

## **Appendix D**

### Required Learning Strands and Standards By Grade Level

## REQUIRED LEARNING STANDARDS BY GRADE LEVEL

The following are the required learning strands and possible learning standards broken out by grade level. **Choose one of the listed learning standards for each strand.**

### 3<sup>rd</sup> Grade

Reading Strand	Learning Standard
<b>Language Development</b>	<p><b>3.LD-V.8.</b> Identify the meaning of common prefixes and suffixes (e.g., un-, re-, in-, dis-, -ful, -ly, -less), and know how they change the meaning of roots.</p> <p><i>Or</i></p> <p><b>3.LD-V.12.</b> Use context of the sentence to determine the intended meaning of an unknown word or a word with multiple meanings.</p>
<b>Literary Text</b>	<p><b>3.LT-U.4.</b> Use story details and prior knowledge to understand ideas that are not directly stated in the text.</p> <p><i>Or</i></p> <p><b>3.LT-F.8.</b> Identify the elements of stories (problem, solution, character, and setting) and analyze how major events lead from problem to solution.</p>
<b>Informational Text</b>	<p><b>3.IT-E.1.</b> Identify the purpose or main point and supporting details in text.</p> <p><i>Or</i></p> <p><b>3.IT-E.3.</b> Distinguish cause from effect.</p> <p><i>Or</i></p> <p><b>3.IT-E.4.</b> Identify and use knowledge of common textual features (e.g., title, headings, table of contents, glossary, captions) to make predictions about content.</p> <p><i>Or</i></p> <p><b>3.IT-E.5.</b> Form questions about text and locate facts in response to those questions.</p> <p><i>Or</i></p> <p><b>3.IT-DP.6.</b> Locate specific information in graphic representations (e.g., charts, maps, diagrams, illustrations, tables, timelines) of text.</p> <p><i>Or</i></p> <p><b>3.IT-DP.7.</b> Use information from text and text features to determine the sequence of activities needed to carry out a procedure.</p>

<b>Mathematics Strand</b>	<b>Learning Standard</b>
<b>Number Sense and Operations</b>	<p><b>3.NSO-N.1.</b> Exhibit an understanding of the base 10 number system by reading, modeling, and writing whole numbers to at least 10,000; demonstrate an understanding of the values of the digits.</p> <p><i>Or</i></p> <p><b>3.NSO-E.24.</b> Understand and use the strategies of rounding and regrouping to estimate quantities, measures, and the results of whole-number computations (addition, subtraction, and multiplication) up to two-digit whole numbers and amounts of money to \$100 and to judge the reasonableness of answers.</p> <p><i>Or</i></p> <p><b>3.NSO-C.10.</b> Demonstrate an understanding of and the ability to use conventional algorithms for the addition and subtraction of up to five-digit whole numbers.</p> <p><i>Or</i></p> <p><b>3.NSO-C.18.</b> Solve division problems in which a multidigit whole number is evenly divided by a one-digit number.</p> <p><i>Or</i></p> <p><b>3.NSO-F.5.</b> Identify and represent fractions (between 0 and 1 with denominators through 10) as parts of unit wholes and parts of a collection.</p>
<b>Patterns, Relations, and Algebra</b>	<p><b>3.PRA.3.</b> Determine values of variables in simple equations involving addition, subtraction, or multiplication.</p> <p><i>Or</i></p> <p><b>3.PRA.5.</b> Extend and recognize a linear pattern by its rules.</p>
<b>Geometry</b>	<p><b>3.G.1.</b> Compare and analyze attributes and other features (e.g., number and shape of sides, faces, corners, right angles) of two-dimensional geometric shapes, especially the attributes of triangles (isosceles, equilateral, right) and quadrilaterals (rectangle, square).</p> <p><i>Or</i></p> <p><b>3.G.4.</b> Identify and draw lines that are parallel, perpendicular, and intersecting.</p> <p><i>Or</i></p> <p><b>3.G.6.</b> Apply techniques such as reflections (flips), rotations (turns), and translations (slides) for determining if two shapes are congruent. time using a clock (e.g., hours and minutes since ...) and using a calendar (e.g., days since ...).</p>

Choose one of the listed learning standards for each strand.

**4<sup>th</sup> Grade**

Reading Strand	Learning Standard
<b>Language Development</b>	<p><b>4.LD-V.10.</b> Use knowledge of morphology or the analysis of word roots and affixes to determine the meaning of unfamiliar words.</p> <p><i>Or</i></p> <p><b>4.LD-V.13.</b> Recognize and use words with multiple meanings (e.g., sentence, school, hard) and determine which meaning is intended from the context of the sentence.</p>
<b>Literary Text</b>	<p><b>4.LT-C.1.</b> Identify similarities and differences between the characters or events in a story and the experiences in an author’s life.</p> <p><i>Or</i></p> <p><b>4.LT-F.5.</b> Explain how the plot, setting, or characters influence the events in a story, using evidence from the text.</p> <p><i>Or</i></p> <p><b>4.LT-F.6.</b> Describe a character’s traits, relationships, and feelings, using evidence from the text (e.g., thoughts, dialogue, actions).</p> <p><i>Or</i></p> <p><b>4.LT-G.2.</b> Distinguish among common forms of literature (poetry, prose, fiction, nonfiction, and drama) using knowledge of their structural elements.</p> <p><i>Or</i></p> <p><b>4.LT-T.4.</b> Compare the moral lessons of several fables.</p> <p><i>Or</i></p> <p><b>4.LT-P.8.</b> Recognize the similarities of sounds in words (e.g., onomatopoeia, alliteration, assonance) and rhythmic patterns in a poetry selection.</p> <p><i>Or</i></p> <p><b>4.LT-P.9.</b> Identify characteristics and structural elements (e.g., imagery, rhyme, verse, rhythm, meter) of poetry (narrative poem, free verse, lyrical poem, humorous poem).</p>

<b>Informational Text</b>	<p><b>4.IT-E.1.</b> Identify the purpose and main points of a text and summarize its supporting details.</p> <p><i>Or</i></p> <p><b>4.IT-E.2.</b> Distinguish fact from opinion.</p> <p><i>Or</i></p> <p><b>4.IT-E.3.</b> Identify cause-and-effect relationships stated and implied.</p> <p><i>Or</i></p> <p><b>4.IT-DP.6.</b> Interpret information in graphic representations (e.g., charts, maps, diagrams, illustrations, tables, timelines) of text.</p> <p><i>Or</i></p> <p><b>4.IT-DP.7.</b> Locate specific information from text (e.g., letters, memos, directories, menus, schedules, pamphlets, search engines, signs, manuals, instructions, recipes, labels, forms).</p>
<b>Mathematics Strand</b>	<b>Learning Standard</b>
<b>Number Sense and Operations</b>	<p><b>4.NSO-N.1.</b> Exhibit an understanding of the base 10 number system by reading, modeling, and writing whole numbers to at least 100,000; demonstrating an understanding of the values of the digits; and comparing and ordering the numbers.</p> <p><i>Or</i></p> <p><b>4.NSO-C.19.</b> Demonstrate understanding of and ability to use the conventional algorithms for multiplication of up to a three-digit whole number by a two-digit whole number. Multiply three-digit whole numbers by two-digit whole numbers accurately and efficiently.</p> <p><i>Or</i></p> <p><b>4.NSO-C.20.</b> Demonstrate understanding of and the ability to use the conventional algorithm for division of up to a three-digit whole number with a single-digit divisor (with or without remainders). Divide up to a three-digit whole number with a single-digit divisor accurately and efficiently. Interpret any remainders.</p> <p><i>Or</i></p> <p><b>4.NSO-C.25.</b> Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money.</p> <p><i>Or</i></p> <p><b>4.NSO-F.12.</b> Select, use, and explain models to relate common fractions and mixed numbers (e.g., <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{1}{5}</math>, <math>\frac{1}{8}</math>, <math>\frac{1}{10}</math>, <math>\frac{1}{12}</math>, and <math>1\frac{1}{2}</math>); find equivalent fractions, mixed numbers, and decimals.</p>
<b>Patterns, Relations, and Algebra</b>	<p><b>4.PRA.3.</b> Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships.</p> <p><i>Or</i></p> <p><b>4.PRA.4.</b> Solve problems involving proportional relationships, including unit pricing.</p>
<b>Measurement</b>	<p><b>4.M.1.</b> Identify and use appropriate metric and U.S. customary units and tools (e.g., ruler, protractor, graduated cylinder, thermometer) to estimate, measure, and solve problems involving length, area, volume, weight, time, angle size, and temperature.</p>

Choose one of the listed learning standards for each strand.

5<sup>th</sup> Grade

Reading Strand	Learning Standard
<b>Language Development</b>	<p>5.LD-V.8. Identify the meaning of common Greek and Latin roots and affixes to determine the meaning of unfamiliar words.</p> <p><i>Or</i></p> <p>5.LD-V.9. Identify and apply the meanings of the terms antonym, synonym, and homophone.</p>
<b>Literary Text</b>	<p>5.LT-T.3. Identify the theme (moral, lesson, meaning, message, view or comment on life) of a literary selection.</p> <p><i>Or</i></p> <p>5.LT-F.5. Identify the plot and its components (e.g., main events, conflict, resolution).</p> <p><i>Or</i></p> <p>5.LT-P.7. Respond to and analyze the effects of the sounds in words (alliteration, onomatopoeia, rhyme scheme), form (free verse, couplets), and figurative language (metaphor, simile) to uncover the meaning of a poem.</p> <p><i>Or</i></p> <p>5.LT-S.9. Identify and draw conclusions about the author's use of sensory details, imagery, and figurative language.</p>
<b>Informational Text</b>	<p>5.IT-E.1. Identify the author's purpose and summarize the critical details of expository text, maintaining chronological or logical order.</p> <p><i>Or</i></p> <p>5.IT-E.2. Distinguish fact from opinion in expository text, providing supporting evidence from text.</p> <p><i>Or</i></p> <p>5.IT-A.7. Determine an author's position (i.e., what the author is arguing), providing supporting evidence from the text.</p>

Mathematics Strand	Learning Standard
<b>Number Sense and Operations</b>	<p><b>5.NSO-N.1.</b> Estimate, round, and manipulate very large (e.g., billions) and very small (e.g., thousandths) numbers; demonstrate an understanding of place value to billions and thousandths.</p> <p><i>Or</i></p> <p><b>5.NSO-N.3.</b> Find and position integers, fractions, mixed numbers, and decimals (both positive and negative) on the number line.</p> <p><i>Or</i></p> <p><b>5.NSO-F.8.</b> Explain different interpretations of fractions as a ratio of whole numbers, as parts of unit wholes, as parts of a collection, as division of whole numbers by whole numbers, and as locations on the number line.</p> <p><i>Or</i></p> <p><b>5.NSO-C.13.</b> Add and subtract fractions (including mixed numbers) with like and unlike denominators (of 2, 3, 4, 5, 6 and 10), and express answers in the simplest form.</p> <p><i>Or</i></p> <p><b>5.NSO-E.23.</b> Estimate sums and differences of whole numbers, positive fractions, and positive decimals. Estimate products of whole numbers and products of positive decimals with whole numbers. Use a variety of strategies and judge reasonableness of answers</p>
<b>Patterns, Relations, and Algebra</b>	<p><b>5.PRA.1.</b> Analyze and determine the rules for extending symbolic, arithmetic, and geometric patterns and progressions (e.g., ABBCCC ...; 1, 5, 9, 13, ...; 3, 9, 27, ...).</p> <p><i>Or</i></p> <p><b>5.PRA.3.</b> Use the properties of equality to solve problems with whole numbers.</p> <p><i>Or</i></p> <p><b>5.PRA.5.</b> Interpret and evaluate mathematical expressions that use parentheses; use parentheses to indicate which operation to perform first when writing expressions containing more than two terms and different operations.</p> <p><i>Or</i></p> <p><b>5.PRA.6.</b> Solve problems involving proportional relationships using concrete models, tables, graphs, and paper-pencil methods.</p>
<b>Geometry</b>	<p><b>5.G.1.</b> Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides (e.g., squares, rectangles, rhombuses, parallelograms, and trapezoids; isosceles, equilateral, and right triangles).</p> <p><i>Or</i></p> <p><b>5.G.2.</b> Identify, describe, and compare special types of three-dimensional shapes (e.g., cubes, prisms, spheres, cones, and pyramids) based on their properties, such as edges and faces.</p> <p><i>Or</i></p> <p><b>5.G.3.</b> Identify relationships among points, lines, and planes (e.g., intersecting, parallel, perpendicular).</p> <p><i>Or</i></p> <p><b>5.G.6.</b> Predict, describe, and perform transformations on two-dimensional shapes (e.g., translations, rotations, and reflections).</p>

Science Strand	Learning Standard
<b>Scientific Thinking and Inquiry</b>	<p>5.1.1 Recognize and describe how results of similar scientific investigations may turn out differently because of inconsistencies in methods, materials, and observations, or because of limitations of the precision of the instruments used.</p> <p><i>Or</i></p> <p>5.1.2 Evaluate the validity of claims based on the amount and quality of the evidence cited.</p> <p><i>Or</i></p> <p>5.1.6 Identify the controlled variable and at least one independent variable in a scientific investigation, when appropriate.</p> <p><i>Or</i></p> <p>5.1.8 Realize and explain why predictions may be more accurate if they are based on large collections of similar events for statistical accuracy.</p>
<b>Earth Science</b>	<p>5.3.1 Describe the Earth as part of a system called the solar system, which includes the sun (a star), planets, comets, asteroids, and many moons.</p> <p><i>Or</i></p> <p>5.3.3 Demonstrate how the Earth orbits the sun in a year's time, and Earth rotates on its axis about once every 24 hours.</p>
<b>Life Science</b>	<p>5.7.1 Observe and describe that some organisms consist of a single cell that needs an environment that can supply food, water, sometimes oxygen, and a way to dispose of waste. (Some single-celled organisms are anaerobes.)</p> <p><i>Or</i></p> <p>5.9.2 Identify organisms that are not native to the Washington, DC, area and how they undergo changes to increase their chance of survival in the area.</p> <p><i>Or</i></p> <p>5.9.4 Explain that organisms fit enough to survive in a particular environment will typically produce offspring fit enough to survive and reproduce in that particular environment. Over time, these inherited characteristics are carried as the predominant forms (e.g., adaptations such as shape of beak, length of neck, shape of teeth).</p> <p><i>Or</i></p> <p>5.9.5 Explain how changes in an organism's habitat are sometimes beneficial and sometimes harmful, and how changes in the environment (drought, cold) have caused some plants and animals to die, migrate, or become extinct.</p> <p><i>Or</i></p> <p>5.9.9 Examine the information that fossils provide us about living things that inhabited the Earth in the distant past, and describe how they can be compared both to one another and to living organisms according to their similarities and differences.</p>

Choose one of the listed learning standards for each strand.

## 6<sup>th</sup> Grade

Reading Strand	Learning Standard
<b>Language Development</b>	<p><b>6.LD-V.7.</b> Determine the meaning of unfamiliar words, using knowledge of English language structure, Greek and Latin roots (e.g., <i>annus, aqua</i>), suffixes (e.g., <i>-itis, -osis</i>), and prefixes (e.g., <i>multi-, dis-, anti-, hyper-, syn-</i>).</p> <p><b>Or</b></p> <p><b>6.LD-V.9.</b> Determine the meaning of figurative language, including similes, metaphors, personification, and grade appropriate idioms.</p>
<b>Literary Text</b>	<p><b>6.LT-C.1.</b> Analyze the relevance of the setting (e.g., time, place, and situation) to the mood and tone of the text.</p> <p><b>Or</b></p> <p><b>6.LT-G.2.</b> Identify the characteristics of different forms of prose (short story, novel, novella, essay).</p> <p><b>Or</b></p> <p><b>6.LT-T.3.</b> Apply knowledge that theme, whether stated or implied, refers to the basic meaning of a literary text.</p> <p><b>Or</b></p> <p><b>6.LT-P.7.</b> Respond to and analyze the effects of figurative language (personification, metaphor, simile, hyperbole) and graphics (capital letters) to uncover the meaning of a poem.</p>
<b>Informational Text</b>	<p><b>6.IT-E.1.</b> Identify and analyze the author's stated purpose, main ideas, supporting ideas, and supporting evidence.</p> <p><b>Or</b></p> <p><b>6.IT-E.3.</b> Identify and use organizational structures in text, including chronological order, comparison and contrast, cause and effect, logical order, and classification schemes.</p>
Mathematics Strand	Learning Standard
<b>Number Sense and Operations</b>	<p><b>6.NSO-N.5.</b> Identify and determine common equivalent fractions, mixed numbers, decimals, and percentages.</p> <p><b>Or</b></p> <p><b>6.NSO-N.6.</b> Apply number theory concepts — including prime and composite numbers; prime factorization; greatest common factor; least common multiple; and divisibility rules for 2, 3, 4, 5, 6, 9, and 10 — to the solution of problems.</p> <p><b>Or</b></p> <p><b>6.NSO-C.8.</b> Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers and with positive fractions, mixed numbers, decimals, and percentages.</p> <p><b>Or</b></p> <p><b>6.NSO-C.13.</b> Calculate given percentages of quantities, and solve problems involving discounts at sales, interest earned, and tips.</p> <p><b>Or</b></p> <p><b>6.NSO-E.18.</b> Estimate results of computations with whole numbers and with positive fractions, mixed numbers, decimals, and percentages. Determine reasonableness of estimates.</p>

<b>Patterns, Relations, and Algebra</b>	<p><b>6.PRA.1.</b> Use the properties of equality to solve problems using letter name variables.</p> <p><b>Or</b></p> <p><b>6.PRA.4.</b> Simplify expressions of the first degree by combining like terms, and evaluate using specific values.</p> <p><b>Or</b></p> <p><b>6.PRA.9.</b> Produce and interpret graphs that represent the relationship between two variables (x and y) in everyday situations.</p>
<b>Measurement</b>	<p><b>6.M.3.</b> Develop strategies to find the area and perimeter of complex shapes (e.g., subdividing them into basic shapes such as quadrilaterals, triangles, circles).</p> <p><b>Or</b></p> <p><b>6.M.6.</b> Identify, measure, describe, classify, and construct various angles, triangles, and quadrilaterals; measure the interior angles of various polygons.</p> <p><b>Or</b></p> <p><b>6.M.8.</b> Know and use the formulas for the volumes and surface areas of cubes and rectangular prisms, given the lengths of their sides.</p>

Choose one of the listed learning standards for each strand.

### 7<sup>th</sup> Grade

<b>Reading Strand</b>	<b>Learning Standard</b>
<b>Language Development</b>	<p><b>7.LD-V.7.</b> Use Greek and Latin roots and affixes to determine the meaning of content area vocabulary.</p> <p><b>Or</b></p> <p><b>7.LD-V.8.</b> Use such clues as cause and effect and comparison and contrast to identify the meaning of unfamiliar words and words with multiple meanings in context.</p>
<b>Literary Text</b>	<p><b>7.LT-G.3.</b> Identify various genres of fiction (e.g., mysteries, science fiction, historical fiction, adventures, fantasies, fables, myths) based on their characteristics.</p> <p><b>Or</b></p> <p><b>7.LT-F.5.</b> Analyze plot development (e.g., conflict, rising action, falling action, resolution, subplots, flashbacks, parallel episodes) to determine whether and how conflicts are resolved.</p> <p><b>Or</b></p> <p><b>7.LT-F.7.</b> Analyze the ways characters change or interact with others over time and give supporting evidence from the text.</p>
<b>Informational Text</b>	<p><b>7.IT-E.1.</b> Identify the author's purpose(s) in a text when it is not stated.</p> <p><b>Or</b></p> <p><b>7.IT-E.2.</b> Identify and use knowledge of common textual features.</p> <p><b>Or</b></p> <p><b>7.IT-E.3.</b> Apply knowledge of organizational structures of text to aid comprehension, including chronological order, comparison and contrast, cause and effect, logical order, and classification schemes.</p>
<b>Mathematics Strand</b>	<b>Learning Standard</b>

<b>Number Sense and Operations</b>	<p><b>7.NSO-N.1.</b> Compare, order, estimate, and translate among integers, fractions, mixed numbers (i.e., rational numbers), decimals, and percents.</p> <p><b>Or</b></p> <p><b>7.NSO-N.7.</b> Apply number theory concepts, including prime factorization and relatively prime numbers, to the solution of problems.</p>
<b>Patterns, Relations, and Algebra</b>	<p><b>7.PRA.1.</b> 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).</p> <p><b>Or</b></p> <p><b>7.PRA.3.</b> Use the correct order of operations to evaluate expressions (e.g., <math>3(2x) = 5</math>).</p> <p><b>Or</b></p> <p><b>7.PRA.4.</b> Create and use symbolic expressions for linear relationships, and relate them to verbal and graphical representations.</p> <p><b>Or</b></p> <p><b>7.PRA.6.</b> Write and solve two-step linear equations and check the answers.</p> <p><b>Or</b></p> <p><b>7.PRA.7.</b> Identify, describe, and analyze linear relationships between two variables. Compare positive rate of change (e.g., <math>y = 3x + 1</math>) to negative rate of change (e.g., <math>y = -3x + 1</math>).</p>
<b>Data Analysis, Statistics, and Probability</b>	<p><b>7.DASP.1.</b> Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data.</p> <p><b>Or</b></p> <p><b>7.DASP.2.</b> Select, create, interpret, and use various tabular and graphical representations of data (e.g., circle graphs, Venn diagrams, stem-and-leaf plots, histograms, tables, and charts).</p> <p><b>Or</b></p> <p><b>7.DASP.4.</b> Use tree diagrams, tables, organized lists, and area models to compute probabilities for simple compound events (e.g., multiple coin tosses or rolls of dice).</p>

Choose one of the listed learning standards for each strand.

### 8<sup>th</sup> Grade

Reading Strand	Learning Standard
<b>Language Development</b>	<p><b>8.LD-V.9.</b> Monitor text for unknown words or words with novel meanings, using word, sentence, and paragraph clues to determine meaning.</p> <p><b>Or</b></p> <p><b>8.LD-V.10.</b> Understand and explain “shades of meaning” for related words.</p>

<b>Literary Text</b>	<p><b>8.LT-G.2.</b> Identify and analyze how the different genres (e.g., poetry, short story, biography, drama) used by one particular author accomplish different aesthetic purposes.</p> <p><b>Or</b></p> <p><b>8.LT-F.5.</b> Interpret a character's traits, emotions, or motivations, and provide supporting evidence from a text.</p> <p><b>Or</b></p> <p><b>8.LT-F.6.</b> Analyze the influence of setting (e.g., time of day, place, historical period, situation) on the problem and resolution.</p> <p><b>Or</b></p> <p><b>8.LT-F.8.</b> Analyze the effects of sound (alliteration, internal rhyme, rhyme scheme), figurative language (personification, metaphor, simile, hyperbole), and graphics (capital letters, line length, word position) on the meaning of a poem.</p> <p><b>Or</b></p> <p><b>8.LT-S.10.</b> Draw conclusions about style, mood, tone, and meaning of prose, poetry, and drama based on the author's word choice and use of figurative language.</p>
<b>Informational Text</b>	<p><b>8.IT-E.1.</b> Compare (and contrast) the central ideas, problems, or situations from readings on a specific topic selected to reflect a range of viewpoints.</p> <p><b>Or</b></p> <p><b>8.IT-E.2.</b> Explain how an author uses word choice and organization of text to achieve his purposes.</p> <p><b>Or</b></p> <p><b>8.IT-E.3.</b> Distinguish between the concept of theme in a literary work and the author's explicit or implicit purpose in an expository text.</p>
<b>Mathematics Strand</b>	<b>Learning Standard</b>
<b>Number Sense and Operations</b>	<p><b>8.NSO-N.7.</b> Demonstrate an understanding of the properties of arithmetic operations on rational numbers.</p> <p><b>Or</b></p> <p><b>8.NSO-C.9.</b> Solve problems involving ratio units such as miles per hour, dollars per pound, or persons per square mile.</p> <p><b>Or</b></p> <p><b>8.NSO-C.11.</b> Solve problems that involve markups, commissions, profits, and simple and compound interest.</p> <p><b>Or</b></p> <p><b>8.NSO-E.17.</b> Determine estimates to a certain stated accuracy.</p>
<b>Patterns, Relations, and Algebra</b>	<p><b>8.PRA.2.</b> Set up and solve linear equations and inequalities with one or two variables using algebraic methods and graphs.</p> <p><b>Or</b></p> <p><b>8.PRA.3.</b> Use linear equations to model and analyze problems involving proportional relationships.</p> <p><b>Or</b></p> <p><b>8.PRA.7.</b> Interpret the formula <math>(-x)(-y) = xy</math> in calculations involving such things as distance, speed, and time, or in the graphing of linear functions. Use this identity to simplify algebraic expressions [e.g., <math>(-2)(-x + 2) = 2x - 4</math>].</p> <p><b>Or</b></p> <p><b>8.PRA.8.</b> Explain and analyze — both quantitatively and qualitatively, using pictures, graphs, charts, and equations — how a change in one variable results in a change in another variable in functional relationships</p>

<b>Data Analysis, Statistics, and Probability</b>	<b>8.DASP.2.</b> Select, create, interpret, and use various tabular and graphical representations of data (e.g., scatterplots, box-and-whisker plots). <i>Or</i> <b>8.DASP.3.</b> Recognize practices of collecting and displaying data that may bias the presentation or analysis.
<b>Science Strand</b>	<b>Learning Standard</b>
<b>Structure of Matter</b>	<b>8.2.2</b> Construct a model of an atom and know the atom is composed of protons, neutrons, and electrons. <i>Or</i> <b>8.2.3</b> Using a periodic chart, explain that the atoms of any element are similar to each other, but they are different from atoms of other elements. Know the atoms of a given isotope are identical to each other. <i>Or</i> <b>8.2.7</b> Understand how an ion is an atom or group of atoms (molecule) that has acquired an electric charge by losing or gaining one or more electrons. <i>Or</i> <b>8.2.10</b> Describe the contributions of the scientists involved with the development of current atomic theory, including John Dalton, Marie and Pierre Curie, Joseph John Thomson, Albert Einstein, Max Planck, Ernest Rutherford, Niels Bohr, and Erwin Schroedinger.
<b>Reactions</b>	<b>8.3.3</b> Explain how the idea of atoms, as proposed by John Dalton, explains the conservation of matter: In chemical reactions, the number of atoms stays the same no matter how they are arranged, and the mass of atoms does not change significantly in chemical reactions, so their total mass stays the same. <i>Or</i> <b>8.3.5</b> Investigate and explain that reactions occur at different rates, slow to fast, and that reaction rates can be changed by changing the concentration of reactants, the temperature, the surface areas of solids and by using a catalyst. <i>Or</i> <b>8.3.6</b> Recognize that solutions can be acidic, basic, or neutral depending on the concentration of hydrogen ions in the solution. Understand that because this concentration can vary over a very large range, the logarithmic (each increase of one in the pH scale is an increase of 10 times in concentration) pH scale is used to describe how acidic or basic a solution is.
<b>Conservation of Energy</b>	<b>8.5.2</b> Describe kinetic energy as the energy of motion (e.g., a rolling ball), and potential energy as the energy of position or configuration (e.g., a raised object or a compressed spring). <i>Or</i> <b>8.5.7</b> Know the sun's radiation consists of a wide range of wavelengths, mainly visible light and infrared and ultraviolet radiation. <i>Or</i> <b>8.5.8</b> Investigate and explain that heat energy is a common product of an energy transformation, such as in biological growth, the operation of machines, the operation of a lightbulb, and the motion of people. <i>Or</i> <b>8.5.10</b> Investigate and explain that in processes at the scale of atomic size or greater, energy cannot be created or destroyed but only changed from one form into another. <i>Or</i> <b>8.5.11</b> Compare and contrast how heat energy can be transferred through radiation, convection, or conduction.

Choose one of the listed learning standards for each strand.

**10<sup>th</sup> Grade**

Reading Strand	Learning Standard
<b>Language Development</b>	<b>10.LD-V.9</b> Distinguish between the denotative and connotative meanings of words and interpret the connotative power of words.
<b>Literary Text</b>	<p><b>10.LT-F4</b> Analyze such elements in fiction as foreshadowing, flashbacks, suspense, and irony.  <i>Or</i>  <b>10.LT-F5</b> Explain how narrator's point of view affects tone, characterization, and plot.  <i>Or</i>  <b>10.LT-S10</b> Analyze the author's use of figurative language, including personification, symbolism, simile, metaphor, hyperbole, allusion, and imagery in a poetry selection.  <i>Or</i>  <b>10.LT-T3</b> Analyze the way in which the theme or meaning of a selection represents a view or comment on life, providing textual evidence for the identified theme.</p>
<b>Informational Text</b>	<p><b>10.IT-A.9</b> Analyze the logic and use of evidence in an author's argument.  <i>Or</i>  <b>10.IT-E2</b> Explain the author's stated (or implied) purpose(s) for writing expository text.  <i>Or</i>  <b>10.IT-E5</b> Make relevant inferences by synthesizing concepts and ideas from a single reading selection.</p>

Mathematics Strand	Learning Standard
<b>Algebra I: Patterns, Relations, and Algebra</b>	<p><b>AI.P.5.</b> 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.</p> <p><b>Or</b></p> <p><b>AI.P.8.</b> Add, subtract, and multiply polynomials with emphasis on 1st- and 2nd-degree polynomials.</p> <p><b>Or</b></p> <p><b>AI.P.9.</b> Demonstrate facility in symbolic manipulation of polynomial and rational expressions by rearranging and collecting terms, factoring [e.g., <math>a^2 - b^2 = (a + b)(a - b)</math>, <math>x^2 + 10x + 21 = (x + 3)(x + 7)</math>, <math>5x^4 + 10x^3 - 5x^2 = 5x^2(x^2 + 2x - 1)</math>], identifying and canceling common factors in rational expressions, and applying the properties of positive integer exponents.</p> <p><b>Or</b></p> <p><b>AI.P.13.</b> Solve equations and inequalities, including those involving absolute value of linear expressions (e.g., <math> x - 2  &gt; 5</math>), and apply to the solution of problems.</p> <p><b>Or</b></p> <p><b>AI.P.14.</b> Solve everyday problems (e.g., compound interest and direct and inverse variation problems) that can be modeled using linear or quadratic functions. Apply appropriate graphical or symbolic methods to the solution.</p> <p><b>Or</b></p> <p><b>AI.P.15.</b> Solve everyday problems (e.g., mixture, rate, and work problems) that can be modeled using systems of linear equations or inequalities. Apply algebraic and graphical methods to the solution.</p>
<b>Algebra I: Data Analysis, Statistics and Probability</b>	<p><b>AI.D.1.</b> Select, create, and interpret an appropriate graphical representation (e.g., scatter plot, 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.</p>
<b>Geometry</b>	<p><b>G.G.3.</b> 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.</p> <p><b>Or</b></p> <p><b>G.G.15.</b> Use the properties of special triangles (e.g., isosceles, equilateral, <math>30^\circ</math>-<math>60^\circ</math>-<math>90^\circ</math>, <math>45^\circ</math>-<math>45^\circ</math>-<math>90^\circ</math>) to solve problems.</p> <p><b>Or</b></p> <p><b>G.G.20.</b> Draw the results and interpret transformations on figures in the coordinate plane such as translations, reflections, rotations, scale factors, and the results of successive transformations. Apply transformations to the solution of problems.</p> <p><b>Or</b></p> <p><b>G.G.21.</b> Demonstrate the ability to visualize solid objects and recognize their projections, cross sections, and graph points in 3-D.</p> <p><b>Or</b></p> <p><b>G.G.22.</b> Find and use measures of perimeter, circumference, and area of common geometric figures such as parallelograms, trapezoids, circles, and triangles.</p>

Science Strand	Learning Standard
<b>Biology: Scientific Investigation and Inquiry</b>	<p><b>B.1.10</b> Select and use appropriate tools and technology to perform tests, collect data, analyze relationships, and display data. (The focus is on manual graphing, interpreting graphs, and mastery of metric measurements and units, with supplementary use of computers and electronic data gathering when appropriate.)</p> <p><i>Or</i></p> <p><b>B.1.12</b> Analyze situations and solve problems that require combining concepts from more than one topic area of science and applying these concepts.</p>
<b>Biology: Cell Biology</b>	<p><b>B.3.4</b> Describe the organelles that plant and animal cells have in common (e.g., ribosomes, Golgi bodies, endoplasmic reticulum) and some that differ (e.g., only plant cells have chloroplasts and cell walls).</p> <p><i>Or</i></p> <p><b>B.3.5</b> Demonstrate and explain that cell membranes act as highly selective permeable barriers to penetration of substances by diffusion or active transport.</p> <p><i>Or</i></p> <p><b>B.3.7</b> Describe that the work of the cell is carried out by structures made up of many different types of large (macro) molecules that it assembles, such as proteins, carbohydrates, lipids, and nucleic acids.</p> <p><i>Or</i></p> <p><b>B.3.8</b> Demonstrate that most cells function best within a narrow range of temperature and pH; extreme changes usually harm cells by modifying the structure of their macromolecules and, therefore, some of their functions.</p> <p><i>Or</i></p> <p><b>B.3.14</b> Recognize and describe that cellular respiration is important for the production of ATP, which is the basic energy source for cell metabolism.</p> <p><i>Or</i></p> <p><b>B.3.15</b> Differentiate between the functions of mitosis and meiosis: Mitosis is a process by which a cell divides into each of two daughter cells, each of which has the same number of chromosomes as the original cell. Meiosis is a process of cell division in organisms that reproduce sexually, during which the nucleus divides eventually into four nuclei, each of which contains half the usual number of chromosomes.</p>

<b>Biology: Genetics</b>	<p><b>B.4.3</b> Explain how hereditary information is passed from parents to offspring in the form of “genes,” which are long stretches of DNA consisting of sequences of nucleotides. Explain that in eukaryotes, the genes are contained in chromosomes, which are bodies made up of DNA and various proteins.</p> <p><i>Or</i></p> <p><b>B.4.6</b> Explain how the genetic information in DNA molecules provides the basic form of instructions for assembling protein molecules and that this mechanism is the same for all life forms.</p> <p><i>Or</i></p> <p><b>B.4.8</b> Explain the mechanisms of genetic mutations and chromosomal recombinations, and when and how they are passed on to offspring.</p> <p><i>Or</i></p> <p><b>B.4.9</b> Understand and explain that specialization of cells is almost always due to different patterns of gene expression rather than differences in the genes themselves.</p> <p><i>Or</i></p> <p><b>B.4.10</b> Explain how the sorting and recombination of genes in sexual reproduction result in a vast variety of potential allele combinations in the offspring of any two parents.</p>
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