Integration of Knowledge and Ideas

7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.
8. Explain how an author uses reasons and evidence to support particular points in a text.
9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.

Range of Reading and Level of Text Complexity

10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

Reading Standards for Foundational Skills

These standards are directed toward fostering students' understanding and working knowledge of concepts of print, the alphabetic principle, and other basic conventions of the English writing system. These foundational skills are not an end in and of themselves; rather, they are necessary and important components of an effective, comprehensive reading program designed to develop proficient readers with the capacity to comprehend texts across a range of types and disciplines. Instruction should be differentiated: good readers will need much less practice with these concepts than struggling readers will. The point is to teach students what they need to learn and not what they already know— to discern when particular children or activities warrant more or less attention.

Print Concepts

1. Mastered in grade 1.

Phonological Awareness

2. Mastered in grade 1.

Phonics and Word Recognition

3. Know and apply grade-level phonics and word analysis skills in decoding words.

a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

Fluency

4. Read with sufficient accuracy and fluency to support comprehension.
   a. Read on-level text[7] with purpose and understanding.
   b. Read on-level prose[8] and poetry orally with accuracy, appropriate rate, and expression on successive readings.
   c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

Writing Standards

The following standards offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. Each year in their writing, students should demonstrate increasing sophistication in all aspects of language use, from vocabulary and syntax to the development and organization of ideas, and they should address increasingly demanding content and sources. *Students advancing through the grades are expected*

[7] "On-level text" means grade level text.
[8] "On-level prose" means grade level prose.

to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.

Text Types and Purposes

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

2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
   a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
   b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
   c. Link ideas within categories of information using words and phrases (e.g., *another*, *for example*, *also*, *because*).
   d. Use precise language and domain-specific vocabulary to inform about or explain the topic.
   e. Provide a concluding statement or section related to the information or explanation presented.

3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.
   a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.
   b. Use dialogue and description to develop experiences and events or show the responses of characters to situations.
   c. Use a variety of transitional words and phrases to manage the sequence of events.
   d. Use concrete words and phrases and sensory details to convey experiences and events precisely.
   e. Provide a conclusion that follows from the narrated experiences or events.

Production and Distribution of Writing

4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing.
6. With some guidance and support from adults, produce and publish grade-appropriate writing using technology, either independently or in collaboration with others.

Research to Build and Present Knowledge

7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.
8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.
9. Draw relevant evidence from grade-appropriate literary or informational texts to support analysis, reflection, and research.
   a. Apply *grade 4 Reading standards* to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions].").

b. Apply *grade 4 Reading standards* to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").

Range of Writing

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

Speaking and Listening Standards

The following standards offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Comprehension and Collaboration

1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.
   a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
   b. Follow agreed-upon rules for discussions and carry out assigned roles.
   c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
   d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.
2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
3. Identify the reasons and evidence a speaker provides to support particular points.

Presentation of Knowledge and Ideas

4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.
6. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task, audience, and situation.

Language Standards

The following standards for grades offer a focus for instruction each year to help ensure that students gain adequate mastery of a range of skills and applications. *Students advancing through the grades are expected to meet each year's grade-specific standards and retain or further develop skills and understandings mastered in preceding grades.*

Conventions of Standard English

1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
   a. Use relative pronouns (*who, whose, whom, which, that*) and relative adverbs (*where, when, why*).
   b. Form and use the progressive (e.g., *I was walking; I am walking; I will be walking*) verb tenses.

c. Use modal auxiliaries (e.g., *can, may, must*) to convey various conditions.
d. Order adjectives within sentences according to conventional patterns (e.g., *a small red bag* rather than *a red small bag*).
e. Form and use prepositional phrases.
f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.
g. Correctly use frequently confused words (e.g., *to, too, two; there, their*).

2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
   a. Use correct capitalization.
   b. Use commas and quotation marks to mark direct speech and quotations from a text.
   c. Use a comma before a coordinating conjunction in a compound sentence.
   d. Spell grade-appropriate words correctly, consulting references as needed.

Knowledge of Language

3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.
   a. Choose words and phrases to convey ideas precisely.
   b. Choose punctuation for effect.
   c. Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion).

Vocabulary Acquisition and Use

4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.
   a. Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.
   b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., *telegraph, photograph, autograph*).
   c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases.
5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
   a. Explain the meaning of simple similes and metaphors (e.g., *as pretty as a picture*) in context.
   b. Recognize and explain the meaning of common idioms, adages, and proverbs.
   c. Demonstrate understanding of words by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms).
6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., *quizzed, whined, stammered*) and that are basic to a particular topic (e.g., *wildlife, conservation,* and *endangered* when discussing animal preservation).

Mathematics | Grade 4

Teachers Companion Documents.zip

Grade Level Overview

(1) Students generalize their understanding of place value to 1,000,000, understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select and accurately apply appropriate methods to estimate and mentally calculate quotients, and interpret remainders based upon the context.

(2) Students develop understanding of fraction equivalence and operations with fractions. They recognize that two different fractions can be equal (e.g., $^{15}/_{9} = {}^{5}/_{3}$), and they develop methods for generating and recognizing equivalent fractions. Students extend previous understandings about how fractions are built from unit fractions, composing fractions from unit fractions, decomposing fractions into unit fractions, and using the meaning of fractions and the meaning of multiplication to multiply a fraction by a whole number.

(3) Students describe, analyze, compare, and classify two-dimensional shapes. Through building, drawing, and analyzing two-dimensional shapes, students deepen their understanding of properties of two-dimensional objects and the use of them to solve problems involving symmetry.

Operations and Algebraic Thinking 4.OA

A. Use the four operations with whole numbers to solve problems.

1. Interpret a multiplication equation as a comparison and represent verbal statements of multiplicative comparisons as multiplication equations, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7, and 7 times as many as 5.
2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and/or equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison (Example: 6 times as many vs. 6 more than).[1]
3. Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. *Example: Twenty-five people are going to the movies. Four people fit in each car. How many cars are needed to get all 25 people to the theater at the same time?*

B. Gain familiarity with factors and multiples.

4. Using whole numbers in the range 1–100,
   a. Find all factor pairs for a given whole number.
   b. Recognize that a given whole number is a multiple of each of its factors.
   c. Determine whether a given whole number is a multiple of a given one-digit number.
   d. Determine whether a given whole number is prime or composite.

[1] See Glossary, Table 2.

C. Generate and analyze patterns.

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Number and Operations in Base Ten 4.NBT

A. Generalize place value understanding for multi-digit whole numbers.

1. Recognize that in a multi-digit whole number less than or equal to 1,000,000, a digit in one place represents ten times what it represents in the place to its right. *For example, (1) recognize that 700 ÷ 70 = 10; (2) in the number 7,246, the 2 represents 200, but in the number 7,426 the 2 represents 20, recognizing that 200 is ten times as large as 20, by applying concepts of place value and division.*
2. Read and write multi-digit whole numbers less than or equal to 1,000,000 using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
3. Use place value understanding to round multi-digit whole numbers, less than or equal to 1,000,000, to any place.

B. Use place value understanding and properties of operations to perform multi-digit arithmetic.

4. Fluently add and subtract multi-digit whole numbers with sums less than or equal to 1,000,000, using the standard algorithm.
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
6. Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Number and Operations—Fractions 4.NF

A. Extend understanding of fraction equivalence and ordering.

1. Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
2. Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)

B. Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

3. Understand a fraction a/b with $a > 1$ as a sum of fractions $1/b$. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
   a. Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. *Example: 3/4 = 1/4 + 1/4 + 1/4.*
   b. Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. *Examples: $3/8 = 1/8 + 1/8 + 1/8$; $3/8 = 1/8 + 2/8$; $2\ 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8$.*
   c. Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.
   d. Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.
4. Multiply a fraction by a whole number. (Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100.)
   a. Understand a fraction a/b as a multiple of $1/b$. *For example, use a visual fraction model to represent 5/4 as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.*
   b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as 6/5. (In general, $n \times (a/b) = (n \times a)/b$.)*
   c. Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*

C. Understand decimal notation for fractions, and compare decimal fractions.

5. Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.[2] *For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.*
6. Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram; represent 62/100 of a dollar as $0.62.*
7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Measurement and Data 4.MD

A. Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.

1. Know relative sizes of measurement units within one system of units including ft, in; km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. (Conversions are limited to one-step conversions.) *For example, know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), …*

[2] Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.

2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving whole numbers and/or simple fractions (addition and subtraction of fractions with like denominators and multiplying a fraction times a fraction[3] or a whole number), and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.
3. Apply the area and perimeter formulas for rectangles in real-world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

B. Represent and interpret data.

4. Make a line plot to display a data set of measurements in fractions of a unit ($1/2$, $1/4$, $1/8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*

C. Geometric measurement: understand concepts of angle and measure angles.

5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:
   a. An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where two rays intersect the circle.
   b. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.
   c. An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.
6. Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.
7. Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems, e.g., by using an equation with a letter for the unknown angle measure.

D. Relate area to operations of multiplication and addition.

8. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.

Geometry 4.G

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

1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.
2. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.
3. Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.

[3] Students in Grade 4 will be assessed on multiplying a fraction and a whole number as indicated in the NF domain. Some students may be able to multiply a fraction by a fraction as a result of generating equivalent fractions; however, mastery of multiplying two fractions occurs in Grade 5.

GRADE 4 The Ancient World

After building knowledge in grades K-3 about their community, parish, state, and nation, students are ready to expand their historical horizons and begin an exploration of the ancient and classical world. In grade 4, students are introduced to the story of human civilization and will examine key characteristics of society, government, and culture in the ancient Near East, Northern Africa, India, Greece, Rome, China, and the Americas.

- 4.1 Create and use a chronological sequence of related events to compare developments and describe instances of change and continuity.
- 4.2 Use a variety of primary and secondary sources to:
    a. Analyze social studies content.
    b. Explain claims and evidence.
    c. Compare and contrast multiple sources.
- 4.3 Explain connections between ideas, events, and developments in world history.
- 4.4 Compare and contrast events and developments in world history.
- 4.5 Construct and express claims that are supported with relevant evidence from primary and/or secondary sources, content knowledge, and clear reasoning in order to:
    a. Demonstrate an understanding of social studies content.
    b. Compare and contrast content and viewpoints.
    c. Explain causes and effects.
    d. Describe counterclaims.
- 4.6 Create and use geographic representations to locate and describe places and geographic characteristics, including hemispheres; landforms such as continents, oceans, rivers, mountains, and deserts; cardinal and intermediate directions; climate and environment.
- 4.7 Use geographic representations and historical information to explain how physical geography influenced the development of ancient civilizations and empires.
- 4.8 Describe the origin and spread of major world religions as they developed throughout history.
- 4.9 Describe the characteristics of nomadic hunter-gatherer societies, including their use of hunting weapons, fire, shelter and tools.
- 4.10 Describe early human migration out of Africa, first to Asia and Europe, then to Australia and the Americas.
- 4.11 Explain the effects of the Agricultural Revolution, including the barter economy, food surpluses, domestication of plants and animals, specialization, and the growth of permanent settlements.
- 4.12 Identify and explain the importance of the following key characteristics of civilizations: culture, specialization, infrastructure, stable food supply, government, technology, belief systems, writing, and social structure.
- 4.13 Describe the geographic, political, economic, and cultural structures of the ancient Near East.
    a. Identify and locate geographic features of the ancient Near East, including the Black Sea, Persian Gulf, Euphrates River, Tigris River, Mediterranean Sea, and Zagros Mountains.
    b. Explain how geographic and climatic features led to the region being known as the Fertile Crescent.

c. Explain how irrigation, silt, metallurgy, production of tools, use of animals and inventions, such as the wheel and plow, led to advancements in agriculture.
d. Describe how changes in agriculture in Sumer led to economic growth, expansion of trade and transportation, and the growth of independent city-states.
e. Identify important achievements of the Mesopotamian civilization, including cuneiform, clay tablets, ziggurats, and the Epic of Gilgamesh as the oldest written epic.
f. Describe the significance of the written law in the Code of Hammurabi, and explain the meaning of the phrase "an eye for an eye and a tooth for a tooth."
g. Describe the achievements of the ancient Israelites.

- 4.14 Describe the geographic, political, economic, and cultural structures of ancient Egypt.
  a. Identify and locate geographic features of ancient Egypt, including the Mediterranean Sea, Red Sea, Nile River and Delta, and the Sahara Desert.
  b. Explain the structure of ancient Egyptian society, including the relationships between groups of people and the role played by the pharaoh and enslaved people.
  c. Explain Egyptian beliefs about the afterlife, the reasons for mummification, and the use of pyramids.
  d. Describe the significance of key figures from ancient Egypt, including Queen Hatshepsut, Ramses the Great, and the significance of the discovery of Tutankhamun's tomb on the modern understanding of ancient Egypt.
  e. Describe the achievements of ancient Egyptian civilization, including hieroglyphics, papyrus, and the pyramids and Sphinx at Giza.
  f. Describe the cultural diffusion of ancient Egypt with surrounding civilizations through trade and conflict.
- 4.15 Describe the geographic, political, economic, and cultural structures of ancient India.
  a. Identify and locate geographic features of ancient India, including the Ganges River, Indus River, Himalayan Mountains, Indian Ocean, and the subcontinent of India.
  b. Explain the emergence of civilization in the Indus River Valley as an early agricultural civilization and describe its achievements, including architecture built with bricks, roads arranged into a series of grid systems, and sewer systems.
  c. Identify the long-lasting intellectual traditions that emerged during the late empire of ancient India, including advances in medicine and Hindu-Arabic numerals.
- 4.16 Describe the geographic, political, economic, and cultural structures of ancient Greece.
  a. Identify and locate geographic features of ancient Greece, including the Mediterranean Sea, Athens, the Peloponnesian peninsula, and Sparta.
  b. Describe how the geographic features of ancient Greece, including its mountainous terrain and access to the Mediterranean Sea contributed to its organization into city-states and the development of maritime trade.
  c. Describe the concept of the polis in Greek city-states, including the ideas of citizenship, civic participation, and the rule of law.
  d. Explain the basic concepts of direct democracy and oligarchy.
  e. Explain the characteristics of the major Greek city-states of Athens and Sparta, including status of women, approaches to education, type of government, and the practice of slavery.

f. Describe the causes and consequences of the Persian Wars, including the role of Athens and its cooperation with Sparta.
g. Describe the polytheistic religion of ancient Greece.
h. Identify Socrates, Plato, and Aristotle as great philosophers of ancient Greece and explain how ideas can spread through writing and teaching.
i. Identify examples of ancient Greek architecture, including the Parthenon and the Acropolis.
j. Identify Alexander the Great and explain how his conquests spread Hellenistic (Greek) culture.

- 4.17 Describe the geographic, political, economic, and cultural structures of ancient Rome.
  a. Identify and locate the geographic features of ancient Rome, including the Mediterranean Sea, Italian Alps, Rome, Italian Peninsula, and the Tiber River.
  b. Explain how the geographic location of ancient Rome contributed to its political and economic growth in the Mediterranean region and beyond.
  c. Describe the class system of ancient Rome, including the roles and rights of patricians, plebeians, and enslaved people in Roman society.
  d. Describe the polytheistic religion of ancient Rome and its connection to ancient Greek beliefs.
  e. Describe the characteristics of Julius Caesar's rule, including his role as dictator for life.
  f. Explain the influence of Augustus Caesar, including the establishment of the Roman Empire and its expansion during the Pax Romana.
  g. Describe how innovations in engineering and architecture contributed to Roman expansion, including the role of: aqueducts, domes, arches, roads, bridges, and sanitation.
  h. Describe the fall of the Western Roman Empire, including difficulty governing its large territory and political, military, and economic problems.
- 4.18 Describe the geographic, political, economic, and cultural structures of ancient China.
  a. Identify and locate geographic features of ancient China, including the Gobi Desert, Plateau of Tibet, Himalayan Mountains, Yangtze River, Pacific Ocean, and the Yellow River.
  b. Describe the influence of geographic features on the origins of ancient Chinese civilization in the Yellow River Valley, and explain how China's geography helped create a unique cultural identity.
  c. Describe problems prevalent in the time of Confucius and explain the concepts of filial piety (dutiful respect) and the Mandate of Heaven.
  d. Explain the significance of the unification of ancient China into the first Chinese empire by Qin Shi Huangdi.
  e. Describe how the size of ancient China made governing difficult and how early dynasties attempted to solve this problem, including the construction of the Grand Canal and the Great Wall.
  f. Explain the major accomplishments of the Han Dynasty, including the magnetic compass, paper making, porcelain, silk, and woodblock printing.
  g. Describe how the desire for Chinese goods influenced the creation of The Silk Road and began a process of cultural diffusion throughout Eurasia.
- 4.19 Describe the geographic, political, economic, and cultural structures of Indigenous civilizations of the Americas.

a. Identify and locate geographic features in the Americas, including Mississippi River and Delta, Amazon River, the Pacific Ocean, Appalachian Mountains, Gulf of Mexico, Atlantic Ocean, South America, and the Yucatan Peninsula.
b. Describe the cultural elements among Indigenous communities in the Americas, including housing, clothing, games/entertainment, dance, and how food was gathered/caught and cooked.
c. Explain how nomadic groups of people first hunted and traveled throughout what would become Louisiana.
d. Explain how people living in what would become Louisiana gradually moved towards seasonal hunting and gathering, using new tools and practices for hunting, and building large mounds for ceremonial and practical purposes.
e. Describe key characteristics of Poverty Point culture, including art, hunting methods, dress, food, use of mounds, and resources traded there.
f. Explain the major accomplishments of the Mayans, including advancements in astronomy, mathematics and the calendar, construction of pyramids, temples, and hieroglyphic writing.
g. Describe the influence of geographic features on the origins of the Mayan civilization and explain theories related to the abandonment of their cities.

ENERGY

Performance Expectation	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Clarification Statement	Relating the speed of an object to the energy of the object does not require calculation of the object's speed.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking **6. Constructing explanations and designing solutions:** Constructing explanations (science) and designing solutions (engineering) in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems • Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation or design a solution to a problem. 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**DEFINITIONS OF ENERGY** The faster a given object is moving, the more energy it possesses. (UE.PS3A.a)	**ENERGY AND MATTER** Energy can be transferred in various ways and between objects.

ENERGY

Performance Expectation	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
Clarification Statement	When energy is transferred it may change forms such as when light from the sun warms a window pane.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. **Planning and carrying out Investigations:** Planning and carrying out investigations to answer questions (science) or test solutions (engineering) to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**DEFINITIONS OF ENERGY** Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (UE.PS3A.b) **CONSERVATION OF ENERGY AND ENERGY TRANSFER** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (UE.PS3B.a) Light also transfers energy from place to place. (UE.PS3B.b) Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (UE.PS3B.c)	**ENERGY AND MATTER** Energy can be transferred in various ways and between objects.

ENERGY

Performance Expectation	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
Clarification Statement	Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact. Quantitative measurements of energy are not included.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. **Asking questions and defining problems:** Asking questions (science) and defining problems (engineering) in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**DEFINITIONS OF ENERGY** Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (UE.PS3A.b) **CONSERVATION OF ENERGY AND ENERGY TRANSFER** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (UE.PS3B.a) **RELATIONSHIP BETWEEN ENERGY AND FORCES** When objects collide, the contact forces transfer energy so as to change the objects' motions. (UE.PS3C.a)	**ENERGY AND MATTER** Energy can be transferred in various ways and between objects.

ENERGY

Performance Expectation	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
Clarification Statement	Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound and a passive solar heater that converts light into heat. Example of constraints could include the materials, cost, or time to design the device.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking **6. Constructing explanations and designing solutions:** Constructing explanations (science) and designing solutions (engineering) in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Apply scientific ideas to solve design problems. 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**CONSERVATION OF ENERGY AND ENERGY TRANSFER** Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (UE.PS3B.c) **ENERGY IN CHEMICAL PROCESSES AND EVERYDAY LIFE** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (UE.PS3D.a) **OPTIMIZING THE DESIGN SOLUTION** Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (UE.ETS1C.a)	**ENERGY AND MATTER** Energy can be transferred in various ways and between objects.

WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER

Performance Expectation	Develop a model of waves to describe patterns in terms of amplitude and wavelength and to show that waves can cause objects to move.
Clarification Statement	Examples of models could include diagrams, analogies, or physical models using wire to illustrate wavelength and amplitude of waves. Examples of wave patterns could include the vibrating patterns associated with sound or the vibrating patterns of seismic waves produced by earthquakes. Does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems **2. Developing and using models:** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**WAVE PROPERTIES** Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; it does not move in the direction of the wave except when the water meets the beach. (UE.PS4A.a) Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (UE.PS4A.b)	**PATTERNS** Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena and designed products.

WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER

Performance Expectation	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Clarification Statement	Develop a model to make sense of a phenomenon involving the relationship between light reflection and visibility of objects. In the model, identify the relevant components including light and its source, objects, the path that light follows, and the eye.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. **Developing and using models:** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. • Develop and/or use models to describe and/or predict phenomena. 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**ELECTROMAGNETIC RADIATION** An object can be seen when light reflected from its surface enters the eyes. (UE.PS4B.a)	**CAUSE AND EFFECT** Cause and effect relationships are routinely identified, tested, and used to explain change.

FROM MOLECULES TO ORGANISMS: STRUCTURE AND PROCESSES

Performance Expectation	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
Clarification Statement	Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, shells, fur or skin.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions **7. Engaging in argument from evidence:** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • Construct and/or support an argument with evidence, data, and/or a model. 8. Obtaining, evaluating, and communicating information	**STRUCTURE AND FUNCTION** Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (UE.LS1A.a)	**SYSTEMS AND SYSTEM MODELS** A system can be described in terms of its components and their interactions.

FROM MOLECULES TO ORGANISMS: STRUCTURE AND PROCESSES

Performance Expectation	Construct an explanation to describe how animals receive different types of information through their senses, process the information in their brains, and respond to the information in different ways.
Clarification Statement	Emphasis is on systems of information transfer. Responses could include animals running from predators, animals returning to breeding grounds, animals scavenging for food, or humans responding to stimuli.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking **6. Constructing explanations and designing solutions:** Constructing explanations (science) and designing solutions (engineering) in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard). 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**INFORMATION PROCESSING** Different sense receptors are specialized for particular kinds of information, which then may be processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (UE.LS1D.a)	**CAUSE AND EFFECT** Events that occur together with regularity might or might not be a cause and effect relationship.

EARTH'S PLACE IN THE UNIVERSE

Performance Expectation	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in landforms over time.
Clarification Statement	Examples of evidence from patterns could include rock layers with marine shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time, and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock. Does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formation and layers.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking **6. Constructing explanations and designing solutions:** Constructing explanations (science) and designing solutions (engineering) in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems • Identify the evidence that supports particular points in an explanation. 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**THE HISTORY OF PLANET EARTH** Local, regional, and global patterns of rock formations reveal changes over time due to Earth's forces such as earthquakes and volcanoes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (UE.ESS1C.a)	**PATTERNS** Patterns can be used as evidence to support an explanation.

EARTH'S SYSTEM

Performance Expectation	Plan and conduct investigations on the effects of water, ice, wind, and vegetation on the relative rate of weathering and erosion.
Clarification Statement	Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. **Planning and carrying out investigations:** Planning and carrying out investigations to answer questions (science) or test solutions (engineering) to problems in 3-5 builds on K-2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**EARTH MATERIALS AND SYSTEMS** Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (UE.ESS2A.a) **BIOGEOLOGY** Living things affect the physical characteristics of their environment. (UE.ESS2E.a)	**CAUSE AND EFFECT** Cause and effect relationships are routinely identified, tested, and used to explain change.

EARTH'S SYSTEM

Performance Expectation	Analyze and interpret data from maps to describe patterns of Earth's features.
Clarification Statement	Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out investigations **4. Analyzing and interpreting data:** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. • Analyze and interpret data to make sense of phenomena using logical reasoning. 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**PLATE TECTONICS AND LARGE-SCALE SYSTEM INTERACTIONS** The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features of Earth. (UE.ESS2B.a)	**PATTERNS** Patterns can be used as evidence to support an explanation.

EARTH'S SYSTEM

Performance Expectation	Ask questions that can be investigated and predict reasonable outcomes about how living things affect the physical characteristics of their environment.
Clarification Statement	Investigations include making observations in various habitats in real life or virtual circumstances. Living things could include animals such as beavers, crawfish, armadillos, nutria, gophers, and plants such as kudzu, water hyacinth, and Chinese tallow.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. **Asking questions and defining problems:** Asking questions (science) and defining problems (engineering) in 3–5 builds on K–2 experiences and progresses to specifying qualitative relationships. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**BIOGEOLOGY** Living things affect the physical characteristics of their environment. (UE.ESS2E.a)	**CAUSE AND EFFECT** Cause and effect relationships are routinely identified, tested, and used to explain change.

EARTH AND HUMAN ACTIVITY

Performance Expectation	Obtain and combine information to describe that energy and fuels are derived from renewable and non-renewable resources and how their uses affect the environment.
Clarification Statement	Examples of renewable energy resources could include wind energy, hydroelectric energy, and solar energy; non-renewable energy resources are fossil fuels. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning fossil fuels.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in argument from evidence **8. Obtaining, evaluating, and communicating information:** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.	**NATURAL RESOURCES** Energy and fuels (fossil fuels, wind energy, solar energy, hydroelectric energy) that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not. (UE.ESS3A.a)	**CAUSE AND EFFECT** Cause and effect relationships are routinely identified, tested, and used to explain change.

EARTH AND HUMAN ACTIVITY

Performance Expectation	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
Clarification Statement	Examples of solutions could include designing flood, wind, or earthquake resistant structures and models to prevent soil erosion.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out Investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking **6. Constructing explanations and designing solutions:** Constructing explanations (science) and designing solutions (engineering) in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. 7. Engaging in argument from evidence 8. Obtaining, evaluating, and communicating information	**NATURAL HAZARDS** A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (UE.ESS3B.a) **DEVELOPING POSSIBLE SOLUTIONS TO ENGINEERING PROBLEMS** Testing a solution involves investigating how well it performs under a range of likely conditions. (UE.ETS1B.d)	**CAUSE AND EFFECT** Cause and effect relationships are routinely identified, tested, and used to explain change.