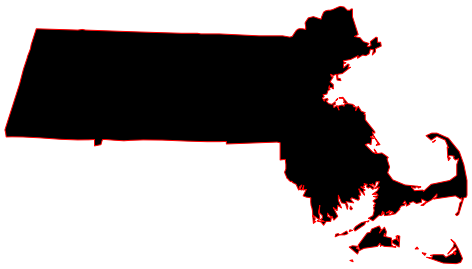

STATE MATCH

Massachusetts Curriculum Frameworks

English Language Arts, Mathematics, and Science
Grades 8–12

and

EXPLORE®, PLAN®, the ACT®, and WorkKeys®

August 2008

ACT®

About This Report

EXECUTIVE SUMMARY

(pp. 1–3)

This portion summarizes the findings of the alignment between Massachusetts's Standards as articulated in the Massachusetts Curriculum Frameworks and ACT's Educational Planning and Assessment System (EPAS™) tests—EXPLORE® (8th and 9th grades), PLAN® (10th grade), and the ACT® (11th and 12th grades)—and ACT's WorkKeys® assessments (Reading for Information, Applied Mathematics, and Locating Information). It also presents ACT's involvement in meeting NCLB requirements and describes additional information about the unique programs and services ACT can provide to Massachusetts.

SECTION A

(pp. 5–7)

This section provides tables by content area (English Language Arts, Mathematics, and Science), listing the precise number of Massachusetts Standards measured by ACT's EPAS tests and/or WorkKeys assessments by grade level.

SECTION B

(pp. 8–63)

All Massachusetts Standards are listed here; each one highlighted is measured by ACT's EPAS tests and/or WorkKeys assessments. Massachusetts Standards listed here are from the Massachusetts Standards as presented on the Massachusetts Department of Education's website in February 2008. Underlined science content indicates that the content topics are included in, but not directly measured by, ACT's EPAS Science tests.

SECTION C

(pp. 65–74)

ACT's College Readiness Standards appear here. Highlighting indicates that a statement reflects one or more statements in the Massachusetts Standards. College Readiness Standards not highlighted are not addressed in the Massachusetts Standards.

SECTION D

(pp. 75–76)

WorkKeys Skills appear here. Highlighting indicates that a statement reflects one or more statements in the Massachusetts Standards. Skills not highlighted are not addressed in the Massachusetts Standards.

A supplement is available that identifies the specific ACT College Readiness Standard(s) and WorkKeys Skill(s) corresponding to each Massachusetts Standard in a side-by-side format. To request this supplement, please e-mail ACT at **statematch@act.org**.

ACT

Executive Summary

We at ACT believe our programs offer many advantages to Massachusetts students and educators, and this report offers strong evidence for this belief. This alignment analysis clearly answers four critical questions:

1. To what extent do ACT's Educational Planning and Assessment System (EPAS™) tests—EXPLORE® (8th and 9th grades), PLAN® (10th grade), and the ACT® (11th and 12th grades)—and ACT's WorkKeys® assessments (Reading for Information, Applied Mathematics, and Locating Information) measure Massachusetts's Standards?
2. Can the results from ACT's testing programs be used to meet Massachusetts's NCLB requirement?
3. Why should Massachusetts choose EPAS?
4. Why choose to include WorkKeys assessments?

ACT'S TESTS MEASURE ALMOST ALL MASSACHUSETTS STANDARDS IN ENGLISH LANGUAGE ARTS, MATHEMATICS, AND SCIENCE.

1. Match Results: Comparisons conducted by our content specialists show that ACT's Reading, English, Writing, Mathematics, and Science tests and WorkKeys Reading for Information and Applied Mathematics assessments measure almost all of Massachusetts's English Language Arts, Mathematics, and Science Standards. WorkKeys Locating Information assessment measures some skills listed in Massachusetts's Science standards:

- English Language Arts: 3 out of 4 Strands

  Most of Massachusetts's English Language Arts Standards are covered by ACT's English, Reading, and Writing tests and WorkKeys Reading for Information (RI) assessment.

- Mathematics: 5 out of 5 Strands

  All of Massachusetts's Mathematics Standards are covered by ACT's Mathematics tests and WorkKeys Applied Mathematics (AM) assessment.

- Science: Grade 8: (Content Strands: 4 out of 4)

  High School: Process Strands: 4 out of 5
  (Content Strands: 5 out of 5)

  Almost all of Massachusetts's Science Standards are covered by ACT's Science tests and WorkKeys Locating Information (LI) assessment.

  (A note about science content: ACT's Science tests present content from biology, chemistry, physics, and Earth/space sciences. Although content knowledge in these content areas is needed to answer some of the test questions, the test questions emphasize scientific reasoning and are based in experimental science contexts. Factual content knowledge, although needed to answer some of the test questions, is not systematically sampled from the full content knowledge domain. Therefore, each ACT Science Test covers some, but not all, of the discrete science content knowledge specifically described in the Massachusetts Science Standards.

  To emphasize the point that content is included, but not necessarily covered in its entirety, on every test form, science content match results appear in parentheses in Section A of this document (which describes the number of Massachusetts standards measured by ACT's tests), and are underlined rather than highlighted in Section B. Our goal here is to clearly communicate that science content will be included, but each specific content topic will not be covered consistently enough for inferences to be made about student proficiency in all areas.)

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STATES CHOOSE ACT BECAUSE:

- **STUDENT MOTIVATION IS HIGH.**
- **ACT'S IS THE ONLY CURRICULUM-BASED ASSESSMENT SYSTEM THAT MEASURES STUDENT READINESS ALONG A CONTINUUM OF EMPIRICALLY DERIVED COLLEGE READINESS BENCHMARKS.**
- **EPAS DATA PROVIDE HELPFUL FEEDBACK FOR TEACHERS, STUDENTS, AND POLICYMAKERS TO MAKE EDUCATIONAL DECISIONS AND IDENTIFY WAYS TO IMPROVE.**

ACT BUILDS ITS DEFINITION OF COLLEGE READINESS ON A SOUND EMPIRICAL BASE:

1. **THE ACT NATIONAL CURRICULUM SURVEY**
2. **ACT'S COLLEGE READINESS BENCHMARK SCORES**
3. **ACT'S COLLEGE READINESS STANDARDS™**

Most exceptions to a match between ACT's tests and Massachusetts's Standards arise from standards not being assessable in group settings, standards that are personal in nature, and standards requiring measurement over extended time. If additional testing is deemed necessary, ACT would be interested in working with Massachusetts on developing any necessary augmentation.

2. NCLB requirement? Yes; states like Michigan and Illinois use ACT components as part of testing that is submitted to the U.S. Department of Education for NCLB approval.

3. Why choose ACT? States and school districts choose ACT's EPAS programs because student motivation is high, and EPAS is the *only curriculum-based assessment system that measures student readiness along a continuum of empirically derived college readiness benchmarks*. Various groups claim to describe what students truly need to know and be able to do for college and/or workplace readiness. Such groups typically ask individual experts in education to gather and discuss what they feel is important for students to understand. Not surprisingly, the answers vary. In contrast, ACT defines college readiness through a unique and rigorous empirical process:

- **The knowledge and skills necessary for students to be ready for college-level work are empirically identified via the ACT National Curriculum Survey®.**

  ACT surveys thousands of secondary and postsecondary instructors across the nation to determine which skills and knowledge are most important at each course level and for college and work readiness. The responses drive the test specifications for EXPLORE, PLAN, and the ACT.

- **The empirically derived performance levels necessary for students to be ready to succeed in college-level work are defined in ACT's College Readiness Benchmark Scores.**

  ACT analyzed thousands of student records to identify the ACT scores associated with success in postsecondary coursework (i.e., a 50% chance of earning a B or better in credit-bearing first-year college courses): 18 for English, 22 for Math, 21 for Reading, and 24 for Science.

- **Skills and knowledge a student currently has and areas for improvement can be identified by the empirically derived ACT College Readiness Standards.**

  Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors articulate student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on the EXPLORE, PLAN, and ACT. These statements provide specific details about students' college readiness and can be used to identify next steps for improvement.

4. Why choose to include WorkKeys assessments? Students can use WorkKeys to help determine the skill levels and education required for various jobs. Educators can use WorkKeys to ensure that students enter the work world with the foundational skills needed in any field they choose.

Further, the WorkKeys scores offer a clear way for students to demonstrate their knowledge and skills to prospective employers. WorkKeys is at the center of the nationwide Career Readiness System that links qualified individuals with employers who recognize the value of skilled job applicants. ACT's National Career Readiness Certificate (NCRC) ensures that an individual has certain foundational skills that are important across a range of positions. The NCRC is a portable credential that employees can use anywhere in the nation. Individuals seeking employment gain a competitive edge with an NCRC because they are able to provide prospective employers with clear evidence that their knowledge and skills align with the requirements of the job they are applying for. The NCRC offers job seekers, employers, and educators an easily understood, conveniently attained, and universally valued credential.

Test takers are most commonly certified in the skills areas of Applied Mathematics, Locating Information, and Reading for Information. Higher scores qualify students for more jobs than do lower scores. New Jersey, Virginia, Louisiana, Kentucky, North Carolina, and New Mexico have already initiated certificate programs, and many other states are in the process of developing similar programs.

In sum, ACT's EPAS and WorkKeys programs provide abundant data regarding student readiness for college and work. This information can help Massachusetts educators and students make well-informed decisions in planning students' career and academic goals.

Section A: Number of Massachusetts Standards and Core Learning Goals Measured by EXPLORE, PLAN, the ACT, and WorkKeys

Table A-1. Number of Massachusetts English Language Arts Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys

Massachusetts Strands*	Number of Massachusetts Standards Measured by ACT's tests	Aspects of Massachusetts Standards that are Not Measured
Language	Grade 8: 2 out of 6 Grades 9–10: 2 out of 6 Grades 11–12: 2 out of 6	Apply rules for formal discussions Contribute knowledge to class discussion Give oral presentations Identify differences between oral and written language patterns
Reading and Literature	Grade 8: 5 out of 12 Grades 9–10: 5 out of 12 Grades 11–12: 5 out of 12	Read aloud grade-appropriate text fluently Identify similarities in plot, setting, and character among the works of an author or illustrator Identify differences among the common forms of literature Relate themes in works of fiction and nonfiction to personal experience Analyze the effects of sound, form, figurative language, and graphics in poetry Retell or dramatize traditional literature Identify and analyze the similarities and differences between a narrative text and its film or play version Develop and present characters through the use of basic acting skills
Composition	Grade 8: 3 out of 7 Grades 9–10: 3 out of 7 Grades 11–12: 3 out of 7	Write formal letters Write poems Identify and apply steps in conducting and reporting research
Media	Grade 8: 0 out of 2 Grades 9–10: 0 out of 2 Grades 11–12: 0 out of 2	Analyze the effect on the reader's or viewer's emotions of text and image in journalism Create presentations using computer technology
TOTALS 3 out of 4 Strands	Grade 8: 10 out of 27 Grades 9–10: 10 out of 27 Grades 11–12: 10 out of 27	

*Refer to Massachusetts's English Language Arts Standards on pages 8–35.

ACT

Table A-2. Number of Massachusetts Mathematics Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys		
Massachusetts Strands*	**Number of Massachusetts Standards Measured by ACT's tests**	**Aspects of Massachusetts Standards that are Not Measured**
Number Sense and Operations	Grade 8: 12 out of 12 Grades 9–10: 4 out of 4 Grades 11–12: 2 out of 2 Algebra I: 4 out of 4 Algebra II: 2 out of 2 Precalculus: 1 out of 1	Use a straightedge, compass, or other tools to formulate and test conjectures Describe the characteristics and limitations of a data sample
Patterns, Relations, and Algebra	Grade 8: 8 out of 10 Grades 9–10: 8 out of 8 Grades 11–12: 13 out of 13 Algebra I: 12 out of 12 Algebra II: 12 out of 13 Precalculus: 6 out of 9	Describe the effects of approximate error in measurement
Geometry	Grade 8: 7 out of 8 Grades 9–10: 8 out of 11 Grades 11–12: 5 out of 5 Geometry: 13 out of 18 Algebra II: 3 out of 3 Precalculus: 3 out of 3	Use a straightedge, compass, or other tools to formulate and test conjectures
Measurement	Grade 8: 5 out of 5 Grades 9–10: 3 out of 4 Grades 11–12: 2 out of 2 Geometry: 4 out of 5 Precalculus: 2 out of 2	Describe the effects of approximate error in measurement
Data Analysis, Statistics, and Probability	Grade 8: 3 out of 4 Grades 9–10: 2 out of 3 Grades 11–12: 4 out of 7 Algebra I: 2 out of 3 Algebra II: 2 out of 2 Precalculus: 2 out of 5	Describe the characteristics and limitations of a data sample Design surveys and apply random sampling techniques to avoid bias in the data collection Apply regression results and curve fitting to make predictions from data Apply uniform, normal, and binomial distributions to the solutions of problems
TOTALS 5 out of 5 Strands	Grade 8: 35 out of 39 Grades 9–10: 25 out of 30 Grades 11–12: 26 out of 29 Algebra I: 18 out of 19 Geometry: 17 out of 23 Algebra II: 19 out of 20 Precalculus: 14 out of 20	

*Refer to Massachusetts's Mathematics Standards on pages 36–46.

Table A-3. Number of Massachusetts Grade 8 Science Standards Measured by EXPLORE			
Massachusetts Strands*	**Number of Massachusetts Standards Measured by ACT's tests**		**Aspects of Massachusetts Standards that are Not Measured**
Earth and Space Science	(5) out of (5)		
Life Science	(7) out of (7)		
Physical Sciences	(5) out of (5)		
Technology/Engineering	(7) out of (7)		
TOTALS 4 out of 4 Strands	**Content Standards**	(24) out of (24)	

*Refer to Massachusetts's Grade 8 Science Standards on pages 47–50.

Table A-4. Number of Massachusetts High School Science Standards Measured by EXPLORE, PLAN, the ACT, and WorkKeys			
Massachusetts Strands*	**Number of Massachusetts Standards Measured by ACT's tests**		**Aspects of Massachusetts Standards that are Not Measured**
Earth and Space Science	4 out of 4		
Biology	4 out of 4		
Chemistry	4 out of 4		
Physics	4 out of 4		
Technology/Engineering	0 out of 1		Steps of the engineering design process
TOTALS 4 out of 5 Strands	**Process Standards**	16 out of 17	
Earth and Space Science	(4) out of (4)		
Biology	(6) out of (6)		
Chemistry	(8) out of (8)		
Physics	(6) out of (6)		
Technology/Engineering	(5) out of (7)		Understand that the engineering design process is used in the solution of problems and the advancement of society Produce and analyze multi-view drawings and pictorial drawings using various techniques
TOTALS 5 out of 5 Strands	**Content Standards**	(29) out of (31)	

*Refer to Massachusetts's High School Science Standards on pages 51–63.

ACT

English Language Arts
Massachusetts Grade 8 Standards

Language

Standard 1: Discussion

1.1: Follow agreed-upon rules for discussion.

1.2: Follow agreed-upon rules for class discussion and carry out assigned roles in self-run small group discussions.

1.3: Apply understanding of agreed-upon rules and individual roles in order to make decisions.

1.4: Know and apply rules for formal discussions (*classroom, parliamentary debate, town meeting rules*).

Standard 2: Questioning, Listening, and Contributing

2.1: Contribute knowledge to class discussion in order to develop a topic for a class project.

2.2: Contribute knowledge to class discussion in order to develop ideas for a class project and generate interview questions to be used as part of the project.

2.3: Gather relevant information for a research project or composition through interviews.

2.4: Integrate relevant information gathered from group discussions and interviews for reports.

Standard 3: Oral Presentation

3.1: Give oral presentations about personal experiences or interests, using clear enunciation and adequate volume.

3.2: Maintain focus on the topic.

3.3: Adapt language to persuade, to explain, or to seek information.

3.4: Give oral presentations about experiences or interests using eye contact, proper place, adequate volume, and clear pronunciation.

3.5: Make informal presentations that have a recognizable organization (*sequencing, summarizing*).

3.6: Express an opinion of a literary work or film in an organized way, with supporting detail.

3.7: Use teacher-developed assessment criteria to prepare their presentations.

3.8: Give oral presentations for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.9: Use teacher-developed assessment criteria to prepare their presentations.

3.10: Present an organized interpretation of a literary work, film, or dramatic production.

3.11: Use appropriate techniques for oral persuasion.

3.12: Give oral presentations to different audiences for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.13: Create a scoring guide based on categories supplied by the teacher (*content, presentation style*) to prepare and assess their presentations.

Standard 4: Vocabulary and Concept Development

4.1: Identify and sort common words into various classifications.

4.2: Describe common objects and events in general and specific language.

4.3: Identify and sort common words into conceptual categories.

4.4: Identify base words and their inflectional forms.

4.5: Identify the relevant meaning for a word with multiple meanings using its context.

4.6: Identify common antonyms and synonyms.

4.7: Use knowledge of the meaning of individual words to predict the meaning of unknown compound words.

4.8: Determine meanings of words by using a beginning dictionary.

4.9: Identify the meaning of common prefixes.

4.10: Identify the meaning of common Greek and Latin roots to determine the meaning of unfamiliar words.

4.11: Identify the meaning of common idioms and figurative phrases.

4.12: Identify playful uses of language (*puns, jokes, palidromes*).

4.13: Determine the meaning of unknown words using their context.

4.14: Recognize and use words with multiple meanings and be able to determine which meaning is intended from the context of the sentence.

4.15: Determine meanings of words and alternate word choices using a dictionary or thesaurus.

4.16: Identify and apply the meaning of the terms *antonym*, *synonym*, and *homophone*.

4.17: Determine the meaning of unfamiliar words using context clues.

4.18: Determine the meaning of unfamiliar words using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.19: Determine pronunciations, meanings, alternate word choices, and parts of speech of words using dictionaries and thesauruses.

4.20: Determine the meaning of unfamiliar words using context clues.

4.21: Determine the meaning of unfamiliar words by using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.22: Determine pronunciations, meanings, alternate word choices, parts of speech, or etymologies of words using dictionaries and thesauruses.

Standard 5: Structure and Origins of Modern English

5.1: Use language to express spatial and temporal relationships.

5.2: Recognize that the names of things can also be the names of actions.

5.3: Identify correct capitalization for names and places, and correct capitalization and commas in dates.

5.4: Identify appropriate end marks.

5.5: Recognize the subject-predicate relationship in sentences.

5.6: Identify the four basic parts of speech.

5.7: Identify correct mechanics (end marks, commas for series, capitalization), correct usage (subject and verb agreement in a simple sentence), and correct sentence structure (elimination of sentence fragments).

5.8: Identify words or word parts from other languages that have been adopted into the English language.

5.9: Identify the eight basic parts of speech (noun, pronoun, verb, adverb, adjective, conjunction, preposition, interjection).

5.10: Expand or reduce sentences (adding or deleting modifiers, combining or decombining sentences).

5.11: Identify verb phrases and verb tenses.

5.12: Recognize that a word performs different functions according to its position in the sentence.

5.13: Identify simple and compound sentences.

5.14: Identify correct mechanics (apostrophes, quotation marks, comma use in compound sentences, paragraph indentations) and correct sentence structure (elimination of sentence fragments and run-ons).

5.15: Recognize the basic patterns of English sentences (noun-verb; noun-verb-noun; noun-verb-noun-noun; noun-linking verb-noun).

5.16: Distinguish phrases from clauses.

5.17: Recognize the makeup and function of prepositional phrases.

5.18: Identify simple, compound, and complex sentences.

5.19: Recognize appropriate use of pronoun reference.

5.20: Identify correct mechanics (comma after introductory structures), correct usage (pronoun reference), and correct sentence structure (complete sentences, properly placed modifiers).

5.21: Employ grammar and usage rhetorically by combining, including, reordering, and reducing sentences.

5.22: Describe the origins and meanings of common words, as well as of foreign words or phrases used frequently in written English.

Standard 6: Formal and Informal English

6.1: Identify formal and informal language in stories, poems, and plays.

6.2: Recognize dialect in the conversational voices in American folk tales.

6.3: Identify formal and informal language use in advertisements read, heard, and/or seen.

6.4: Demonstrate through role-playing appropriate use of formal and informal language.

6.5: Write stories using a mix of formal and informal language.

6.6: Identify differences between oral and written language patterns.

6.7: Analyze the language styles of different characters in literary works.

Reading and Literature

Standard 7: Beginning Reading

7.1: Demonstrate understanding of the forms and functions of written English:

- recognize that printed materials provide information or entertaining stories;
- know how to handle a book and turn the pages;
- identify the covers and title page of a book;
- recognize that, in English, print moves left to right across the page and from top to bottom;
- identify upper- and lower-case letters;
- recognize that written words are separated by spaces;
- recognize that sentences in print are made up of separate words.

7.2: Demonstrate orally that phonemes exist and that they can be isolated and manipulated:

- understand that a sound is a phoneme, or one distinct sound;
- understand that words are made up of one or more syllables;
- recognize and produce rhyming words;

= Measured by EXPLORE English and/or Reading tests

- identify the initial, medial, and final sounds of a word;
- blend sounds to make words.

7.3: Use letter-sound knowledge to identify unfamiliar words in print and gain meaning:

- know that there is a link between letters and sounds;
- recognize letter-sound matches by naming and identifying each letter of the alphabet;
- understand that written words are composed of letters that represent sounds;
- use letter-sound matches to decode simple words.

7.4: Demonstrate understanding of the various features of written English:

- know the order of the letters in the alphabet;
- understand that spoken words are represented in written English by sequences of letters;
- match oral words to printed words;
- recognize that there are correct spellings for words;
- use correct spelling of appropriate high-frequency words, whether irregularly or regularly spelled;
- recognize the distinguishing features of a sentence and a paragraph;
- identify the author and title of a book, and use a table of contents.

7.5: Demonstrate orally that phonemes exist:

- generate the sounds from all the letters and letter patterns, including consonant blends, long- and short-vowel patterns, and onsets and rimes and combine these sounds into recognizable words;
- use knowledge of vowel digraphs, vowel diphthongs, and r-controlled letter-sound associations (*as in star*) to read words.

7.6: Recognize common irregularly spelled words by sight.

7.7: Use letter-sound knowledge to decode written English:

- decode accurately phonetically regular one-syllable and multi-syllable real words and nonsense words;
- read accurately many irregularly spelled words, special vowel spellings, and common word endings;
- apply knowledge of letter patterns to identify syllables;
- apply independently the most common letter-sound correspondences, including the sounds represented by single letters, consonant blends, consonant digraphs, and vowel digraphs and diphthongs;
- know and use more difficult word families (-*ought*) and known words to decode unknown words;
- read words with several syllables;
- read aloud with fluency and comprehension at grade level.

7.8: Use letter-sound knowledge to decode written English.

7.9: Read grade-appropriate imaginative/literary and informational/expository text with comprehension.

7.10: Read aloud grade-appropriate imaginative/literary and informational/expository text fluently, accurately, and with comprehension, using appropriate timing, change in voice, and expression.

Standard 8: Understanding a Text

8.1: Make predictions using prior knowledge, pictures, and text.

8.2: Retell a main event from a story heard or read.

8.3: Ask questions about the important characters, settings, and events.

8.4: Make predictions about the content of the text using prior knowledge and text features (*title, captions, illustrations*).

8.5: Retell important facts from a text heard or read.

8.6: Make predictions about what will happen next in a story, and explain whether they were confirmed or disconfirmed and why.

8.7: Retell a story's beginning, middle, and end.

8.8: Distinguish cause from effect.

8.9: Make predictions about the content of a text using prior knowledge and text features (*headings, table of contents, key words*), and explain whether they were confirmed or disconfirmed and why.

8.10: Restate main ideas.

8.11: Identify and show the relevance of foreshadowing clues.

8.12: Identify sensory details and figurative language.

8.13: Identify the speaker of a poem or story.

8.14: Make judgments about setting, characters, and events and support them with evidence from the text.

8.15: Locate facts that answer the reader's questions.

8.16: Distinguish cause from effect.

8.17: Distinguish fact from opinion or fiction.

8.18: Summarize main ideas and supporting details.

8.19: Identify and analyze sensory details and figurative language.

8.20: Identify and analyze the author's use of dialogue and description.

8.21: Recognize organizational structures (*chronological order, logical order, cause and effect, classification schemes*).

8.22: Identify and analyze main ideas, supporting ideas, and supporting details.

8.23: Use knowledge of genre characteristics to analyze a text.

8.24: Interpret mood and tone, and give supporting evidence in a text.

8.25: Interpret a character's traits, emotions, or motivation and give supporting evidence from a text.

8.26: Recognize organizational structures and use of arguments for and against an issue.

8.27: Identify evidence used to support an argument.

8.28: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

Standard 9: Making Connections

9.1: Identify similarities in plot, setting, and character among the works of an author or illustrator.

9.2: Identify different interpretations of plot, setting, and character in the same work by different illustrators.

9.3: Identify similarities and differences between the characters or events in a literary work and the actual experiences in an author's life.

9.4: Relate a literary work to information about its setting.

9.5: Relate a literary work to artifacts, artistic creations, or historical sites of the period of its setting.

Standard 10: Genre

10.1: Identify differences among the common forms of literature: poetry, prose, fiction, nonfiction (*informational and expository*), and dramatic literature.

10.2: Distinguish among forms of literature such as poetry, prose, fiction, nonfiction, and drama and apply this knowledge as a strategy for reading and writing.

10.3: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms with distinct characteristics and purposes.

10.4: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms chosen by an author to accomplish a purpose.

Standard 11: Theme

11.1: Relate themes in works of fiction and nonfiction to personal experience.

11.2: Identify themes as lessons in folktales, fables, and Greek myths for children.

11.3: Apply knowledge of the concept that theme refers to the main idea and meaning of a selection, whether it is implied or stated.

11.4: Analyze and evaluate similar themes across a variety of selections, distinguishing theme from topic.

Standard 12: Fiction

12.1: Identify the elements of plot, character, and setting in a favorite story.

12.2: Identify and analyze the elements of plot, character, and setting in the stories they read and write.

12.3: Identify and analyze the elements of setting, characterization, and plot (including conflict).

12.4: Locate and analyze elements of plot and characterization and then use an understanding of these elements to determine how qualities of the central characters influence the resolution of the conflict.

Standard 13: Nonfiction

13.1: Identify and use knowledge of common textual features (title, headings, captions, key words, table of contents).

13.2: Identify and use knowledge of common graphic features (illustrations, type size).

13.3: Make predictions about the content of a text using prior knowledge and text and graphic features.

13.4: Explain whether predictions about the content of a text were confirmed or disconfirmed and why.

13.5: Restate main ideas and important facts from a text heard or read.

13.6: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, glossary*).

13.7: Identify and use knowledge of common graphic features (*charts, maps, diagrams, illustrations*).

13.8: Identify and use knowledge of common organizational structures (*chronological order*).

13.9: Locate facts that answer the reader's questions.

13.10: Distinguish cause from effect.

13.11: Distinguish fact from opinion or fiction.

13.12: Summarize main ideas and supporting details.

13.13: Identify and use knowledge of common textual features (paragraphs, topic sentences, concluding sentences, glossary, index).

13.14: Identify and use knowledge of common graphic features (charts, maps, diagrams, captions, illustrations).

13.15: Identify and use knowledge of common organizational structures (chronological order, logical order, cause and effect, classification schemes).

13.17: Identify and analyze main ideas, supporting ideas, and supporting details.

13.18: Identify and use knowledge of common textual features (paragraphs, topic sentences, concluding sentences, introduction, conclusion, footnotes, index, bibliography).

13.19: Identify and use knowledge of common graphic features (charts, maps, diagrams).

13.20: Identify and use knowledge of common organizational structures (logical order, comparison and contrast, cause and effect relationships).

13.21: Recognize use of arguments for and against an issue.

13.22: Identify evidence used to support an argument.

13.23: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

Standard 14: Poetry

14.1: Identify a regular beat and similarities of sounds in words in responding to rhythm and rhyme in poetry.

14.2: Identify rhyme and rhythm, repetition, similes, and sensory images in poems.

14.3: Respond to and analyze the effects of sound, figurative language, and graphics in order to uncover meaning in poetry:

- sound (*alliteration, onomatopoeia, rhyme scheme*);
- figurative language (*personification, metaphor, simile, hyperbole*); and
- graphics (*capital letters, line length*).

14.4: Respond to and analyze the effects of sound, form, figurative language, and graphics in order to uncover meaning in poetry:

- sound (alliteration, onomatopoeia, internal rhyme, rhyme scheme);
- figurative language (personification, metaphor, simile, hyperbole);
- graphics (capital letters, line length, word position).

Standard 15: Style and Language

15.1: Identify the senses implied in words appealing to the senses in literature and spoken language.

15.2: Identify words appealing to the senses or involving direct comparisons in literature and spoken language.

15.3: Identify imagery, figurative language, rhythm, or flow when responding to literature.

15.4: Identify and analyze the importance of shades of meaning in determining word choice in a piece of literature.

15.5: Identify and analyze imagery and figurative language.

15.6: Identify and analyze how an author's use of words creates tone and mood.

Standard 16: Myth, Traditional Narrative, and Classical Literature

16.1: Identify familiar forms of traditional literature read aloud.

16.2: Retell or dramatize traditional literature.

16.3: Identify and predict recurring phrases (*Once upon a time*) in traditional literature.

16.4: Identify phenomena explained in origin myths.

16.5: Identify the adventures or exploits of a character type in traditional literature.

16.6: Acquire knowledge of culturally significant characters and events in Greek, Roman, and Norse mythology and other traditional literature.

16.7: Compare traditional literature from different cultures.

16.8: Identify common structures and stylistic elements in traditional literature.

16.9: Identify conventions in epic tales.

16.10: Identify and analyze similarities and differences in mythologies from different cultures.

Standard 17: Dramatic Literature

17.1: Identify the elements of dialogue and use them in informal plays.

17.2: Identify and analyze the elements of plot and character, as presented through dialogue in scripts that are read, viewed, written, or performed.

17.3: Identify and analyze structural elements particular to dramatic literature (*scenes, acts, cast of characters, stage directions*) in the plays they read, view, write, and perform.

17.4: Identify and analyze the similarities and differences between a narrative text and its film or play version.

17.5: Identify and analyze elements of setting, plot, and characterization in the plays that are read, viewed, written, and/or performed:

- setting (place, historical period, time of day);
- plot (exposition, conflict, rising action, falling action); and
- characterization (character motivations, actions, thoughts, development).

17.6: Identify and analyze the similarities and differences in the presentation of setting, character, and plot in texts, plays, and films.

Standard 18: Dramatic Reading and Performance

18.1: Rehearse and perform stories, plays, and poems for an audience using eye contact, volume, and clear enunciation appropriate to the selection.

18.2: Plan and perform readings of selected texts for an audience, using clear diction and voice quality (*volume, tempo, pitch, tone*) appropriate to the selection, and use teacher-developed assessment criteria to prepare presentations.

18.3: Develop characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*) and self-assess using teacher-developed criteria before performing.

18.4: Develop and present characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*), explain the artistic choices made, and use a scoring guide with teacher-developed categories (*content, presentation style*) to create scoring criteria for assessment.

Composition

Standard 19: Writing

19.1: Draw pictures and/or use letters or phonetically spelled words to tell a story.

19.2: Dictate sentences for a story and collaborate to put the sentences in chronological sequence.

19.3: Draw pictures and/or use letters or phonetically spelled words to give others information.

19.4: Dictate sentences for a letter or directions and collaborate to put the sentences in order.

19.5: Write or dictate stories that have a beginning, middle, and end.

19.6: Write or dictate short poems.

19.7: Write or dictate letters, directions, or short accounts of personal experiences that follow a logical order.

19.8: Write or dictate research questions.

19.9: Write stories that have a beginning, middle, and end and contain details of setting.

19.10: Write short poems that contain simple sense details.

19.11: Write brief summaries of information gathered through research.

19.12: Write a brief interpretation or explanation of a literary or informational text using evidence from the text as support.

19.13: Write an account based on personal experience that has a clear focus and sufficient supporting detail.

19.14: Write stories or scripts containing the basic elements of fiction (*characters, dialogue, setting, plot with a clear resolution*).

19.15: Write poems using poetic techniques (*alliteration, onomatopoeia*), figurative language (*simile, metaphor*), and graphic elements *(capital letters, line length*).

19.16: Write brief research reports with clear focus and supporting detail.

19.17: Write a short explanation of a process that includes a topic statement, supporting details, and a conclusion.

19.18: Write formal letters to correspondents such as authors, newspapers, businesses, or government officials.

19.19: Write stories or scripts with well-developed characters, setting, dialogue, clear conflict and resolution, and sufficient descriptive detail.

19.20: Write poems using poetic techniques (*alliteration, onomatopoeia, rhyme scheme*), figurative language (*simile, metaphor, personification*), and graphic elements (*capital letters, line length, word position*).

19.21: Write reports based on research that include quotations, footnotes or endnotes, and a bibliography.

19.22: Write and justify a personal interpretation of literary, informational, or expository reading that includes a topic statement, supporting details from the literature, and a conclusion.

19.23: Write multi-paragraph compositions that have clear topic development, logical organization, effective use of detail, and variety in sentence structure.

Standard 20: Consideration of Audience and Purpose

20.1: Use a variety of forms or genres when writing for different purposes.

20.2: Use appropriate language for different audiences and purposes.

20.3: Make distinctions among fiction, nonfiction, dramatic literature, and poetry, and use these genres selectively when writing for different purposes.

20.4: Select and use appropriate rhetorical techniques for a variety of purposes, such as to convince or entertain the reader.

Standard 21: Revising

21.1: After writing or dictating a composition, identify words and phrases that could be added to make the thought clearer, more logical, or more expressive.

21.2: Revise writing to improve level of detail after determining what could be added or deleted.

21.3: Improve word choice by using dictionaries.

21.4: Revise writing to improve level of detail and precision of language after determining where to add images and sensory detail, combine sentences, vary sentences, and rearrange text.

21.5: Improve word choice by using dictionaries or thesauruses.

21.6: Revise writing to improve organization and diction after checking the logic underlying the order of ideas, the precision of vocabulary used, and the economy of writing.

21.7: Improve word choice by using a variety of references.

Standard 22: Standard English Conventions

22.1: Print upper- and lower-case letters of the alphabet.

22.2: Use correct standard English mechanics such as:

- printing upper- and lower-case letters legibly and using them to make words;
- separating words with spaces;
- understanding and applying rules for capitalization at the beginning of a sentence, for names and places and capitalization and commas in dates.
- using correct spelling of sight and/or spelling words; and
- using appropriate end marks such as periods and question marks.

22.3: Write legibly in cursive, leaving space between letters in a word and between words in a sentence.

22.4: Use knowledge of correct mechanics (*end marks, commas for series, capitalization*), usage (*subject and verb agreement in a simple sentence*), and sentence structure (*elimination of fragments*) when writing and editing.

22.5: Use knowledge of letter sounds, word parts, word segmentation, and syllabication to monitor and correct spelling.

22.6: Spell most commonly used homophones correctly in their writing (*there, they're, their; two, too, to*).

22.7: Use additional knowledge of correct mechanics (apostrophes, quotation marks, comma use in compound sentences, paragraph indentations), correct sentence structure (elimination of fragments and run-ons), and correct standard English spelling (commonly used homophones) when writing, revising, and editing.

22.8: Use knowledge of types of sentences (simple, compound, complex), correct mechanics (comma after introductory structures), correct usage (pronoun reference), sentence structure (complete sentences, properly placed modifiers), and standard English spelling when writing and editing.

Standard 23: Organizing Ideas in Writing

23.1: Arrange events in order when writing or dictating.

23.2: Arrange ideas in a way that makes sense.

23.3: Organize plot events of a story in an order that leads to a climax.

23.4: Organize ideas for a brief response to a reading.

23.5: Organize ideas for an account of personal experience in a way that makes sense.

23.6: Decide on the placement of descriptive details about setting, characters, and events in stories.

23.7: Group related ideas and place them in logical order when writing summaries or reports.

23.8: Organize information about a topic into a coherent paragraph with a topic sentence, sufficient supporting detail, and a concluding sentence.

23.9: Integrate the use of organizing techniques that break up strict chronological order in a story (*starting in the middle of the action, then filling in background information using flashbacks*).

23.10: Organize information into a coherent essay or report with a thesis statement in the introduction, transition sentences to link paragraphs, and a conclusion.

23.11: Organize ideas for writing comparison-and-contrast essays.

Standard 24: Research

24.1: Generate questions and gather information from several sources in a classroom, school, or public library.

24.2: Identify and apply steps in conducting and reporting research:

- Define the need for information and formulate open-ended research questions.
- Initiate a plan for searching for information.
- Locate resources.
- Evaluate the relevance of the information.
- Interpret, use, and communicate the information.
- Evaluate the research project as a whole.

24.3: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects:

- use an expanded range of print and non-print sources (*atlases, data bases, electronic, on-line resources*);
- follow established criteria for evaluating information;
- locate specific information within resources by using indexes, tables of contents, electronic search key words;
- organize and present research using the grades 5–6 Learning Standards in the Composition Strand as a guide for writing; and
- provide appropriate documentation in a consistent format.

24.4: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual projects:

- differentiate between primary and secondary source materials;
- differentiate between paraphrasing and using direct quotes in a report;
- organize and present research using the grade 7–8 Learning Standards in the Composition Strand as a guide for writing;

- document information and quotations and use a consistent format for footnotes or endnotes; and
- use standard bibliographic format to document sources.

Standard 25: Evaluating Writing and Presentations

25.1: Support judgments about classroom activities or presentations.

25.2: Form and explain personal standards or judgments of quality, display them in the classroom, and present them to family members.

25.3: Use prescribed criteria from a scoring rubric to evaluate compositions, recitations, or performances before presenting them to an audience.

25.4: As a group, develop and use scoring guides or rubrics to improve organization and presentation of written and oral projects.

Media

Standard 26: Analysis of Media

26.1: Identify techniques used in television (*animation, close-ups, wide-angle shots, sound effects, music, graphics*) and use knowledge of these techniques to distinguish between facts and misleading information.

26.2: Compare stories in print with their filmed adaptations, describing the similarities and differences in the portrayal of characters, plot, and settings.

26.3: Identify techniques used in educational reference software and websites and describe how these techniques are the same as or different from the techniques used by authors and illustrators of print materials.

26.4: Analyze the effect on the reader's or viewer's emotions of text and image in print journalism, and images, sound, and text in electronic journalism, distinguishing techniques used in each to achieve these effects.

Standard 27: Media Production

27.1: Create radio scripts, audiotapes, or videotapes for display or transmission.

27.2: Create presentations using computer technology.

27.3: Create a media production using effective images, text, music, sound effects, or graphics.

27.4: Create media presentations and written reports on the same subject and compare the differences in effects of each medium.

27.5: Use criteria to assess the effectiveness of media presentations.

Language

Standard 1: Discussion

1.1: Follow agreed-upon rules for discussion.

1.2: Follow agreed-upon rules for class discussion and carry out assigned roles in self-run small group discussions.

1.3: Apply understanding of agreed-upon rules and individual roles in order to make decisions.

1.4: Know and apply rules for formal discussions (*classroom, parliamentary debate, town meeting rules*).

1.5: Identify and practice techniques such as setting time limits for speakers and deadlines for decision-making to improve productivity of group discussions.

Standard 2: Questioning, Listening, and Contributing

2.1: Contribute knowledge to class discussion in order to develop a topic for a class project.

2.2: Contribute knowledge to class discussion in order to develop ideas for a class project and generate interview questions to be used as part of the project.

2.3: Gather relevant information for a research project or composition through interviews.

2.4: Integrate relevant information gathered from group discussions and interviews for reports.

2.5: Summarize in a coherent and organized way information and ideas learned from a focused discussion.

Standard 3: Oral Presentation

3.1: Give oral presentations about personal experiences or interests, using clear enunciation and adequate volume.

3.2: Maintain focus on the topic.

3.3: Adapt language to persuade, to explain, or to seek information.

3.4: Give oral presentations about experiences or interests using eye contact, proper place, adequate volume, and clear pronunciation.

3.5: Make informal presentations that have a recognizable organization (*sequencing, summarizing*).

3.6: Express an opinion of a literary work or film in an organized way, with supporting detail.

3.7: Use teacher-developed assessment criteria to prepare their presentations.

3.8: Give oral presentations for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.9: Use teacher-developed assessment criteria to prepare their presentations.

3.10: Present an organized interpretation of a literary work, film, or dramatic production.

3.11: Use appropriate techniques for oral persuasion.

3.12: Give oral presentations to different audiences for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.13: Create a scoring guide based on categories supplied by the teacher (*content, presentation style*) to prepare and assess their presentations.

3.14: Give formal and informal talks to various audiences and for various purposes using appropriate level of formality and rhetorical devices.

3.15: Analyze effective speeches made for a variety of purposes and prepare and deliver a speech containing some of these features.

3.16: Create an appropriate scoring guide to prepare, improve, and assess presentations.

Standard 4: Vocabulary and Concept Development

4.1: Identify and sort common words into various classifications.

4.2: Describe common objects and events in general and specific language.

4.3: Identify and sort common words into conceptual categories.

4.4: Identify base words and their inflectional forms.

4.5: Identify the relevant meaning for a word with multiple meanings using its context.

4.6: Identify common antonyms and synonyms.

4.7: Use knowledge of the meaning of individual words to predict the meaning of unknown compound words.

4.8: Determine meanings of words by using a beginning dictionary.

4.9: Identify the meaning of common prefixes.

4.10: Identify the meaning of common Greek and Latin roots to determine the meaning of unfamiliar words.

4.11: Identify the meaning of common idioms and figurative phrases.

4.12: Identify playful uses of language (*puns, jokes, palindromes*).

= Measured by EXPLORE and/or PLAN English and/or Reading tests

4.13: Determine the meaning of unknown words using their context.

4.14: Recognize and use words with multiple meanings and be able to determine which meaning is intended from the context of the sentence.

4.15: Determine meanings of words and alternate word choices using a dictionary or thesaurus.

4.16: Identify and apply the meaning of the terms *antonym*, *synonym*, and *homophone*.

4.17: Determine the meaning of unfamiliar words using context clues.

4.18: Determine the meaning of unfamiliar words using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.19: Determine pronunciations, meanings, alternate word choices, and parts of speech of words using dictionaries and thesauruses.

4.20: Determine the meaning of unfamiliar words using context clues.

4.21: Determine the meaning of unfamiliar words by using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.22: Determine pronunciations, meanings, alternate word choices, parts of speech, or etymologies of words using dictionaries and thesauruses.

4.23: Identify and use correctly idioms, cognates, words with literal and figurative meanings, and patterns of word changes that indicate different meanings or functions.

4.24: Use knowledge of Greek, Latin, and Norse mythology, the Bible, and other works often alluded to in British and American literature to understand the meanings of new words.

4.25: Use general dictionaries, specialized dictionaries, thesauruses, or related references as needed to increase learning.

Standard 5: Structure and Origins of Modern English

5.1: Use language to express spatial and temporal relationships.

5.2: Recognize that the names of things can also be the names of actions.

5.3: Identify correct capitalization for names and places, and correct capitalization and commas in dates.

5.4: Identify appropriate end marks.

5.5: Recognize the subject-predicate relationship in sentences.

5.6: Identify the four basic parts of speech.

5.7: Identify correct mechanics (*end marks, commas for series, capitalization*), correct usage (*subject and verb agreement in a simple sentence*), and correct sentence structure (*elimination of sentence fragments*).

5.8: Identify words or word parts from other languages that have been adopted into the English language.

5.9: Identify the eight basic parts of speech (*noun, pronoun, verb, adverb, adjective, conjunction, preposition, interjection*).

5.10: Expand or reduce sentences (*adding or deleting modifiers, combining or decombining sentences*).

5.11: Identify verb phrases and verb tenses.

5.12: Recognize that a word performs different functions according to its position in the sentence.

5.13: Identify simple and compound sentences.

5.14: Identify correct mechanics (*apostrophes, quotation marks, comma use in compound sentences, paragraph indentations*) and correct sentence structure (*elimination of sentence fragments and run-ons*).

5.15: Recognize the basic patterns of English sentences (*noun-verb; noun-verb-noun; noun-verb-noun-noun; noun-linking verb-noun*).

5.16: Distinguish phrases from clauses.

5.17: Recognize the makeup and function of prepositional phrases.

5.18: Identify simple, compound, and complex sentences.

5.19: Recognize appropriate use of pronoun reference.

5.20: Identify correct mechanics (comma after introductory structures), correct usage (pronoun reference), and correct sentence structure (complete sentences, properly placed modifiers).

5.21: Employ grammar and usage rhetorically by combining, including, reordering, and reducing sentences.

5.22: Describe the origins and meanings of common words, as well as of foreign words or phrases used frequently in written English.

5.23: Identify simple, compound, complex, and compound-complex sentences.

5.24: Identify nominalized, adjectival, and adverbial clauses.

5.25: Recognize the functions of verbals: participles, gerunds, and infinitives.

5.26: Analyze the structure of a sentence (*traditional diagram, transformational model*).

5.27: Identify rhetorically functional sentence structure (*parallelism, properly placed modifiers*).

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5.28: Identify correct mechanics (*semicolons, colons, hyphens*), correct usage (*tense consistency*), and correct sentence structure (*parallel structure*).

5.29: Describe the origins and meanings of common words and foreign words or phrases used frequently in written English, and show their relationship to historical events or developments (*glasnost, coup d'état*).

Standard 6: Formal and Informal English

6.1: Identify formal and informal language in stories, poems, and plays.

6.2: Recognize dialect in the conversational voices in American folk tales.

6.3: Identify formal and informal language use in advertisements read, heard, and/or seen.

6.4: Demonstrate through role-playing appropriate use of formal and informal language.

6.5: Write stories using a mix of formal and informal language.

6.6: Identify differences between oral and written language patterns.

6.7: Analyze the language styles of different characters in literary works.

6.8: Identify content-specific vocabulary, terminology, or jargon unique to particular social or professional groups.

6.9: Identify differences between the voice, tone, diction, and syntax used in media presentations (*documentary films, news broadcasts, taped interviews*) and these elements in informal speech.

Reading and Literature

Standard 7: Beginning Reading

7.1: Demonstrate understanding of the forms and functions of written English:

- recognize that printed materials provide information or entertaining stories;
- know how to handle a book and turn the pages;
- identify the covers and title page of a book;
- recognize that, in English, print moves left to right across the page and from top to bottom;
- identify upper- and lower-case letters;
- recognize that written words are separated by spaces;
- recognize that sentences in print are made up of separate words.

7.2: Demonstrate orally that phonemes exist and that they can be isolated and manipulated:

- understand that a sound is a phoneme, or one distinct sound;
- understand that words are made up of one or more syllables;
- recognize and produce rhyming words;
- identify the initial, medial, and final sounds of a word;
- blend sounds to make words.

7.3: Use letter-sound knowledge to identify unfamiliar words in print and gain meaning:

- know that there is a link between letters and sounds;
- recognize letter-sound matches by naming and identifying each letter of the alphabet;
- understand that written words are composed of letters that represent sounds;
- use letter-sound matches to decode simple words.

7.4: Demonstrate understanding of the various features of written English:

- know the order of the letters in the alphabet;
- understand that spoken words are represented in written English by sequences of letters;
- match oral words to printed words;
- recognize that there are correct spellings for words;
- use correct spelling of appropriate high-frequency words, whether irregularly or regularly spelled;
- recognize the distinguishing features of a sentence and a paragraph;
- identify the author and title of a book, and use a table of contents.

7.5: Demonstrate orally that phonemes exist:

- generate the sounds from all the letters and letter patterns, including consonant blends, long- and short-vowel patterns, and onsets and rimes and combine these sounds into recognizable words;
- use knowledge of vowel digraphs, vowel diphthongs, and r-controlled letter-sound associations (*as in star*) to read words.

7.6: Recognize common irregularly spelled words by sight.

7.7: Use letter-sound knowledge to decode written English:

- decode accurately phonetically regular one-syllable and multi-syllable real words and nonsense words;
- read accurately many irregularly spelled words, special vowel spellings, and common word endings;
- apply knowledge of letter patterns to identify syllables;

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- apply independently the most common letter-sound correspondences, including the sounds represented by single letters, consonant blends, consonant digraphs, and vowel digraphs and diphthongs;
- know and use more difficult word families (-*ought*) and known words to decode unknown words;
- read words with several syllables;
- read aloud with fluency and comprehension at grade level.

7.8: Use letter-sound knowledge to decode written English.

7.9: Read grade-appropriate imaginative/literary and informational/expository text with comprehension.

7.10: Read aloud grade-appropriate imaginative/literary and informational/expository text fluently, accurately, and with comprehension, using appropriate timing, change in voice, and expression.

Standard 8: Understanding a Text

8.1: Make predictions using prior knowledge, pictures, and text.

8.2: Retell a main event from a story heard or read.

8.3: Ask questions about the important characters, settings, and events.

8.4: Make predictions about the content of the text using prior knowledge and text features (*title, captions, illustrations*).

8.5: Retell important facts from a text heard or read.

8.6: Make predictions about what will happen next in a story, and explain whether they were confirmed or disconfirmed and why.

8.7: Retell a story's beginning, middle, and end.

8.8: Distinguish cause from effect.

8.9: Make predictions about the content of a text using prior knowledge and text features (*headings, table of contents, key words*), and explain whether they were confirmed or disconfirmed and why.

8.10: Restate main ideas.

8.11: Identify and show the relevance of foreshadowing clues.

8.12: Identify sensory details and figurative language.

8.13: Identify the speaker of a poem or story.

8.14: Make judgments about setting, characters, and events and support them with evidence from the text.

8.15: Locate facts that answer the reader's questions.

8.16: Distinguish cause from effect.

8.17: Distinguish fact from opinion or fiction.

8.18: Summarize main ideas and supporting details.

8.19: Identify and analyze sensory details and figurative language.

8.20: Identify and analyze the author's use of dialogue and description.

8.21: Recognize organizational structures (*chronological order, logical order, cause and effect, classification schemes*).

8.22: Identify and analyze main ideas, supporting ideas, and supporting details.

8.23: Use knowledge of genre characteristics to analyze a text.

8.24: Interpret mood and tone, and give supporting evidence in a text.

8.25: Interpret a character's traits, emotions, or motivation and give supporting evidence from a text.

8.26: Recognize organizational structures and use of arguments for and against an issue.

8.27: Identify evidence used to support an argument.

8.28: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

8.29: Identify and analyze patterns of imagery or symbolism.

8.30: Identify and interpret themes and give supporting evidence from a text.

8.31: Analyze the logic and use of evidence in an author's argument.

Standard 9: Making Connections

9.1: Identify similarities in plot, setting, and character among the works of an author or illustrator.

9.2: Identify different interpretations of plot, setting, and character in the same work by different illustrators.

9.3: Identify similarities and differences between the characters or events in a literary work and the actual experiences in an author's life.

9.4: Relate a literary work to information about its setting.

9.5: Relate a literary work to artifacts, artistic creations, or historical sites of the period of its setting.

9.6: Relate a literary work to primary source documents of its literary period or historical setting.

Standard 10: Genre

10.1: Identify differences among the common forms of literature: poetry, prose, fiction, nonfiction (*informational and expository*), and dramatic literature.

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10.2: Distinguish among forms of literature such as poetry, prose, fiction, nonfiction, and drama and apply this knowledge as a strategy for reading and writing.

10.3: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms with distinct characteristics and purposes.

10.4: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms chosen by an author to accomplish a purpose.

10.5: Compare and contrast the presentation of a theme or topic across genres to explain how the selection of genre shapes the message.

Standard 11: Theme

11.1: Relate themes in works of fiction and nonfiction to personal experience.

11.2: Identify themes as lessons in folktales, fables, and Greek myths for children.

11.3: Apply knowledge of the concept that theme refers to the main idea and meaning of a selection, whether it is implied or stated.

11.4: Analyze and evaluate similar themes across a variety of selections, distinguishing theme from topic.

11.5: Apply knowledge of the concept that the theme or meaning of a selection represents a view or comment on life, and provide support from the text for the identified themes.

Standard 12: Fiction

12.1: Identify the elements of plot, character, and setting in a favorite story.

12.2: Identify and analyze the elements of plot, character, and setting in the stories they read and write.

12.3: Identify and analyze the elements of setting, characterization, and plot (including conflict).

12.4: Locate and analyze elements of plot and characterization and then use an understanding of these elements to determine how qualities of the central characters influence the resolution of the conflict.

12.5: Locate and analyze such elements in fiction as point of view, foreshadowing, and irony.

Standard 13: Nonfiction

13.1: Identify and use knowledge of common textual features (title, headings, captions, key words, table of contents).

13.2: Identify and use knowledge of common graphic features (illustrations, type size)

13.3: Make predictions about the content of a text using prior knowledge and text and graphic features.

13.4: Explain whether predictions about the content of a text were confirmed or disconfirmed and why.

13.5: Restate main ideas and important facts from a text heard or read.

13.6: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, glossary*).

13.7: Identify and use knowledge of common graphic features (*charts, maps, diagrams, captions, illustrations*).

13.8: Identify and use knowledge of common organizational structures (*chronological order*).

13.9: Locate facts that answer the reader's questions.

13.10: Distinguish cause from effect.

13.11: Distinguish fact from opinion or fiction.

13.12: Summarize main ideas and supporting details.

13.13: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, glossary, index*).

13.14: Identify and use knowledge of common graphic features (*charts, maps, diagrams, captions, illustrations*).

13.15: Identify and use knowledge of common organizational structures (*chronological order, logical order, cause and effect, classification schemes*).

13.17: Identify and analyze main ideas, supporting ideas, and supporting details.

13.18: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, introduction, conclusion, footnotes, index, bibliography*).

13.19: Identify and use knowledge of common graphic features (*charts, maps, diagrams*).

13.20: Identify and use knowledge of common organizational structures (*logical order, comparison and contrast, cause and effect relationships*).

13.21: Recognize use of arguments for and against an issue.

13.22: Identify evidence used to support an argument.

13.23: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

13.24: Analyze the logic and use of evidence in an author's argument.

13.25: Analyze and explain the structure and elements of nonfiction works.

Standard 14: Poetry

14.1: Identify a regular beat and similarities of sounds in words in responding to rhythm and rhyme in poetry.

= Measured by EXPLORE and/or PLAN English and/or Reading tests

14.2: Identify rhyme and rhythm, repetition, similes, and sensory images in poems.

14.3: Respond to and analyze the effects of sound, figurative language, and graphics in order to uncover meaning in poetry:

- sound (alliteration, onomatopoeia, rhyme scheme);
- figurative language (personification, metaphor, simile, hyperbole); and
- graphics (capital letters, line length).

14.4: Respond to and analyze the effects of sound, form, figurative language, and graphics in order to uncover meaning in poetry:

- sound (alliteration, onomatopoeia, internal rhyme, rhyme scheme);
- figurative language (personification, metaphor, simile, hyperbole);
- graphics (capital letters, line length, word position).

14.5: Identify, respond to, and analyze the effects of sound, form, figurative language, graphics, and dramatic structure of poems:

- sound (alliteration, onomatopoeia, rhyme scheme, consonance, assonance);
- form (ballad, sonnet, heroic couplets);
- figurative language (personification, metaphor, simile, hyperbole, symbolism); and
- dramatic structure.

Standard 15: Style and Language

15.1: Identify the senses implied in words appealing to the senses in literature and spoken language.

15.2: Identify words appealing to the senses or involving direct comparisons in literature and spoken language.

15.3: Identify imagery, figurative language, rhythm, or flow when responding to literature.

15.4: Identify and analyze the importance of shades of meaning in determining word choice in a piece of literature.

15.5: Identify and analyze imagery and figurative language.

15.6: Identify and analyze how an author's use of words creates tone and mood.

15.7: Evaluate how an author's choice of words advances the theme or purpose of a work.

15.8: Identify and describe the importance of sentence variety in the overall effectiveness of an imaginary/literary or informational/expository work.

Standard 16: Myth, Traditional Narrative, and Classical Literature

16.1: Identify familiar forms of traditional literature read aloud.

16.2: Retell or dramatize traditional literature.

16.3: Identify and predict recurring phrases (*Once upon a time*) in traditional literature.

16.4: Identify phenomena explained in origin myths.

16.5: Identify the adventures or exploits of a character type in traditional literature.

16.6: Acquire knowledge of culturally significant characters and events in Greek, Roman, and Norse mythology and other traditional literature.

16.7: Compare traditional literature from different cultures.

16.8: Identify common structures and stylistic elements in traditional literature.

16.9: Identify conventions in epic tales.

16.10: Identify and analyze similarities and differences in mythologies from different cultures.

16.11: Analyze the characters, structure, and themes of classical Greek drama and epic poetry.

Standard 17: Dramatic Literature

17.1: Identify the elements of dialogue and use them in informal plays.

17.2: Identify and analyze the elements of plot and character, as presented through dialogue in scripts that are read, viewed, written, or performed.

17.3: Identify and analyze structural elements particular to dramatic literature (*scenes, acts, cast of characters, stage directions*) in the plays they read, view, write, and perform.

17.4: Identify and analyze the similarities and differences between a narrative text and its film or play version.

17.5: Identify and analyze elements of setting, plot, and characterization in the plays that are read, viewed, written, and/or performed:

- setting (place, historical period, time of day);
- plot (exposition, conflict, rising action, falling action); and
- characterization (character motivations, actions, thoughts, development).

17.6: Identify and analyze the similarities and differences in the presentation of setting, character, and plot in texts, plays, and films.

17.7: Identify and analyze how dramatic conventions support, interpret, and enhance dramatic text.

Standard 18: Dramatic Reading and Performance

18.1: Rehearse and perform stories, plays, and poems for an audience using eye contact, volume, and clear enunciation appropriate to the selection.

= Measured by EXPLORE and/or PLAN English and/or Reading tests

18.2: Plan and perform readings of selected texts for an audience, using clear diction and voice quality (*volume, tempo, pitch, tone*) appropriate to the selection, and use teacher-developed assessment criteria to prepare presentations.

18.3: Develop characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*) and self-assess using teacher-developed criteria before performing.

18.4: Develop and present characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*), explain the artistic choices made, and use a scoring guide with teacher-developed categories (*content, presentation style*) to create scoring criteria for assessment.

18.5: Develop, communicate, and sustain consistent characters in improvisational, formal, and informal productions and create scoring guides with categories and criteria for assessment of presentations.

Composition

Standard 19: Writing

19.1: Draw pictures and/or use letters or phonetically spelled words to tell a story.

19.2: Dictate sentences for a story and collaborate to put the sentences in chronological sequence.

19.3: Draw pictures and/or use letters or phonetically spelled words to give others information.

19.4: Dictate sentences for a letter or directions and collaborate to put the sentences in order.

19.5: Write or dictate stories that have a beginning, middle, and end.

19.6: Write or dictate short poems.

19.7: Write or dictate letters, directions, or short accounts of personal experiences that follow a logical order.

19.8: Write or dictate research questions.

19.9: Write stories that have a beginning, middle, and end and contain details of setting.

19.10: Write short poems that contain simple sense details.

19.11: Write brief summaries of information gathered through research.

19.12: Write a brief interpretation or explanation of a literary or informational text using evidence from the text as support.

19.13: Write an account based on personal experience that has a clear focus and sufficient supporting detail.

19.14: Write stories or scripts containing the basic elements of fiction (*characters, dialogue, setting, plot with a clear resolution*).

19.15: Write poems using poetic techniques (*alliteration, onomatopoeia*), figurative language (*simile, metaphor*), and graphic elements (*capital letters, line length*).

19.16: Write brief research reports with clear focus and supporting detail.

19.17: Write a short explanation of a process that includes a topic statement, supporting details, and a conclusion.

19.18: Write formal letters to correspondents such as authors, newspapers, businesses, or government officials.

19.19: Write stories or scripts with well-developed characters, setting, dialogue, clear conflict and resolution, and sufficient descriptive detail.

19.20: Write poems using poetic techniques (alliteration, onomatopoeia, rhyme scheme), figurative language (simile, metaphor, personification), and graphic elements (capital letters, line length, word position).

19.21: Write reports based on research that include quotations, footnotes or endnotes, and a bibliography.

19.22: Write and justify a personal interpretation of literary, informational, or expository reading that includes a topic statement, supporting details from the literature, and a conclusion.

19.23: Write multi-paragraph compositions that have clear topic development, logical organization, effective use of detail, and variety in sentence structure.

19.24: Write well-organized stories or scripts with an explicit or implicit theme and details that contribute to a definite mood or tone.

19.25: Write poems using a range of poetic techniques, forms (*sonnet, ballad*), and figurative language.

19.26: Write well-organized essays (*persuasive, literary, personal*) that have a clear focus, logical development, effective use of detail, and variety in sentence structure.

19.27: Write well-organized research papers that prove a thesis statement using logical organization, effective supporting evidence, and variety in sentence structure.

Standard 20: Consideration of Audience and Purpose

20.1: Use a variety of forms or genres when writing for different purposes.

20.2: Use appropriate language for different audiences and purposes.

20.3: Make distinctions among fiction, nonfiction, dramatic literature, and poetry, and use these genres selectively when writing for different purposes.

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20.4: Select and use appropriate rhetorical techniques for a variety of purposes, such as to convince or entertain the reader.

20.5: Use different levels of formality, style, and tone when composing for different audiences.

Standard 21: Revising

21.1: After writing or dictating a composition, identify words and phrases that could be added to make the thought clearer, more logical, or more expressive.

21.2: Revise writing to improve level of detail after determining what could be added or deleted.

21.3: Improve word choice by using dictionaries.

21.4: Revise writing to improve level of detail and precision of language after determining where to add images and sensory detail, combine sentences, vary sentences, and rearrange text.

21.5: Improve word choice by using dictionaries or thesauruses.

21.6: Revise writing to improve organization and diction after checking the logic underlying the order of ideas, the precision of vocabulary used, and the economy of writing.

21.7: Improve word choice by using a variety of references.

21.8: Revise writing by attending to topic/idea development, organization, level of detail, language/style, sentence structure, grammar and usage, and mechanics.

Standard 22: Standard English Conventions

22.1: Print upper- and lower-case letters of the alphabet.

22.2: Use correct standard English mechanics such as:

- printing upper- and lower-case letters legibly and using them to make words;
- separating words with spaces;
- understanding and applying rules for capitalization at the beginning of a sentence, for names and places, and capitalization and commas in dates.
- using correct spelling of sight and/or spelling words; and
- using appropriate end marks such as periods and question marks.

22.3: Write legibly in cursive, leaving space between letters in a word and between words in a sentence.

22.4: Use knowledge of correct mechanics (end marks, commas for series, capitalization), usage (subject and verb agreement in a simple sentence), and sentence structure (elimination of fragments) when writing and editing.

22.5: Use knowledge of letter sounds, word parts, word segmentation, and syllabication to monitor and correct spelling.

22.6: Spell most commonly used homophones correctly in their writing (*there, they're, their; two, too, to*).

22.7: Use additional knowledge of correct mechanics (apostrophes, quotation marks, comma use in compound sentences, paragraph indentations), correct sentence structure (elimination of fragments and run-ons), and correct standard English spelling (commonly used homophones) when writing, revising, and editing.

22.8: Use knowledge of types of sentences (*simple, compound, complex*), correct mechanics (*comma after introductory structures*), correct usage (*pronoun reference*), sentence structure (*complete sentences, properly placed modifiers*), and standard English spelling when writing and editing.

22.9: Use knowledge of types of clauses (*main and subordinate*), verbals (*gerunds, infinitives, participles*), mechanics (*semicolons, colons, hyphens*), usage (*tense consistency*), sentence structure (*parallel structure*), and standard English spelling when writing and editing.

Standard 23: Organizing Ideas in Writing

23.1: Arrange events in order when writing or dictating.

23.2: Arrange ideas in a way that makes sense.

23.3: Organize plot events of a story in an order that leads to a climax.

23.4: Organize ideas for a brief response to a reading.

23.5: Organize ideas for an account of personal experience in a way that makes sense.

23.6: Decide on the placement of descriptive details about setting, characters, and events in stories.

23.7: Group related ideas and place them in logical order when writing summaries or reports.

23.8: Organize information about a topic into a coherent paragraph with a topic sentence, sufficient supporting detail, and a concluding sentence.

23.9: Integrate the use of organizing techniques that break up strict chronological order in a story (*starting in the middle of the action, then filling in background information using flashbacks*).

23.10: Organize information into a coherent essay or report with a thesis statement in the introduction, transition sentences to link paragraphs, and a conclusion.

23.11: Organize ideas for writing comparison-and-contrast essays.

23.12: Integrate all elements of fiction to emphasize the theme and tone of the story.

23.13: Organize ideas for a critical essay about literature or a research report with an original thesis statement in the introduction, well constructed paragraphs that build an effective argument, transition sentences to link paragraphs into a coherent whole, and a conclusion.

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Standard 24: Research

24.1: Generate questions and gather information from several sources in a classroom, school, or public library.

24.2: Identify and apply steps in conducting and reporting research:

- Define the need for information and formulate open-ended research questions.
- Initiate a plan for searching for information.
- Locate resources.
- Evaluate the relevance of the information.
- Interpret, use, and communicate the information.
- Evaluate the research project as a whole.

24.3: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects:

- use an expanded range of print and non-print sources (atlases, data bases, electronic, on-line resources);
- follow established criteria for evaluating information;
- locate specific information within resources by using indexes, tables of contents, electronic search key words;
- organize and present research using the grades 5–6 Learning Standards in the Composition Strand as a guide for writing; and
- provide appropriate documentation in a consistent format.

24.4: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual projects:

- differentiate between primary and secondary source materials;
- differentiate between paraphrasing and using direct quotes in a report;
- organize and present research using the grade 7–8 Learning Standards in the Composition Strand as a guide for writing;
- document information and quotations and use a consistent format for footnotes or endnotes; and
- use standard bibliographic format to document sources.

24.5: Formulate open-ended research questions and apply steps for obtaining and evaluating information from a variety of sources, organizing information, documenting sources in a consistent and standard format, and presenting research.

Standard 25: Evaluating Writing and Presentations

25.1: Support judgments about classroom activities or presentations.

25.2: Form and explain personal standards or judgments of quality, display them in the classroom, and present them to family members.

25.3: Use prescribed criteria from a scoring rubric to evaluate compositions, recitations, or performances before presenting them to an audience.

25.4: As a group, develop and use scoring guides or rubrics to improve organization and presentation of written and oral projects.

25.5: Use group-generated criteria for evaluating different forms of writing and explain why these are important before applying them.

Media

Standard 26: Analysis of Media

26.1: Identify techniques used in television (*animation, close-ups, wide-angle shots, sound effects, music, graphics*) and use knowledge of these techniques to distinguish between facts and misleading information.

26.2: Compare stories in print with their filmed adaptations, describing the similarities and differences in the portrayal of characters, plot, and settings.

26.3: Identify techniques used in educational reference software and websites and describe how these techniques are the same as or different from the techniques used by authors and illustrators of print materials.

26.4: Analyze the effect on the reader's or viewer's emotions of text and image in print journalism, and images, sound, and text in electronic journalism, distinguishing techniques used in each to achieve these effects.

26.5: Analyze visual or aural techniques used in a media message for a particular audience and evaluate their effectiveness.

Standard 27: Media Production

27.1: Create radio scripts, audiotapes, or videotapes for display or transmission.

27.2: Create presentations using computer technology.

27.3: Create a media production using effective images, text, music, sound effects, or graphics.

27.4: Create media presentations and written reports on the same subject and compare the differences in effects of each medium.

27.5: Use criteria to assess the effectiveness of media presentations.

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27.6: Create media presentations that effectively use graphics, images, and/or sound to present a distinctive point of view on a topic.

27.7: Develop and apply criteria for assessing the effectiveness of the presentation, style, and content of films and other forms of electronic communication.

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Language

Standard 1: Discussion

1.1: Follow agreed-upon rules for discussion.

1.2: Follow agreed-upon rules for class discussion and carry out assigned roles in self-run small group discussions.

1.3: Apply understanding of agreed-upon rules and individual roles in order to make decisions.

1.4: Know and apply rules for formal discussions (*classroom, parliamentary debate, town meeting rules*).

1.5: Identify and practice techniques such as setting time limits for speakers and deadlines for decision-making to improve productivity of group discussions.

1.6: Drawing on one of the widely used professional evaluation forms for group discussion, evaluate how well participants engage in discussions at a local meeting.

Standard 2: Questioning, Listening, and Contributing

2.1: Contribute knowledge to class discussion in order to develop a topic for a class project.

2.2: Contribute knowledge to class discussion in order to develop ideas for a class project and generate interview questions to be used as part of the project.

2.3: Gather relevant information for a research project or composition through interviews.

2.4: Integrate relevant information gathered from group discussions and interviews for reports.

2.5: Summarize in a coherent and organized way information and ideas learned from a focused discussion.

2.6: Analyze differences in responses to focused group discussion in an organized and systematic way.

Standard 3: Oral Presentation

3.1: Give oral presentations about personal experiences or interests, using clear enunciation and adequate volume.

3.2: Maintain focus on the topic.

3.3: Adapt language to persuade, to explain, or to seek information.

3.4: Give oral presentations about experiences or interests using eye contact, proper place, adequate volume, and clear pronunciation.

3.5: Make informal presentations that have a recognizable organization (*sequencing, summarizing*).

3.6: Express an opinion of a literary work or film in an organized way, with supporting detail.

3.7: Use teacher-developed assessment criteria to prepare their presentations.

3.8: Give oral presentations for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.9: Use teacher-developed assessment criteria to prepare their presentations.

3.10: Present an organized interpretation of a literary work, film, or dramatic production.

3.11: Use appropriate techniques for oral persuasion.

3.12: Give oral presentations to different audiences for various purposes, showing appropriate changes in delivery (*gestures, vocabulary, pace, visuals*) and using language for dramatic effect.

3.13: Create a scoring guide based on categories supplied by the teacher (*content, presentation style*) to prepare and assess their presentations.

3.14: Give formal and informal talks to various audiences and for various purposes using appropriate level of formality and rhetorical devices.

3.15: Analyze effective speeches made for a variety of purposes and prepare and deliver a speech containing some of these features.

3.16: Create an appropriate scoring guide to prepare, improve, and assess presentations.

3.17: Deliver formal presentations for particular audiences using clear enunciation and appropriate organization, gestures, tone, and vocabulary.

3.18: Create an appropriate scoring guide to evaluate final presentations.

Standard 4: Vocabulary and Concept Development

4.1: Identify and sort common words into various classifications.

4.2: Describe common objects and events in general and specific language.

4.3: Identify and sort common words into conceptual categories.

4.4: Identify base words and their inflectional forms.

4.5: Identify the relevant meaning for a word with multiple meanings using its context.

4.6: Identify common antonyms and synonyms.

4.7: Use knowledge of the meaning of individual words to predict the meaning of unknown compound words.

4.8: Determine meanings of words by using a beginning dictionary.

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4.9: Identify the meaning of common prefixes.

4.10: Identify the meaning of common Greek and Latin roots to determine the meaning of unfamiliar words.

4.11: Identify the meaning of common idioms and figurative phrases.

4.12: Identify playful uses of language (*puns, jokes, palindromes*).

4.13: Determine the meaning of unknown words using their context.

4.14: Recognize and use words with multiple meanings and be able to determine which meaning is intended from the context of the sentence.

4.15: Determine meanings of words and alternate word choices using a dictionary or thesaurus.

4.16: Identify and apply the meaning of the terms *antonym*, *synonym*, and *homophone*.

4.17: Determine the meaning of unfamiliar words using context clues.

4.18: Determine the meaning of unfamiliar words using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.19: Determine pronunciations, meanings, alternate word choices, and parts of speech of words using dictionaries and thesauruses.

4.20: Determine the meaning of unfamiliar words using context clues.

4.21: Determine the meaning of unfamiliar words by using knowledge of common Greek and Latin roots, suffixes, and prefixes.

4.22: Determine pronunciations, meanings, alternate word choices, parts of speech, or etymologies of words using dictionaries and thesauruses.

4.23: Identify and use correctly idioms, cognates, words with literal and figurative meanings, and patterns of word changes that indicate different meanings or functions.

4.24: Use knowledge of Greek, Latin, and Norse mythology, the Bible, and other works often alluded to in British and American literature to understand the meanings of new words.

4.25: Use general dictionaries, specialized dictionaries, thesauruses, or related references as needed to increase learning.

4.26: Identify and use correctly new words acquired through study of their different relationships to other words.

4.27: Use general dictionaries, specialized dictionaries, thesauruses, histories of language, books of quotations, and other related references as needed.

Standard 5: Structure and Origins of Modern English

5.1: Use language to express spatial and temporal relationships.

5.2: Recognize that the names of things can also be the names of actions.

5.3: Identify correct capitalization for names and places, and correct capitalization and commas in dates.

5.4: Identify appropriate end marks.

5.5: Recognize the subject-predicate relationship in sentences.

5.6: Identify the four basic parts of speech.

5.7: Identify correct mechanics (*end marks, commas for series, capitalization*), correct usage (*subject and verb agreement in a simple sentence*), and correct sentence structure (*elimination of sentence fragments*).

5.8: Identify words or word parts from other languages that have been adopted into the English language.

5.9: Identify the eight basic parts of speech (*noun, pronoun, verb, adverb, adjective, conjunction, preposition, interjection*).

5.10: Expand or reduce sentences (*adding or deleting modifiers, combining or decombining sentences*).

5.11: Identify verb phrases and verb tenses.

5.12: Recognize that a word performs different functions according to its position in the sentence.

5.13: Identify simple and compound sentences.

5.14: Identify correct mechanics (*apostrophes, quotation marks, comma use in compound sentences, paragraph indentations*) and correct sentence structure (*elimination of sentence fragments and run-ons*).

5.15: Recognize the basic patterns of English sentences (*noun-verb; noun-verb-noun; noun-verb-noun-noun; noun-linking verb-noun*).

5.16: Distinguish phrases from clauses.

5.17: Recognize the makeup and function of prepositional phrases.

5.18: Identify simple, compound, and complex sentences.

5.19: Recognize appropriate use of pronoun reference.

5.20: Identify correct mechanics (comma after introductory structures), correct usage (pronoun reference), and correct sentence structure (complete sentences, properly placed modifiers).

5.21: Employ grammar and usage rhetorically by combining, including, reordering, and reducing sentences.

5.22: Describe the origins and meanings of common words, as well as of foreign words or phrases used frequently in written English.

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5.23: Identify simple, compound, complex, and compound-complex sentences.

5.24: Identify nominalized, adjectival, and adverbial clauses.

5.25: Recognize the functions of verbals: participles, gerunds, and infinitives.

5.26: Analyze the structure of a sentence (traditional diagram, transformational model).

5.27: Identify rhetorically functional sentence structure (parallelism, properly placed modifiers).

5.28: Identify correct mechanics (semicolons, colons, hyphens), correct usage (tense consistency), and correct sentence structure (parallel structure).

5.29: Describe the origins and meanings of common words and foreign words or phrases used frequently in written English, and show their relationship to historical events or developments (glasnost, coup d'état).

5.30: Identify, describe, and apply all conventions of standard English.

5.31: Describe historical changes in conventions for usage and grammar.

5.32: Explain and evaluate the influence of the English language on world literature and world cultures.

5.33: Analyze and explain how the English language has developed and been influenced by other languages.

Standard 6: Formal and Informal English

6.1: Identify formal and informal language in stories, poems, and plays.

6.2: Recognize dialect in the conversational voices in American folk tales.

6.3: Identify formal and informal language use in advertisements read, heard, and/or seen.

6.4: Demonstrate through role-playing appropriate use of formal and informal language.

6.5: Write stories using a mix of formal and informal language.

6.6: Identify differences between oral and written language patterns.

6.7: Analyze the language styles of different characters in literary works.

6.8: Identify content-specific vocabulary, terminology, or jargon unique to particular social or professional groups.

6.9: Identify differences between the voice, tone, diction, and syntax used in media presentations (*documentary films, news broadcasts, taped interviews*) and these elements in informal speech.

6.10: Analyze the role and place of standard American English in speech, writing, and literature.

6.11: Analyze how dialect can be a source of negative or positive stereotypes among social groups.

Reading and Literature

Standard 7: Beginning Reading

7.1: Demonstrate understanding of the forms and functions of written English:

- recognize that printed materials provide information or entertaining stories;
- know how to handle a book and turn the pages;
- identify the covers and title page of a book;
- recognize that, in English, print moves left to right across the page and from top to bottom;
- identify upper- and lower-case letters;
- recognize that written words are separated by spaces;
- recognize that sentences in print are made up of separate words.

7.2: Demonstrate orally that phonemes exist and that they can be isolated and manipulated:

- understand that a sound is a phoneme, or one distinct sound;
- understand that words are made up of one or more syllables;
- recognize and produce rhyming words;
- identify the initial, medial, and final sounds of a word;
- blend sounds to make words.

7.3: Use letter-sound knowledge to identify unfamiliar words in print and gain meaning:

- know that there is a link between letters and sounds;
- recognize letter-sound matches by naming and identifying each letter of the alphabet;
- understand that written words are composed of letters that represent sounds;
- use letter-sound matches to decode simple words.

7.4: Demonstrate understanding of the various features of written English:

- know the order of the letters in the alphabet;
- understand that spoken words are represented in written English by sequences of letters;
- match oral words to printed words;
- recognize that there are correct spellings for words;
- use correct spelling of appropriate high-frequency words, whether irregularly or regularly spelled;
- recognize the distinguishing features of a sentence and a paragraph;
- identify the author and title of a book, and use a table of contents.

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7.5: Demonstrate orally that phonemes exist:

- generate the sounds from all the letters and letter patterns, including consonant blends, long- and short-vowel patterns, and onsets and rimes and combine these sounds into recognizable words;
- use knowledge of vowel digraphs, vowel diphthongs, and r-controlled letter-sound associations (*as in star*) to read words.

7.6: Recognize common irregularly spelled words by sight.

7.7: Use letter-sound knowledge to decode written English:

- decode accurately phonetically regular one-syllable and multi-syllable real words and nonsense words;
- read accurately many irregularly spelled words, special vowel spellings, and common word endings;
- apply knowledge of letter patterns to identify syllables;
- apply independently the most common letter-sound correspondences, including the sounds represented by single letters, consonant blends, consonant digraphs, and vowel digraphs and diphthongs;
- know and use more difficult word families (*-ought*) and known words to decode unknown words;
- read words with several syllables;
- read aloud with fluency and comprehension at grade level.

7.8: Use letter-sound knowledge to decode written English.

7.9: Read grade-appropriate imaginative/literary and informational/expository text with comprehension.

7.10: Read aloud grade-appropriate imaginative/literary and informational/expository text fluently, accurately, and with comprehension, using appropriate timing, change in voice, and expression.

Standard 8: Understanding a Text

8.1: Make predictions using prior knowledge, pictures, and text.

8.2: Retell a main event from a story heard or read.

8.3: Ask questions about the important characters, settings, and events.

8.4: Make predictions about the content of the text using prior knowledge and text features (*title, captions, illustrations*).

8.5: Retell important facts from a text heard or read.

8.6: Make predictions about what will happen next in a story, and explain whether they were confirmed or disconfirmed and why.

8.7: Retell a story's beginning, middle, and end.

8.8: Distinguish cause from effect.

8.9: Make predictions about the content of a text using prior knowledge and text features (*headings, table of contents, key words*), and explain whether they were confirmed or disconfirmed and why.

8.10: Restate main ideas.

8.11: Identify and show the relevance of foreshadowing clues.

8.12: Identify sensory details and figurative language.

8.13: Identify the speaker of a poem or story.

8.14: Make judgments about setting, characters, and events and support them with evidence from the text.

8.15: Locate facts that answer the reader's questions.

8.16: Distinguish cause from effect.

8.17: Distinguish fact from opinion or fiction.

8.18: Summarize main ideas and supporting details.

8.19: Identify and analyze sensory details and figurative language.

8.20: Identify and analyze the author's use of dialogue and description.

8.21: Recognize organizational structures (*chronological order, logical order, cause and effect, classification schemes*).

8.22: Identify and analyze main ideas, supporting ideas, and supporting details.

8.23: Use knowledge of genre characteristics to analyze a text.

8.24: Interpret mood and tone, and give supporting evidence in a text.

8.25: Interpret a character's traits, emotions, or motivation and give supporting evidence from a text.

8.26: Recognize organizational structures and use of arguments for and against an issue.

8.27: Identify evidence used to support an argument.

8.28: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

8.29: Identify and analyze patterns of imagery or symbolism.

8.30: Identify and interpret themes and give supporting evidence from a text.

8.31: Analyze the logic and use of evidence in an author's argument.

8.32: Identify and analyze the point(s) of view in a literary work.

8.33: Analyze patterns of imagery or symbolism and connect them to themes and/or tone and mood.

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8.34: Analyze and evaluate the logic and use of evidence in an author's argument.

Standard 9: Making Connections

9.1: Identify similarities in plot, setting, and character among the works of an author or illustrator.

9.2: Identify different interpretations of plot, setting, and character in the same work by different illustrators.

9.3: Identify similarities and differences between the characters or events in a literary work and the actual experiences in an author's life.

9.4: Relate a literary work to information about its setting.

9.5: Relate a literary work to artifacts, artistic creations, or historical sites of the period of its setting.

9.6: Relate a literary work to primary source documents of its literary period or historical setting.

9.7: Relate a literary work to the seminal ideas of its time.

Standard 10: Genre

10.1: Identify differences among the common forms of literature: poetry, prose, fiction, nonfiction (*informational and expository*), and dramatic literature.

10.2: Distinguish among forms of literature such as poetry, prose, fiction, nonfiction, and drama and apply this knowledge as a strategy for reading and writing.

10.3: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms with distinct characteristics and purposes.

10.4: Identify and analyze the characteristics of various genres (*poetry, fiction, nonfiction, short story, dramatic literature*) as forms chosen by an author to accomplish a purpose.

10.5: Compare and contrast the presentation of a theme or topic across genres to explain how the selection of genre shapes the message.

10.6: Identify and analyze characteristics of genres (*satire, parody, allegory, pastoral*) that overlap or cut across the lines of genre classifications such as poetry, prose, drama, short story, essay, and editorial.

Standard 11: Theme

11.1: Relate themes in works of fiction and nonfiction to personal experience.

11.2: Identify themes as lessons in folktales, fables, and Greek myths for children.

11.3: Apply knowledge of the concept that theme refers to the main idea and meaning of a selection, whether it is implied or stated.

11.4: Analyze and evaluate similar themes across a variety of selections, distinguishing theme from topic.

11.5: Apply knowledge of the concept that the theme or meaning of a selection represents a view or comment on life, and provide support from the text for the identified themes.

11.6: Apply knowledge of the concept that a text can contain more than one theme.

11.7: Analyze and compare texts that express a universal theme, and locate support in the text for the identified theme.

Standard 12: Fiction

12.1: Identify the elements of plot, character, and setting in a favorite story.

12.2: Identify and analyze the elements of plot, character, and setting in the stories they read and write.

12.3: Identify and analyze the elements of setting, characterization, and plot (including conflict).

12.4: Locate and analyze elements of plot and characterization and then use an understanding of these elements to determine how qualities of the central characters influence the resolution of the conflict.

12.5: Locate and analyze such elements in fiction as point of view, foreshadowing, and irony.

12.6: Analyze, evaluate, and apply knowledge of how authors use techniques and elements in fiction for rhetorical and aesthetic purposes.

Standard 13: Nonfiction

13.1: Identify and use knowledge of common textual features (title, headings, captions, key words, table of contents).

13.2: Identify and use knowledge of common graphic features (illustrations, type size).

13.3: Make predictions about the content of a text using prior knowledge and text and graphic features.

13.4: Explain whether predictions about the content of a text were confirmed or disconfirmed and why.

13.5: Restate main ideas and important facts from a text heard or read.

13.6: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, glossary*).

13.7: Identify and use knowledge of common graphic features (*charts, maps, diagrams, illustrations*).

13.8: Identify and use knowledge of common organizational structures (*chronological order*).

13.9: Locate facts that answer the reader's questions.

13.10: Distinguish cause from effect.

13.11: Distinguish fact from opinion or fiction.

13.12: Summarize main ideas and supporting details.

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13.13: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, glossary, index*).

13.14: Identify and use knowledge of common graphic features (*charts, maps, diagrams, captions, illustrations*).

13.15: Identify and use knowledge of common organizational structures (*chronological order, logical order, cause and effect, classification schemes*).

13.17: Identify and analyze main ideas, supporting ideas, and supporting details.

13.18: Identify and use knowledge of common textual features (*paragraphs, topic sentences, concluding sentences, introduction, conclusion, footnotes, index, bibliography*).

13.19: Identify and use knowledge of common graphic features (*charts, maps, diagrams*).

13.20: Identify and use knowledge of common organizational structures (*logical order, comparison and contrast, cause and effect relationships*).

13.21: Recognize use of arguments for and against an issue.

13.22: Identify evidence used to support an argument.

13.23: Distinguish between the concepts of theme in a literary work and author's purpose in an expository text.

13.24: Analyze the logic and use of evidence in an author's argument.

13.25: Analyze and explain the structure and elements of nonfiction works.

13.26: Analyze and evaluate the logic and use of evidence in an author's argument.

13.27: Analyze, explain, and evaluate how authors use the elements of nonfiction to achieve their purposes.

Standard 14: Poetry

14.1: Identify a regular beat and similarities of sounds in words in responding to rhythm and rhyme in poetry.

14.2: Identify rhyme and rhythm, repetition, similes, and sensory images in poems.

14.3: Respond to and analyze the effects of sound, figurative language, and graphics in order to uncover meaning in poetry:

- sound (alliteration, onomatopoeia, rhyme scheme);
- figurative language (personification, metaphor, simile, hyperbole); and
- graphics (capital letters, line length).

14.4: Respond to and analyze the effects of sound, form, figurative language, and graphics in order to uncover meaning in poetry:

- sound (alliteration, onomatopoeia, internal rhyme, rhyme scheme);
- figurative language (personification, metaphor, simile, hyperbole);
- graphics (capital letters, line length, word position).

14.5: Identify, respond to, and analyze the effects of sound, form, figurative language, graphics, and dramatic structure of poems:

- sound (alliteration, onomatopoeia, rhyme scheme, consonance, assonance);
- form (ballad, sonnet, heroic couplets);
- figurative language (personification, metaphor, simile, hyperbole, symbolism); and
- dramatic structure.

14.6: Analyze and evaluate the appropriateness of diction and imagery (controlling images, figurative language, understatement, overstatement, irony, paradox).

Standard 15: Style and Language

15.1: Identify the senses implied in words appealing to the senses in literature and spoken language.

15.2: Identify words appealing to the senses or involving direct comparisons in literature and spoken language.

15.3: Identify imagery, figurative language, rhythm, or flow when responding to literature.

15.4: Identify and analyze the importance of shades of meaning in determining word choice in a piece of literature.

15.5: Identify and analyze imagery and figurative language.

15.6: Identify and analyze how an author's use of words creates tone and mood.

15.7: Evaluate how an author's choice of words advances the theme or purpose of a work.

15.8: Identify and describe the importance of sentence variety in the overall effectiveness of an imaginary/literary or informational/expository work.

15.9: Identify, analyze, and evaluate an author's use of rhetorical devices in persuasive argument.

15.10: Analyze and compare style and language across significant cross-cultural literary works.

Standard 16: Myth, Traditional Narrative, and Classical Literature

16.1: Identify familiar forms of traditional literature read aloud.

16.2: Retell or dramatize traditional literature.

16.3: Identify and predict recurring phrases (*Once upon a time*) in traditional literature.

16.4: Identify phenomena explained in origin myths.

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16.5: Identify the adventures or exploits of a character type in traditional literature.

16.6: Acquire knowledge of culturally significant characters and events in Greek, Roman, and Norse mythology and other traditional literature.

16.7: Compare traditional literature from different cultures.

16.8: Identify common structures and stylistic elements in traditional literature.

16.9: Identify conventions in epic tales.

16.10: Identify and analyze similarities and differences in mythologies from different cultures.

16.11: Analyze the characters, structure, and themes of classical Greek drama and epic poetry.

16.12: Analyze the influence of mythic, traditional, or classical literature on later literature and film.

Standard 17: Dramatic Literature

17.1: Identify the elements of dialogue and use them in informal plays.

17.2: Identify and analyze the elements of plot and character, as presented through dialogue in scripts that are read, viewed, written, or performed.

17.3: Identify and analyze structural elements particular to dramatic literature (*scenes, acts, cast of characters, stage directions*) in the plays they read, view, write, and perform.

17.4: Identify and analyze the similarities and differences between a narrative text and its film or play version.

17.5: Identify and analyze elements of setting, plot, and characterization in the plays that are read, viewed, written, and/or performed:

- setting (place, historical period, time of day);
- plot (exposition, conflict, rising action, falling action); and
- characterization (character motivations, actions, thoughts, development).

17.6: Identify and analyze the similarities and differences in the presentation of setting, character, and plot in texts, plays, and films.

17.7: Identify and analyze how dramatic conventions support, interpret, and enhance dramatic text.

17.8: Identify and analyze types of dramatic literature.

17.9: Identify and analyze dramatic conventions (*monologue, soliloquy, chorus, aside, dramatic irony*).

Standard 18: Dramatic Reading and Performance

18.1: Rehearse and perform stories, plays, and poems for an audience using eye contact, volume, and clear enunciation appropriate to the selection.

18.2: Plan and perform readings of selected texts for an audience, using clear diction and voice quality (*volume, tempo, pitch, tone*) appropriate to the selection, and use teacher-developed assessment criteria to prepare presentations.

18.3: Develop characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*) and self-assess using teacher-developed criteria before performing.

18.4: Develop and present characters through the use of basic acting skills (*memorization, sensory recall, concentration, diction, body alignment, expressive detail*), explain the artistic choices made, and use a scoring guide with teacher-developed categories (*content, presentation style*) to create scoring criteria for assessment.

18.5: Develop, communicate, and sustain consistent characters in improvisational, formal, and informal productions and create scoring guides with categories and criteria for assessment of presentations.

18.6: Demonstrate understanding of the functions of playwright, director, technical designer, and actor by writing, directing, designing, and/or acting in an original play.

Composition

Standard 19: Writing

19.1: Draw pictures and/or use letters or phonetically spelled words to tell a story.

19.2: Dictate sentences for a story and collaborate to put the sentences in chronological sequence.

19.3: Draw pictures and/or use letters or phonetically spelled words to give others information.

19.4: Dictate sentences for a letter or directions and collaborate to put the sentences in order.

19.5: Write or dictate stories that have a beginning, middle, and end.

19.6: Write or dictate short poems.

19.7: Write or dictate letters, directions, or short accounts of personal experiences that follow a logical order.

19.8: Write or dictate research questions.

19.9: Write stories that have a beginning, middle, and end and contain details of setting.

19.10: Write short poems that contain simple sense details.

19.11: Write brief summaries of information gathered through research.

19.12: Write a brief interpretation or explanation of a literary or informational text using evidence from the text as support.

19.13: Write an account based on personal experience that has a clear focus and sufficient supporting detail.

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19.14: Write stories or scripts containing the basic elements of fiction (*characters, dialogue, setting, plot with a clear resolution*).

19.15: Write poems using poetic techniques (*alliteration, onomatopoeia*), figurative language (*simile, metaphor*), and graphic elements (*capital letters, line length*).

19.16: Write brief research reports with clear focus and supporting detail.

19.17: Write a short explanation of a process that includes a topic statement, supporting details, and a conclusion.

19.18: Write formal letters to correspondents such as authors, newspapers, businesses, or government officials.

19.19: Write stories or scripts with well-developed characters, setting, dialogue, clear conflict and resolution, and sufficient descriptive detail.

19.20: Write poems using poetic techniques (alliteration, onomatopoeia, rhyme scheme), figurative language (simile, metaphor, personification), and graphic elements (capital letters, line length, word position).

19.21: Write reports based on research that include quotations, footnotes or endnotes, and a bibliography.

19.22: Write and justify a personal interpretation of literary, informational, or expository reading that includes a topic statement, supporting details from the literature, and a conclusion.

19.23: Write multi-paragraph compositions that have clear topic development, logical organization, effective use of detail, and variety in sentence structure.

19.24: Write well-organized stories or scripts with an explicit or implicit theme and details that contribute to a definite mood or tone.

19.25: Write poems using a range of poetic techniques, forms (*sonnet, ballad*), and figurative language.

19.26: Write well-organized essays (*persuasive, literary, personal*) that have a clear focus, logical development, effective use of detail, and variety in sentence structure.

19.27: Write well-organized research papers that prove a thesis statement using logical organization, effective supporting evidence, and variety in sentence structure.

19.28: Write well-organized stories or scripts with an explicit or implicit theme, using a variety of literary techniques.

19.29: Write poems using a range of forms and techniques.

19.30: Write coherent compositions with a clear focus, objective presentation of alternate views, rich detail, well-developed paragraphs, and logical argumentation.

Standard 20: Consideration of Audience and Purpose

20.1: Use a variety of forms or genres when writing for different purposes.

20.2: Use appropriate language for different audiences and purposes.

20.3: Make distinctions among fiction, nonfiction, dramatic literature, and poetry, and use these genres selectively when writing for different purposes.

20.4: Select and use appropriate rhetorical techniques for a variety of purposes, such as to convince or entertain the reader.

20.5: Use different levels of formality, style, and tone when composing for different audiences.

20.6: Use effective rhetorical techniques and demonstrate understanding of purpose, speaker, audience, and form when completing expressive, persuasive, or literary writing assignments.

Standard 21: Revising

21.1: After writing or dictating a composition, identify words and phrases that could be added to make the thought clearer, more logical, or more expressive.

21.2: Revise writing to improve level of detail after determining what could be added or deleted.

21.3: Improve word choice by using dictionaries.

21.4: Revise writing to improve level of detail and precision of language after determining where to add images and sensory detail, combine sentences, vary sentences, and rearrange text.

21.5: Improve word choice by using dictionaries or thesauruses.

21.6: Revise writing to improve organization and diction after checking the logic underlying the order of ideas, the precision of vocabulary used, and the economy of writing.

21.7: Improve word choice by using a variety of references.

21.8: Revise writing by attending to topic/idea development, organization, level of detail, language/style, sentence structure, grammar and usage, and mechanics.

21.9: Revise writing to improve style, word choice, sentence variety, and subtlety of meaning after rethinking how well questions of purpose, audience, and genre have been addressed.

Standard 22: Standard English Conventions

22.1: Print upper- and lower-case letters of the alphabet.

22.2: Use correct standard English mechanics such as:

- printing upper- and lower-case letters legibly and using them to make words;
- separating words with spaces;

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- understanding and applying rules for capitalization at the beginning of a sentence, for names and places, and capitalization and commas in dates.
- using correct spelling of sight and/or spelling words; and
- using appropriate end marks such as periods and question marks.

22.3: Write legibly in cursive, leaving space between letters in a word and between words in a sentence.

22.4: Use knowledge of correct mechanics (end marks, commas for series, capitalization), usage (subject and verb agreement in a simple sentence), and sentence structure (elimination of fragments) when writing and editing.

22.5: Use knowledge of letter sounds, word parts, word segmentation, and syllabication to monitor and correct spelling.

22.6: Spell most commonly used homophones correctly in their writing (*there, they're, their; two, too, to*).

22.7: Use additional knowledge of correct mechanics (apostrophes, quotation marks, comma use in compound sentences, paragraph indentations), correct sentence structure (elimination of fragments and run-ons), and correct standard English spelling (commonly used homophones) when writing, revising, and editing.

22.8: Use knowledge of types of sentences (*simple, compound, complex*), correct mechanics (*comma after introductory structures*), correct usage (*pronoun reference*), sentence structure (*complete sentences, properly placed modifiers*), and standard English spelling when writing and editing.

22.9: Use knowledge of types of clauses (*main and subordinate*), verbals (*gerunds, infinitives, participles*), mechanics (*semicolons, colons, hyphens*), usage (*tense consistency*), sentence structure (*parallel structure*), and standard English spelling when writing and editing.

22.10: Use all conventions of standard English when writing and editing.

Standard 23: Organizing Ideas in Writing

23.1: Arrange events in order when writing or dictating.

23.2: Arrange ideas in a way that makes sense.

23.3: Organize plot events of a story in an order that leads to a climax.

23.4: Organize ideas for a brief response to a reading.

23.5: Organize ideas for an account of personal experience in a way that makes sense.

23.6: Decide on the placement of descriptive details about setting, characters, and events in stories.

23.7: Group related ideas and place them in logical order when writing summaries or reports.

23.8: Organize information about a topic into a coherent paragraph with a topic sentence, sufficient supporting detail, and a concluding sentence.

23.9: Integrate the use of organizing techniques that break up strict chronological order in a story (*starting in the middle of the action, then filling in background information using flashbacks*).

23.10: Organize information into a coherent essay or report with a thesis statement in the introduction, transition sentences to link paragraphs, and a conclusion.

23.11: Organize ideas for writing comparison-and-contrast essays.

23.12: Integrate all elements of fiction to emphasize the theme and tone of the story.

23.13: Organize ideas for a critical essay about literature or a research report with an original thesis statement in the introduction, well constructed paragraphs that build an effective argument, transition sentences to link paragraphs into a coherent whole, and a conclusion.

23.14: Organize ideas for emphasis in a way that suits the purpose of the writer.

23.15: Craft sentences in a way that supports the underlying logic of the ideas.

Standard 24: Research

24.1: Generate questions and gather information from several sources in a classroom, school, or public library.

24.2: Identify and apply steps in conducting and reporting research:

- Define the need for information and formulate open-ended research questions.
- Initiate a plan for searching for information.
- Locate resources.
- Evaluate the relevance of the information.
- Interpret, use, and communicate the information.
- Evaluate the research project as a whole.

24.3: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual and group projects:

- use an expanded range of print and non-print sources (atlases, data bases, electronic, on-line resources);
- follow established criteria for evaluating information;
- locate specific information within resources by using indexes, tables of contents, electronic search key words;
- organize and present research using the grades 5–6 Learning Standards in the Composition Strand as a guide for writing; and

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- provide appropriate documentation in a consistent format.

24.4: Apply steps for obtaining information from a variety of sources, organizing information, documenting sources, and presenting research in individual projects:

- differentiate between primary and secondary source materials;
- differentiate between paraphrasing and using direct quotes in a report;
- organize and present research using the grade 7–8 Learning Standards in the Composition Strand as a guide for writing;
- document information and quotations and use a consistent format for footnotes or endnotes; and
- use standard bibliographic format to document sources.

24.5: Formulate open-ended research questions and apply steps for obtaining and evaluating information from a variety of sources, organizing information, documenting sources in a consistent and standard format, and presenting research.

24.6: Formulate original, open-ended questions to explore a topic of interest, design and carry out research, and evaluate the quality of the research paper in terms of the adequacy of its questions, materials, approach, and documentation of sources.

Standard 25: Evaluating Writing and Presentations

25.1: Support judgments about classroom activities or presentations.

25.2: Form and explain personal standards or judgments of quality, display them in the classroom, and present them to family members.

25.3: Use prescribed criteria from a scoring rubric to evaluate compositions, recitations, or performances before presenting them to an audience.

25.4: As a group, develop and use scoring guides or rubrics to improve organization and presentation of written and oral projects.

25.5: Use group-generated criteria for evaluating different forms of writing and explain why these are important before applying them.

25.6: Individually develop and use criteria for assessing work across the curriculum, explaining why the criteria are appropriate before applying them.

Media

Standard 26: Analysis of Media

26.1: Identify techniques used in television (*animation, close-ups, wide-angle shots, sound effects, music, graphics*) and use knowledge of these techniques to distinguish between facts and misleading information.

26.2: Compare stories in print with their filmed adaptations, describing the similarities and differences in the portrayal of characters, plot, and settings.

26.3: Identify techniques used in educational reference software and websites and describe how these techniques are the same as or different from the techniques used by authors and illustrators of print materials.

26.4: Analyze the effect on the reader's or viewer's emotions of text and image in print journalism, and images, sound, and text in electronic journalism, distinguishing techniques used in each to achieve these effects.

26.5: Analyze visual or aural techniques used in a media message for a particular audience and evaluate their effectiveness.

26.6: Identify the aesthetic effects of a media presentation and identify and evaluate the techniques used to create them.

Standard 27: Media Production

27.1: Create radio scripts, audiotapes, or videotapes for display or transmission.

27.2: Create presentations using computer technology.

27.3: Create a media production using effective images, text, music, sound effects, or graphics.

27.4: Create media presentations and written reports on the same subject and compare the differences in effects of each medium.

27.5: Use criteria to assess the effectiveness of media presentations.

27.6: Create media presentations that effectively use graphics, images, and/or sound to present a distinctive point of view on a topic.

27.7: Develop and apply criteria for assessing the effectiveness of the presentation, style, and content of films and other forms of electronic communication.

27.8: Create coherent media productions that synthesize information from several sources.

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Number Sense and Operations

8.N.1. Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents.

8.N.2. Define, compare, order, and apply frequently used irrational numbers, such as $\sqrt{2}$ and π.

8.N.3. Use ratios and proportions in the solution of problems, in particular, problems involving unit rates, scale factors, and rate of change.

8.N.4. Represent numbers in scientific notation, and use them in calculations and problem situations.

8.N.5. Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems.

8.N.6. Demonstrate an understanding of absolute value, e.g., $|-3| = |3| = 3$.

8.N.7. Apply the rules of powers and roots to the solution of problems. Extend the Order of Operations to include positive integer exponents and square roots.

8.N.8. Demonstrate an understanding of the properties of arithmetic operations on rational numbers. Use the associative, commutative, and distributive properties; properties of the identity and inverse elements (e.g., -7 + 7 = 0; $\frac{3}{4} \times \frac{4}{3} = 1$); and the notion of closure of a subset of the rational numbers under an operation (e.g., the set of odd integers is closed under multiplication but not under addition).

8.N.9. Use the inverse relationships of addition and subtraction, multiplication and division, and squaring and finding square roots to simplify computations and solve problems, e.g. multiplying by $\frac{1}{2}$ or 0.5 is the same as dividing by 2.

8.N.10. Estimate and compute with fractions (including simplification of fractions), integers, decimals, and percents (including those greater than 100 and less than 1).

8.N.11. Determine when an estimate rather than an exact answer is appropriate and apply in problem situations.

8.N.12. Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives).

Patterns, Relations, and Algebra

8.P.1. Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions. Include arithmetic and geometric progressions, e.g., compounding.

8.P.2. Evaluate simple algebraic expressions for given variable values, e.g., $3a^2 - b$ for $a = 3$ and $b = 7$.

8.P.3. Demonstrate an understanding of the identity $(-x)(-y) = xy$. Use this identity to simplify algebraic expressions, e.g., $(-2)(-x + 2) = 2x - 4$.

8.P.4. Create and use symbolic expressions and relate them to verbal, tabular, and graphical representations.

8.P.5. Identify the slope of a line as a measure of its steepness and as a constant rate of change from its table of values, equation, or graph. Apply the concept of slope to the solution of problems.

8.P.6. Identify the roles of variables within an equation, e.g., $y = mx + b$, expressing y as a function of x with parameters m and b.

8.P.7. Set up and solve linear equations and inequalities with one or two variables, using algebraic methods, models, and/or graphs.

8.P.8. Explain and analyze—both quantitatively and qualitatively, using pictures, graphs, charts, or equations—how a change in one variable results in a change in another variable in functional relationships, e.g., $C = \pi d$, $A = \pi r^2$ (A as a function of r), $A_{rectangle} = lw$ ($A_{rectangle}$ as a function of l and w).

8.P.9. Use linear equations to model and analyze problems involving proportional relationships. Use technology as appropriate.

8.P.10. Use tables and graphs to represent and compare linear growth patterns. In particular, compare rates of change and x- and y-intercepts of different linear patterns.

Geometry

8.G.1. Analyze, apply, and explain the relationship between the number of sides and the sums of the interior and exterior angle measures of polygons.

8.G.2. Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.

8.G.3. Demonstrate an understanding of the relationships of angles formed by intersecting lines, including parallel lines cut by a transversal.

8.G.4. Demonstrate an understanding of the Pythagorean theorem. Apply the theorem to the solution of problems.

8.G.5. Use a straightedge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.

8.G.6. Predict the results of transformations on unmarked or coordinate planes and draw the transformed figure, e.g., predict how tessellations transform under translations, reflections, and rotations.

8.G.7. Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.

8.G.8. Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.

Measurement

8.M.1. Select, convert (within the same system of measurement), and use appropriate units of measurement or scale.

8.M.2. Given the formulas, convert from one system of measurement to another. Use technology as appropriate.

8.M.3. Demonstrate an understanding of the concepts and apply formulas and procedures for determining measures, including those of area and perimeter/circumference of parallelograms, trapezoids, and circles. Given the formulas, determine the surface area and volume of rectangular prisms, cylinders, and spheres. Use technology as appropriate.

8.M.4. Use ratio and proportion (including scale factors) in the solution of problems, including problems involving similar plane figures and indirect measurement.

8.M.5. Use models, graphs, and formulas to solve simple problems involving rates, e.g., velocity and density.

Data Analysis, Statistics, and Probability

8.D.1. Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling.

8.D.2. Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle graphs, Venn diagrams, scatterplots, stem-and-leaf plots, box-and-whisker plots, histograms, tables, and charts. Differentiate between continuous and discrete data and ways to represent them.

8.D.3. Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data. Use these notions to compare different sets of data.

8.D.4. Use tree diagrams, tables, organized lists, basic combinatorics ("fundamental counting principle"), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice.

Number Sense and Operations

10.N.1. Identify and use the properties of operations on real numbers, including the associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; the existence of nth roots of positive real numbers for any positive integer n; and the inverse relationship between taking the n^{th} root of and the n^{th} power of a positive real number.

10.N.2. Simplify numerical expressions, including those involving positive integer exponents or the absolute value, e.g., $3(2^4 - 1) = 45$, $4|3 - 5| + 6 = 14$; apply such simplifications in the solution of problems.

10.N.3. Find the approximate value for solutions to problems involving square roots and cube roots without the use of a calculator, e.g., $\sqrt{3^2 - 1} \approx 2.8$.

10.N.4. Use estimation to judge the reasonableness of results of computations and of solutions to problems involving real numbers.

Patterns, Relations, and Algebra

10.P.1. Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative, recursive (e.g., Fibonnacci Numbers), linear, quadratic, and exponential functional relationships.

10.P.2. Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and x- and y-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope y-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope.

10.P.3. Add, subtract, and multiply polynomials. Divide polynomials by monomials.

10.P.4. Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms; factoring (e.g., $a^2 - b^2 = (a + b)(a - b)$, $x^2 + 10x + 21 = (x + 3)(x + 7)$, $5x^4 + 10x^3 - 5x^2 = 5x^2(x^2 + 2x - 1)$); identifying and canceling common factors in rational expressions; and applying the properties of positive integer exponents.

10.P.5. Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate an understanding of the equivalence of the methods.

10.P.6. Solve equations and inequalities including those involving absolute value of linear expressions (e.g., $|x - 2| > 5$) and apply to the solution of problems.

10.P.7. Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. Use technology when appropriate.

10.P.8. Solve everyday problems that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical methods to the solution. Use technology when appropriate. Include mixture, rate, and work problems.

Geometry

10.G.1. Identify figures using properties of sides, angles, and diagonals. Identify the figures' type(s) of symmetry.

10.G.2. Draw congruent and similar figures using a compass, straightedge, protractor, and other tools such as computer software. Make conjectures about methods of construction. Justify the conjectures by logical arguments.

10.G.3. Recognize and solve problems involving angles formed by transversals of coplanar lines. Identify and determine the measure of central and inscribed angles and their associated minor and major arcs. Recognize and solve problems associated with radii, chords, and arcs within or on the same circle.

10.G.4. Apply congruence and similarity correspondences (e.g., $\Delta ABC \cong \Delta XYZ$) and properties of the figures to find missing parts of geometric figures, and provide logical justification.

10.G.5. Solve simple triangle problems using the triangle angle sum property and/or the Pythagorean theorem.

10.G.6. Use the properties of special triangles (e.g., isosceles, equilateral, 30º – 60º – 90º, 45º – 45º – 90º) to solve problems.

10.G.7. Using rectangular coordinates, calculate midpoints of segments, slopes of lines and segments, and distances between two points, and apply the results to the solutions of problems.

10.G.8. Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation.

= Measured by EXPLORE and/or PLAN Mathematics tests

10.G.9. Draw the results, and interpret transformations on figures in the coordinate plane, e.g., translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solutions of problems.

10.G.10. Demonstrate the ability to visualize solid objects and recognize their projections and cross sections.

10.G.11. Use vertex-edge graphs to model and solve problems.

Measurement

10.M.1. Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles.

10.M.2. Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g., find the volume of a sphere with a specified surface area.

10.M.3. Relate changes in the measurement of one attribute of an object to changes in other attributes, e.g., how changing the radius or height of a cylinder affects its surface area or volume.

10.M.4. Describe the effects of approximate error in measurement and rounding on measurements and on computed values from measurements.

Data Analysis, Statistics, and Probability

10.D.1. Select, create, and interpret an appropriate graphical representation (e.g., scatterplot, table, stem-and-leaf plots, box-and-whisker plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode) to communicate information about the data. Use these notions to compare different sets of data.

10.D.2. Approximate a line of best fit (trend line) given a set of data (e.g., scatterplot). Use technology when appropriate.

10.D.3. Describe and explain how the relative sizes of a sample and the population affect the validity of predictions from a set of data.

Number Sense and Operations

12.N.1. Define complex numbers (e.g., $a + bi$) and operations on them, in particular, addition, subtraction, multiplication, and division. Relate the system of complex numbers to the systems of real and rational numbers.

12.N.2. Simplify numerical expressions with powers and roots, including fractional and negative exponents.

Patterns, Relations, and Algebra

12.P.1. Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative and recursive patterns such as Pascal's Triangle.

12.P.2. Identify arithmetic and geometric sequences and finite arithmetic and geometric series. Use the properties of such sequences and series to solve problems, including finding the general term and sum recursively and explicitly.

12.P.3. Demonstrate an understanding of the binomial theorem and use it in the solution of problems.

12.P.4. Demonstrate an understanding of the trigonometric, exponential, and logarithmic functions.

12.P.5. Perform operations on functions, including composition. Find inverses of functions.

12.P.6. Given algebraic, numeric and/or graphical representations, recognize functions as polynomial, rational, logarithmic, exponential, or trigonometric.

12.P.7. Find solutions to quadratic equations (with real coefficients and real or complex roots) and apply to the solutions of problems.

12.P.8. Solve a variety of equations and inequalities using algebraic, graphical, and numerical methods, including the quadratic formula; use technology where appropriate. Include polynomial, exponential, logarithmic, and trigonometric functions; expressions involving absolute values; trigonometric relations; and simple rational expressions.

12.P.9. Use matrices to solve systems of linear equations. Apply to the solution of everyday problems.

12.P.10. Use symbolic, numeric, and graphical methods to solve systems of equations and/or inequalities involving algebraic, exponential, and logarithmic expressions. Also use technology where appropriate. Describe the relationships among the methods.

12.P.11. Solve everyday problems that can be modeled using polynomial, rational, exponential, logarithmic, trigonometric, and step functions, absolute values, and square roots. Apply appropriate graphical, tabular, or symbolic methods to the solution. Include growth and decay; joint (e.g., $I = Prt$, $y = k(w_1 + w_2)$) and combined ($F = G\left(\frac{m_1 m_2}{d^2}\right)$ variation, and periodic processes.

12.P.12. Relate the slope of a tangent line at a specific point on a curve to the instantaneous rate of change. Identify maximum and minimum values of functions in simple situations. Apply these concepts to the solution of problems.

12.P.13. Describe the translations and scale changes of a given function $f(x)$ resulting from substitutions for the various parameters a, b, c, and d in $y = af(b(x + \frac{c}{b})) + d$. In particular, describe the effect of such changes on polynomial, rational, exponential, logarithmic, and trigonometric functions.

Geometry

12.G.1. Define the sine, cosine, and tangent of an acute angle. Apply to the solution of problems.

12.G.2. Derive and apply basic trigonometric identities (e.g., $\sin^2\theta + \cos^2\theta = 1$, $\tan^2\theta + 1 = \sec^2\theta$) and the laws of sines and cosines.

12.G.3. Use the notion of vectors to solve problems. Describe addition of vectors and multiplication of a vector by a scalar, both symbolically and geometrically. Use vector methods to obtain geometric results.

12.G.4. Relate geometric and algebraic representations of lines, simple curves, and conic sections.

12.G.5. Apply properties of angles, parallel lines, arcs, radii, chords, tangents, and secants to solve problems.

Measurement

12.M.1. Describe the relationship between degree and radian measures, and use radian measure in the solution of problems, in particular, problems involving angular velocity and acceleration.

12.M.2. Use dimensional analysis for unit conversion and to confirm that expressions and equations make sense.

Data Analysis, Statistics, and Probability

12.D.1. Design surveys and apply random sampling techniques to avoid bias in the data collection.

12.D.2. Select an appropriate graphical representation for a set of data and use appropriate statistics (e.g., quartile or percentile distribution) to communicate information about the data.

12.D.3. Apply regression results and curve fitting to make predictions from data.

12.D.4. Apply uniform, normal, and binomial distributions to the solutions of problems.

12.D.5. Describe a set of frequency distribution data by spread (i.e., variance and standard deviation), skewness, symmetry, number of modes, or other characteristics. Use these concepts in everyday applications.

12.D.6. Use combinatorics (e.g., "fundamental counting principle," permutations, and combinations) to solve problems, in particular, to compute probabilities of compound events. Use technology as appropriate.

12.D.7. Compare the results of simulations (e.g., random number tables, random functions, and area models) with predicted probabilities.

Number Sense and Operations

AI.N.1. Identify and use the properties of operations on real numbers, including the associative, commutative, and distributive properties; the existence of the identity and inverse elements for addition and multiplication; the existence of nth roots of positive real numbers for any positive integer n; the inverse relationship between taking the nth root of and the nth power of a positive real number; and the density of the set of rational numbers in the set of real numbers. (10.N.1)

AI.N.2. Simplify numerical expressions, including those involving positive integer exponents or the absolute value, e.g., $3(2^4 - 1) = 45$, $4|3 - 5| + 6 = 14$; apply such simplifications in the solution of problems. (10.N.2)

AI.N.3. Find the approximate value for solutions to problems involving square roots and cube roots without the use of a calculator, e.g., $\sqrt{3^2 - 1} \approx 2.8$. (10.N.3)

AI.N.4. Use estimation to judge the reasonableness of results of computations and of solutions to problems involving real numbers. (10.N.4)

Patterns, Relations, and Algebra

AI.P.1. Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative, recursive (e.g., Fibonnacci Numbers), linear, quadratic, and exponential functional relationships. (10.P.1)

AI.P.2. Use properties of the real number system to judge the validity of equations and inequalities, to prove or disprove statements, and to justify every step in a sequential argument.

AI.P.3. Demonstrate an understanding of relations and functions. Identify the domain, range, dependent, and independent variables of functions.

AI.P.4. Translate between different representations of functions and relations: graphs, equations, point sets, and tabular.

AI.P.5. Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and *x*- and *y*-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope *y*-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope. (10.P.2)

AI.P.6. Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation. (10.G.8)

AI.P.7. Add, subtract, and multiply polynomials. Divide polynomials by monomials. (10.P.3)

AI.P.8. Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms, factoring (e.g., $a^2 - b^2 = (a + b)(a - b)$, $x^2 + 10x + 21 = (x + 3)(x + 7)$, $5x^4 + 10x^3 - 5x^2 = 5x^2(x^2 + 2x - 1)$), identifying and canceling common factors in rational expressions, and applying the properties of positive integer exponents. (10.P.4)

AI.P.9. Find solutions to quadratic equations (with real roots) by factoring, completing the square, or using the quadratic formula. Demonstrate an understanding of the equivalence of the methods. (10.P.5)

AI.P.10. Solve equations and inequalities including those involving absolute value of linear expressions (e.g., $|x - 2| > 5$) and apply to the solution of problems. (10.P.6)

AI.P.11. Solve everyday problems that can be modeled using linear, reciprocal, quadratic, or exponential functions. Apply appropriate tabular, graphical, or symbolic methods to the solution. Include compound interest, and direct and inverse variation problems. Use technology when appropriate. (10.P.7)

AI.P.12. Solve everyday problems that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical methods to the solution. Use technology when appropriate. Include mixture, rate, and work problems. (10.P.8)

Data Analysis, Statistics, and Probability

AI.D.1. Select, create, and interpret an appropriate graphical representation (e.g., scatterplot, table, stem-and-leaf plots, circle graph, line graph, and line plot) for a set of data and use appropriate statistics (e.g., mean, median, range, and mode) to communicate information about the data. Use these notions to compare different sets of data. (10.D.1)

AI.D.2. Approximate a line of best fit (trend line) given a set of data (e.g., scatterplot). Use technology when appropriate. (10.D.2)

AI.D.3. Describe and explain how the relative sizes of a sample and the population affect the validity of predictions from a set of data. (10.D.3)

= Measured by EXPLORE, PLAN and/or the ACT Mathematics tests and/or WorkKeys AM Test

Geometry

G.G.1. Recognize special types of polygons (e.g., isosceles triangles, parallelograms, and rhombuses). Apply properties of sides, diagonals, and angles in special polygons; identify their parts and special segments (e.g., altitudes, midsegments); determine interior angles for regular polygons. Draw and label sets of points such as line segments, rays, and circles. Detect symmetries of geometric figures.

G.G.2. Write simple proofs of theorems in geometric situations, such as theorems about congruent and similar figures, parallel or perpendicular lines. Distinguish between postulates and theorems. Use inductive and deductive reasoning, as well as proof by contradiction. Given a conditional statement, write its inverse, converse, and contrapositive.

G.G.3. Apply formulas for a rectangular coordinate system to prove theorems.

G.G.4. Draw congruent and similar figures using a compass, straightedge, protractor, or computer software. Make conjectures about methods of construction. Justify the conjectures by logical arguments. (10.G.2)

G.G.5. Apply congruence and similarity correspondences (e.g., $\Delta ABC \cong \Delta XYZ$) and properties of the figures to find missing parts of geometric figures, and provide logical justification. (10.G.4)

G.G.6. Apply properties of angles, parallel lines, arcs, radii, chords, tangents, and secants to solve problems.

G.G.7. Solve simple triangle problems using the triangle angle sum property, and/or the Pythagorean theorem. (10.G.5)

G.G.8. Use the properties of special triangles (e.g., isosceles, equilateral, 30º–60º–90º, 45º–45º–90º) to solve problems. (10.G.6)

G.G.9. Define the sine, cosine, and tangent of an acute angle. Apply to the solution of problems.

G.G.10. Apply the triangle inequality and other inequalities associated with triangles (e.g., the longest side is opposite the greatest angle) to prove theorems and solve problems.

G.G.11. Demonstrate an understanding of the relationship between various representations of a line. Determine a line's slope and *x*- and *y*-intercepts from its graph or from a linear equation that represents the line. Find a linear equation describing a line from a graph or a geometric description of the line, e.g., by using the "point-slope" or "slope *y*-intercept" formulas. Explain the significance of a positive, negative, zero, or undefined slope. (10.P.2)

G.G.12. Using rectangular coordinates, calculate midpoints of segments, slopes of lines and segments, and distances between two points, and apply the results to the solutions of problems. (10.G.7)

G.G.13. Find linear equations that represent lines either perpendicular or parallel to a given line and through a point, e.g., by using the "point-slope" form of the equation. (10.G.8)

G.G.14. Demonstrate an understanding of the relationship between geometric and algebraic representations of circles.

G.G.15. Draw the results, and interpret transformations on figures in the coordinate plane, e.g., translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solution of problems. (10.G.9)

G.G.16. Demonstrate the ability to visualize solid objects and recognize their projections and cross sections. (10.G.10)

G.G.17. Use vertex-edge graphs to model and solve problems. (10.G.11)

G.G.18. Use the notion of vectors to solve problems. Describe addition of vectors and multiplication of a vector by a scalar, both symbolically and pictorially. Use vector methods to obtain geometric results. (12.G.3)

Measurement

G.M.1. Calculate perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles. (10.M.1)

G.M.2. Given the formula, find the lateral area, surface area, and volume of prisms, pyramids, spheres, cylinders, and cones, e.g., find the volume of a sphere with a specified surface area. (10.M.2)

G.M.3. Relate changes in the measurement of one attribute of an object to changes in other attributes, e.g., how changing the radius or height of a cylinder affects its surface area or volume. (10.M.3)

= Measured by PLAN and/or the ACT Mathematics tests and/or WorkKeys AM Test

G.M.4. Describe the effects of approximate error in measurement and rounding on measurements and on computed values from measurements. (10.M.4)

G.M.5. Use dimensional analysis for unit conversion and to confirm that expressions and equations make sense. (12.M.2)

= Measured by PLAN and/or the ACT Mathematics tests and/or WorkKeys AM Test

Number Sense and Operations

AII.N.1. Define complex numbers (e.g., $a + bi$) and operations on them, in particular, addition, subtraction, multiplication, and division. Relate the system of complex numbers to the systems of real and rational numbers. (12.N.1)

AII.N.2. Simplify numerical expressions with powers and roots, including fractional and negative exponents. (12.N.2)

Patterns, Relations, and Algebra

AII.P.1. Describe, complete, extend, analyze, generalize, and create a wide variety of patterns, including iterative and recursive patterns such as Pascal's Triangle. (12.P.1)

AII.P.2. Identify arithmetic and geometric sequences and finite arithmetic and geometric series. Use the properties of such sequences and series to solve problems, including finding the formula for the general term and the sum, recursively and explicitly. (12.P.2)

AII.P.3. Demonstrate an understanding of the binomial theorem and use it in the solution of problems. (12.P.3)

AII.P.4. Demonstrate an understanding of the exponential and logarithmic functions.

AII.P.5. Perform operations on functions, including composition. Find inverses of functions. (12.P.5)

AII.P.6. Given algebraic, numeric and/or graphical representations, recognize functions as polynomial, rational, logarithmic, or exponential. (12.P.6)

AII.P.7. Find solutions to quadratic equations (with real coefficients and real or complex roots) and apply to the solutions of problems. (12.P.7)

AII.P.8. Solve a variety of equations and inequalities using algebraic, graphical, and numerical methods, including the quadratic formula; use technology where appropriate. Include polynomial, exponential, and logarithmic functions; expressions involving the absolute values; and simple rational expressions. (12.P.8)

AII.P.9. Use matrices to solve systems of linear equations. Apply to the solution of everyday problems. (12.P.9)

AII.P.10. Use symbolic, numeric, and graphical methods to solve systems of equations and/or inequalities involving algebraic, exponential, and logarithmic expressions. Also use technology where appropriate. Describe the relationships among the methods. (12.P.10)

AII.P.11. Solve everyday problems that can be modeled using polynomial, rational, exponential, logarithmic, and step functions, absolute values and square roots. Apply appropriate graphical, tabular, or symbolic methods to the solution. Include growth and decay; logistic growth; joint (e.g., $I = Prt$, $y = k(w_1 + w_2)$), and combined ($F = G\left(\frac{m_1 m_2}{d^2}\right)$ variation. (12.P.11)

AII.P.12. Identify maximum and minimum values of functions in simple situations. Apply to the solution of problems. (12.P.12)

AII.P.13. Describe the translations and scale changes of a given function $f(x)$ resulting from substitutions for the various parameters a, b, c, and d in $y = af(b(x + \frac{c}{b})) + d$. In particular, describe the effect of such changes on polynomial, rational, exponential, and logarithmic functions. (12.P.13)

Geometry

AII.G.1. Define the sine, cosine, and tangent of an acute angle. Apply to the solution of problems. (12.G.1)

AII.G.2. Derive and apply basic trigonometric identities (e.g., $\sin^2\theta + \cos^2\theta = 1$, $\tan^2\theta + 1 = \sec^2\theta$) and the laws of sines and cosines. (12.G.2)

AII.G.3. Relate geometric and algebraic representations of lines, simple curves, and conic sections. (12.G.4)

Data Analysis, Statistics, and Probability

AII.D.1. Select an appropriate graphical representation for a set of data and use appropriate statistics (e.g., quartile or percentile distribution) to communicate information about the data. (12.D.2)

AII.D.2. Use combinatorics (e.g., "fundamental counting principle," permutations, and combinations) to solve problems, in particular, to compute probabilities of compound events. Use technology as appropriate. (12.D.6)

= Measured by PLAN and/or the ACT Mathematics tests and/or WorkKeys AM Test

Number Sense and Operations

PC.N.1. Plot complex numbers using both rectangular and polar coordinates systems. Represent complex numbers using polar coordinates, i.e., $a + bi = r(\cos\theta + i\sin\theta)$. Apply DeMoivre's theorem to multiply, take roots, and raise complex numbers to a power.

Patterns, Relations, and Algebra

PC.P.1. Use mathematical induction to prove theorems and verify summation formulas, e.g., verify $\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$

PC.P.2. Relate the number of roots of a polynomial to its degree. Solve quadratic equations with complex coefficients.

PC.P.3. Demonstrate an understanding of the trigonometric functions (sine, cosine, tangent, cosecant, secant, and cotangent). Relate the functions to their geometric definitions.

PC.P.4. Explain the identity $\sin^2\theta + \cos^2\theta = 1$. Relate the identity to the Pythagorean theorem.

PC.P.5. Demonstrate an understanding of the formulas for the sine and cosine of the sum or the difference of two angles. Relate the formulas to DeMoivre's theorem and use them to prove other trigonometric identities. Apply to the solution of problems.

PC.P.6. Understand, predict, and interpret the effects of the parameters a, ω, b, and c on the graph of $y = a\sin(\omega(x - b)) + c$; similarly for the cosine and tangent. Use to model periodic processes. (12.P.13)

PC.P.7. Translate between geometric, algebraic, and parametric representations of curves. Apply to the solution of problems.

PC.P.8. Identify and discuss features of conic sections: axes, foci, asymptotes, and tangents. Convert between different algebraic representations of conic sections.

PC.P.9. Relate the slope of a tangent line at a specific point on a curve to the instantaneous rate of change. Explain the significance of a horizontal tangent line. Apply these concepts to the solution of problems.

Geometry

PC.G.1. Demonstrate an understanding of the laws of sines and cosines. Use the laws to solve for the unknown sides or angles in triangles. Determine the area of a triangle given the length of two adjacent sides and the measure of the included angle. (12.G.2)

PC.G.2. Use the notion of vectors to solve problems. Describe addition of vectors, multiplication of a vector by a scalar, and the dot product of two vectors, both symbolically and geometrically. Use vector methods to obtain geometric results. (12.G.3)

PC.G.3. Apply properties of angles, parallel lines, arcs, radii, chords, tangents, and secants to solve problems. (12.G.5)

Measurement

PC.M.1. Describe the relationship between degree and radian measures, and use radian measure in the solution of problems, in particular problems involving angular velocity and acceleration. (12.M.1)

PC.M.2. Use dimensional analysis for unit conversion and to confirm that expressions and equations make sense. (12.M.2)

Data Analysis, Statistics, and Probability

PC.D.1. Design surveys and apply random sampling techniques to avoid bias in the data collection. (12.D.1)

PC.D.2. Apply regression results and curve fitting to make predictions from data. (12.D.3)

PC.D.3. Apply uniform, normal, and binomial distributions to the solutions of problems. (12.D.4)

PC.D.4. Describe a set of frequency distribution data by spread (variance and standard deviation), skewness, symmetry, number of modes, or other characteristics. Use these concepts in everyday applications. (12.D.5)

PC.D.5. Compare the results of simulations (e.g., random number tables, random functions, and area models) with predicted probabilities. (12.D.7)

= Measured by the ACT Mathematics Test and/or WorkKeys AM Test

Mapping the Earth

1. Recognize, interpret, and be able to create models of the earth's common physical features in various mapping representations, including contour maps.

Earth's Structure

2. Describe the layers of the earth, including the lithosphere, the hot convecting mantle, and the dense metallic core.

Heat Transfer in the Earth System

3. Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through the earth's system.
4. Explain the relationship among the energy provided by the sun, the global patterns of atmospheric movement, and the temperature differences among water, land, and atmosphere.

Earth's History

5. Describe how the movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g., formation of mountains and ocean basins) and rapid ones (e.g., volcanic eruptions and earthquakes).
6. Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering.
7. Explain and give examples of how physical evidence, such as fossils and surface features of glaciation, supports theories that the earth has evolved over geologic time.

The Earth in the Solar System

8. Recognize that gravity is a force that pulls all things on and near the earth toward the center of the earth. Gravity plays a major role in the formation of the planets, stars, and solar system and in determining their motions.
9. Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun.
10. Compare and contrast properties and conditions of objects in the solar system (i.e., sun, planets, and moons) to those on Earth (i.e., gravitational force, distance from the sun, speed, movement, temperature, and atmospheric conditions).
11. Explain how the tilt of the earth and its revolution around the sun result in an uneven heating of the earth, which in turn causes the seasons.
12. Recognize that the universe contains many billions of galaxies, and that each galaxy contains many billions of stars.

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Classification of Organisms

1. Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom.

Structure and Function of Cells

2. Recognize that all organisms are composed of cells, and that many organisms are single-celled (unicellular), e.g., bacteria, yeast. In these single-celled organisms, one cell must carry out all of the basic functions of life.
3. Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles).
4. Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms.

Systems in Living Things

5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms.
6. Identify the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, excretion, protection from disease, and movement, control, and coordination) and describe ways that these systems interact with each other.

Reproduction and Heredity

7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.
8. Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes.
9. Compare sexual reproduction (offspring inherit half of their genes from each parent) with asexual reproduction (offspring is an identical copy of the parent's cell).

Evolution and Biodiversity

10. Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.
11. Recognize that evidence drawn from geology, fossils, and comparative anatomy provides the basis of the theory of evolution.
12. Relate the extinction of species to a mismatch of adaptation and the environment.
13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.

Energy and Living Things

14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.
15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.
16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms.

Changes in Ecosystems Over Time

17. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.
18. Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations.

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Properties of Matter

1. Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.
2. Differentiate between volume and mass. Define density.
3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g., rulers, graduated cylinders, balances) and knowledge and appropriate use of significant digits.
4. Explain and give examples of how mass is conserved in a closed system.

Elements, Compounds, and Mixtures

5. Recognize that there are more than 100 elements that combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.
6. Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound).
7. Give basic examples of elements and compounds.
8. Differentiate between mixtures and pure substances.
9. Recognize that a substance (element or compound) has a melting point and a boiling point, both of which are independent of the amount of the sample.
10. Differentiate between physical changes and chemical changes.

Motion of Objects

11. Explain and give examples of how the motion of an object can be described by its position, direction of motion, and speed.
12. Graph and interpret distance vs. time graphs for constant speed.

Forms of Energy

13. Differentiate between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.

Heat Energy

14. Recognize that heat is a form of energy and that temperature change results from adding or taking away heat from a system.
15. Explain the effect of heat on particle motion through a description of what happens to particles during a change in phase.
16. Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium.

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1. Materials, Tools, and Machines

1.1. Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based on specific properties and characteristics (e.g., strength, hardness, and flexibility).

1.2. Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use.

1.3. Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g., band saw, drill press, sander, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design.

2. Engineering Design

2.1. Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign.

2.2. Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings.

2.3. Describe and explain the purpose of a given prototype.

2.4. Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.

2.5. Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype.

2.6. Identify the five elements of a universal systems model: goal, inputs, processes, outputs, and feedback.

3. Communication Technologies

3.1. Identify and explain the components of a communication system, i.e., source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.

3.2. Identify and explain the appropriate tools, machines, and electronic devices (e.g., drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports).

3.3. Identify and compare communication technologies and systems, i.e., audio, visual, printed, and mass communication.

3.4. Identify and explain how symbols and icons (e.g., international symbols and graphics) are used to communicate a message.

4. Manufacturing Technologies

4.1. Describe and explain the manufacturing systems of custom and mass production.

4.2. Explain and give examples of the impacts of interchangeable parts, components of mass-produced products, and the use of automation, e.g., robotics.

4.3. Describe a manufacturing organization, e.g., corporate structure, research and development, production, marketing, quality control, distribution.

4.4. Explain basic processes in manufacturing systems, e.g., cutting, shaping, assembling, joining, finishing, quality control, and safety.

5. Construction Technologies

5.1. Describe and explain parts of a structure, e.g., foundation, flooring, decking, wall, roofing systems.

5.2. Identify and describe three major types of bridges (e.g., arch, beam, and suspension) and their appropriate uses (e.g., site, span, resources, and load).

5.3. Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.

5.4. Describe and explain the effects of loads and structural shapes on bridges.

6. Transportation Technologies

6.1. Identify and compare examples of transportation systems and devices that operate on or in each of the following: land, air, water, and space.

6.2. Given a transportation problem, explain a possible solution using the universal systems model.

6.3. Identify and describe three subsystems of a transportation vehicle or device, i.e., structural, propulsion, guidance, suspension, control, and support.

6.4. Identify and explain lift, drag, friction, thrust, and gravity in a vehicle or device, e.g., cars, boats, airplanes, rockets.

7. Bioengineering Technologies

7.1. Explain examples of adaptive or assistive devices, e.g., prosthetic devices, wheelchairs, eyeglasses, grab bars, hearing aids, lifts, braces.

7.2. Describe and explain adaptive and assistive bioengineered products, e.g., food, bio-fuels, irradiation, integrated pest management.

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I. CONTENT STANDARDS

1. Matter and Energy in the Earth System

1.1. Identify Earth's principal sources of internal and external energy, such as radioactive decay, gravity, and solar energy.

1.2. Describe the characteristics of electromagnetic radiation and give examples of its impact on life and Earth's systems.

1.3. Explain how the transfer of energy through radiation, conduction, and convection contributes to global atmospheric processes, such as storms, winds, and currents.

1.4. Provide examples of how the unequal heating of Earth and the Coriolis effect influence global circulation patterns, and show how they impact Massachusetts weather and climate (e.g., global winds, convection cells, land/sea breezes, mountain/valley breezes).

1.5. Explain how the revolution of Earth around the Sun and the inclination of Earth on its axis cause Earth's seasonal variations (equinoxes and solstices).

1.6. Describe the various conditions associated with frontal boundaries and cyclonic storms (e.g., thunderstorms, winter storms [nor'easters], hurricanes, tornadoes) and their impact on human affairs, including storm preparations.

1.7. Explain the dynamics of oceanic currents, including upwelling, deep-water currents, the Labrador Current and the Gulf Stream, and their relationship to global circulation within the marine environment and climate.

1.8. Read, interpret, and analyze a combination of ground-based observations, satellite data, and computer models to demonstrate Earth systems and their interconnections.

2. Energy Resources in the Earth System

2.1. Recognize, describe, and compare renewable energy resources (e.g., solar, wind, water, biomass) and nonrenewable energy resources (e.g., fossil fuels, nuclear energy).

2.2. Describe the effects on the environment and on the carbon cycle of using both renewable and nonrenewable sources of energy.

3. Earth Processes and Cycles

3.1. Explain how physical and chemical weathering leads to erosion and the formation of soils and sediments, and creates various types of landscapes. Give examples that show the effects of physical and chemical weathering on the environment.

3.2. Describe the carbon cycle.

3.3. Describe the nitrogen cycle.

3.4. Explain how water flows into and through a watershed. Explain the roles of aquifers, wells, porosity, permeability, water table, and runoff.

3.5. Describe the processes of the hydrologic cycle, including evaporation, condensation, precipitation, surface runoff and groundwater percolation, infiltration, and transpiration.

3.6. Describe the rock cycle, and the processes that are responsible for the formation of igneous, sedimentary, and metamorphic rocks. Compare the physical properties of these rock types and the physical properties of common rock-forming minerals.

3.7. Describe the absolute and relative dating methods used to measure geologic time, such as index fossils, radioactive dating, law of superposition, and crosscutting relationships.

3.8. Trace the development of a lithospheric plate from its growth at a divergent boundary (mid-ocean ridge) to its destruction at a convergent boundary (subduction zone). Recognize that alternating magnetic polarity is recorded in rock at mid-ocean ridges.

3.9. Explain the relationship between convection currents in Earth's mantle and the motion of the lithospheric plates.

3.10. Relate earthquakes, volcanic activity, tsunamis, mountain building, and tectonic uplift to plate movements.

3.11. Explain how seismic data are used to reveal Earth's interior structure and to locate earthquake epicenters.

3.12. Describe the Richter scale of earthquake magnitude and the relative damage that is incurred by earthquakes of a given magnitude.

4. The Origin and Evolution of the Universe

4.1. Explain the Big Bang Theory and discuss the evidence that supports it, such as background radiation and relativistic Doppler effect (i.e., "red shift").

4.2. Describe the influence of gravity and inertia on the rotation and revolution of orbiting bodies. Explain the Sun-Earth-moon relationships (e.g., day, year, solar/lunar eclipses, tides).

4.3. Explain how the Sun, Earth, and solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 billion years ago.

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- Follow safety guidelines.

SIS3. Analyze and interpret results of scientific investigations.

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- Represent data and relationships between and among variables in charts and graphs.
- Use appropriate technology (e.g., graphing software) and other tools.
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- Use the Celsius and Kelvin scales.

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I. CONTENT STANDARDS

1. The Chemistry of Life

1.1. Recognize that biological organisms are composed primarily of very few elements. The six most common are C, H, N, O, P, and S.

1.2. Describe the basic molecular structures and primary functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, nucleic acids).

1.3. Explain the role of enzymes as catalysts that lower the activation energy of biochemical reactions. Identify factors, such as pH and temperature, that have an effect on enzymes.

2. Cell Biology

2.1. Relate cell parts/organelles (plasma membrane, nuclear envelope, nucleus, nucleolus, cytoplasm, mitochondrion, endoplasmic reticulum, Golgi apparatus, lysosome, ribosome, vacuole, cell wall, chloroplast, cytoskeleton, centriole, cilium, flagellum, pseudopod) to their functions. Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, facilitated diffusion, active transport).

2.2. Compare and contrast, at the cellular level, the general structures and degrees of complexity of prokaryotes and eukaryotes.

2.3. Use cellular evidence (e.g., cell structure, cell number, cell reproduction) and modes of nutrition to describe the six kingdoms (Archaebacteria, Eubacteria, Protista, Fungi, Plantae, Animalia).

2.4. Identify the reactants, products, and basic purposes of photosynthesis and cellular respiration. Explain the interrelated nature of photosynthesis and cellular respiration in the cells of photosynthetic organisms.

2.5. Explain the important role that ATP serves in metabolism.

2.6. Describe the cell cycle and the process of mitosis. Explain the role of mitosis in the formation of new cells, and its importance in maintaining chromosome number during asexual reproduction.

2.7. Describe how the process of meiosis results in the formation of haploid cells. Explain the importance of this process in sexual reproduction, and how gametes form diploid zygotes in the process of fertilization.

2.8. Compare and contrast a virus and a cell in terms of genetic material and reproduction.

3. Genetics

3.1. Describe the basic structure (double helix, sugar/phosphate backbone, linked by complementary nucleotide pairs) of DNA, and describe its function in genetic inheritance.

3.2. Describe the basic process of DNA replication and how it relates to the transmission and conservation of the genetic code. Explain the basic processes of transcription and translation, and how they result in the expression of genes. Distinguish among the end products of replication, transcription, and translation.

3.3. Explain how mutations in the DNA sequence of a gene may or may not result in phenotypic change in an organism. Explain how mutations in gametes may result in phenotypic changes in offspring.

3.4. Distinguish among observed inheritance patterns caused by several types of genetic traits (dominant, recessive, codominant, sex-linked, polygenic, incomplete dominance, multiple alleles).

3.5. Describe how Mendel's laws of segregation and independent assortment can be observed through patterns of inheritance (e.g., dihybrid crosses).

3.6. Use a Punnett Square to determine the probabilities for genotype and phenotype combinations in monohybrid crosses.

4. Anatomy and Physiology

4.1. Explain generally how the digestive system (mouth, pharynx, esophagus, stomach, small and large intestines, rectum) converts macromolecules from food into smaller molecules that can be used by cells for energy and for repair and growth.

4.2. Explain how the circulatory system (heart, arteries, veins, capillaries, red blood cells) transports nutrients and oxygen to cells and removes cell wastes. Describe how the kidneys and the liver are closely associated with the circulatory system as they perform the excretory function of removing waste from the blood. Recognize that kidneys remove nitrogenous wastes, and the liver removes many toxic compounds from blood.

4.3. Explain how the respiratory system (nose, pharynx, larynx, trachea, lungs, alveoli) provides exchange of oxygen and carbon dioxide.

4.4. Explain how the nervous system (brain, spinal cord, sensory neurons, motor neurons) mediates communication among different parts of the body and mediates the body's interactions with the environment. Identify the basic unit of the nervous system, the neuron, and explain generally how it works.

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4.5. Explain how the muscular/skeletal system (skeletal, smooth and cardiac muscles, bones, cartilage, ligaments, tendons) works with other systems to support the body and allow for movement. Recognize that bones produce blood cells.

4.6. Recognize that the sexual reproductive system allows organisms to produce offspring that receive half of their genetic information from their mother and half from their father, and that sexually produced offspring resemble, but are not identical to, either of their parents.

4.7. Recognize that communication among cells is required for coordination of body functions. The nerves communicate with electrochemical signals, hormones circulate through the blood, and some cells produce signals to communicate only with nearby cells.

4.8. Recognize that the body's systems interact to maintain homeostasis. Describe the basic function of a physiological feedback loop.

5. Evolution and Biodiversity

5.1. Explain how evolution is demonstrated by evidence from the fossil record, comparative anatomy, genetics, molecular biology, and examples of natural selection.

5.2. Describe species as reproductively distinct groups of organisms. Recognize that species are further classified into a hierarchical taxonomic system (kingdom, phylum, class, order, family, genus, species) based on morphological, behavioral, and molecular similarities. Describe the role that geographic isolation can play in speciation.

5.3. Explain how evolution through natural selection can result in changes in biodiversity through the increase or decrease of genetic diversity within a population.

6. Ecology

6.1. Explain how birth, death, immigration, and emigration influence population size.

6.2. Analyze changes in population size and biodiversity (speciation and extinction) that result from the following: natural causes, changes in climate, human activity, and the introduction of invasive, non-native species.

6.3. Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels. Describe how relationships among organisms (predation, parasitism, competition, commensalism, mutualism) add to the complexity of biological communities.

6.4. Explain how water, carbon, and nitrogen cycle between abiotic resources and organic matter in an ecosystem, and how oxygen cycles through photosynthesis and respiration.

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I. CONTENT STANDARDS

1. Properties of Matter

1.1. Identify and explain physical properties (e.g., density, melting point, boiling point, conductivity, malleability) and chemical properties (e.g., the ability to form new substances). Distinguish between chemical and physical changes.

1.2. Explain the difference between pure substances (elements and compounds) and mixtures. Differentiate between heterogeneous and homogeneous mixtures.

1.3. Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle motion, and phase transitions.

2. Atomic Structure and Nuclear Chemistry

2.1. Recognize discoveries from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus), and Bohr (planetary model of atom), and understand how each discovery leads to modern theory.

2.2. Describe Rutherford's "gold foil" experiment that led to the discovery of the nuclear atom. Identify the major components (protons, neutrons, and electrons) of the nuclear atom and explain how they interact.

2.3. Interpret and apply the laws of conservation of mass, constant composition (definite proportions), and multiple proportions.

2.4. Write the electron configurations for the first twenty elements of the periodic table.

2.5. Identify the three main types of radioactive decay (alpha, beta, and gamma) and compare their properties (composition, mass, charge, and penetrating power).

2.6. Describe the process of radioactive decay by using nuclear equations, and explain the concept of half-life for an isotope (for example, C-14 is a powerful tool in determining the age of objects).

2.7. Compare and contrast nuclear fission and nuclear fusion.

3. Periodicity

3.1. Explain the relationship of an element's position on the periodic table to its atomic number. Identify families (groups) and periods on the periodic table.

3.2. Use the periodic table to identify the three classes of elements: metals, nonmetals, and metalloids.

3.3. Relate the position of an element on the periodic table to its electron configuration and compare its reactivity to the reactivity of other elements in the table.

3.4. Identify trends on the periodic table (ionization energy, electronegativity, and relative sizes of atoms and ions).

4. Chemical Bonding

4.1. Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons.

4.2. Draw Lewis dot structures for simple molecules and ionic compounds.

4.3. Use electronegativity to explain the difference between polar and nonpolar covalent bonds.

4.4. Use valence-shell electron-pair repulsion theory (VSEPR) to predict the molecular geometry (linear, trigonal planar, and tetrahedral) of simple molecules.

4.5. Identify how hydrogen bonding in water affects a variety of physical, chemical, and biological phenomena (e.g., surface tension, capillary action, density, boiling point).

4.6. Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate.

5. Chemical Reactions and Stoichiometry

5.1. Balance chemical equations by applying the laws of conservation of mass and constant composition (definite proportions).

5.2. Classify chemical reactions as synthesis (combination), decomposition, single displacement (replacement), double displacement, and combustion.

5.3. Use the mole concept to determine number of particles and molar mass for elements and compounds.

5.4. Determine percent compositions, empirical formulas, and molecular formulas.

5.5. Calculate the mass-to-mass stoichiometry for a chemical reaction.

5.6. Calculate percent yield in a chemical reaction.

6. States of Matter, Kinetic Molecular Theory, and Thermochemistry

6.1. Using the kinetic molecular theory, explain the behavior of gases and the relationship between pressure and volume (Boyle's law), volume and temperature (Charles's law), pressure and temperature (Gay-Lussac's law), and the number of particles in a gas sample (Avogadro's hypothesis). Use the combined gas law to determine changes in pressure, volume, and temperature.

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6.2. Perform calculations using the ideal gas law. Understand the molar volume at 273 K and 1 atmosphere (STP).

6.3. Using the kinetic molecular theory, describe and contrast the properties of gases, liquids, and solids. Explain, at the molecular level, the behavior of matter as it undergoes phase transitions.

6.4. Describe the law of conservation of energy. Explain the difference between an endothermic process and an exothermic process.

6.5. Recognize that there is a natural tendency for systems to move in a direction of disorder or randomness (entropy).

7. Solutions, Rates of Reaction, and Equilibrium

7.1. Describe the process by which solutes dissolve in solvents.

7.2. Calculate concentration in terms of molarity. Use molarity to perform solution dilution and solution stoichiometry.

7.3. Identify and explain the factors that affect the rate of dissolving (e.g., temperature, concentration, surface area, pressure, mixing).

7.4. Compare and contrast qualitatively the properties of solutions and pure solvents (colligative properties such as boiling point and freezing point).

7.5. Identify the factors that affect the rate of a chemical reaction (temperature, mixing, concentration, particle size, surface area, catalyst).

7.6. Predict the shift in equilibrium when a system is subjected to a stress (LeChatelier's principle) and identify the factors that can cause a shift in equilibrium (concentration, pressure, volume, temperature).

8. Acids and Bases and Oxidation-Reduction Reactions

8.1. Define the Arrhenius theory of acids and bases in terms of the presence of hydronium and hydroxide ions in water and the Bronsted-Lowry theory of acids and bases in terms of proton donors and acceptors.

8.2. Relate hydrogen ion concentrations to the pH scale and to acidic, basic, and neutral solutions. Compare and contrast the strengths of various common acids and bases (e.g., vinegar, baking soda, soap, citrus juice).

8.3. Explain how a buffer works.

8.4. Describe oxidation and reduction reactions and give some everyday examples, such as fuel burning and corrosion. Assign oxidation numbers in a reaction.

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The following skills are not detailed in the Mathematics Framework, but are necessary for a solid understanding in this course:

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- Determine percent error from experimental and accepted values.
- Use appropriate metric/standard international (SI) units of measurement for mass (g); length (cm); and time (s).
- Use the Celsius and Kelvin scales.

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I. CONTENT STANDARDS

1. Motion and Forces

1.1. Compare and contrast vector quantities (e.g., displacement, velocity, acceleration force, linear momentum) and scalar quantities (e.g., distance, speed, energy, mass, work).

1.2. Distinguish between displacement, distance, velocity, speed, and acceleration. Solve problems involving displacement, distance, velocity, speed, and constant acceleration.

1.3. Create and interpret graphs of 1-dimensional motion, such as position vs. time, distance vs. time, speed vs. time, velocity vs. time, and acceleration vs. time where acceleration is constant.

1.4. Interpret and apply Newton's three laws of motion.

1.5. Use a free-body force diagram to show forces acting on a system consisting of a pair of interacting objects. For a diagram with only co-linear forces, determine the net force acting on a system and between the objects.

1.6. Distinguish qualitatively between static and kinetic friction, and describe their effects on the motion of objects.

1.7. Describe Newton's law of universal gravitation in terms of the attraction between two objects, their masses, and the distance between them.

1.8. Describe conceptually the forces involved in circular motion.

2. Conservation of Energy and Momentum

2.1. Interpret and provide examples that illustrate the law of conservation of energy.

2.2. Interpret and provide examples of how energy can be converted from gravitational potential energy to kinetic energy and vice versa.

2.3. Describe both qualitatively and quantitatively how work can be expressed as a change in mechanical energy.

2.4. Describe both qualitatively and quantitatively the concept of power as work done per unit time.

2.5. Provide and interpret examples showing that linear momentum is the product of mass and velocity, and is always conserved (law of conservation of momentum). Calculate the momentum of an object.

3. Heat and Heat Transfer

3.1. Explain how heat energy is transferred by convection, conduction, and radiation.

3.2. Explain how heat energy will move from a higher temperature to a lower temperature until equilibrium is reached.

3.3. Describe the relationship between average molecular kinetic energy and temperature. Recognize that energy is absorbed when a substance changes from a solid to a liquid to a gas, and that energy is released when a substance changes from a gas to a liquid to a solid. Explain the relationships among evaporation, condensation, cooling, and warming.

3.4. Explain the relationships among temperature changes in a substance, the amount of heat transferred, the amount (mass) of the substance, and the specific heat of the substance.

4. Waves

4.1. Describe the measurable properties of waves (velocity, frequency, wavelength, amplitude, period) and explain the relationships among them. Recognize examples of simple harmonic motion.

4.2. Distinguish between mechanical and electromagnetic waves.

4.3. Distinguish between the two types of mechanical waves, transverse and longitudinal.

4.4. Describe qualitatively the basic principles of reflection and refraction of waves.

4.5. Recognize that mechanical waves generally move faster through a solid than through a liquid and faster through a liquid than through a gas.

4.6. Describe the apparent change in frequency of waves due to the motion of a source or a receiver (the Doppler effect).

5. Electromagnetism

5.1. Recognize that an electric charge tends to be static on insulators and can move on and in conductors. Explain that energy can produce a separation of charges.

5.2. Develop qualitative and quantitative understandings of current, voltage, resistance, and the connections among them (Ohm's law).

5.3. Analyze simple arrangements of electrical components in both series and parallel circuits. Recognize symbols and understand the functions of common circuit elements (battery, connecting wire, switch, fuse, resistance) in a schematic diagram.

5.4. Describe conceptually the attractive or repulsive forces between objects relative to their charges and the distance between them (Coulomb's law).

5.5. Explain how electric current is a flow of charge caused by a potential difference (voltage), and how power is equal to current multiplied by voltage.

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5.6. Recognize that moving electric charges produce magnetic forces and moving magnets produce electric forces. Recognize that the interplay of electric and magnetic forces is the basis for electric motors, generators, and other technologies.

6. Electromagnetic Radiation

6.1. Recognize that electromagnetic waves are transverse waves and travel at the speed of light through a vacuum.

6.2. Describe the electromagnetic spectrum in terms of frequency and wavelength, and identify the locations of radio waves, microwaves, infrared radiation, visible light (red, orange, yellow, green, blue, indigo, and violet), ultraviolet rays, x-rays, and gamma rays on the spectrum.

II. SCIENTIFIC INQUIRY SKILLS STANDARDS

SIS1. Make observations, raise questions, and formulate hypotheses.

- Observe the world from a scientific perspective.
- Pose questions and form hypotheses based on personal observations, scientific articles, experiments, and knowledge.
- Read, interpret, and examine the credibility and validity of scientific claims in different sources of information, such as scientific articles, advertisements, or media stories.

SIS2. Design and conduct scientific investigations.

- Articulate and explain the major concepts being investigated and the purpose of an investigation.
- Select required materials, equipment, and conditions for conducting an experiment.
- Identify independent and dependent variables.
- Write procedures that are clear and replicable.
- Employ appropriate methods for accurately and consistently
  - making observations
  - making and recording measurements at appropriate levels of precision
  - collecting data or evidence in an organized way
- Properly use instruments, equipment, and materials (e.g., scales, probeware, meter sticks, microscopes, computers) including set-up, calibration (if required), technique, maintenance, and storage.
- Follow safety guidelines.

SIS3. Analyze and interpret results of scientific investigations.

- Present relationships between and among variables in appropriate forms.
- Represent data and relationships between and among variables in charts and graphs.
- Use appropriate technology (e.g., graphing software) and other tools.
- Use mathematical operations to analyze and interpret data results.
- Assess the reliability of data and identify reasons for inconsistent results, such as sources of error or uncontrolled conditions.
- Use results of an experiment to develop a conclusion to an investigation that addresses the initial questions and supports or refutes the stated hypothesis.
- State questions raised by an experiment that may require further investigation.

SIS4. Communicate and apply the results of scientific investigations.

- Develop descriptions of and explanations for scientific concepts that were a focus of one or more investigations.
- Review information, explain statistical analysis, and summarize data collected and analyzed as the result of an investigation.
- Explain diagrams and charts that represent relationships of variables.
- Construct a reasoned argument and respond appropriately to critical comments and questions.
- Use language and vocabulary appropriately, speak clearly and logically, and use appropriate technology (e.g., presentation software) and other tools to present findings.
- Use and refine scientific models that simulate physical processes or phenomena.

III. MATHEMATICAL SKILLS

Students are expected to know the content of the Massachusetts Mathematics Curriculum Framework, through grade 8. Below are some specific skills from the Mathematics Framework that students in this course should have the opportunity to apply:

- Construct and use tables and graphs to interpret data sets.
- Solve simple algebraic expressions.
- Perform basic statistical procedures to analyze the center and spread of data.
- Measure with accuracy and precision (e.g., length, volume, mass, temperature, time)
- Convert within a unit (e.g., centimeters to meters).
- Use common prefixes such as milli-, centi-, and kilo-.
- Use scientific notation, where appropriate.
- Use ratio and proportion to solve problems.

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The following skills are not detailed in the Mathematics Framework, but are necessary for a solid understanding in this course:

- Determine the correct number of significant figures.
- Determine percent error from experimental and accepted values.
- Use appropriate metric/standard international (SI) units of measurement for mass (kg); length (m); time (s); force (N); speed (m/s); acceleration (m/s2); frequency (Hz); work and energy (J); power (W); momentum (kg•m/s); electric current (A); electric potential difference/voltage (V); and electric resistance (Ω).
- Use the Celsius and Kelvin scales.

I. CONTENT STANDARDS

1. Engineering Design

1.1. Identify and explain the steps of the engineering design process: identify the problem, research the problem, develop possible solutions, select the best possible solution(s), construct prototypes and/or models, test and evaluate, communicate the solutions, and redesign.

1.2. Understand that the engineering design process is used in the solution of problems and the advancement of society. Identify examples of technologies, objects, and processes that have been modified to advance society, and explain why and how they were modified.

1.3. Produce and analyze multi-view drawings (orthographic projections) and pictorial drawings (isometric, oblique, perspective), using various techniques.

1.4. Interpret and apply scale and proportion to orthographic projections and pictorial drawings (e.g., ¼" = 1'0", 1 cm = 1 m).

1.5. Interpret plans, diagrams, and working drawings in the construction of prototypes or models.

2. Construction Technologies

2.1. Identify and explain the engineering properties of materials used in structures (e.g., elasticity, plasticity, R value, density, strength).

2.2. Distinguish among tension, compression, shear, and torsion, and explain how they relate to the selection of materials in structures.

2.3. Explain Bernoulli's principle and its effect on structures such as buildings and bridges.

2.4. Calculate the resultant force(s) for a combination of live loads and dead loads.

2.5. Identify and demonstrate the safe and proper use of common hand tools, power tools, and measurement devices used in construction.

2.6. Recognize the purposes of zoning laws and building codes in the design and use of structures.

3. Energy and Power Technologies—Fluid Systems

3.1. Explain the basic differences between open fluid systems (e.g., irrigation, forced hot air system, air compressors) and closed fluid systems (e.g., forced hot water system, hydraulic brakes).

3.2. Explain the differences and similarities between hydraulic and pneumatic systems, and explain how each relates to manufacturing and transportation systems.

3.3. Calculate and describe the ability of a hydraulic system to multiply distance, multiply force, and effect directional change.

3.4. Recognize that the velocity of a liquid moving in a pipe varies inversely with changes in the cross-sectional area of the pipe.

3.5. Identify and explain sources of resistance (e.g., 45º elbow, 90º elbow, changes in diameter) for water moving through a pipe.

4. Energy and Power Technologies—Thermal Systems

4.1. Differentiate among conduction, convection, and radiation in a thermal system (e.g., heating and cooling a house, cooking).

4.2. Give examples of how conduction, convection, and radiation are considered in the selection of materials for buildings and in the design of a heating system.

4.3. Explain how environmental conditions such as wind, solar angle, and temperature influence the design of buildings.

4.4. Identify and explain alternatives to nonrenewable energies (e.g., wind and solar energy conversion systems).

5. Energy and Power Technologies—Electrical Systems

5.1. Explain how to measure and calculate voltage, current, resistance, and power consumption in a series circuit and in a parallel circuit. Identify the instruments used to measure voltage, current, power consumption, and resistance.

5.2. Identify and explain the components of a circuit, including sources, conductors, circuit breakers, fuses, controllers, and loads. Examples of some controllers are switches, relays, diodes, and variable resistors.

5.3. Explain the relationships among voltage, current, and resistance in a simple circuit, using Ohm's law.

5.4. Recognize that resistance is affected by external factors (e.g., temperature).

5.5. Compare and contrast alternating current (AC) and direct current (DC), and give examples of each.

6. Communication Technologies

6.1. Explain how information travels through the following media: electrical wire, optical fiber, air, and space.

6.2. Differentiate between digital and analog signals. Describe how communication devices employ digital and analog technologies (e.g., computers, cell phones).

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6.3. Explain how the various components (source, encoder, transmitter, receiver, decoder, destination, storage, and retrieval) and processes of a communication system function.

6.4. Identify and explain the applications of laser and fiber optic technologies (e.g., telephone systems, cable television, photography).

6.5. Explain the application of electromagnetic signals in fiber optic technologies, including critical angle and total internal reflection.

7. Manufacturing Technologies

7.1. Describe the manufacturing processes of casting and molding, forming, separating, conditioning, assembling, and finishing.

7.2. Identify the criteria necessary to select safe tools and procedures for a manufacturing process (e.g., properties of materials, required tolerances, end-uses).

7.3. Describe the advantages of using robotics in the automation of manufacturing processes (e.g., increased production, improved quality, safety).

II. STEPS OF THE ENGINEERING DESIGN PROCESS

1. Identify the need or problem
2. Research the need or problem
   - Examine current state of the issue and current solution(s)
   - Explore other options via the Internet, library, interviews, etc.
3. Develop possible solution(s)
   - Brainstorm possible solution(s)
   - Draw on mathematics and science
   - Articulate the possible solution(s) in two and three dimensions
   - Refine the possible solution(s)
4. Select the best possible solution(s)
   - Determine which solution(s) best meet(s) the original requirements
5. Construct one or more prototypes and/or models
   - Model the selected solution(s) in two and three dimensions
6. Test and evaluate the solution(s)
   - Does it work?
   - Does it meet the original design constraints?
7. Communicate the solution(s)
   - Make an engineering presentation that includes a discussion of how the solution(s) best meet(s) the needs of the initial problem or need
   - Discuss societal impact and tradeoffs of the solution(s)
8. Redesign
   - Modify the solution(s) based on information gathered during the tests and presentation

III. MATHEMATICAL SKILLS

Students are expected to know the content of the Massachusetts Mathematics Curriculum Framework, through grade 8. Below are some specific skills from the Mathematics Framework that students in this course should have the opportunity to apply:

- Construct and use tables and graphs to interpret data sets.
- Solve simple algebraic expressions.
- Perform basic statistical procedures to analyze the center and spread of data.
- Measure with accuracy and precision (e.g., length, volume, mass, temperature, time)
- Convert within a unit (e.g., centimeters to meters, inches to feet).
- Use common prefixes such as milli-, centi-, and kilo-.
- Use scientific notation, where appropriate.
- Use ratio and proportion to solve problems.

The following skills are not detailed in the Mathematics Framework, but are necessary for a solid understanding in this course:

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- Use the Celsius and Fahrenheit scales.

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Section C: ACT's College Readiness Standards Included in Massachusetts's Grade 8–12 Content Standards

In recent years ACT has brought a distinctive voice to the debate on what it means to be truly ready for college. Using a wealth of longitudinal data—data that no one else possesses—ACT has pioneered empirical approaches to assessing students' college readiness. Using thousands of student records and responses, content and measurement experts at ACT have developed detailed statements that describe what students typically know and are able to do at different levels of test performance. These data-driven, empirically derived score descriptors, known as **ACT's College Readiness Standards,** describe student achievement within various score ranges on the English, Reading, Writing, Mathematics, and Science tests on the EXPLORE, PLAN, and ACT.

In this section (Section C), the ACT College Readiness Standards included in Massachusetts's Standards are highlighted. Standards not highlighted are those that include specific content, complexity, and/or proficiency level descriptors that ACT content experts determined were not included in Massachusetts's Standards.

Table C-1. ACT's College Readiness Standards — English

	Topic Development in Terms of Purpose and Focus	Organization, Unity, and Coherence	Word Choice in Terms of Style, Tone, Clarity, and Economy
13–15		Use conjunctive adverbs or phrases to show time relationships in simple narrative essays (e.g., *then*, *this time*)	Revise sentences to correct awkward and confusing arrangements of sentence elements Revise vague nouns and pronouns that create obvious logic problems
16–19	Identify the basic purpose or role of a specified phrase or sentence Delete a clause or sentence because it is obviously irrelevant to the essay	Select the most logical place to add a sentence in a paragraph	Delete obviously synonymous and wordy material in a sentence Revise expressions that deviate from the style of an essay
20–23	Identify the central idea or main topic of a straightforward piece of writing Determine relevancy when presented with a variety of sentence-level details	Use conjunctive adverbs or phrases to express straightforward logical relationships (e.g., *first*, *afterward*, *in response*) Decide the most logical place to add a sentence in an essay Add a sentence that introduces a simple paragraph	Delete redundant material when information is repeated in different parts of speech (e.g., "alarmingly startled") Use the word or phrase most consistent with the style and tone of a fairly straightforward essay Determine the clearest and most logical conjunction to link clauses
24–27	Identify the focus of a simple essay, applying that knowledge to add a sentence that sharpens that focus or to determine if an essay has met a specified goal Delete material primarily because it disturbs the flow and development of the paragraph Add a sentence to accomplish a fairly straightforward purpose such as illustrating a given statement	Determine the need for conjunctive adverbs or phrases to create subtle logical connections between sentences (e.g., *therefore*, *however*, *in addition*) Rearrange the sentences in a fairly uncomplicated paragraph for the sake of logic Add a sentence to introduce or conclude the essay or to provide a transition between paragraphs when the essay is fairly straightforward	Revise a phrase that is redundant in terms of the meaning and logic of the entire sentence Identify and correct ambiguous pronoun references Use the word or phrase most appropriate in terms of the content of the sentence and tone of the essay
28–32	Apply an awareness of the focus and purpose of a fairly involved essay to determine the rhetorical effect and suitability of an existing phrase or sentence, or to determine the need to delete plausible but irrelevant material Add a sentence to accomplish a subtle rhetorical purpose such as to emphasize, to add supporting detail, or to express meaning through connotation	Make sophisticated distinctions concerning the logical use of conjunctive adverbs or phrases, particularly when signaling a shift between paragraphs Rearrange sentences to improve the logic and coherence of a complex paragraph Add a sentence to introduce or conclude a fairly complex paragraph	Correct redundant material that involves sophisticated vocabulary and sounds acceptable as conversational English (e.g., "an aesthetic viewpoint" versus "the outlook of an aesthetic viewpoint") Correct vague and wordy or clumsy and confusing writing containing sophisticated language
33–36	Determine whether a complex essay has accomplished a specific purpose Add a phrase or sentence to accomplish a complex purpose, often expressed in terms of the main focus of the essay	Consider the need for introductory sentences or transitions, basing decisions on a thorough understanding of both the logic and rhetorical effect of the paragraph and essay	Delete redundant material that involves subtle concepts or that is redundant in terms of the paragraph as a whole

Table C-1. ACT's College Readiness Standards — English (continued)

	Sentence Structure and Formation	Conventions of Usage	Conventions of Punctuation
13–15	Use conjunctions or punctuation to join simple clauses Revise shifts in verb tense between simple clauses in a sentence or between simple adjoining sentences	Solve such basic grammatical problems as how to form the past and past participle of irregular but commonly used verbs and how to form comparative and superlative adjectives	Delete commas that create basic sense problems (e.g., between verb and direct object)
16–19	Determine the need for punctuation and conjunctions to avoid awkward-sounding sentence fragments and fused sentences Decide the appropriate verb tense and voice by considering the meaning of the entire sentence	Solve such grammatical problems as whether to use an adverb or adjective form, how to ensure straightforward subject-verb and pronoun-antecedent agreement, and which preposition to use in simple contexts Recognize and use the appropriate word in frequently confused pairs such as *there* and *their*, *past* and *passed*, and *led* and *lead*	Provide appropriate punctuation in straightforward situations (e.g., items in a series) Delete commas that disturb the sentence flow (e.g., between modifier and modified element)
20–23	Recognize and correct marked disturbances of sentence flow and structure (e.g., participial phrase fragments, missing or incorrect relative pronouns, dangling or misplaced modifiers)	Use idiomatically appropriate prepositions, especially in combination with verbs (e.g., *long for*, *appeal to*) Ensure that a verb agrees with its subject when there is some text between the two	Use commas to set off simple parenthetical phrases Delete unnecessary commas when an incorrect reading of the sentence suggests a pause that should be punctuated (e.g., between verb and direct object clause)
24–27	Revise to avoid faulty placement of phrases and faulty coordination and subordination of clauses in sentences with subtle structural problems Maintain consistent verb tense and pronoun person on the basis of the preceding clause or sentence	Ensure that a pronoun agrees with its antecedent when the two occur in separate clauses or sentences Identify the correct past and past participle forms of irregular and infrequently used verbs and form present-perfect verbs by using *have* rather than *of*	Use punctuation to set off complex parenthetical phrases Recognize and delete unnecessary commas based on a careful reading of a complicated sentence (e.g., between the elements of a compound subject or compound verb joined by *and*) Use apostrophes to indicate simple possessive nouns Recognize inappropriate uses of colons and semicolons
28–32	Use sentence-combining techniques, effectively avoiding problematic comma splices, run-on sentences, and sentence fragments, especially in sentences containing compound subjects or verbs Maintain a consistent and logical use of verb tense and pronoun person on the basis of information in the paragraph or essay as a whole	Correctly use reflexive pronouns, the possessive pronouns *its* and *your*, and the relative pronouns *who* and *whom* Ensure that a verb agrees with its subject in unusual situations (e.g., when the subject-verb order is inverted or when the subject is an indefinite pronoun)	Use commas to set off a nonessential/nonrestrictive appositive or clause Deal with multiple punctuation problems (e.g., compound sentences containing unnecessary commas and phrases that may or may not be parenthetical) Use an apostrophe to show possession, especially with irregular plural nouns Use a semicolon to indicate a relationship between closely related independent clauses
33–36	Work comfortably with long sentences and complex clausal relationships within sentences, avoiding weak conjunctions between independent clauses and maintaining parallel structure between clauses	Provide idiomatically and contextually appropriate prepositions following verbs in situations involving sophisticated language or ideas Ensure that a verb agrees with its subject when a phrase or clause between the two suggests a different number for the verb	Use a colon to introduce an example or an elaboration

Table C-2. ACT's College Readiness Standards — Reading

	Main Ideas and Author's Approach	Supporting Details
13–15	Recognize a clear intent of an author or narrator in uncomplicated literary narratives	Locate basic facts (e.g., names, dates, events) clearly stated in a passage
16–19	Identify a clear main idea or purpose of straightforward paragraphs in uncomplicated literary narratives	Locate simple details at the sentence and paragraph level in uncomplicated passages Recognize a clear function of a part of an uncomplicated passage
20–23	Infer the main idea or purpose of straightforward paragraphs in uncomplicated literary narratives Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in uncomplicated passages	Locate important details in uncomplicated passages Make simple inferences about how details are used in passages
24–27	Identify a clear main idea or purpose of any paragraph or paragraphs in uncomplicated passages Infer the main idea or purpose of straightforward paragraphs in more challenging passages Summarize basic events and ideas in more challenging passages Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in more challenging passages	Locate important details in more challenging passages Locate and interpret minor or subtly stated details in uncomplicated passages Discern which details, though they may appear in different sections throughout a passage, support important points in more challenging passages
28–32	Infer the main idea or purpose of more challenging passages or their paragraphs Summarize events and ideas in virtually any passage Understand the overall approach taken by an author or narrator (e.g., point of view, kinds of evidence used) in virtually any passage	Locate and interpret minor or subtly stated details in more challenging passages Use details from different sections of some complex informational passages to support a specific point or argument
33–36	Identify clear main ideas or purposes of complex passages or their paragraphs	Locate and interpret details in complex passages Understand the function of a part of a passage when the function is subtle or complex

Descriptions of the ACT Reading Passages

Uncomplicated Literary Narratives refers to excerpts from essays, short stories, and novels that tend to use simple language and structure, have a clear purpose and a familiar style, present straightforward interactions between characters, and employ only a limited number of literary devices such as metaphor, simile, or hyperbole.

More Challenging Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make moderate use of figurative language, have a more intricate structure and messages conveyed with some subtlety, and may feature somewhat complex interactions between characters.

Complex Literary Narratives refers to excerpts from essays, short stories, and novels that tend to make generous use of ambiguous language and literary devices, feature complex and subtle interactions between characters, often contain challenging context-dependent vocabulary, and typically contain messages and/or meanings that are not explicit but are embedded in the passage.

Table C-2. ACT's College Readiness Standards — Reading (continued)

	Sequential, Comparative, and Cause-Effect Relationships	Meanings of Words	Generalizations and Conclusions
13–15	Determine when (e.g., first, last, before, after) or if an event occurred in uncomplicated passages Recognize clear cause-effect relationships described within a single sentence in a passage	Understand the implication of a familiar word or phrase and of simple descriptive language	Draw simple generalizations and conclusions about the main characters in uncomplicated literary narratives
16–19	Identify relationships between main characters in uncomplicated literary narratives Recognize clear cause-effect relationships within a single paragraph in uncomplicated literary narratives	Use context to understand basic figurative language	Draw simple generalizations and conclusions about people, ideas, and so on in uncomplicated passages
20–23	Order simple sequences of events in uncomplicated literary narratives Identify clear relationships between people, ideas, and so on in uncomplicated passages Identify clear cause-effect relationships in uncomplicated passages	Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in uncomplicated passages	Draw generalizations and conclusions about people, ideas, and so on in uncomplicated passages Draw simple generalizations and conclusions using details that support the main points of more challenging passages
24–27	Order sequences of events in uncomplicated passages Understand relationships between people, ideas, and so on in uncomplicated passages Identify clear relationships between characters, ideas, and so on in more challenging literary narratives Understand implied or subtly stated cause-effect relationships in uncomplicated passages Identify clear cause-effect relationships in more challenging passages	Use context to determine the appropriate meaning of virtually any word, phrase, or statement in uncomplicated passages Use context to determine the appropriate meaning of some figurative and nonfigurative words, phrases, and statements in more challenging passages	Draw subtle generalizations and conclusions about characters, ideas, and so on in uncomplicated literary narratives Draw generalizations and conclusions about people, ideas, and so on in more challenging passages
28–32	Order sequences of events in more challenging passages Understand the dynamics between people, ideas, and so on in more challenging passages Understand implied or subtly stated cause-effect relationships in more challenging passages	Determine the appropriate meaning of words, phrases, or statements from figurative or somewhat technical contexts	Use information from one or more sections of a more challenging passage to draw generalizations and conclusions about people, ideas, and so on
33–36	Order sequences of events in complex passages Understand the subtleties in relationships between people, ideas, and so on in virtually any passage Understand implied, subtle, or complex cause-effect relationships in virtually any passage	Determine, even when the language is richly figurative and the vocabulary is difficult, the appropriate meaning of context-dependent words, phrases, or statements in virtually any passage	Draw complex or subtle generalizations and conclusions about people, ideas, and so on, often by synthesizing information from different portions of the passage Understand and generalize about portions of a complex literary narrative

Uncomplicated Informational Passages refers to materials that tend to contain a limited amount of data, address basic concepts using familiar language and conventional organizational patterns, have a clear purpose, and are written to be accessible.

More Challenging Informational Passages refers to materials that tend to present concepts that are not always stated explicitly and that are accompanied or illustrated by more—and more detailed—supporting data, include some difficult context-dependent words, and are written in a somewhat more demanding and less accessible style.

Complex Informational Passages refers to materials that tend to include a sizable amount of data, present difficult concepts that are embedded (not explicit) in the text, use demanding words and phrases whose meaning must be determined from context, and are likely to include intricate explanations of processes or events.

Table C-3. ACT's College Readiness Standards — Writing			
	Expressing Judgments	**Focusing on the Topic**	**Developing a Position**
3–4	Show a little understanding of the persuasive purpose of the task but neglect to take or to maintain a position on the issue in the prompt Show limited recognition of the complexity of the issue in the prompt	Maintain a focus on the general topic in the prompt through most of the essay	Offer a little development, with one or two ideas; if examples are given, they are general and may not be clearly relevant; resort often to merely repeating ideas Show little or no movement between general and specific ideas and examples
5–6	Show a basic understanding of the persuasive purpose of the task by taking a position on the issue in the prompt but may not maintain that position Show a little recognition of the complexity of the issue in the prompt by acknowledging, but only briefly describing, a counterargument to the writer's position	Maintain a focus on the general topic in the prompt throughout the essay	Offer limited development of ideas using a few general examples; resort sometimes to merely repeating ideas Show little movement between general and specific ideas and examples
7–8	Show understanding of the persuasive purpose of the task by taking a position on the issue in the prompt Show some recognition of the complexity of the issue in the prompt by • acknowledging counterarguments to the writer's position • providing some response to counter-arguments to the writer's position	Maintain a focus on the general topic in the prompt throughout the essay and attempt a focus on the specific issue in the prompt Present a thesis that establishes focus on the topic	Develop ideas by using some specific reasons, details, and examples Show some movement between general and specific ideas and examples
9–10	Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a broad context for discussion Show recognition of the complexity of the issue in the prompt by • partially evaluating implications and/or complications of the issue, and/or • posing and partially responding to counter-arguments to the writer's position	Maintain a focus on discussion of the specific topic and issue in the prompt throughout the essay Present a thesis that establishes a focus on the writer's position on the issue	Develop most ideas fully, using some specific and relevant reasons, details, and examples Show clear movement between general and specific ideas and examples
11–12	Show clear understanding of the persuasive purpose of the task by taking a position on the specific issue in the prompt and offering a critical context for discussion Show understanding of the complexity of the issue in the prompt by • examining different perspectives, and/or • evaluating implications or complications of the issue, and/or • posing and fully discussing counter-arguments to the writer's position	Maintain a clear focus on discussion of the specific topic and issue in the prompt throughout the essay Present a critical thesis that clearly establishes the focus on the writer's position on the issue	Develop several ideas fully, using specific and relevant reasons, details, and examples Show effective movement between general and specific ideas and examples

Table C-3. ACT's College Readiness Standards — Writing (continued)		
	Organizing Ideas	**Using Language**
3–4	Provide a discernible organization with some logical grouping of ideas in parts of the essay Use a few simple and obvious transitions Present a discernible, though minimally developed, introduction and conclusion	Show limited control of language by • correctly employing some of the conventions of standard English grammar, usage, and mechanics, but with distracting errors that sometimes significantly impede understanding • using simple vocabulary • using simple sentence structure
5–6	Provide a simple organization with logical grouping of ideas in parts of the essay Use some simple and obvious transitional words, though they may at times be inappropriate or misleading Present a discernible, though underdeveloped, introduction and conclusion	Show a basic control of language by • correctly employing some of the conventions of standard English grammar, usage, and mechanics, but with distracting errors that sometimes impede understanding • using simple but appropriate vocabulary • using a little sentence variety, though most sentences are simple in structure
7–8	Provide an adequate but simple organization with logical grouping of ideas in parts of the essay but with little evidence of logical progression of ideas Use some simple and obvious, but appropriate, transitional words and phrases Present a discernible introduction and conclusion with a little development	Show adequate use of language to communicate by • correctly employing many of the conventions of standard English grammar, usage, and mechanics, but with some distracting errors that may occasionally impede understanding • using appropriate vocabulary • using some varied kinds of sentence structures to vary pace
9–10	Provide unity and coherence throughout the essay, sometimes with a logical progression of ideas Use relevant, though at times simple and obvious, transitional words and phrases to convey logical relationships between ideas Present a somewhat developed introduction and conclusion	Show competent use of language to communicate ideas by • correctly employing most conventions of standard English grammar, usage, and mechanics, with a few distracting errors but none that impede understanding • using some precise and varied vocabulary • using several kinds of sentence structures to vary pace and to support meaning
11–12	Provide unity and coherence throughout the essay, often with a logical progression of ideas Use relevant transitional words, phrases, and sentences to convey logical relationships between ideas Present a well-developed introduction and conclusion	Show effective use of language to clearly communicate ideas by • correctly employing most conventions of standard English grammar, usage, and mechanics, with just a few, if any, errors • using precise and varied vocabulary • using a variety of kinds of sentence structures to vary pace and to support meaning

Table C-4. ACT's College Readiness Standards — Mathematics

	Basic Operations & Applications	Probability, Statistics, & Data Analysis	Numbers: Concepts & Properties	Expressions, Equations, & Inequalities
13–15	Perform one-operation computation with whole numbers and decimals Solve problems in one or two steps using whole numbers Perform common conversions (e.g., inches to feet or hours to minutes)	Calculate the average of a list of positive whole numbers Perform a single computation using information from a table or chart	Recognize equivalent fractions and fractions in lowest terms	Exhibit knowledge of basic expressions (e.g., identify an expression for a total as $b + g$) Solve equations in the form $x + a = b$, where a and b are whole numbers or decimals
16–19	Solve routine one-step arithmetic problems (using whole numbers, fractions, and decimals) such as single-step percent Solve some routine two-step arithmetic problems	Calculate the average of a list of numbers Calculate the average, given the number of data values and the sum of the data values Read tables and graphs Perform computations on data from tables and graphs Use the relationship between the probability of an event and the probability of its complement	Recognize one-digit factors of a number Identify a digit's place value	Substitute whole numbers for unknown quantities to evaluate expressions Solve one-step equations having integer or decimal answers Combine like terms (e.g., $2x + 5x$)
20–23	Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and computing with a given average	Calculate the missing data value, given the average and all data values but one Translate from one representation of data to another (e.g., a bar graph to a circle graph) Determine the probability of a simple event Exhibit knowledge of simple counting techniques	Exhibit knowledge of elementary number concepts including rounding, the ordering of decimals, pattern identification, absolute value, primes, and greatest common factor	Evaluate algebraic expressions by substituting integers for unknown quantities Add and subtract simple algebraic expressions Solve routine first-degree equations Perform straightforward word-to-symbol translations Multiply two binomials
24–27	Solve multistep arithmetic problems that involve planning or converting units of measure (e.g., feet per second to miles per hour)	Calculate the average, given the frequency counts of all the data values Manipulate data from tables and graphs Compute straightforward probabilities for common situations Use Venn diagrams in counting	Find and use the least common multiple Order fractions Work with numerical factors Work with scientific notation Work with squares and square roots of numbers Work problems involving positive integer exponents Work with cubes and cube roots of numbers Determine when an expression is undefined Exhibit some knowledge of the complex numbers	Solve real-world problems using first-degree equations Write expressions, equations, or inequalities with a single variable for common pre-algebra settings (e.g., rate and distance problems and problems that can be solved by using proportions) Identify solutions to simple quadratic equations Add, subtract, and multiply polynomials Factor simple quadratics (e.g., the difference of squares and perfect square trinomials) Solve first-degree inequalities that do not require reversing the inequality sign
28–32	Solve word problems containing several rates, proportions, or percentages	Calculate or use a weighted average Interpret and use information from figures, tables, and graphs Apply counting techniques Compute a probability when the event and/or sample space are not given or obvious	Apply number properties involving prime factorization Apply number properties involving even/odd numbers and factors/multiples Apply number properties involving positive/negative numbers Apply rules of exponents Multiply two complex numbers	Manipulate expressions and equations Write expressions, equations, and inequalities for common algebra settings Solve linear inequalities that require reversing the inequality sign Solve absolute value equations Solve quadratic equations Find solutions to systems of linear equations
33–36	Solve complex arithmetic problems involving percent of increase or decrease and problems requiring integration of several concepts from pre-algebra and/or pre-geometry (e.g., comparing percentages or averages, using several ratios, and finding ratios in geometry settings)	Distinguish between mean, median, and mode for a list of numbers Analyze and draw conclusions based on information from figures, tables, and graphs Exhibit knowledge of conditional and joint probability	Draw conclusions based on number concepts, algebraic properties, and/or relationships between expressions and numbers Exhibit knowledge of logarithms and geometric sequences Apply properties of complex numbers	Write expressions that require planning and/or manipulating to accurately model a situation Write equations and inequalities that require planning, manipulating, and/or solving Solve simple absolute value inequalities

Table C-4. ACT's College Readiness Standards — Mathematics (continued)

	Graphical Representations	Properties of Plane Figures	Measurement	Functions
13–15	Identify the location of a point with a positive coordinate on the number line		Estimate or calculate the length of a line segment based on other lengths given on a geometric figure	
16–19	Locate points on the number line and in the first quadrant	Exhibit some knowledge of the angles associated with parallel lines	Compute the perimeter of polygons when all side lengths are given Compute the area of rectangles when whole number dimensions are given	
20–23	Locate points in the coordinate plane Comprehend the concept of length on the number line Exhibit knowledge of slope	Find the measure of an angle using properties of parallel lines Exhibit knowledge of basic angle properties and special sums of angle measures (e.g., 90°, 180°, and 360°)	Compute the area and perimeter of triangles and rectangles in simple problems Use geometric formulas when all necessary information is given	Evaluate quadratic functions, expressed in function notation, at integer values
24–27	Identify the graph of a linear inequality on the number line Determine the slope of a line from points or equations Match linear graphs with their equations Find the midpoint of a line segment	Use several angle properties to find an unknown angle measure Recognize Pythagorean triples Use properties of isosceles triangles	Compute the area of triangles and rectangles when one or more additional simple steps are required Compute the area and circumference of circles after identifying necessary information Compute the perimeter of simple composite geometric figures with unknown side lengths	Evaluate polynomial functions, expressed in function notation, at integer values Express the sine, cosine, and tangent of an angle in a right triangle as a ratio of given side lengths
28–32	Interpret and use information from graphs in the coordinate plane Match number line graphs with solution sets of linear inequalities Use the distance formula Use properties of parallel and perpendicular lines to determine an equation of a line or coordinates of a point Recognize special characteristics of parabolas and circles (e.g., the vertex of a parabola and the center or radius of a circle)	Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles Use the Pythagorean theorem	Use relationships involving area, perimeter, and volume of geometric figures to compute another measure	Evaluate composite functions at integer values Apply basic trigonometric ratios to solve right-triangle problems
33–36	Match number line graphs with solution sets of simple quadratic inequalities Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ Solve problems integrating multiple algebraic and/or geometric concepts Analyze and draw conclusions based on information from graphs in the coordinate plane	Draw conclusions based on a set of conditions Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas Use relationships among angles, arcs, and distances in a circle	Use scale factors to determine the magnitude of a size change Compute the area of composite geometric figures when planning or visualization is required	Write an expression for the composite of two simple functions Use trigonometric concepts and basic identities to solve problems Exhibit knowledge of unit circle trigonometry Match graphs of basic trigonometric functions with their equations

Table C-5. ACT's College Readiness Standards — Science

	Interpretation of Data	Scientific Investigation	Evaluation of Models, Inferences, and Experimental Results
13–15	Select a single piece of data (numerical or nonnumerical) from a simple data presentation (e.g., a table or graph with two or three variables; a food web diagram) Identify basic features of a table, graph, or diagram (e.g., headings, units of measurement, axis labels)		
16–19	Select two or more pieces of data from a simple data presentation Understand basic scientific terminology Find basic information in a brief body of text Determine how the value of one variable changes as the value of another variable changes in a simple data presentation	Understand the methods and tools used in a simple experiment	
20–23	Select data from a complex data presentation (e.g., a table or graph with more than three variables; a phase diagram) Compare or combine data from a simple data presentation (e.g., order or sum data from a table) Translate information into a table, graph, or diagram	Understand the methods and tools used in a moderately complex experiment Understand a simple experimental design Identify a control in an experiment Identify similarities and differences between experiments	Select a simple hypothesis, prediction, or conclusion that is supported by a data presentation or a model Identify key issues or assumptions in a model
24–27	Compare or combine data from two or more simple data presentations (e.g., categorize data from a table using a scale from another table) Compare or combine data from a complex data presentation Interpolate between data points in a table or graph Determine how the value of one variable changes as the value of another variable changes in a complex data presentation Identify and/or use a simple (e.g., linear) mathematical relationship between data Analyze given information when presented with new, simple information	Understand the methods and tools used in a complex experiment Understand a complex experimental design Predict the results of an additional trial or measurement in an experiment Determine the experimental conditions that would produce specified results	Select a simple hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a simple hypothesis or conclusion, and why Identify strengths and weaknesses in one or more models Identify similarities and differences between models Determine which model(s) is(are) supported or weakened by new information Select a data presentation or a model that supports or contradicts a hypothesis, prediction, or conclusion
28–32	Compare or combine data from a simple data presentation with data from a complex data presentation Identify and/or use a complex (e.g., nonlinear) mathematical relationship between data Extrapolate from data points in a table or graph	Determine the hypothesis for an experiment Identify an alternate method for testing a hypothesis	Select a complex hypothesis, prediction, or conclusion that is supported by a data presentation or model Determine whether new information supports or weakens a model, and why Use new information to make a prediction based on a model
33–36	Compare or combine data from two or more complex data presentations Analyze given information when presented with new, complex information	Understand precision and accuracy issues Predict how modifying the design or methods of an experiment will affect results Identify an additional trial or experiment that could be performed to enhance or evaluate experimental results	Select a complex hypothesis, prediction, or conclusion that is supported by two or more data presentations or models Determine whether given information supports or contradicts a complex hypothesis or conclusion, and why

Science College Readiness Standards are measured in the context of science topics students encounter in science courses. These topics may include:

Life Science/Biology	Physical Science/Chemistry, Physics	Earth & Space Science
• Animal behavior • Animal development and growth • Body systems • Cell structure and processes • Ecology • Evolution • Genetics • Homeostasis • Life cycles • Molecular basis of heredity • Origin of life • Photosynthesis • Plant development, growth, structure • Populations • Taxonomy	• Atomic structure • Chemical bonding, equations, nomenclature, reactions • Electrical circuits • Elements, compounds, mixtures • Force and motions • Gravitation • Heat and work • Kinetic and potential energy • Magnetism • Momentum • The Periodic Table • Properties of solutions • Sound and light • States, classes, and properties of matter • Waves	• Earthquakes and volcanoes • Earth's atmosphere • Earth's resources • Fossils and geological time • Geochemical cycles • Groundwater • Lakes, rivers, oceans • Mass movements • Plate tectonics • Rocks, minerals • Solar system • Stars, galaxies, and the universe • Water cycle • Weather and climate • Weathering and erosion

Section D: **ACT's WorkKeys Skills Included in Massachusetts's Core Content Curriculum Standards**

Working with Charter States, national education organizations, educators, employers, and experts in employment and training requirements, ACT identified workplace skills that help individuals successfully perform a wide range of jobs. These skills form the basis of the WorkKeys assessments.

In this section (Section D), the WorkKeys Skills that are highlighted are those that are included in Massachusetts's Standards. WorkKeys Skills not highlighted are those statements that include specific content, complexity and/or proficiency level descriptions that were not described in Massachusetts's standards.

Because Massachusetts educators are the experts on the Massachusetts Standards, we would strongly encourage them to examine this document and offer their interpretations.

WorkKeys Skills

Level	Reading for Information	Applied Mathematics	Locating Information
3	Identify main ideas and clearly stated details Choose the correct meaning of a word that is clearly defined in the reading Choose the correct meaning of common, everyday and workplace words Choose when to perform each step in a short series of steps Apply instructions to a situation that is the same as the one in the reading materials	Solve problems that require a single type of mathematics operation (addition, subtraction, multiplication, and division) using whole numbers Add or subtract negative numbers Change numbers from one form to another using whole numbers, fractions, decimals, or percentages Convert simple money and time units (e.g., hours to minutes)	Find one or two pieces of information in a graphic Fill in one or two pieces of information that are missing from a graphic
4	Identify important details that may not be clearly stated Use the reading material to figure out the meaning of words that are not defined Apply instructions with several steps to a situation that is the same as the situation in the reading materials Choose what to do when changing conditions call for a different action (follow directions that include "if-then" statements)	Solve problems that require one or two operations Multiply negative numbers Calculate averages, simple ratios, simple proportions, or rates using whole numbers and decimals Add commonly known fractions, decimals, or percentages (e.g., ½, .75, 25%) Add three fractions that share a common denominator Multiply a mixed number by a whole number or decimal Put the information in the right order before performing calculations	Find several pieces of information in one or two graphics Understand how graphics are related to each other Summarize information from one or two straightforward graphics Identify trends shown in one or two straightforward graphics Compare information and trends shown in one or two straightforward graphics
5	Figure out the correct meaning of a word based on how the word is used Identify the correct meaning of an acronym that is defined in the document Identify the paraphrased definition of a technical term or jargon that is defined in the document Apply technical terms and jargon and relate them to stated situations Apply straightforward instructions to a new situation that is similar to the one described in the material Apply complex instructions that include conditionals to situations described in the materials	Decide what information, calculations, or unit conversions to use to solve the problem Look up a formula and perform single-step conversions within or between systems of measurement Calculate using mixed units (e.g., 3.5 hours and 4 hours 30 minutes) Divide negative numbers Find the best deal using one- and two-step calculations and then comparing results Calculate perimeters and areas of basic shapes (rectangles and circles) Calculate percentage discounts or markups	Sort through distracting information Summarize information from one or more detailed graphics Identify trends shown in one or more detailed or complicated graphics Compare information and trends from one or more complicated graphics
6	Identify implied details Use technical terms and jargon in new situations Figure out the less common meaning of a word based on the context Apply complicated instructions to new situations Figure out the principles behind policies, rules, and procedures Apply general principles from the materials to similar and new situations Explain the rationale behind a procedure, policy, or communication	Use fractions, negative numbers, ratios, percentages, or mixed numbers Rearrange a formula before solving a problem Use two formulas to change from one unit to another within the same system of measurement Use two formulas to change from one unit in one system of measurement to a unit in another system of measurement Find mistakes in items that belong at Levels 3, 4, and 5 Find the best deal and use the result for another calculation Find areas of basic shapes when it may be necessary to rearrange the formula, convert units of measurement in the calculations, or use the result in further calculations Find the volume of rectangular solids Calculate multiple rates	Draw conclusions based on one complicated graphic or several related graphics Apply information from one or more complicated graphics to specific situations Use the information to make decisions
7	Figure out the definitions of difficult, uncommon words based on how they are used Figure out the meaning of jargon or technical terms based on how they are used Figure out the general principles behind the policies and apply them to situations that are quite different from any described in the materials	Solve problems that include nonlinear functions and/or that involve more than one unknown Find mistakes in Level 6 items Convert between systems of measurement that involve fractions, mixed numbers, decimals, and/or percentages Calculate multiple areas and volumes of spheres, cylinders, or cones Set up and manipulate complex ratios or proportions Find the best deal when there are several choices Apply basic statistical concepts	