach (these principles also appear in **Appendix D**):

a. **Practices function differently** from content in curriculum and instruction—for example, one can teach content without practices but not practices without content. Because content and practices function differently in curriculum and instruction, they should not be treated equivalently in assessment either.

b. Practices should be **authentically connected to specific content**, as opposed to being connected mechanistically or being separated from content altogether.

c. Practices should be **involved in all assessment components**, not just the performance assessment.

d. Assessment of the practices **should be well specified** to enable contractors to deliver a quality product that lives up to the standards.

e. **Practices are challenging** to learn, to teach, and to assess. Habits of mind such as precision and perseverance, and capacities such as logical argument, are among the deepest values of education. The practices "describe varieties of expertise that mathematics educators at all levels should seek to develop in their students" (CCSSM, p. 6)—and expertise in any discipline develops over long timeframes through sustained hard work and dedication.

   Note that the Practices will be well represented on the PARCC Assessment. In part, this is because the practices are to some extent already threaded through the Standards for Mathematical Content. Thus, content standards can be divided with fair accuracy into three classes:

- Those content standards for which one or more practices is fairly explicit in the statement of the content standard. Such content standards are called practice-integrated. For example, any content standard that requires the student to justify a conclusion is a practice-integrated content standard for MP.3. Contractors will be provided with a list of practice-integrated content standards prior to the start of development.

- Those content standards in which one or more practices is implicit. Such content standards are called practice-related. For example, because grade 3 students are just learning what multiplication and division mean, content standard 3.OA.3 is a practice-related content standard for practice standard MP.4 (see the PARCC Model Content Frameworks). Additional examples of implicit connections between content and practices can be found the PARCC Model Content Frameworks. Contractors will be provided with a list of practice-related content standards prior to the start of development.

- Those remaining content standards which are not associated with particular practices in an obvious way.

To ensure that the Practices are well represented, each year's assessment (taking into account both the PBA and End of Year components) will satisfy the following constraints:

1. *Practice coverage*: For each Standard for Mathematical Practice, there will be one or more practice-forward tasks on the assessment.

   As stated in the Definitions, a practice-forward task is one that aligns to a practice-integrated content standard, or one that is otherwise intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. Each targeted practice or its absence is observable in the student's response, whether directly through observing student work or indirectly through an incorrect answer to a problem in which the practice would have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice. (See further discussion of practice-forward tasks in the next section.)

2. *Content integration*: In each content domain, there should be at least one task on every test associated with one or more Standards for Mathematical Practice, either a practice-forward task or a task aligned to a practice-related content standard.

3. *Distribution*: Different Standards for Mathematical Practice will appear with differing frequencies on assessments. The pattern of authentic connections to the content will tend to vary across practices, across content domains, and across grades given the specifics of the content standards themselves. This flow will drive the distribution of Practices on the test.

4. *Weight minimum*: A specified minimum percentage of the total raw points on the test will come from tasks that are practice-forward or that align to practice-related content standards. Points from practice-forward tasks will fall within a specified range of percentages. (The specified minimum percentage and the specified range of percentages will be determined by an analysis of connections between content and practices, and will be provided to vendors prior to the start of development.)

Consistent with the directive in the standards to connect content and practices (CCSSM, p. 6), a practice-forward task must be tightly tied and coded to specified content that is articulated in the Standards for Mathematical Content. **Refer to the *PARCC Model Content Frameworks* for examples of connections between content and practices.**

Including practice-forward tasks in the assessment design is not intended to permit loose interpretations of the standards. These tasks must be carefully crafted to strike a delicate balance: they illustrate the practices in connection with stated CCSSM content expectations without amounting to additional requirements beyond what the standards already require.

Practice-forward tasks are anticipated to be of any length from ~1 minute or less to the maximum length of tasks appearing on the assessment. The format of the answer may be of various kinds, from yes/no or single-number answers to diagrams or written responses. Practice-forward tasks may be machine-scorable or hand scored, though PARCC particularly seeks to spur innovation in machine-scorable practice-forward tasks.

Practice-forward tasks can appear not only on the PBA assessment but also on the end-of-year assessment.

Table F.f provides some general cases of practice-forward tasks for each Standard for Mathematical Practice. Following the table are particular illustrations. **Refer to *Appendix D* for additional information.**

Table F.f. General Cases of Practice-Forward Tasks *(not a complete list)*. *Note that although the table lists each practice separately, a practice-forward task can often be practice-forward for several practices at once. The general cases are not a complete list. The list may also evolve (and still remain incomplete). Note that the last column does not list all possible combinations.*

Standard for Mathematical Practice	General Cases of Practice-Forward Tasks *(not a complete list)*	May Combine Easily With
1. Make sense of problems and persevere in solving them	g. Word problems involving ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., a multiplication or division word problem in Grade 3 or addition and subtraction of fractions in Grade 4). h. Problems in which the statement of the problem itself is designed not to allow for jumping in and working the problem immediately–for example, problems posed using abstract statements that must be parsed carefully before they make sense, problems with several "givens," or unscaffolded problems in which a multi-step strategy must be autonomously devised by the student. i. For perseverance: problems designed to take a typical student a long time to solve; problems that require a large number of routine and fairly easy steps; problems in which each step leads to a more difficult problem, with a rubric that awards increasingly many points to each part.	MP. 2, 4, 5, 7, 8
2. Reason abstractly and quantitatively	j. Contextual problems in which the student can gain insight into the problem, and earn points on the task, by relating the algebraic form of an answer or intermediate step to the given context. (See the crossover point example in the *PARCC Model Content Frameworks*, p. 43.)	MP.1, 4, 7, 8

Standard for Mathematical Practice	General Cases of Practice-Forward Tasks *(not a complete list)*	May Combine Easily With
3. Construct viable arguments and critique the reasoning of others	Tasks that require any of the following, separately or in combination, in connection with specified content standards: *Approximately grades 3-5:* k. Basing explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student's response). l. Distinguishing correct explanation/reasoning from that which is flawed, and—if there is a flaw in the argument—explaining what it is. (For example, some flawed 'student' reasoning is presented and the task is to correct and improve it.) Tasks presenting students with common errors are valuable because students are often better at explaining why something is wrong than why something is right. *Approximately grades 6-8: Any of the above, plus:* m. Testing propositions or conjectures with specific examples. n. Constructing, autonomously, chains of reasoning that will justify or refute propositions or conjectures. *Approximately High School: Any of the above, plus:* o. Stating logical assumptions being used. p. Determining conditions under which an argument does and does not apply.	MP.6

Standard for Mathematical Practice	General Cases of Practice-Forward Tasks *(not a complete list)*	May Combine Easily With
4. Model with mathematics	Tasks of any of the following kinds in connection with specified content standards: *Approximately grades 3-5:* q. Contextual word problems involving ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., a multiplication or division word problem in Grade 3 or addition and subtraction of fractions in Grade 4). • Multi-step contextual word problems in which the problem isn't broken into steps or sub-parts. Problems of either these two kinds may involve related practices, particularly: making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using math diagrams as tools (MP.5); looking for and making use of structure (MP.7); looking for and expressing regularity in repeated reasoning (MP.8). *Approximately grades 6-8: Any of the above, plus:* • Micro models: These tasks define goals that can be met by autonomously applying a known technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature). • Reasoned estimates: These tasks require students to use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity. Problems of either these two kinds may involve related practices, particularly: making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using appropriate tools strategically (MP.5); and looking for and making use of structure (MP.7). *Approximately High School: Any of the above, plus:* • Decisions from data: These tasks require students to select from a data source, analyze the data and draw reasonable conclusions from it. This will often result in an evaluation or recommendation. (The purpose of these tasks is not to provide a setting for the student to demonstrate breadth in data analysis skills such as box-and-whisker plots and the like. Rather, the purpose is for the student to draw conclusions in a realistic setting, generally using elementary techniques. • Full models: These tasks require execution of some or all of the modeling cycle in high school (see CCSSM pp. 72,73) Problems of either these two kinds may involve related practices, particularly: making sense of problems and persevering to solve them (MP.1); reasoning abstractly and quantitatively (MP.2); using appropriate tools strategically (MP.5); and looking for and making use of structure (MP.7).	MP.1, 2, 5, 7, 8

Standard for Mathematical Practice	General Cases of Practice-Forward Tasks *(not a complete list)*	May Combine Easily With
5. Use appropriate tools strategically	• Coordinates as a tool: Problems in which the coordinate plane is helpful or essential for solving the problem, yet no direction is given to the student to use coordinates. (Simultaneously practice-forward for MP.1.) • Diagrams as a tool: Problems that are fairly easy to solve or to answer correctly if you first draw a diagram, very hard to solve or to answer correctly if you don't—yet no direction is given to the student to draw a diagram. (See *PARCC Model Content Frameworks*) • Formulas, conversions, or other mathematical knowledge as a tool: Problems in which tools such as the quadratic formula, volume formulas etc. are helpful yet there is no prompting to use them. (See *PARCC Model Content Frameworks*.) • Calculators as tools: ○ Problems in which students are asked to substitute messy numerical values into a complicated expression and find the numerical result. If the expression is simplified first, then the calculator steps are fast. (Simultaneously practice-forward for MP.7.) ○ Data problems involving data sets of 15-30 numbers. ○ Problems in which a calculator is useful to test conjectures with many specific cases. *Practice MP.5 is not a coded statement to "use a calculator." If the student is not being strategic, the student is not meeting the standard. To be practice-forward for MP.5, tasks must create circumstances for poor use of tools, misuse of tools, and/or mistakenly **not** using tools.*	MP.1, 4, 7
6. Attend to precision	• Algebraic word problems in which success depends on carefully defining variables. (Even if the final answer is correct, rubrics award less than full credit for introducing symbols the meaning of which is not explained, or for defining symbols by nonsense statements such as "let G be gasoline.") • Problems involving reasoned solving of equations, such as those in which extraneous (mathematically false) solutions are likely to be found and must be discarded. • Tasks requiring the student to present solutions to multi-step problems in the form of valid chains of reasoning, using symbols such as equals signs appropriately. (For example, rubrics award less than full credit for the presence of nonsense statements such as 1 + 4 = 5 + 7 = 12, even if the final answer is correct.) •	MP.3
7. Look for and make use of structure	• Mathematical and real-world problems that reward seeing structure in an algebraic expression and using the structure to rewrite it for a purpose. • Numerical problems that reward or require deferring calculation steps until one sees the overall structure. Examples: using operations and/or base-ten reasoning to simplify calculations such as 357 + 17999 + 1 or $37 \times 25 \times 4$; choosing the correct symbol >, =, or < to insert in 66 + 5 ☐ 66 + 4. • Geometric problems solved by analyzing parts of figures in relation to one another, or by introducing auxiliary lines into a figure.	MP.1, 2, 4, 5

Standard for Mathematical Practice	General Cases of Practice-Forward Tasks *(not a complete list)*	May Combine Easily With
8. Look for and express regularity in repeated reasoning	• Problems in which a tedious and repetitive calculation can be made shorter by observing regularity in the repeated steps. • Mathematical problems in which repeated calculations lead to the articulation of a conjecture. • Modeling problems in which working repetitively with numerical examples leads without prompting to the writing of equations or functions that describe the situation.	MP.1, 2, 4

3. <u>Tasks assessing conceptual understanding with machine scoring of responses entered by computer interface</u>

   As noted in CCSSM (p. 5), "one hallmark of conceptual understanding is the ability to justify, in a way appropriate to the student's mathematical maturity, why a particular mathematical statement is true or where a mathematical rule comes from." This is one reason why expressing mathematical reasoning is identified as a claim in the assessment design (Sub Claim C). But justification exercises are not the only way to demonstrate conceptual understanding. Machine scorable tasks are also required for assessing student understanding where required by the standards.

   For example, the following four illustrations involving fractions at the fourth grade level (**4.NF**) are suggestive of tasks that are potentially machine scorable, computationally non-intensive, and easy to answer when one understands the concepts involved, yet difficult to answer when one does not.

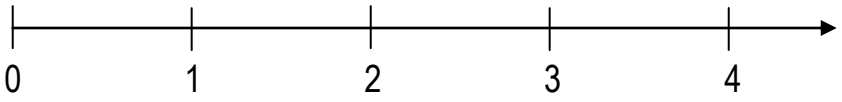
Write four fractions that are all equal to 5: _____, _____, _____, _____

Which number is least and which is greatest? – 2 – –

Write a number that is greater than – and less than – : _____

Hint: find equivalent fractions for – and – with denominators 40 or 100.

Plot each of the following on the number line: 2 – – – – —



4. <u>Integrative tasks with machine scoring of responses entered by computer interface</u>

   An integrative task is one that may best be coded to a cluster heading, domain heading, or grade/course title rather than a specific standard. If specific standard(s) can be identified they would also be noted. This circumstance might arise from a task with several sub-parts that each code to an individual standard, or it might arise from a task that calls for a synthesis of knowledge and skills across a cluster, domain, or grade/course.

The presence of integrative tasks in the assessment design is not intended to permit loose interpretations of the standards. Such tasks are used where necessary to measure plausible and immediate implications of what is written in the standards, without ever slipping into the imposition of additional requirements. Not every cluster or domain will be assessed using integrative tasks. **For additional discussion, refer to *APPENDIX D***. A list of clusters, domains, and grades/courses requiring integrative tasks will be provided to contractors prior to the start of development.

Illustration at the cluster level

- The following problem codes straightforwardly to the cluster "Understand place value" at Grade 5, but may not clearly code to any single standard in the cluster.

Write a number in each space to make true equations.

1 tenth = _____ hundredths

100 tenths = _____ hundredths

0.1 tenths = _____ hundredths

0.01 tenths = _____ hundredths

— tenths = _____ hundredths

_____ tenths = 0.1 hundredths

Illustrations at the domain level

- The following problem is plausible as a direct implication of the Grade 4 standards for Number and Operations–Fractions, but since it involves concepts and skills in fraction addition, multiplication, and equivalence, it does not clearly code to any single standard in the NF domain.

(4.NF) 9 large trucks are carrying ½ ton of lumber each. 7 small trucks are carrying ¼ ton of lumber each. How many total tons are being carried by all of the trucks?

- The following problem is plausible as a direct implication of the grade 4 standards for Number and Operations in Base Ten, but it involves place value understanding as well as elements of place value computation, so it blends the first two clusters in **4.NBT**.

893,462
840,924
824,595
824,162
810,930
808,879
799,982
778,877
777,852
766,398

Find two numbers in this table that differ by approximately two thousand.

- Each of the following three illustrations is plausible as a direct implication of the grade 5 standards for Number and Operations in Base Ten in grade 5, but each involves place value understanding as well as elements of place value computation, so each blends the first two clusters in **5.NBT**.

Mark each statement true or false.

108×30 is equal to a four-digit number. _____

6731×23 is equal to a four-digit number. _____

$2244 \div 11$ is equal to a three-digit number. _____

A bakery made 3,200 cookies and needs to package them in bags for a sale. 10 cookies will go in each bag. How many bags will be needed?

(Although word problems are not explicitly mentioned in 5.NBT, simple word problems whose main object is to assess conceptual understanding of place value and/or multi-digit computation are plausibly coded directly to these standards. Place value problems of contextual and non-contextual varieties can both be valuable in helping students develop an understanding of place value that serves practical and mathematical purposes.)

Compute each of the following:

357 + 17,999 + 1

357 + 17,999

899 + 1343 + 101

37 · 25 · 4

1001 · 20

5. <u>Fluency assessment with machine scoring of responses entered by computer interface</u>

Fluency is an area in which technology may be especially valuable in measuring the full range of the standards. Technology-enhanced tasks can monitor time on task and even the rhythm of steps. Technology-enhanced tasks might gather fluency information unobtrusively, and/or through a game-like environment (such as one in which single-digit products and related quotients are arrayed on the screen—some correct, and some incorrect—and students are asked to "save" as many correct products and quotients as they can before they all disappear).

Fluency tasks might generate direct evidence about fluency, e.g., by gathering information about the timing and rhythm of steps taken in a calculation. Or they might generate indirect evidence by simply posing a task for which success is unlikely without the ability to obtain fast and accurate results. Two fluency illustrations follow (one of these was also shown in **Table F.c.** above. With time limits they would assess fluency directly. Point totals for fluency tasks would reflect the expected amount of time to complete the task for a student who is fluent.

Mark each equation true or false.

☐
☐
☐
☐
☐

If $A = 356 \times 618$ and $B = {}^{2.4}/_{0.1}$ then what is $A \div B$ divided by 18?

Second cluster of **6.NS**

6. <u>Expressing Mathematical Reasoning</u>

Expressing mathematical reasoning is one of the assessment claims (Sub Claim C, Highlighted Practices MP.3, 6 with connections to content). Refer to Appendix D for more information.

Assessing students' expressions of mathematical reasoning typically requires some hand scoring of tasks. However, PARCC is interested in possible technological innovations that can allow tasks assessing this aspect of the standards to be machine scored or partially machine scored. PARCC is also interested in transformative technological innovations that can enrich the range of activities beyond what is possible with a paper test (e.g., assembling shapes to prove or disprove a conjecture).

Illustrative tasks that require students to express mathematical reasoning

- The following problem asks for reasoning in connection with properties of operations as strategies to multiply and divide (**3.OA.5**).

  Amber didn't know what 7×5 equals, but she knew $5 \times 5 = 25$ and $2 \times 5 = 10$. Use drawings, words, and/or equations to explain why Amber can add 25 and 10 to find what 7×5 equals.

  The formulation *"Use drawings, words, and/or equations"* can be useful in tasks generating evidence for Claim C (expressing mathematical reasoning).

- The following problem asks for reasoned solving of equations (**A-REI**).

  A student performs the following steps in solving an equation:

  _____

  Is the solution correct? If yes, explain why. If no, explain what was wrong with the student's reasoning.

- The following problem rewards careful definition of variables in connection with a problem involving two unknowns (**8.EE.8c**).

  "Give me 8 sheep and then we will have an equal number," said one shepherd to another. "No, you give me 8 sheep and then I will have twice as many as you," replied the other shepherd. How many sheep did each shepherd have to start with?

  Show your work.

- The following problem calls for a proof (**G-GPE.4**).

  Prove or disprove: The point lies on the circle that has its center at the origin and passes through the point .

- The following problem calls for reasoning in a contextual situation.

  Sale prices

  Max bought 2 items that were on sale.

  One item was 10% off.

  One item was 20% off.

  Max says he saved 15% altogether.

  a) Could Max be right?

  b) Could Max be wrong?

  Justify your answers.

7. <u>Modeling / application</u>

   Expressing mathematical reasoning is one of the assessment claims (Sub Claim C, Highlighted Practices MP.3, 6 with connections to content specified in the Standards for Mathematical Content. Refer to **APPENDIX D** for more information.

   PARCC is interested in possible technological innovations that can allow tasks assessing this aspect of the standards to be machine scored or partially machine scored, as well as transformative technological innovations that can broaden the range of modeling activities beyond what is possible on a paper test (e.g., using a simulation to test a model or using a spreadsheet to analyze a recursive relationship).

   a. Contextual word problems involving ideas that are currently at the forefront of the student's developing mathematical knowledge (e.g., a multiplication or division word problem in Grade 3 or addition and subtraction of fractions in Grade 4).

      - The following is an illustration at Grade 3:

There are 60 straws in a package. How many straws are in 7 packages?

b. Multi-step contextual word problems in which the problem isn't broken into steps or sub-parts.

- The following is an illustration at Grade 4, drawing on content from the **OA** progression:

A plate of cookies

There were 28 cookies on a plate.
Five children each ate one cookie.
Two children each ate 3 cookies.
One child ate 5 cookies.
The rest of the children each ate two cookies.
Then the plate was empty.

How many children ate two cookies? Show your work.

- The following is an illustration at Grade 4 (**4.NF**)

On Monday, Joe walked ½ mile. On Tuesday, Joe walked ½ mile again. On Wednesday, Joe walked some more. Altogether Joe walked 2 ½ miles. How far did Joe walk on Wednesday?

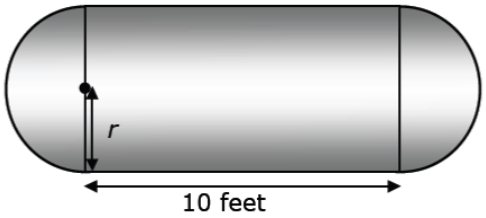
- The following is a high school illustration (**A.CED.1**)

School officials have decided to build a new football field that will be 120 yards by 53 yards. However, the owner of a local nursery has donated enough grass seed to plant 81,000 square feet of grass. Since they have more than enough grass seed for the football field, school officials would like to plant a uniformly wide border around the field. What are the dimensions of the 81,000 square feet rectangular area that should be planted for the football field and uniformly wide border?

- The following illustration at the high school level draws on content articulated in **8.G.9**, **A-REI.11**, **F-IF.7c**, and **G-GMD.3**. Note that the task would be presented along with a graphing calculator or other technological tool, because the solution to the problem requires finding approximately the single real root of a cubic equation.

Propane Tanks

Propane tanks are used to store propane gas. Often these tanks are made in the shape of a cylinder with hemispheres on the ends.



The Propane Tank Company makes tanks with this shape, in different sizes. The cylinder part of every tank is exactly 10 feet long, but the radius of the hemispheres, *r*, will be different depending on the size of the tank.

A standard tank measures 6 feet in diameter. The company wants to double the capacity of its standard tank. What should the radius of the new tank be?

c. Micro models: These tasks define goals that can be met by autonomously applying a known technique from pure mathematics to a real-world situation in which the technique yields valuable results even though it is obviously not applicable in a strict mathematical sense (e.g., profitably applying proportional relationships to a phenomenon that is obviously nonlinear or statistical in nature).
Rubrics for these tasks credit students for:

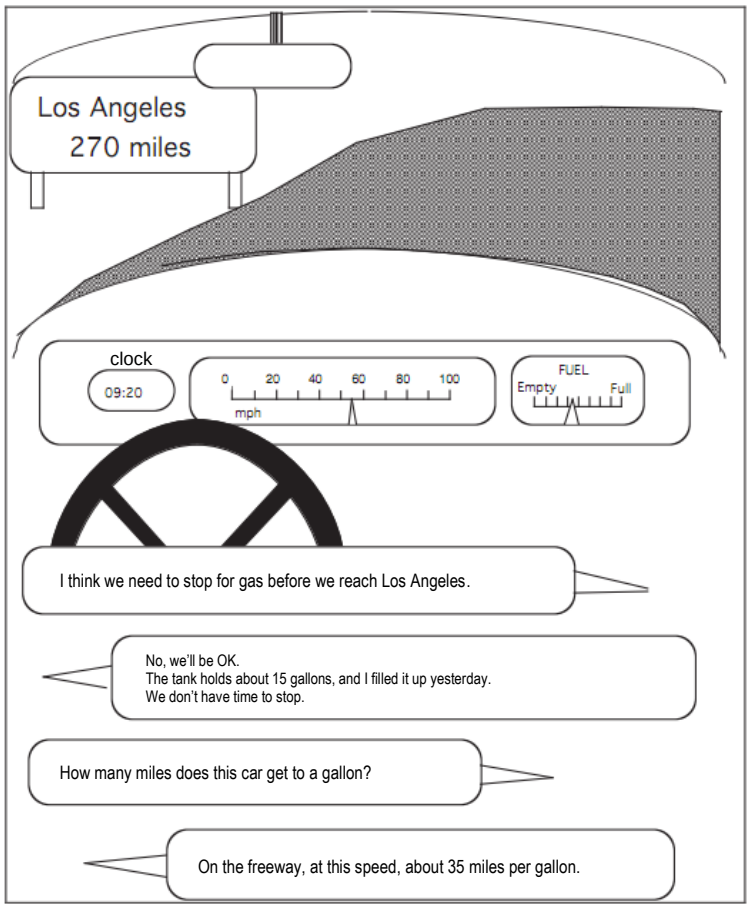
- Stating simplifying assumption(s)
- Formulating a mathematical problem that describes the situation given the assumption(s)
- Correctly solving the mathematical problem
- Answering the stated question in light of the mathematical solution
- Recognizing unreasonable answers (following from either unreasonable assumptions or incorrect calculations) as such.

➢ The following middle or high school illustration draws on content articulated in **6.RP**.

Suppose Tom wrote check #556 on November 5, 1995, and check #953 on September 26, 1997. What is a good guess for when Tom wrote check #678? Explain how you arrived at your guess.

➢ The following middle or high school illustration draws on content articulated in **7.RP**.

The figure shows a conversation between two friends in a car.



- Do they have to stop for gas? Explain your reasoning.
- (b) Suppose they decide to stop for gas and the stop takes 30 minutes. If they continue their trip at the same speed, what time will they reach Los Angeles?

d. Reasoned estimates: These tasks require students to use reasonable estimates of known quantities in a chain of reasoning that yields an estimate of an unknown quantity.

e. Decisions from data: These tasks require students to select from a data source, analyze the data and draw reasonable conclusions from it. This will often result in an evaluation or recommendation. (The purpose of these tasks is not to provide a setting for the student to demonstrate breadth in data analysis skills such as box-and-whisker plots and the like. Rather, the purpose is for the student to draw conclusions in a realistic setting, generally using elementary techniques.

- The following illustration draws on content articulated in **6-7.SP**.

Our school has to select a girl for the long jump at the regional championship. Three girls are in contention. We have a school jump-off. Each of their jumps (in meters) is recorded below:

Jasmine	Emma	Lena
3.25	3.55	3.67
3.95	3.88	3.78
4.28	3.61	3.92
2.95	3.97	3.62
3.66	3.75	3.85
3.81	3.59	3.73

Another student named Hans says, "Lena's average distance was the longest. She should go to the championship."

Do you think Hans is right? If so, explain your thinking. If not, explain who you think should go and support your argument using the table
.

f. Full models: These tasks require execution of some or all of the modeling cycle in high school (see CCSSM pp. 72,73)

- The following high school illustration draws primarily on content articulated in **F** and **SP**.

Year	Fertilizer ($\times 10^5$ tons)	Yield ($\times$ 10 kg/ha)
1956	0.06	52.3
1966	0.38	45.8
1970	1.32	19.1
1974	1.95	88.9
1975	2.32	82.9
1976	2.03	93.9
1977	2.08	79.2
1978	2.9	97.9
1979	3.72	101.7
1980	3.59	102.9
1981	3.54	91.9
1982	3.87	102.2
1983	3.83	85.8
1984	4.87	102.1
1985	5.9	95.4
1986	5.55	81.19
1987	5.66	97.03
1988	5.58	83.57
1989	5.75	93.5

Karnataka is a state in southwest India. The accompanying table is agricultural data on fertilizer use and grain crop yield in Karnataka. Fertilizer is measured in 100,000 tons. Crop yield is measured in 10 kilograms per hectare.

Throughout the years over which these data were gathered, the amount of land in cultivation remained fairly constant.

(a) Write a mathematical function that models the

relationship between fertilizer use and grain crop yield. Show your work.

(b) Use the function you have chosen to predict the yield if the fertilizer use is 500,000 tons.

(c) How precise is the prediction you made in Question (b)? Explain.

(d) Based on the data and your function, what advice can you offer the government of Karnataka about fertilizer use? Explain

- For illustrative purposes, longer modeling tasks can also be seen at:

  http://www.mathmodels.org/problems

8. Technology-enhanced tasks

The chief goal of technology enhancement is to measure a wider range of the standards in a cost-effective way. Thus, technology enhancements may be important to attain innovations 1 through 7.

Technology enhancements might be said to range from incremental to transformative. Incremental enhancements might include response formats that go beyond selected response—such as drag-and-drop, categorizing, ranking and sequencing, or single-number constructed response. Often, these formats have paper-based analogs. Truly transformative enhancements make possible what couldn't be done at all with paper: constructing shapes, testing conjectures numerically, running a simulation to correct a model, using a spreadsheet, winning a game, or awarding partial credit for a task that isn't broken into parts by monitoring the student's actions while engaged in the task. (Scaffolding a task by breaking it into parts generally lowers the rigor of the task by removing the need for student autonomy in generating the solution. Thus, awarding partial credit without such scaffolding could allow more rigorous, complex, and authentic problems to be included on assessments without the costs of hand scoring.)

PARCC seeks technological innovations across the range from incremental to transformative, and across the major steps of the operational cycle:

- device-independent task delivery
- capture of student responses through device interface (e.g., via drawing tools, symbol palettes, etc.), and
- machine scoring.

PARCC is also interested in technology enhancements that support wider accessibility (e.g., the ability to hover over words to see and/or hear their definition, etc.). In all of these areas, PARCC is particularly interested for bidders to display the current state of the art.

The illustrations were adapted from the following sources:

1) College Board; from 2009 College and Career Readiness Standards.
2) L-E. E. T. Wu (Ed.), Japanese University Entrance Examination Problems in Mathematics. Mathematical Association of America, 1993. Available at http://www.maa.org/juee/.

3) Adapted from 2009 College and Career Readiness Standards.
4) Original and illustration adapted from problems courtesy of Al Cuoco. For additional illustrations, see R. Howe, “From Arithmetic to Algebra.”
5) Adapted from 2009 College and Career Readiness Standards.
6) Adapted from a task © the Shell Centre
7) Adapted from New Standards © 2003
8) Adapted from Gelfand and Shen, Algebra.
9) Adapted from “Helping Amber”, © New Standards
10) 2009 College and Career Readiness Standards
11) Adapted from 2009 College and Career Readiness Standards
12) Adapted from a task © the Shell Centre.
13) Illustration adapted from a task © New Standards.
14) Adapted from 2009 College and Career Readiness Standards
15) Adapted from a task © the Shell Centre.
16) 2009 College and Career Readiness Standards
17) Adapted from a task © by the Shell Centre
18) Adapted from a task © by the Shell Centre
19) Adapted from a task © COMAP

ITN 2012-31

PARCC Item Development

Appendix G: PROJECT TERMS AND DEFINITIONS

- Accessible Portable Item Profile (APIP) Standard: The APIP Standard provides assessment programs and question item developers a data model for standardizing the interchange file format for digital test items. The standard builds on the IMS GLC Question and Test Interoperability (QTI) v2.1 specification.

- Additional and Supporting Content: This term is specific to Mathematics content. The Additional and Supporting Content in a grade/course is determined by that grade level's Additional and Supporting Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics.

- Analytic Writing: Writing that places a premium on using evidence while demonstrating logical integration and coherence in order to inform/explain, convey an opinion, advance an argument, or simultaneously meet a combination of these purposes. Notably, narrative elements may also be included in analytic writing, but informative/explanatory or opinion/argumentative elements must be included for a piece to be considered analytic writing.

- Anchor Text: This term is relevant only for ELA/Literacy assessment components. An anchor text is the extended text used during the research simulation task in conjunction with the additional short texts read during the research simulation task. (See also: Extended Text).

- Assessment System: A cohesive set of assessments that serve summative and other purposes. There are five major components to the PARCC assessment system. Three of these components—the Performance-Based Assessment, End-of-Year Assessment, and Speaking/Listening Assessment—are required. The Performance-Based Assessment and End-of-Year Assessment will measure the full range of the Common Core State Standards and contribute to students' summative scores.

- Bias: is, in a statistical context, a systematic error in a test score. In discussing test fairness, bias may refer to construct underrepresentation or construct-irrelevant components of test scores that differentially affect the performance of different groups of test takers.

- Blueprint: A blueprint is a guide for indicating the content and structure of an assessment. It is an exact and detailed chart designating the minimum score points supporting each claim. A blueprint may designate the total number of tasks and/or items for any given assessment component. There will be separate blueprints for English Language Arts/Literacy and for Mathematics for each assessment component for each grade level.

- Claim: A statement about students indicating what they know and can do. Claims are supported by evidence gathered from student responses. The claims about students' knowledge and skills are developed according to the purpose of the assessment (e.g., assessing progress or end-of-course knowledge) and the domain covered therein. When the purpose is summative, claims are written to represent the set of skills and knowledge that students must acquire by the end of a period of instruction, such as a school year (see also: Master Claim, Reporting Categories, Supporting Reporting Categories).

- Common Education Data Standards (CEDS): Common Education Data Standards are the most common education data elements used to support the effective exchange of data within and across states, as students transition between educational sectors and levels, and for federal reporting. This common vocabulary enables more consistent and comparable data to be used throughout all education levels and sectors necessary to support improved student achievement. The standards are being developed by the National Center for Education Statistics (NCES) with the assistance of a CEDS Stakeholder Group that includes representatives from states, districts, institutions of higher education, state higher education agencies, early childhood organizations, federal program offices, interoperability standards organizations, and key education associations and non-profit organizations. CEDS is a voluntary effort and will increase data interoperability, portability, and comparability across states, districts, and higher education organizations.

- Complexity: The intended cognitive demand of an item or task from a student in understanding and responding to it. For example, an item or a task requiring students to predict a phenomenon based on data presented in a graph will be expected to be more complex (or more challenging, or more cognitively complex) than an item or task requiring students to describe the same data presented in the graph.

- Device: Digital tools that students may use to respond to the PARCC assessments. The use of this term is meant to imply no preference for a specific platform. PARCC's expectation is that the assessment will be delivered on the widest possible range of platforms.

- Diagnostic Assessment: Diagnostic assessments are designed to measure students' strengths and weaknesses in terms of specific standards or knowledge and skills. These assessments are developed to inform instructional strategies, remediation, and intervention. Development of diagnostic assessments requires a theoretical framework that explains how students learn different skills and knowledge, and how such skills and knowledge are interrelated. Results of such assessments inform what particular standards students need to master in order to master the next set of knowledge and skills within their reach.

- Embedded Support: Any tool, support, scaffold, link, or preference that is built into the assessment system with the explicit expectation that the feature will help many diverse students, some whom we cannot predict in advance will use and benefit from the support. Embedded supports will be readily available individually on-screen, stored in a tool palette, or accessible through a menu or control panel as needed. To the extent possible, supports will be consistent through subtests. When an embedded support is made available to all users, it is considered a function of Universal Design. When a support is made available to only a subset of users based on their learner profile, it is considered an accessibility feature.

- Evidence(s): Any type of information gathered from student responses supporting claims about student performance in reference to the construct being measured in the assessment. Evidences are derived from observable student behavior(s) in response to assessment items or tasks. Each evidence is linked to a particular claim.

- Evidence Statement: Statements that indicate what students must demonstrate in an assessment in support of the claims about the students in that assessment. Evidence statements describe the observable student behavior(s) or work product(s) that support claims about students' mastery of particular standards. In other words, evidence statements describe what one can point to, highlight, or underline in a student work product that substantiates that the standard has been mastered by that student. Evidence statements must be aligned with particular standards. (See also: Claim).

- Evidence-Based Selected Response (EBSR): This term is relevant only for ELA/Literacy assessment components. This term refers to a specific item model where students are required to answer a two part selected-response question. The first part of this item model is a traditional selected-response item. In the second part of the item, the student is required to demonstrate the ability to cite evidence from the text in determining the response to the first part of the item. To demonstrate this ability, students may be asked to grid in the line(s) of text the student wishes to cite or alternatively to choose which from a set of lines of text presents the best citation. The Contractor(s) will work closely with PARCC to determine the best means to determine student abilities to cite evidence using this innovative item type. Additional information about this item model is provided in the ELA Technical Plan of this ITN.

- Evidence-Centered Design (ECD): Evidence-Centered Design is a process of assessment development that involves gathering, organizing, and transforming information in a variety of representational forms within the framework of a clearly articulated assessment argument. It includes the following: identifying potential claims about what constitutes student proficiency; identifying evidence (what students might say, do, or produce that will constitute observable evidence for the claims); and identifying the kinds of situations or tasks that might produce this evidence. See **SECTION 7.1** for expanded definitions of ECD and terminology associated with ECD.

- Extended Text: This term is relevant only for ELA/Literacy assessment components. The range of text lengths that may be used to measure reading comprehension is delineated in the ELA Technical Plan of this ITN. A text that is designated as an "extended text" is one that is closest in length to the maximum length listed for a given grade-level. As part of the research simulation task, one extended text is used in conjunction with additional short texts. In this case, the extended text is referred to as the extended "anchor text." (See also: Anchor Text).

Fairness in testing refers to perspectives on the ways that scores from tests or items are interpreted in the process of evaluating test takers for a selection or classification decision. Fairness in testing is closely related to test validity, and the evaluation of fairness requires a broad range of evidence that includes empirical data, but may also involve legal, ethical, political, philosophical, and economic reasoning

- Final Deliverable(s): A tangible or intangible object produced as a result of the project that is intended to be delivered to the Department/PARCC. A deliverable could be a final report, document, technical diagram, completion of a major service, or a building block of an overall

project. All Final Deliverables, tangible or intangible, must be supported by documented evidence of completion (e.g., using a report or alternative form of tangible documentation).

- Integrative Task: This term is specific to Mathematics content. A task that clearly codes to a cluster heading, without clearly coding to any single standard in the cluster; or a task that clearly codes to a domain or grade/course, without clearly coding to any single cluster in the domain or grade/course. This might arise from a task that incorporates several individual standards as identifiable component parts, or it might arise from synthesis of individual standards. Not every cluster or domain will be assessed using integrative tasks. The presence of integrative tasks in the assessment design is not intended to permit loose interpretations of the standards. Such tasks are used where necessary to measure plausible and immediate implications of what is written in the standards, without ever slipping into the imposition of additional requirements.

- Interim Deliverable(s): For the purposes of this ITN an Interim Deliverable shall be defined as a tangible or intangible object produced as a result of the project that is intended to be delivered to the customer to show progress towards completion of the Final Deliverable. This could be a draft report, plan, document, or technical diagram. All Interim Deliverables, tangible or intangible, must be supported by documented evidence of completion (e.g., using a report or alternative form of tangible documentation).

- Interoperability: The ability of two or more systems or components to exchange information and to use the information that has been exchanged. Interoperability must be distinguished from Open Standards. Although the goal of each is to provide effective and efficient exchange between computer systems, the mechanism for accomplishing that goal is very different. Open Standards imply interoperability ab-initio, i.e., by definition, while interoperability does not, by itself, imply wider exchange between a range of products, or similar products from several different vendors, or even past future revisions of the same product.

- Item: An individual test question or activity that students complete. All items are assumed to be scored to allow students to earn points to be attributed to a claim.

- Item accessibility: refers to the degree to which items/tasks, stimuli, passages, performance tasks, online tools, and graphics are made available to and appropriate for as many test-takers as possible, beginning in the initial test design stages and continuing throughout the test development process. Item design increases access for all participating students, not just those with special needs or limited English proficiency. Item writers must consider accessibility in the text and graphical presentation of the item/task' students' interaction with the item/task; student navigation between items, screens, and sections; and mode of student responses.

- Item Difficulty: Observed statistic (or estimated parameter) for an item that is based on the proportion of students responding correctly to that item. While it is true that more complex items usually have higher difficulty, item difficulty and complexity are not the same. (See also: Complexity).

- Item Generation Model: For ELA/Literacy, a model to develop operational items *(sometimes referred to as a task model by those publishing research on ECD).* An item generation model allows test developers to generate an operational item that elicits targeted evidence aligned to one or more standards. Each item generation model has fixed features—the structural elements of the model that are common to all operational items developed using this model. Each item generation model can also have variable features—those elements that can vary to create different/unique items. On the sample item generation model provided (see Appendix B, Attachment 7), the variable features are in italics. For the *End-of-Year Assessment*, item generation models may not necessarily combine in ways that fulfill the requirements of a specified task generation model. Instead, an item generation model may generate an item that "stands alone," eliciting evidence aligned to one or more standards without logically cohering to a collection of items. For the *Mid-Year Assessment (MYA) and Performance-Based Assessment (PBA) components* of the PARCC English Language Arts/Literacy summative assessment, *all* items will be developed as part of a task. In other words, the item generation models used on the MYA and PBA must combine in ways that fulfill the requirements of a specified task generation model.

- LEA: A Local Educational Agency (LEA) is a school district that operates local elementary, middle, and/or high schools for members of a community.

- Link: A hypermedia feature that allows the student to access a definition, audio pronunciation, graphic representation, etc. Such links are embedded in text and signal a way for students to get more information about a term or concept.

- Major Content: This term is specific to Mathematics content. The major content in a grade/course is determined by that grade level's Major Clusters as identified in the *PARCC Model Content Frameworks* for Mathematics (with designations for high school courses to come in the final Frameworks). Note that tasks on PARCC assessments providing evidence for Sub Claim A about Major Content will sometimes require the student to apply knowledge, skills, and understandings from across several Major Clusters.

- Master Claim: The master claim is about the overall performance goal for PARCC assessments—students must demonstrate that they are college- and career-ready by the end of high school, or "on track" for college and career readiness at other grades. The extent to which a master claim is true is indicated by scale scores.

- PARCC: The Partnership for Assessment of Readiness for College and Careers (PARCC) is a PARCC of states working together to develop a common set of assessments in English Language Arts/Literacy and Mathematics anchored in what it takes to be ready for college and careers. These new assessments will build a pathway to college and career readiness by the end of high school, mark students' progress toward this goal from 3rd grade forward, and provide teachers with timely information to inform instruction and provide student support. The PARCC assessments will be ready for states to administer during the 2014-2015 school year. PARCC grant timelines as referenced throughout this solicitation adhere to the 2014-2015 administration.

- PARCC Governing Board: PARCC is state-led with a subset of PARCC states making up its Governing Board. States represented on this Board are considered "Governing States," and have made the strongest commitment to PARCC and its activities and, therefore, have the most decision-making authority.

- PARCC Leadership Team: Each governing state has a representative on the PARCC K–12 Leadership Team. The K–12 Leadership Team is responsible for coordinating all aspects of the development of PARCC assessments. It directs all of PARCC's operational programs and serves as the conduit to the Technical Advisory Committee (TAC) and the Governing Board.

- PARCC Operational Working Groups: There are a wide range of committees, working groups and teams of education leaders tasked with specific advisory, technical and operational goals. These committees are responsible for structuring, leading, and contextualizing the major assessment design and development activities.

- Performance-Based Task: For ELA/Literacy, an operational task generated from a task generation model which provides students with an authentic or realistic scenario. In performance-based tasks, evidences are observable in students' work products.

- Performance Level Descriptors (PLDs): There are two types of PLDs: general and specific. The general PLDs convey policy goals. For example, the policy board setting the standards might require that one of the performance levels indicate readiness for the next grade level. These policy level PLDs are usually not grade level or subject specific. On the other hand, specific PLDs indicate the minimum knowledge or skills required at each performance level for the given grade and subject. This second type of PLDs indicates "how well" students are expected to perform on the content standards and "how good is good enough" to be judged as having achieved specific performance standards. Draft PLDs (sometimes called target PLDs) are useful early in the assessment design process to inform the range of task complexity required at each grade level to ensure reliable measurement across all performance categories. In an evidence-centered design approach to assessment development, task models are directly informed by draft PLDs.

- Practice-Forward Tasks: This term is specific to Mathematics content. A practice-forward task is intentionally designed or intentionally selected to elicit one or more particular practices in connection to specified content. Each targeted practice or its absence is observable in the student's response, whether directly through observing student work or indirectly through an incorrect answer to a problem in which the practice will have made a correct answer much more likely. Thus, a requirement of practice-forward tasks is that it be unlikely or impossible to earn full credit on the task without engaging in the practice. General examples of practice-forward tasks might include:
  - Tasks that require execution of the modeling cycle in high school (MP.4; see CCSSM pp. 72,73)
  - Tasks that require the student to justify or prove a statement, or critique such reasoning (MP.3)

- Tasks that reward seeing structure in an algebraic expression and using the structure to rewrite it for a purpose (MP.7).

- Practice-Integrated Content Standard**:** A content standard or part thereof in which one or more practices is explicit. Examples: practice standard MP.3 is explicit in content standards 3.NF.3b and in part of 4.NF.2; practice standard MP.4 is explicit in part of content standard F-BF.2.

- Practice-Related Content Standard**:** A content standard or part thereof in which one or more practices is implicit. Examples: practice standards MP.1, 2, 7, and 8 are implicit in content standard 4.NBT.5 (see PARCC Model Content Framework for Mathematics, p. 21).

- Preference: A feature that can be changed by the user but is thought to be irrelevant to performance (e.g., choice of writing with a pen with blue ink or a pen with black ink on the quality of a written essay). Examples of a preference could include allowing the user to: enlarge the font size, alter the line spacing, alter the leading (space between lines) and margins, change the font color, or alter the background color. Often it is useful to have students interact with the system to select preferences before a time task begins. Preferences may be linked with the learner profile and stored for use across subtests and/.or sessions.

- Progression-Sensitive Task: This term is specific to Mathematics content. A task intentionally designed or intentionally selected to be informative about students' location along a specified content progression in the Common Core State Standards. Progression-sensitive tasks trace coherent progressions in the standards and can play an important role in the assessment design. Example: Write 1/2 + 1/3 + 1/4 as a fraction. This computation is likely beyond the reach of a typical student who meets the grade 4 standards, yet likely within the reach of a typical student who meets the grade 5 standards. A similar example that requires more strategy and persistence will be: Write 3/4 – 1/10 + 1/8 as a fraction.

- Prose Constructed Response (PCR): This term is relevant only for ELA/Literacy assessment components. This term refers to a specific item model where students are required to produce written prose in response to a prompt. Prose constructed-response items always measure the writing claim (Writing and Language Standards). Additional information about this item model is provided in the ELA Technical Plan of this ITN.

- Question and Test Interoperability (QTI): Defines a standard format for the representation of assessment content and results, supporting the exchange of this material between authoring and delivery systems, repositories and other learning management systems. It allows assessment materials to be authored and delivered on multiple systems interchangeably. It is designed to facilitate interoperability between systems.

- Readiness Tool: Online dynamic and interactive technology readiness tool to support technology transitions and implementation that is jointly being developed for the SMARTER Balanced Assessment PARCC (SBAC) and PARCC. The tool is planned to be ready for use in early 2012 and its resulting data available in the months that follow.

- Reporting Categories: Reporting Categories correspond to the master and major claims about student performances that are supported by sufficient evidence to yield scale scores. (see also: Supporting Reporting Categories, Master Claims).

- Scaffold: A support that is provided initially but subsequently faded and withdrawn. Training wheels are often considered a scaffold as they help a beginning/novice bike rider but subsequently become unnecessary. Scaffolds and supports are identical with the exception of the expectation for how long it will be used (temporarily vs. always).

- Scenario: A problem/ issue/ question that establishes the context for a task.

- Schools Interoperability Framework (SIF): A technical blueprint for enabling diverse applications to interact and share data related to entities in the preK–12 instructional and administrative environment. The SIF Implementation Specification defines architecture requirements and communication protocols for software components and the interfaces between them that enable diverse applications to interact and share data efficiently, reliably, and securely, regardless of the platform hosting those applications.

- SEA: A State Educational Agency (SEA) is a state department of education that is responsible for providing information, resources, and technical assistance on educational matters to schools and residents.

- Short Text: This term is relevant only for ELA/Literacy assessment components. The range of text lengths that may be used to measure reading comprehension is delineated in the ELA Technical Plan of this ITN. A text that is designated as a "short text" is one that is close in length to the minimum length listed for a given grade-level.

- Sub Claim/Supporting Claim: A claim that supports another higher level claim. Each sub claim is related to students' mastery of particular knowledge and skills based on the evidence outlined in evidence statements. Note that a sub claim can be under another sub claim.

- Summative Assessment: The purpose of summative assessments is to measure the level of competency of a student against all of the knowledge and skills within the domain of interest at the end of an instructional phase such as an entire school year. In the case of PARCC, summative assessments will measure the full range of the Common Core State Standards and will be designed to report the extent to which students are "on track" or "ready" for college and careers. In the PARCC assessment system, the summative assessment includes the combination of the Performance-Based Assessment and the End-of-Year Assessment, and may include the Mid-Year Assessment after further study.

- Support: A context-specific performance aid. Some directions may need to be provided concerning how this type of aid can be used. Spell checking may be a tool that is provided in workspaces that involve writing but disabled in contexts that involve mathematical problem solving.

- Tag, Tagging, Tagged: In order to gather data from an assessment, pieces of data must have specific computer coding associated with the data. The computer is then able to "gather" all pieces of data with the same code together. To "tag" a piece of data (e.g. an item, a graphic, a passage) is to associate that piece of data with a specified code. The act of associating the code with a piece of data is called "tagging." Data that has been coded is said to be "tagged."

- Task: This term has content-specific meanings. Respondents must be careful to use the definitions provided below in the context of the specific content (ELA/Literacy or Mathematics) being referenced.

  In ELA/Literacy a task is an operational, coherent collection of items. Some collections of items (tasks) are cohesive only insofar as they are linked to a shared stimulus (e.g., a collection of items that are connected to a specific reading passage). Some tasks have more extensive cohesive qualities. For the purposes of the PARCC ELA/Literacy assessments, all tasks must clearly reflect a specified task generation model.

  Operational tasks must be equipped with teacher directions, student directions, scoring tools, and all other ancillary materials needed for administration of the collection of items. The number of tasks on any operational form may be defined by the operational blueprint used to develop the test form. The Mid-Year and Performance-Based Assessments are comprised of two large tasks, one focused on research and one focused on reading literature.

- Task Generation Model: This term has content specific meanings. Respondents must be careful to use the definitions provided below in the context of the specific content (ELA/Literacy or Mathematics) being referenced.

  - In ELA/Literacy, a task generation model allows test developers to generate many different tasks that are roughly equivalent for multiple operational assessments. Each task generation model has fixed features—the structural elements of the model that are common to all operational tasks developed using this model. Each task generation model can also have variable features—those elements that can vary to create different/unique performance-based tasks. See **APPENDIX B**, Attachments 3-6 for sample ELA/Literacy task generation models.

  - In Mathematics, a task generation model also allows test developers to generate multiple, roughly equivalent tasks. A model indicates the following with necessary metadata:
    a. Claim(s) for which evidence is being provided
    b. Particular standard(s) being assessed
    c. Important features of the task (practice-forward, integrative, etc.)
    d. "Markup" of the task showing any parameters that can change from instance to instance of the task
    e. Limits on parameters and additional guidance for task developers.
    f. If appropriate, annotations of the rubric that elucidate the evidence generated by the task.
    g. If appropriate, notes on technologically enhanced features of the task.

See **APPENDIX D** for a sample Mathematics task generation model.

- Task Models: In ECD, task models describe how to structure the kinds of situations in an assessment to obtain the evidence needed to support claims about students' knowledge and skills. Task models identify variables that describe features of tasks to be presented to the student in light of the type of evidence that the tasks will yield. They describe how the assessment materials must be presented to the students and expected student work products in response to the assessment materials For the purposes of the PARCC assessments, given the differences in the assessment design for ELA/Literacy and Mathematics, the role of task models is somewhat different.
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- Technology-Enhanced Items: These are items that utilize technology in presenting assessment materials to students and capturing student responses in a way that cannot be accomplished without the use of such technology. Such items might include simulation, interactivity, and often allow for various types of constructed response. Technology-enhanced items may be designed to target content standards that in the past have been difficult to measure or may be designed to allow for efficiencies in test administration (e.g. to more efficiently capture data than traditional short answer items, thereby reducing student testing time or the amount of hand-scoring required).

- Universal Design Principles: Principles guiding the designing environments, products, and communications in a way that is inherently accessible to all intended users.

- Universal Design for Assessment***:*** refers to principles that support a flexible design approach for test items such that all participating students are able to demonstrate what they know and can do regardless of physical, sensory, behavioral, or cognitive impairment, and recognizing that no single model will meet all students' needs. • Work Tasks/Activities: For the purposes of this ITN, Work Tasks/Activities shall be defined as activities that must be accomplished within a defined period of time with a defined start and end date, which are linked and performed to achieve the completion of Interim and Final Deliverables for a project. All Work Tasks/Activities must be supported by documented evidence of completion (e.g., using a report or alternative form of tangible documentation).