Florida Interim Assessment Item Bank and Test Platform

Item Specifications

Science
Grades 3–5

FLORIDA DEPARTMENT OF EDUCATION
www.fldoe.org

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I. Introduction

The U.S. Department of Education awarded a Race to the Top grant to Florida in August 2010. An important component of this grant focused on the development of high-quality assessment items and balanced assessments for use by districts, schools, and teachers. The assessment items will be stored in the Florida Interim Assessment Item Bank and Test Platform (IBTP), a statewide secure system which allows Florida educators to search the item bank, export test items, and generate customized high-quality assessments for computer-based delivery or paper-and-pencil delivery. The IBTP allows Florida educators to determine what students know and are able to do relative to instruction on Florida's Next Generation Sunshine State Standards and the Common Core State Standards (CCSS).

A. Purpose of the Item Specifications

The *Item Specifications* define the expectations for content, standards alignment, and format of assessment items for the Item Bank and Test Platform. The *Item Specifications* are intended for use by item writers and reviewers in the development of high-quality assessment items.

B. Scope

The *Item Specifications* provide general and grade-specific guidelines for the development of all Grades 3–5 Science assessment items available in the Florida Interim Assessment Item Bank.

C. Standards Alignment

Items developed for the Florida Interim Assessment Item Bank and Test Platform will align to the Next Generation Sunshine State Standards for Science and, where appropriate and applicable, the Common Core State Standards for Mathematics and Literacy in Science and Technical Subjects.

1. Next Generation Sunshine State Standards

Florida's Next Generation Sunshine State Standards (NGSSS) for Science provide the basis for science teaching and learning in Florida's public schools. For Grades K–8, the NGSSS are divided into benchmarks that identify what a student should know and be able to do at each grade level. The NGSSS are available at *http://www.floridastandards.org/homepage/index.aspx*.

2. Common Core State Standards

Appendix B of this document provides a list of the CCSS Mathematics and Literacy Standards associated with the Grades 3–5 science courses. Assessment items for science should be aligned to one or more of the associated CCSS, whenever appropriate, in addition to the targeted science benchmark.

II. Criteria for Item Development

Science item writers for the Florida Interim Assessment Item Bank must have a comprehensive knowledge of science curriculum based on the Next Generation Sunshine State Standards and an understanding of the range of cognitive abilities of the target student population. Item writers should understand and consistently apply the guidelines established in this document. Item writers are expected to use their best judgment in writing items that measure the science benchmarks of the NGSSS and the CCSS, where appropriate, without introducing extraneous elements that reflect bias for or against a group of students.

A. Overall Considerations for Item Development

These guidelines are provided to ensure the development of high-quality assessment items for the Florida Interim Assessment Item Bank.

1. Each item should be written to measure primarily one NGSSS benchmark; however, other benchmarks may also be addressed for some item types.
2. Whenever possible, each item will also be aligned to a secondary CCSS Mathematics and/or Literacy standard applicable to a particular grade.
3. Items should be appropriate for students in terms of grade-level instruction, experience and difficulty, cognitive development, and reading level. The reading level of the test items should be on grade level. (Refer to the glossaries in CPALMS for each course.)
4. Of the assessment items associated with a given benchmark, 50% or more should meet or exceed the cognitive level (DOK) of the benchmark.
5. Each item should be written clearly and unambiguously to elicit the desired response.
6. Items should not disadvantage or exhibit disrespect to anyone in regard to age, gender, race, ethnicity, language, religion, socioeconomic status, disability, occupation, or geographic region.

B. Item Contexts

The context in which an item is presented is called the item context or scenario. These guidelines are provided to assist item writers with development of items within an appropriate context.

1. The item context should be designed to interest students at the targeted level. Scenarios should be appropriate for students in terms of grade-level experience and difficulty, cognitive development, and reading level.
2. The context should be directly related to the question asked. The context should lead the student cognitively to the question. Every effort should be made to keep items as concise as possible without losing cognitive flow or missing the overall idea or concept.
3. Information and/or data in items must be accurate and verifiable using reliable sources. Source documentation should accompany items as needed.

4. All item scenarios, graphics, diagrams, and illustrations must be age-, grade-, and experience-appropriate.
5. Item contexts and illustrations depicting individuals conducting laboratory investigations should include proper safety equipment and model safe laboratory procedures.
6. Scenarios describing scientific investigations should model current science methodology and adhere to the Intel International Science and Engineering Fair Rules and Guidelines unless otherwise noted in the benchmark clarification statements. These rules and guidelines can be found using the Document Library link at: *http://www.societyforscience.org/ISEF*.
7. Grades 3–5 items and illustrations may use common primary school tools, including balances, batteries, beakers, compasses, eyedroppers, flashlights, globes, graduated cylinders, light bulbs, magnets, magnifying glasses or hand lenses, metric measuring tapes, metric rulers, microscopes, microscope slides, mirrors, models, safety goggles, spring scales, stopwatches, telescopes, test tubes, thermometers, topographic maps, and tuning forks.
8. The item content should be timely but not likely to become dated.

C. Use of Media

Media can be used to provide either necessary or supplemental information—that is, some media contain information that is necessary for answering the question, while other media support the context of the question. Items may include diagrams, illustrations, charts, tables, audio files, or video files unless otherwise noted in the Individual Benchmark Specifications.

1. Items should not begin with media. Media in items is always preceded by text.
2. All visual media (tables, charts, graphs, photographs, etc.) should be titled. Titles should be in all caps, boldfaced, and centered, and may be placed above or below the visual media.

D. Item Style and Format

This section presents stylistic guidelines and formatting directions that should be followed while developing items.

1. Items should be clear and concise and should use vocabulary and sentence structure appropriate for the assessed grade level. Writers should refer to the resources provided during item writer training and to the glossaries in CPALMS.
2. The words *most likely* or *best* should be used only when appropriate to the question.
3. At Grades 3–5, temperatures should be given in degrees Celsius unless otherwise noted in the Individual Benchmark Specifications.
4. Metric units of measure should be used in scenarios addressing mass, length, weight, and/or volume. International System of Units (SI) should be used unless otherwise noted in the Individual Benchmark Specifications.

5. The first occurrence of units of measure should be written out in the item stem, e.g., kilograms (kg). In graphics, an abbreviation may be used (e.g., g or cm). To avoid confusion between the preposition *in* and the abbreviation for inches, only units of measure in graphics should be presented, e.g., height (cm) NOT height (in cm).
6. In titles of tables and charts and in labels for axes, the unit of measure should be included, preferably in lowercase and in parentheses, e.g., height (m).
7. Items requiring art should be to scale whenever possible. If not possible, a not-to-scale text box should be included at the bottom left of the art.
8. Graphics in items should be clearly labeled and contain all necessary information.
9. Items referring to new developments or discoveries should include phrases similar to *according to current knowledge* or *based on current knowledge*.
10. Items using the word *not* should emphasize the word *not* using all uppercase letters (e.g., Which of the following is NOT an example of . . .). The word *not* should be used sparingly.
11. As appropriate, boldface type should be used to emphasize key words in the item (e.g., **least**, **most**, **greatest**, **percent**, **best**).
12. Masculine pronouns should NOT be used to refer to both sexes. Name(s) should be used whenever possible to avoid gender-specific pronouns (e.g., instead of "The student will make changes so that he . . .", use "John and Maria will make changes so that they . . .").
13. Decimal numbers between –1 and 1 should have a leading zero.
14. SI units should be expressed in a single type of unit when possible (e.g., 1.4 kilograms instead of 1 kilogram 400 grams).
15. Commas should be used in numbers greater than or equal to 1,000 except for numbers having an SI unit. In this case, numbers with four digits should be presented without a comma or a space (e.g., 9960 meters). Numbers with more than four digits should be presented with a thin space inserted in place of a comma (e.g., 10 123 kilograms).
16. In most cases, scenarios involving elements, chemical formulas, or chemical symbols and/or equations should be written out followed by the abbreviation, e.g., carbon dioxide (CO_2).
17. In the item stem, values needed to compute answers should be presented as numerals.

E. Item Types

This section presents guidelines for development of the following types of items:

- Selected Response (SR)—1 point
- Gridded Response (GR)—1 point
- Short Response (SHR)—1 point
- Constructed Response (CR)—2 points
- Extended Response (ER)—4 points
- Essay Response (ESR)—6 points
- Performance Task (PT)—1–10 points

1. Selected Response (SR) Items (1 point)

Selected response items require students to choose an answer from the choices given. Each item consists of a stem and either three or four answer options, depending on the grade level (see #3 below). One of the answer options is the correct answer, and the remaining options are called distractors. Selected response items may also include a stimulus and/or passage.

1. SR items should take approximately one minute per item to answer.
2. SR items are worth one point each.
3. SR items for grades K, 1, and 2 should have three answer options (A, B, and C). SR items for all other grades and courses should have four answer options (A, B, C, and D).
4. SR items must have only one correct answer option.
5. During item development and review, the correct response should be indicated.
6. During item development and review, the rationale for distractors (incorrect answer choices) should be indicated. The rationale should include information explaining why a student would select that distractor.
7. Distractor rationales should represent computational or conceptual errors or misconceptions commonly made by students who have not mastered the assessed concepts.
8. Each distractor should be a believable answer (i.e., plausible, but incorrect).
9. All answer options should be written in a style appropriate to the question asked. For example, a “how” question should have answer options that explain how.
10. Options should have parallel structure whenever possible. Test item options should not have an outlier (e.g., an answer option that is significantly longer than or different from the other options).
11. Items should not be clued or answered by information in the stem or other options.

12. Options such as *none of the above*, *all of the above*, *not here*, *not enough information*, or *cannot be determined* should not be used as answer options.
13. If an option is a single word or a phrase, the option should start with a lowercase letter. If an option is a sentence, the sentence should be conventionally capitalized and punctuated. Options that are imperatives should be treated as sentences.
14. Answer options that are single words should be arranged in alphabetical or reverse alphabetical order.
15. Answer options that are phrases or sentences should be arranged from shortest to longest or longest to shortest.
16. Numerical answer options should be arranged in ascending or descending order.
17. Numerical answer options that represent relative magnitude or size should be arranged as they are shown in the stem or in some other logical order.
18. When the item requires the identification of a choice from the item stem, table, chart, or illustration, the options should be arranged as they are presented in the item stem, table, chart, or illustration.
19. If the answer options for an item are neither strictly numerical nor denominate numbers, the options should be arranged by the logic presented in the item, by alphabetical order, or by length.

2. Gridded Response (GR) Items (1 point)

Gridded response questions are worth 1 point each. The questions require students to solve problems and mark their answers by filling in the appropriate bubbles for the numbers on answer grids. Students must accurately complete the grid to receive credit for their answers.

3. Short Response (SHR) Items (1 point)

Short Response items usually include a scenario and instructions on how to respond. The recommended time allotment for a student to respond is 3 minutes. A complete answer is worth 1 point. There are no partial points for this item type.

4. Constructed Response (CR) Items (2 points)

Constructed response items usually include a scenario and instructions on how to respond. The recommended time allotment for a student to respond is 5 minutes. A complete answer is worth 2 points and a partial answer is worth

1 point. The constructed response holistic rubric and exemplar specific to each item are used for scoring as follows:

SCORING RUBRIC	
2	A score of two indicates that the student has demonstrated a thorough understanding of the scientific concepts and/or procedures embodied in the task. The student has completed the task correctly, in a scientifically sound manner. When required, student explanations and/or interpretations are clear and complete. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.
1	A score of one indicates that the student has provided a response that is only partially correct. For example, the student may arrive at an acceptable conclusion or provide an adequate interpretation, but may demonstrate some misunderstanding of the underlying scientific concepts and/or procedures. Conversely, a student may arrive at an unacceptable conclusion or provide a faulty interpretation, but could have applied appropriate and scientifically sound concepts and/or procedures.
0	A score of zero indicates that the student has not provided a response or has provided a response that does not demonstrate an understanding of the scientific concepts and/or procedures embodied in the task. The student's explanation may be uninterpretable, lack sufficient information to determine the student's understanding, contain clear misunderstandings of the underlying scientific concepts and/or procedures, or may be incorrect.

Exemplars: A specific exemplar should be developed for each constructed response item. Exemplars will be used as scoring guides and should be specific to the item, but not so specific as to discount multiple correct answers. Exemplars should include a clear and defensible description of the top score point, and contain straightforward language that is accurate, complete, and easy to interpret.

5. **Extended Response (ER) Items (4 points)**

Extended response items include a scenario and instructions on how to respond and are worth 4 score points. However, ER items are usually more complex than SHR items and 2-point CR items. The recommended time allotment for a student to respond is 10–15 minutes. The extended response holistic rubric and exemplar specific to each item are used for scoring as follows:

SCORING RUBRIC	
4	A score of four indicates that the student has demonstrated a thorough understanding of the scientific concepts and/or procedures embodied in the task. The student has completed the task correctly, used scientifically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from a demonstration of a thorough understanding.
3	A score of three indicates that the student has demonstrated an understanding of the scientific concepts and/or procedures embodied in the task. The student's response to the task is essentially correct, but the scientific procedures, explanations, and/or interpretations provided are not thorough. The response may contain minor flaws that reflect inattentiveness or indicate some misunderstanding of the underlying scientific concepts and/or procedures.
2	A score of two indicates that the student has demonstrated only a partial understanding of the scientific concepts and/or procedures embodied in the task. Although the student may have arrived at an acceptable conclusion or provided an adequate interpretation of the task, the student's work lacks an essential understanding of the underlying scientific concepts and/or procedures. The response may contain errors related to misunderstanding important aspects of the task, misuse of scientific procedures/processes, or faulty interpretations of results.
1	A score of one indicates that the student has demonstrated a very limited understanding of the scientific concepts and/or procedures embodied in the task. The student's response is incomplete and exhibits many flaws. Although the student's response has addressed some of the conditions of the task, the student has reached an inadequate conclusion and/or provided reasoning that is faulty or incomplete. The response exhibits many flaws or may be incomplete.
0	A score of zero indicates that the student has not provided a response or has provided a response that does not demonstrate an understanding of the scientific concepts and/or procedures embodied in the task. The student's explanation may be uninterpretable, lack sufficient information to determine the student's understanding, contain clear misunderstandings of the underlying scientific concepts and/or procedures, or may be incorrect.

Exemplars: A specific exemplar should be developed for each extended response item. Exemplars will be used as scoring guides and should be specific to the item, but not so specific as to discount multiple correct answers. Exemplars should include a clear and defensible description of the top score point, and contain straightforward language that is accurate, complete, and easy to interpret.

6. **Essay Response (ESR) Items (6 points)**

   Essay response items consist of asking a general question or providing a stimulus (such as an article or research paper on a relevant topic), and asking the students to express their thoughts or provide facts about the topic using logic and reason. Essay response items encompass a higher level of thinking and a broader range of skills that includes CCSS literacy standards, both of which are critical to future success in higher education and the workforce.

   In most cases, essay responses will go beyond a single paragraph in length, with a distinct introduction, body, and conclusion. An essay response will be worth a total of 6 points, with a rubric structure similar to that of the 4-point extended response. Students should be given about 20 to 30 minutes to complete each item.

   Exemplars: A specific exemplar should be developed for each essay response item. Exemplars will be used as scoring guides and should be specific to the item, but not so specific as to discount multiple correct answers. Exemplars should include a clear and defensible description of the top score point, and contain straightforward language that is accurate, complete, and easy to interpret.

7. **Performance Task (PT) Items (1–10 points)**

   Performance tasks are used to measure students' ability to *demonstrate* knowledge and skills from one or more benchmarks of the NGSSS and the CCSS. Specifically, performance tasks may require students to create a product, demonstrate a process, or perform an activity that demonstrates proficiency in science. They are evaluated using customized scoring rubrics, and each task may be worth 1–10 points. Performance tasks may have the following characteristics:

   1. Performance tasks may cover a short time period or may cover an extended period of time.
   2. Performance tasks must contain clear and explicit directions for understanding and completing the required component tasks and producing the objective output.
   3. All tasks, skills, and/or behaviors required by the performance tasks must be objective, observable, and measurable.
   4. All necessary equipment, materials, and resources should be referenced within the text of the performance task.
   5. Performance tasks should elicit a range of score points.
   6. Performance tasks generally require students to organize, apply, analyze, synthesize, and/or evaluate concepts.

7. Performance tasks may measure performance in authentic situations and outside the classroom, where appropriate and practical.
8. Typical response formats include demonstrations, laboratory performance, oral presentations, exhibits, or other products.
9. Every performance task requires a companion rubric to be used for scoring purposes. Rubrics should meet the following criteria:
    a. The rubrics and performance tasks should be developed in tandem to ensure compatibility.
    b. Rubrics must be specific to the individual requirements of each performance task; generic rubrics are not acceptable.
    c. The rubric must allow for efficient and consistent scoring.
    d. The customized rubric will also serve as an exemplar and should include a clear and defensible description of the top score point, and contain straightforward language that is accurate, complete, and easy to interpret.
    e. The highest score descriptor should allow for all foreseeable methods of correctly and thoroughly completing all requirements of the performance task.

A performance task may address one or more benchmarks or standards and may be composed of multiple items. The expectation is the performance tasks will include a demonstration of the student's mastery of the benchmark or standard. Items are expected to have rubrics.

F. Complex Stimuli and Reading Passages

The cross-curricular focus on aligning Florida IBTP items with the Common Core State Standards for mathematics and literacy make complex reading passages important components of the item bank. A passage is a segment of written work, followed by a series of questions that assess the student's comprehension of reading and the content presented. Some science items will be associated with a reading passage, while others will be standalone items.

G. Readability

Items must be written with readability in mind. In addition, vocabulary must be appropriate for the grade level being tested. The following sources provide information about the reading level of individual words:

Taylor, Stanford E. *EDL Core Vocabularies: Reading, Mathematics, Science, and Social Studies*. Austin, TX: Steck-Vaughn-EDL, 1989.

Mogilner, Alijandra. *Children's Writer's Word Book*. Cincinnati, OH: Writer's Digest Books, 1992.

H. Cognitive Complexity

1. Overview

Florida's adoption of the Common Core State Standards (CCSS) for Mathematics and English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects presents Florida with an opportunity to revise its current Depth of Knowledge (DOK) Model of Cognitive Complexity. More information about Florida's Depth of Knowledge levels is available online at *http://www.cpalms.org/cpalms/dok.aspx*.

2. Levels of Depth of Knowledge for Science

Interpreting and assigning Depth of Knowledge levels to objectives within science standards and assessment items is an essential requirement of alignment analysis. Please note that, in science, "knowledge" can refer to content knowledge, knowledge of science processes, and nature of science.

Level 1 (Recall) is the recall of information such as a fact, definition, or term, as well as performing a simple science process or procedure. Level 1 only requires students to demonstrate a rote response; use a well-known formula; follow a set, well-defined procedure (like a recipe); or perform a clearly defined series of steps. Standards that lend themselves to simple word problems that can be directly translated into and solved by a formula are considered Level 1. Some examples that represent but do not constitute all of Level 1 performance are:

- Recall or recognize a fact, term, or property.
- Represent in words or diagrams a scientific concept or relationship.
- Provide or recognize a standard scientific representation for simple phenomena.
- Perform a routine procedure, such as measuring length.
- Identify familiar forces (e.g., pushes, pulls, gravitation, friction, etc.)
- Identify objects and materials as solids, liquids, or gases.

Level 2 (Basic Application of Concepts & Skills) includes the engagement of some mental processing beyond recalling or reproducing a response. The content knowledge or process involved is more complex than in Level 1. Level 2 requires that students make some decisions as to how to approach the question or problem. Level 2 activities include making observations and collecting data; classifying, organizing, and comparing data; and representing and displaying data in tables, graphs, and charts.

Some action verbs, such as "explain," "describe," or "interpret," may be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, which requires reading information from the graph, is at Level 2. An activity that requires interpretation from a complex graph, such as making decisions regarding features of the graph that should be considered and how

information from the graph can be aggregated, is at Level 3. Some examples that represent but do not constitute all of Level 2 performance are:

- Specify and explain the relationships among facts, terms, properties, and variables.
- Identify variables, including controls, in simple experiments.
- Distinguish between experiments and systematic observations.
- Describe and explain examples and non-examples of science concepts.
- Select a procedure according to specified criteria, and perform it.
- Formulate a routine problem given data and conditions.
- Organize and represent data.

Level 3 (Strategic Thinking & Complex Reasoning) requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands at Level 3 are complex and abstract. The complexity results not only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but also because the multi-step task requires more demanding reasoning. In most instances, requiring students to explain their thinking is at Level 3; requiring a very simple explanation or a word or two should be at Level 2. An activity that has more than one possible answer and requires students to justify the response they give would most likely be at Level 3.

Experimental designs in Level 3 typically involve more than one dependent variable. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and using concepts to solve non-routine problems. Some examples that represent but do not constitute all of Level 3 performance are:

- Identify research questions and design investigations for a scientific problem.
- Design and execute an experiment or systematic observation to test a hypothesis or research question.
- Develop a scientific model for a complex situation.
- Form conclusions from experimental data.
- Cite evidence that living systems follow the laws of conservation of mass and energy.
- Explain how political, social, and economic concerns can affect science, and vice versa.
- Create a conceptual or mathematical model to explain the key elements of a scientific theory or concept.
- Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.

- Analyze past, present, and potential future consequences to the environment resulting from various energy production technologies.

Level 4 (Extended Thinking & Complex Reasoning) standards and assessment items have the same high cognitive demands as Level 3 with the additional requirement that students work over an extended period of time or with extended effort. Students are required to make several connections—relating ideas within the content area or among content areas—and have to select or devise one approach among many alternatives for how the situation or problem can be solved. Standards, goals, and objectives can be stated in such a way as to expect students to perform extended thinking. Many, but not all, performance assessments and open-ended assessment activities requiring significant thought will be at Level 4.

Level 4 requires complex reasoning and an extended period of time either for a science investigation relevant to a standard or for carrying out the complex analysis and synthesis required of an assessment item. For example, a standard or performance task that calls for the student to use evidence from multiple fields of scientific inquiry in supporting a scientific claim might be classified at Level 4, depending upon the complexity of the analysis. In any event, an activity or performance task associated with a Level 4 standard will require an extended period of time for a student to accomplish.

It is important to reiterate that the extended time period is not a distinguishing factor if the required work is only repetitive and does not require the application of significant conceptual understanding and higher-order thinking. For example, an activity that calls upon a student to measure the water temperature from a river each day for a month before constructing a graph would be classified as at Level 2. On the other hand, an activity that calls upon a student to conduct a complex river study that requires taking into consideration a number of variables would be at Level 4. Some examples that represent but do not constitute all of a Level 4 performance are:

- Based on provided data from a complex experiment that is novel to the student, deduce the fundamental relationships among several variables.
- Conduct an investigation, from specifying a problem to designing and carrying out an experiment and analyzing data and forming conclusions.
- Explain how a particular scientific theory (e.g., evolution, plate tectonics, atomic theory, etc.) is supported by evidence from multiple lines of inquiry.
- Produce a detailed report of a scientific experiment or systematic observation, and infer conclusions based upon evidence obtained.
- Write a detailed history of the development of an important scientific concept (e.g., atomic theory, gravitation) and explain how current conceptions developed from prior ones.

I. Item Difficulty

Item writers will not be expected to make a prediction of difficulty for each item created. However, item writers should develop items that reflect a range of difficulty levels.

J. Universal Design

The application of universal design principles helps develop assessments that are usable to the greatest number of students, including students with disabilities and nonnative speakers of English. To support the goal of providing access to all students, the items in the Florida Interim Assessment Item Bank maximize readability, legibility, and compatibility with accommodations, and item development includes a review for potential bias and sensitivity issues.

Items must allow for the widest possible range of student participation. Item writers must attend to the best practices suggested by universal design, including, but not limited to,

- reduction in wordiness;
- avoidance of ambiguity;
- selection of reader-friendly construction and terminology; and
- consistently applied concept names and graphic conventions.

Universal design principles also inform decisions about item layout and design, including, but not limited to, type size, line length, spacing, and graphics.

K. Sample Items

Appendix A of this document contains a selection of sample items. The sample items represent a range of cognitive complexities and item types.

III. Review Procedures for Florida Interim Assessment Item Bank Items

Prior to being included in the Florida Interim Assessment Item Bank, items must pass several levels of review as part of the item development process.

A. Review for Item Quality

Assessment items developed for the Florida Interim Assessment Item Bank are reviewed by Florida educators, the FDOE, and the Item Bank contractors to ensure the quality of the items, including grade-level appropriateness, standards alignment, accuracy, and other criteria for overall item quality.

B. Review for Bias and Sensitivity

Items are reviewed by groups of Florida educators generally representative of Florida's geographic regions and culturally diverse population. Items are reviewed for the following kinds of bias: gender, racial, ethnic, linguistic, religious, geographic, and socioeconomic. Item reviews also include consideration of issues related to individuals with disabilities.

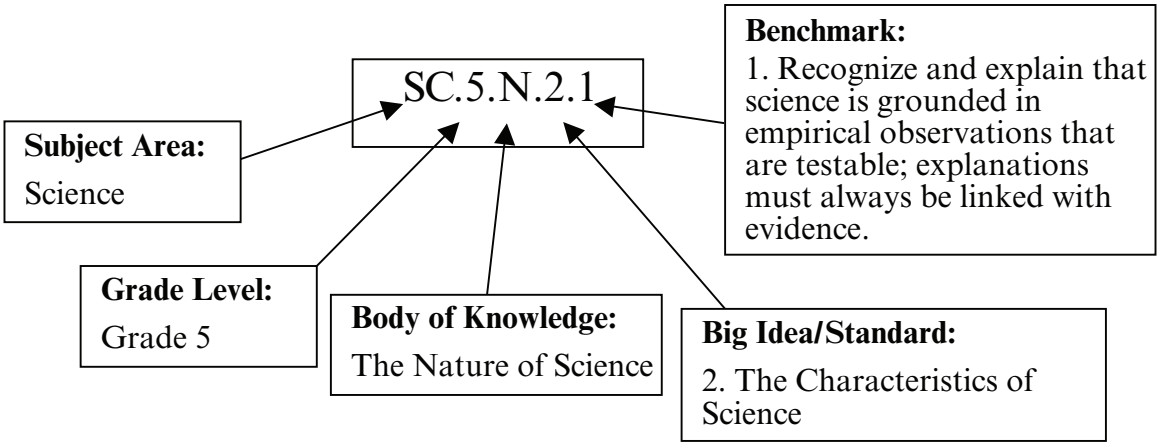
This review is to ensure that the primary purpose of assessing student achievement is not undermined by inadvertently including in the item bank any material that students, parents, or other stakeholders may deem inappropriate. Reviewers are asked to consider the variety of cultural, regional, philosophical, political, and religious backgrounds throughout Florida and to determine whether the subject matter will be acceptable to Florida students, their parents, and other members of Florida communities.

IV. Guide to the Individual Benchmark Specifications

A. Benchmark Classification System

Each benchmark in the NGSSS is labeled with a system of numbers and letters.

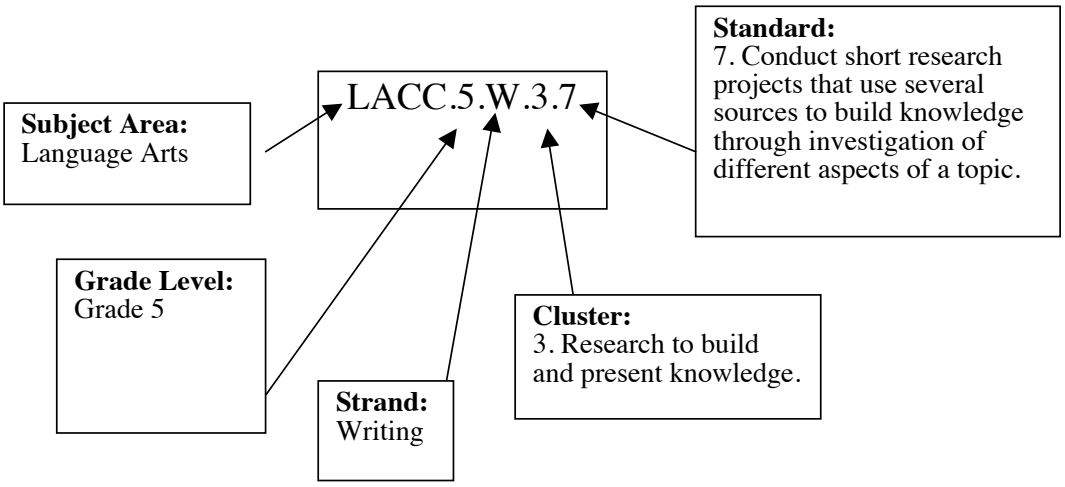
- The two letters in the *first position* of the code identify the **Subject Area**.
- The number(s) in the *second position* represent the **Grade Level**.
- The letter in the *third position* represents the **Body of Knowledge**.
- The number in the *fourth position* represents the **Big Idea/Standard**.
- The number in the *last position* identifies the specific **Benchmark**.



B. Common Core State Standard Classification System

Each standard in the CCSS is also labeled with a system of numbers and letters.

- The four letters in the *first position* of the code identify the **Subject Area**.
- The number(s) in the *second position* represent the **Grade Level**.
- The letter in the *third position* represents the **Strand**.
- The number in the *fourth position* represents the **Cluster**.
- The number in the *last position* identifies the specific **Standard**.



V. Definitions of Benchmark Specifications

The *Item Specifications* identify how the benchmarks in Florida's NGSSS and the CCSS are assessed by items in the Florida Interim Assessment Item Bank. For each assessed benchmark, the following information is provided in the Individual Benchmark Specifications section.

Body of Knowledge/ Strand	refers to the general category of science knowledge (Earth/Space Science, Life Science, Physical Science, and Nature of Science).
Standard/Big Idea	refers to a main idea or description statement of general expectations regarding knowledge and skill development.
Benchmark	refers to specific statements of expected student achievement.
Common Core State Standard Connections	refers to the Common Core Literacy and Mathematics Standards that are closely related to the benchmark. (See Appendix B for a list of CCSS standards associated with this course/grade band.)
Benchmark Clarifications	explain how achievement of the benchmark will be demonstrated by students. The clarification statements explain what students are expected to do when responding to the question.
Content Limits	define the range of content knowledge and degree of difficulty that should be assessed in the items for the benchmark. Content limits may be used to identify content beyond the scope of the targeted benchmark if the content is more appropriately assessed by another benchmark. These statements help to provide validity by ensuring the test items are clearly aligned to the targeted benchmark.

VI. Individual Benchmark Specifications

This section of the *Item Specifications* provides benchmark-specific guidance for assessment item development based on the NGSSS science benchmarks for grades 3–5. Each grade level includes benchmarks from the four Bodies of Knowledge (Nature of Science, Life Science, Earth and Space Science, and Physical Science). Eighteen Big Ideas thread throughout the K–8 grade levels and build in rigor and depth as students advance.

A. Grade 3 Item Specifications

Course Number: 5020040

Benchmark HE.3.C.1.4	
Body of Knowledge/ Strand	**Health Education Concepts**
Standard	**Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.**
Benchmark	**HE.3.C.1.4: Describe common childhood health conditions.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize examples of common childhood health conditions such as asthma, diabetes, food allergies, dental caries, and colds/flu. Students will recognize symptoms of common illnesses such as sore throat, runny nose, and cough.
Content Limits	Items may also address other common illnesses such as mumps, measles, chicken pox, tetanus, or whooping cough. Items may not assess genetic or life threatening conditions such as hemophilia, cystic fibrosis, Down's syndrome, meningitis, cancer, TB, etc.

Benchmark HE.3.C.1.6	
Body of Knowledge/ Strand	**Health Education Concepts**
Standard	**Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.**
Benchmark	**HE.3.C.1.6: Recognize that body parts and organs work together to form human body systems.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize the major body parts/organs of the circulatory system, digestive system, nervous system, and reproductive system.
Content Limits	Items will • include a maximum complexity of two body parts/organs working together; • address only internal body parts/organs working together; and • assess only major body parts and organs that are familiar to students at this grade level (e.g., the brain, heart, stomach) Items will not • address external body parts working with internal body parts (tested in Grade 4); • address the excretory, respiratory, endocrine, skeletal, or muscular systems; or • require students to specifically identify/name body parts and organs (tested in Grade 4).

Benchmark SC.3.E.5.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.3.E.5.1: Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that stars are not all the same; • recognize that stars are different sizes; • understand that stars have variations in brightness; and • explain how all stars, except the Sun, appear very small because they are so far away.
Content Limits	Items will not address knowledge of the constellations. Items may include photographs or illustrations of the night sky.

Benchmark SC.3.E.5.2	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.3.E.5.2: Identify the Sun as a star that emits energy, some of it in the form of light.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define the Sun as a star; • recognize that the Sun emits its own energy; and • identify the types of energy the Sun emits.
Content Limits	Items will not address specifics of how the Sun emits energy or light. Items may include diagrams of the Sun.

Benchmark SC.3.E.5.3	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.3.E.5.3: Recognize that the Sun appears large and bright because it is the closest star to Earth.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • compare the Sun's size to that of other stars; and • identify the Sun as the largest and brightest star from our perspective on Earth.
Content Limits	Items will not assess specifics on actual distances or measurements.

Benchmark SC.3.E.5.4	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.3.E.5.4: Explore the Law of Gravity by demonstrating that gravity is a force that can be overcome.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • explain the Law of Gravity; • describe how to overcome gravity by stopping a falling object; and • identify ways to keep an object from falling.
Content Limits	Items will not assess students' understanding of the theories of gravity. Items may include illustrations of ways to prevent objects from falling, such as by catching them.

Benchmark SC.3.E.5.5	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.3.E.5.5: Investigate that the number of stars that can be seen through telescopes is dramatically greater than those seen by the unaided eye.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize the telescope as a tool to view the stars in space; • describe the purpose of a telescope as a tool to magnify and clarify objects that are far away; and • explain how a telescope aids in viewing objects that are far away.
Content Limits	Items will not assess students' experience in using a telescope. Items may include illustrations showing a view with and without a telescope.

Benchmark SC.3.E.6.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.3.E.6.1: Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • predict how the Sun's absence will impact objects; • predict how the Sun's presence will impact objects; • demonstrate how radiant energy from the Sun affects objects through heat; and • explain what happens to objects when they lose heat.
Content Limits	Items will not assess students' knowledge of temperature or ultraviolet rays. Items may include illustrations of objects left out on a sunny day, for example, melting plastic or hot metal.

Benchmark SC.3.L.14.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 14: Organization and Development of Living Organisms**
Benchmark	**SC.3.L.14.1: Describe structures in plants and their roles in food production, support, water and nutrient transport, and reproduction.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify and/or describe the parts of plants and/or the part's role; • describe how plants respond to stimuli; and • describe processes of sexual reproduction in flowering plants.
Content Limits	Items assessing • the structures and functions of major parts of plants are limited to the following: stem/trunk, leaf/needle, root, flower, seed, and fruit; and • sexual reproduction in flowering plants is limited to the following: stamen, pistil, ovary, petal, sperm, and egg. Items will not assess cellular processes.

Benchmark SC.3.L.14.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 14: Organization and Development of Living Organisms**
Benchmark	**SC.3.L.14.2: Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	N/A
Content Limits	Items referring to a plant's response to stimuli are limited to a conceptual understanding of a plant's response to heat, light, or gravity. Items will not use the terms phototropism, geotropism, hydrotropism, and thigmotropism. Scenarios referring to how plants respond to conditions will not use the terms stimulus or stimuli. Items may include images of plants at various growth stages in response to heat, light, or gravity or diagrams of the Sun impacting a plant.

Benchmark SC.3.L.15.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 15: Diversity and Evolution of Living Organisms**
Benchmark	**SC.3.L.15.1: Classify animals into major groups (mammals, birds, reptiles, amphibians, fish, arthropods, vertebrates and invertebrates, those having live births and those which lay eggs) according to their physical characteristics and behaviors.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • classify animals by similar physical characteristics, such as fur, feathers, and number of legs; • identify the major classification systems for animals (mammals, birds, reptiles, amphibians, fish, arthropods; vertebrates and invertebrates; those having live births and those that lay eggs); and • identify physical characteristics or behaviors that a group of animals share.
Content Limits	Items that require classification of animals will be limited to observable, physical characteristics. Items may include • photographs or illustrations of animals; and • charts or tables for organization of information.

Benchmark SC.3.L.15.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 15: Diversity and Evolution of Living Organisms**
Benchmark	**SC.3.L.15.2: Classify flowering and nonflowering plants into major groups such as those that produce seeds, or those like ferns and mosses that produce spores, according to their physical characteristics.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • classify common plants by similar physical characteristics; • identify physical characteristics that plants share; and • compare and contrast flowering and nonflowering plants.
Content Limits	Items that require classification of plants will be limited to observable, physical characteristics. Items may include photographs or illustrations of plants. Items may also include charts or tables for organization of information.

Benchmark SC.3.L.17.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.3.L.17.1: Describe how animals and plants respond to changing seasons.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications/Content Limits	Students will • recognize how plants and animals adapt to changes in the environment; • describe why plants and animals adapt to changes in the environment; • identify physical changes animals experience with changing seasons; and • compare and contrast how animals and plants respond to changing seasons. Items will be limited to observable, physical changes of both plants and animals. Items may include illustrations of plants and animals during different seasons.

Benchmark SC.3.L.17.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.3.L.17.2: Recognize that plants use energy from the Sun, air, and water to make their own food.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify that plants need light, air, and water to grow; • describe how the Sun, air, and water contribute to a plant's growth; and • describe the process of photosynthesis.
Content Limits	Items may include illustrations of plants and the elements they need to grow.

Benchmark SC.3.N.1.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.1: Raise questions about the natural world, investigate them individually and in teams through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • develop questions about the natural world; • make observations about the natural world; and • generate explanations from observations of the natural world.
Content Limits	Items will not include the words *inquiry* or *hypothesis*. Items may include illustrations or photographs of the natural world.

Benchmark SC.3.N.1.2	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.2: Compare the observations made by different groups using the same tools and seek reasons to explain the differences across groups.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • summarize observations made by two different groups that conducted the same experiment and used the same tools; • describe why there may be differences in observations between groups that completed the same experiment and used the same tools; and • compare and contrast the similarities and differences between observations of two different groups that completed the same experiment.
Content Limits	Items will not include text written above a third grade reading level. Items may include more than one sample lab report outlining different observations from the same experiment for students to analyze and compare.

Benchmark SC.3.N.1.3	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.3: Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • record written or pictorial records of observations and findings from investigations; • organize information from investigations into simple charts or graphs; and • explain the importance of keeping records from investigations and experiments.
Content Limits	Items will not include text written above a third grade reading level. Items may include simple charts and graphs of investigations.

Benchmark SC.3.N.1.4	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.4: Recognize the importance of communication among scientists.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify ways that scientists share their knowledge and results with one another, including lab reports and journal articles; • describe how scientists collaborate together in labs or field stations; and • explain how scientists interact with one another to gain new knowledge or refine ideas.
Content Limits	Item content about scientists and collaborations will be grade-level appropriate. Items may include photographs of scientists working together in labs or in the field.

Benchmark SC.3.N.1.5	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.5: Recognize that scientists question, discuss, and check each other's evidence and explanations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe the importance of scientists questioning, discussing, and checking evidence and explanations; • explain how explanations of experiment results can vary even when scientists are analyzing the same material; and • recognize the importance of checking evidence for accuracy.
Content Limits	Item content about scientists and collaborations will be grade-level appropriate. Items may include photographs of scientists working together in labs or in the field.

Benchmark SC.3.N.1.6	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.6: Infer based on observation.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • form an opinion based on observation; • explain reasons for results of a scientific study; and • define the word *infer* and explain its meaning in the scientific process.
Content Limits	Items will not include text written above a third grade reading level. Items may include a written report of observations from a scientific study.

Benchmark SC.3.N.1.7	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.3.N.1.7: Explain that empirical evidence is information, such as observations or measurements, that is used to help validate explanations of natural phenomena.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define the meaning of *empirical evidence*; • explain how empirical evidence can be used to validate explanations of natural phenomena; and • analyze a text to locate evidence to explain a natural phenomenon.
Content Limits	Items will not include text written above a third grade reading level. Items may include text that includes evidence, such as observations or measurements, to validate an explanation of a natural phenomenon.

Benchmark SC.3.N.3.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models**
Benchmark	**SC.3.N.3.1: Recognize that words in science can have different or more specific meanings than their use in everyday language; for example, energy, cell, heat/cold, and evidence.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that words have multiple meanings; • define several meanings of various words, such as *cell*, *evidence*, *pulse*, *fish*, *scope*, etc.; and • analyze a text and determine the meanings of words based on the written context.
Content Limits	Items will not include text written above a third grade reading level. Items may include text with multiple meanings (e.g., everyday language and specific, scientific language).

Benchmark SC.3.N.3.2	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models**
Benchmark	**SC.3.N.3.2: Recognize that scientists use models to help understand and explain how things work.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that models represent real objects; • identify examples of models that are physical copies of the real object; • identify examples of models that are used to show how things work; • explain how some models are larger than the real-life object, while others are smaller than the real-life object; and • describe why scientists use models.
Content Limits	Items will not require students to understand how objects work from looking at or reading about the models. Examples of models may include, but are not limited to, globes, models of the solar system, models of human organs, models of a volcano, diagrams, and computer animations.

Benchmark SC.3.N.3.3	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models**
Benchmark	**SC.3.N.3.3: Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that models are approximations of natural phenomena; • describe how models provide an approximation of how something works and do not perfectly account for all observations; and • identify models that represent things found in the real world.
Content Limits	Items will not require students to understand how objects work from looking at or reading about the models. Items may include examples of models. For example, pouring water onto a tilted stream table to demonstrate erosion and deposition.

Benchmark SC.3.P.8.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.3.P.8.1: Measure and compare temperatures of various samples of solids and liquids.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • understand that materials have different temperatures that can be measured using a thermometer; • read the temperature on a thermometer in both Celsius and Fahrenheit; and • compare the temperatures of different solids with each other or of different liquids with each other.
Content Limits	Items will not require students to identify temperatures other than a whole number (e.g., 35°C, not 35.2°C or $32\frac{1}{2}$°C) or to convert temperatures from Celsius to Fahrenheit. Items may include illustrations or diagrams of a thermometer.

Benchmark SC.3.P.8.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.3.P.8.2: Measure and compare the mass and volume of solids and liquids.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify that a scale or balance measures mass and a graduated cylinder measures volume; • measure the mass of solids and liquids on a scale or balance; • calculate the volume of solids using water displacement; • measure the volume of liquids in beakers or graduated cylinders; and • compare the mass and volume of solids and liquids.
Content Limits	Items will not • require students to identify measures other than at a whole number; or • include the terms *density*, *matter*, or *buoyancy*. Items may include, but are not limited to, • illustrations or diagrams of scales, balances, beakers, or graduated cylinders; and • charts to record information.

Benchmark SC.3.P.8.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.3.P.8.3: Compare materials and objects according to properties such as size, shape, color, texture, and hardness.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify properties used to describe objects, such as size, shape, color, texture, and hardness; • classify objects according to similar properties; • compare and contrast properties of objects, such as size, shape, color, texture, and hardness; and • describe the similarities and differences of two or more properties.
Content Limits	Items compared should be everyday objects and should not include objects inaccessible to the average third grade student. Items may include charts or tables.

Benchmark SC.3.P.9.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 9: Changes in Matter**
Benchmark	**SC.3.P.9.1: Describe the changes water undergoes when it changes state through heating and cooling, by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify that water can change from a solid state to a liquid state; • describe the changes water undergoes when it changes states through heating and cooling; and • define terms such as *melting*, *freezing*, *boiling*, *evaporation*, and *condensation*.
Content Limits	Items will not include terms such as *matter*, *physical change*, *chemical change*, or *molecular motion*. Items may include, but are not limited to, illustrations or diagrams of ice melting, ice cubes, water boiling, water evaporating, and water condensation.

Benchmark SC.3.P.10.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.3.P.10.1: Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that there are different forms of energy; • identify basic forms of energy; and • explain the form of energy different objects might use.
Content Limits	Items will not require students to understand how the energy works in the objects. Items may include, but are not limited to, pictures of a bat hitting a baseball (illustrating the energy of motion) or a desktop computer plugged into a wall (illustrating the energy of electricity).

Benchmark SC.3.P.10.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.3.P.10.2: Recognize that energy has the ability to cause motion or create change.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that objects not in motion have stored (potential) energy related to their position; • explain how objects can undergo a change in motion; and • identify ways that energy has the ability to cause motion.
Content Limits	Items will not require students to understand details about potential or kinetic energy. Items may include photos or diagrams that illustrate the changing of energy and the causation of motion (for example, a bat hitting a baseball sitting on a cone).

Benchmark SC.3.P.10.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.3.P.10.3: Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify that light can come from different sources, such as the Sun or an electric lamp; • recognize that light travels in a straight line; and • demonstrate how light travels in a straight line until it strikes an object or travels from one medium to another.
Content Limits	Items will not require students to know the speed of light or to define words such as transparent, photon, wave, or particle. Items may include diagrams and/or illustrations of experiments showing how light travels.

Benchmark SC.3.P.10.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.3.P.10.4: Demonstrate that light can be reflected, refracted, and absorbed**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify a situation in which light is being reflected by an object; • identify a situation in which light is being refracted through an object; and • identify a situation in which light is being absorbed by an object.
Content Limits	Items will not require students to explain the science behind reflecting, refracting, or absorbing. Items may include diagrams and/or illustrations of experiments showing how light is reflected, refracted, and absorbed.

Benchmark SC.3.P.11.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformations**
Benchmark	**SC.3.P.11.1: Investigate, observe, and explain that things that give off light often also give off heat.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that objects that give off light often give off heat; • identify objects that give off both heat and light; and • explain why objects that give off light also give off heat.
Content Limits	Items will not require students to explain the science behind the concept that light gives off heat. Items may include diagrams and/or illustrations of experiments showing how light gives off heat.

Benchmark SC.3.P.11.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformation**
Benchmark	**SC.3.P.11.2: Investigate, observe, and explain that heat is produced when one object rubs against another, such as rubbing one's hands together.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 3 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that when an object rubs against another the movement produces heat; • identify everyday examples of objects rubbing against one another and producing heat; and • explain how heat is produced when one object rubs against another.
Content Limits	Items will not include the terms *friction*, *heat transfer*, *internal energy*, *kinetic energy*, or *thermal equilibrium*. Item examples may include rubbing one's hands together, brakes applying force on a bike to stop, sliding down a rope, or sliding into a base during a baseball game.

B. Grade 4 Item Specifications

Course Number: 5020050

Benchmark HE.4.C.1.6	
Body of Knowledge/ Strand	**Heath Education Concepts**
Standard	**Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.**
Benchmark	**HE.4.C.1.6: Identify the human body parts and organs that work together to form healthy body systems.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify the major body parts and organs that work together to form the muscular and skeletal systems, circulatory and respiratory systems, and endocrine and reproductive systems; and • recognize the major external and internal body parts that work together, such as the nose and lungs for breathing and the mouth and stomach for digesting food.
Content Limits	Items will not address the excretory system. Items will assess only major body parts and organs that are familiar to students at this grade level (e.g., the brain, glands, heart, lungs, stomach, nose, mouth, eyes, and teeth).

Benchmark SC.4.E.5.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.4.E.5.1: Observe that the patterns of stars in the sky stay the same although they appear to shift across the sky nightly, and different stars can be seen in different seasons.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications/	Students will • observe star patterns and understand that they appear to be moving because of Earth's daily rotation; • collect and record data and construct charts, tables, and/or graphs based on their conclusions; and • observe that star patterns during the winter may not be visible during summer due to the subtle shift of Earth and the Sun.
Content Limits	Items will not assess the specific names of star patterns. Items will include predicting shifting patterns throughout the sky based on collected data via charts, tables, or graphs.

Benchmark SC.4.E.5.2	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.4.E.5.2: Describe the changes in the observable shape of the Moon over the course of about a month.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify the various shapes of Moon patterns and sequence and explain that the Moon itself does not change shape; • compare and contrast Moon shapes; • explain the reason for different shapes; and • record observable data in a journal.
Content Limits	Items will not • address cycle names; or • assess reasons for different shapes of the Moon. Items will include diagrams of Moon shapes as well as scenarios with specific Sun, Moon, and Earth positions.

Benchmark SC.4.E.5.3	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.4.E.5.3: Recognize that Earth revolves around the Sun in a year and rotates on its axis in a 24-hour day.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • analyze the relationship between Earth and the Sun; and • describe that one year is when Earth completes one full revolution around the Sun and one day is when Earth completes one full rotation.
Content Limits	Student will not be responsible for specific distances between the Earth, Sun, and other planets. Items will include diagrams of Earth and its hemispheres and changes in orbit.

Benchmark SC.4.E.5.4	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.4.E.5.4: Relate that the rotation of Earth (day and night) and apparent movements of the Sun, Moon, and stars are connected.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will explain the reasons for Earth's seasons and the path Earth takes around the Sun and how the distance between Earth and the Sun changes. Students also will be able to compare and contrast the type of season in a specific hemisphere depending on sunlight exposure.
Content Limits	N/A

Benchmark SC.4.E.5.5	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.4.E.5.5: Investigate and report the effects of space research and exploration on the economy and culture of Florida.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify the advances in science that can be attributed to space research in Florida, such as medical technology, transportation, agriculture, and industrial productivity; • investigate products that were generated specifically for space but have now found purpose in the public forum; and • analyze data and form opinions on space exploration in the state of Florida.
Content Limits	Items will not assess opinions from political parties. Scenarios may include a cost/benefit analysis in chart form for the space program in Florida.

Benchmark SC.4.E.6.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.1: Identify the three categories of rocks: igneous (formed from molten rock), sedimentary (pieces of other rocks and fossilized organisms), and metamorphic (formed from heat and pressure).**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • observe and identify samples and/or examples of the three categories of rocks: igneous, sedimentary, and metamorphic; and • be able to describe the steps of the rock cycle. By using technology such as videos and animations, students may observe then explain how igneous, sedimentary, and metamorphic rocks are formed.
Content Limits	Students will not be responsible for identifying minerals or the specific names of rocks. Items may include a flow chart of the rock cycle.

Benchmark SC.4.E.6.2	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.2: Identify the physical properties of common earth-forming minerals, including hardness, color, luster, cleavage, and streak color, and recognize the role of minerals in the formation of rocks.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • visually identify and describe the properties of minerals in a rock sample; • compare and contrast rocks based on physical properties including hardness, color, luster, cleavage, and streak color; and • identify some minerals, such as clay and quartz, that are important in forming rocks.
Content Limits	Students will not be responsible for identifying the Mohs scale or cleavage criteria. Scenarios presented should include natural rocks representing the various mineral properties.

Benchmark SC.4.E.6.3	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.3: Recognize that humans need resources found on Earth and that these are either renewable or nonrenewable.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define *resources* as anything from the environment that meets our needs and wants; • define and provide examples of renewable resources such as fresh water, forests, sunlight, fertile soil, wild animals, and fresh air; • define and provide examples of a nonrenewable resource such as a mineral (iron, copper, aluminum) or a fossil fuel (coal, oil, natural gas); • explain that nonrenewable resources exist in a fixed quantity in Earth and may be used up; and • identify which of these resources are needed most by humans.
Content Limits	Scenarios presented will include visuals of renewable and nonrenewable resources.

Benchmark SC.4.E.6.4	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.4: Describe the basic differences between physical weathering (breaking down of rock by wind, water, ice, temperature change, and plants) and erosion (movement of rock by gravity, wind, water, and ice).**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe the characteristics of physical or mechanical weathering as it occurs in the natural world and identify several ways in which this breakdown or change process happens; • understand that physical weathering and erosion change Earth's surface; and • provide examples of how physical weathering and erosion processes form and/or destroy the landscape in nature.
Content Limits	Students will not be required to know the details of oxidation or chemical weathering. Scenarios presented will allow students to identify examples of surface change in nature and identify the process that caused them, such as tree roots growing up through a sidewalk, cement cracking from weather changes, etc.

Benchmark SC.4.E.6.5	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.5: Investigate how technology and tools help to extend the ability of humans to observe very small things and very large things.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify tools that allow scientists to observe very small things, such as the microscope and magnifying glass; • hypothesize what types of investigations a microscope would be used for; • investigate the histories of the microscope and telescope and cite examples of knowledge gained from their uses; and • identify the telescope and satellites as tools that have allowed scientists to see very large things, such as the Earth, the solar system, and parts of the universe.
Content Limits	Students will not be required to know the specific parts, types, or functions of the microscope or telescope. Scenarios presented should include visuals of objects found in nature and the tools best used to observe them.

Benchmark SC.4.E.6.6	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 6: Earth Structures**
Benchmark	**SC.4.E.6.6: Identify resources available in Florida (water, phosphate, oil, limestone, silicon, wind, and solar energy).**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify the roles of both fresh and salt water in the water cycle; • describe the uses of fresh and salt water by humans, such as personal consumption, irrigation, and industry; • list the main sources of fresh water in their local region; • research how phosphate is formed in Florida, locate mining sites, and identify uses of phosphate; • investigate and locate possible oil resource locations and how oil is a limited resource; • describe locations of limestone and why it is important to humans; and • describe where silicon is found and how it is used in society.
Content Limits	Content should remain age/grade level appropriate and not include the opinions of political parties. Items may include a chart listing the sources and uses of Florida's resources.

Benchmark SC.4.L.16.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 16: Heredity and Reproduction**
Benchmark	**SC.4.L.16.1: Identify processes of sexual reproduction in flowering plants, including pollination, fertilization (seed production), seed dispersal, and germination.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • examine and identify the reproductive parts of a flower (including the carpel, which produces ovules, and the anther, which produces pollen); • describe the functions of the reproductive parts of a flower; • identify how the processes of pollination, fertilization, seed dispersal, and germination and the methods of seed dispersal fit into the life cycle of a flowering plant; • describe the plant reproductive structures and how they contribute to pollination and fertilization; and • describe the plant structure that contributes to seed dispersal and germination.
Content Limits	Items will not asses • modes of reproduction in nonflowering plants such as mosses or ferns or in any other organism kingdom; or • flowers that have only male parts or female parts. Scenarios presented should include the parts of a flower, structures, and functions for reproductive success.

Benchmark SC.4.L.16.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 16: Heredity and Reproduction**
Benchmark	**SC.4.L.16.2: Explain that although characteristics of plants and animals are inherited, some characteristics can be affected by the environment.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will explain that factors in the environment such as predation, climate, disease, light, temperature, and availability of food can affect some characteristics of organisms.
Content Limits	Items will not assess types of genetic variation. Scenarios should focus on plant and animal species common in Florida.

Benchmark SC.4.L.16.3	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 16: Heredity and Reproduction**
Benchmark	**SC.4.L.16.3: Recognize that animal behaviors may be shaped by heredity and learning.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify examples of animal behaviors; • differentiate between learned/acquired behaviors and inherited/innate behaviors; • identify examples as either learned or inherited behavior, such as courtship, grooming, verbal communication, fighting, etc.; and • form conclusions that many animal behaviors are a combination of both heredity and learning.
Content Limits	Items will not assess the molecule of DNA. Scenarios presented should be age appropriate, such as bird and dog behaviors.

Benchmark SC.4.L.16.4	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 16: Heredity and Reproduction**
Benchmark	**SC.4.L.16.4: Compare and contrast the major stages in the life cycles of Florida plants and animals, such as those that undergo incomplete and complete metamorphosis, and flowering and non-flowering seed-bearing plants.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define metamorphosis and examine examples of animals that undergo this change, such as caterpillars/butterflies (Isabella Tiger Moth) and tadpoles/frogs (Spring Peeper); • distinguish between complete and incomplete metamorphosis and describe the stages of each; • compare and contrast differences in body structures and shape (egg, larva, pupa, adult, nymph) and describe the risks and benefits that metamorphosis allows, such as allowing an organism to inhabit a specific niche; and • define and identify the stages in the life cycle of flowering plants and nonflowering seed-bearing plants and provide examples of each, such as daisies and pine trees.
Content Limits	Items will not assess details of the fertilization of these organisms or the concepts of haploid and diploid cells. Scenarios presented should include cyclic diagrams illustrating the stages of both complete and incomplete metamorphosis.

Benchmark SC.4.L.17.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.4.L.17.1: Compare the seasonal changes in Florida plants and animals to those in other regions of the country.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • compare an ecosystem in Florida, such as a deciduous forest, to one found in a northern state; • analyze how organisms in that ecosystem adapt to seasonal changes, such as the changing colors and dropping of tree leaves and animal hibernation, migration, and camouflaging; and • investigate environmental and biological triggers that initiate an organism's response to seasonal change both in Florida and in a different region of the country.
Content Limits	Items will not assess specific types of migration patterns and/or the reasons why seasons change.

Benchmark SC.4.L.17.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.4.L.17.2: Explain that animals, including humans, cannot make their own food and that when animals eat plants or other animals, the energy stored in the food source is passed to them.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	N/A
Content Limits	Items will not involve calculations on energy transfers. Scenarios presented should include diagrams representing the relationships in a food chain.

Benchmark SC.4.L.17.3	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.4.L.17.3: Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe that all life on Earth is dependent upon the Sun; • analyze the transfer of energy through a food chain from producer to consumer; and • determine that some energy is lost from one organism to the next in the form of heat and approximate the amount of energy transferred and lost.
Content Limits	Items will assess food chains only. Items will not include energy pyramids or food webs. Scenarios presented should include diagrams representing the relationships in a food chain.

Benchmark SC.4.L.17.4	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.4.L.17.4: Recognize ways plants and animals, including humans, can impact the environment.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe positive contributions of plants to the environment, including aesthetics, medicine, and their roles in biogeochemical cycles; • describe the relationship between plants as producers and animals as consumers; • identify ways certain plants may negatively affect their environment, such as invasive species and poisonous plants; • describe positive and negative ways animals other than humans affect their environment, such as overpopulation, migration, predation, and invasive species; and • investigate and identify ways that humans help and harm the environment.
Content Limits	Items will not assess effects on a global scale. Scenarios presented might include cause and effect relationships between plants, animals, humans, and the environment.

Benchmark SC.4.N.1.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.1: Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify what science is and the questions that science can and cannot answer; • identify questions that can be answered by science through investigation and observation; • design and conduct experiments and investigations; and • form a hypothesis and form conclusions based on data obtained during investigations.
Content Limits	Items will not assess topics related to pseudoscience. Scenarios presented should include steps in the scientific method. Items will focus only on topics covered in grade 4 science.

Benchmark SC.4.N.1.2	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.2: Compare the observations made by different groups using multiple tools and seek reasons to explain the differences across groups.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • gather and collect data using various tools and technology, such as graduated cylinders, stopwatches, scales, thermometers, rulers, etc.; • use these tools to gather data and measurements, such as length, weight, temperature, and time; and • practice proper methods for obtaining data and making accurate records.
Content Limits	Items will not require students to analyze data obtained by others. Scenarios presented should include making accurate measurements and identifying what tool to use. Items will assess only topics covered in grade 4 science.

Benchmark SC.4.N.1.3	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.3: Explain that science does not always follow a rigidly defined method ("the scientific method") but that science does involve the use of observations and empirical evidence.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • apply steps of the scientific method such as creating investigations, forming hypotheses, and making observations by using their senses; and • use tools and technology to collect and analyze data and form conclusions.
Content Limits	Items will not assess tools and technology beyond what is appropriate for grade 4. Scenarios presented should include when and how to use the scientific method.

Benchmark SC.4.N.1.4	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.4: Attempt reasonable answers to scientific questions and cite evidence in support.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • participate in discussing and analyzing others' results and modify conclusions as necessary based on collected data; • perform investigations and compare and contrast results, taking into consideration sources of error; and • conclude that sharing ideas and conclusions is a source of new information and knowledge.
Content Limits	Items will not require students to understand specific subject area content. Scenarios presented should include results from an investigation, such as charts, graphs, etc., for students to analyze. Items will assess only topics covered in grade 4 science.

Benchmark SC.4.N.1.5	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.5: Compare the methods and results of investigations done by other classmates.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • formulate opinions, new ideas, and conclusions based on investigations by other classmates; • make recommendations for future investigations based on their findings; and • use critical thinking skills to critique others' work in a written manner.
Content Limits	Scenarios presented should include an investigation and allow students to identify sources of errors. Items will assess only topics covered in grade 4 science.

Benchmark SC.4.N.1.6	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.6: Keep records that describe observations made, carefully distinguishing actual observations from ideas and inferences about the observations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • record their findings in a written manner with diagrams, charts, and graphs; • communicate their findings to others; and • critique each other's findings.
Content Limits	Scenarios presented should include results from an investigation (e.g., charts, graphs, etc.) for students to analyze.

Benchmark SC.4.N.1.7	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.7: Recognize and explain that scientists base their explanations on evidence.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define data and evidence and infer how they are used in science; • give and identify examples of evidence in science; • use acquired data and evidence to form conclusions while investigating; and • demonstrate that science is based on data and evidence and investigate a specific theory in science that is based on evidence (e.g., cell theory or the theory of evolution).
Content Limits	Items will not assess qualitative or quantitative data. Scenarios presented should include results from an investigation (e.g., charts, graphs, etc.) for students to analyze. Items will assess only topics covered in grade 4 science.

Benchmark SC.4.N.1.8	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.4.N.1.8: Recognize that science involves creativity in designing experiments.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will be able to • develop, design, implement, and execute investigations and experiments that will answer a question, have a dependent and an independent variable, and allow students to form a conclusion; and • make adaptations based on suggestions from others or from errors made during the investigation. Student investigations will answer questions that science can provide answers and evidence for. Students should identify where/how the investigation failed and make recommendations to improve the outcome of the experiment.
Content Limits	Items will not require students to conduct investigations beyond grade 4 science curriculum requirements. Scenarios presented should include failed investigations/ experiments.

Benchmark SC.4.N.2.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 2: Characteristics of Scientific Knowledge**
Benchmark	**SC.4.N.2.1: Explain that science focuses solely on the natural world.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define science and what it can and cannot answer; • identify various fields of science such as biology, chemistry, geology, zoology, etc.; and • compare and contrast fields of science and relate them to the natural world.
Content Limits	Items will not include details on the fields of science, just a broad understanding. Scenarios presented should include sample questions that may or may not be answered by using science. Scenarios presented should also introduce science prefixes and suffixes such as *bio*, *zoo*, and *-logy*.

Benchmark SC.4.N.3.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 3: The Role of Theories, Laws, Hypotheses, and Models.**
Benchmark	**SC.4.N.3.1: Explain that models can be three dimensional, two dimensional, an explanation in your mind, or a computer model.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will identify models that help explain a theory, law, or hypothesis, such as the cell theory.
Content Limits	Scenarios presented should give examples of relationships between a theory and the model used to demonstrate that theory.

Benchmark SC.4.P.8.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.4.P.8.1: Measure and compare objects and materials based on their physical properties including: mass, shape, volume, color, hardness, texture, odor, taste, attraction to magnets.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define mass, weight, and volume; • investigate objects and compare and contrast their properties; • use tools to calculate mass and volume when comparing the properties of different objects and materials; • use mathematical calculations to determine mass and volume; • use their senses to make observations of objects; and • record observations and data in the form of charts and graphs.
Content Limits	Items will not assess density. Scenarios should include situations in which students have to calculate mass and volume.

Benchmark SC.4.P.8.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.4.P.8.2: Identify properties and common uses of water in each of its states.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe the hydrosphere; • investigate the importance of water to life on Earth; and • investigate the various states of water, including liquid, solid, and gas.
Content Limits	Items will not assess details of the pH scale. Scenarios should include uses of water in its various states, including solid, liquid, and gas.

Benchmark SC.4.P.8.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.4.P.8.3: Explore the Law of Conservation of Mass by demonstrating that the mass of a whole object is always the same as the sum of the masses of its parts.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • use tools and technology to obtain the mass of various objects; and • describe that the sum of the masses of the individual parts of an object is equal to the total mass of the object.
Content Limits	Items will not assess density of an object. Scenarios should include calculating the mass of a whole object and its various parts.

Benchmark SC.4.P.8.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.4.P.8.4: Investigate and describe that magnets can attract magnetic materials and attract and repel other magnets.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • investigate the north and south poles of magnets and use manipulatives to identify which pole attracts and which pole repels a second magnet; • define *magnetic field* and relate this definition to how magnets attract or repel objects; and • experiment with magnets and materials such as steel, nickel, and iron to conclude which materials magnets attract and repel.
Content Limits	Items will not assess Earth's magnetism. Scenarios should include which poles attract and which poles repel.

Benchmark SC.4.P.9.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 9: Changes in Matter**
Benchmark	**SC.4.P.9.1: Identify some familiar changes in materials that result in other materials with different characteristics, such as decaying animal or plant matter, burning, rusting, and cooking.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • observe and discuss the changes in matter (food) that result from cooking (temperature), for example, the change in an egg as it is fried; • compare an iron nail that has rusted with one that has not and discuss possible reasons for this change; • observe fresh leaves and those that are decaying and suggest reasons for this change; and • observe a new candle and a similar one that is burning and discuss the changes they see.
Content Limits	Items will not include the chemistry of oxidation and reduction or the microorganisms involved in the decay process.

Benchmark SC.4.P.10.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.4.P.10.1: Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will be able to • define and identify energy in the form of light, heat, sound, electrical, stored energy, and energy of motion; • recognize examples of these energy forms in their life and in the natural world; and • compare and contrast these types of energy.
Content Limits	Items will not include any type of scientific calculations or formulas. Scenarios presented should include picture examples of the energy types.

Benchmark SC.4.P.10.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.4.P.10.2: Investigate and describe that energy has the ability to cause motion or create change.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define energy, motion, and matter; • explain examples of energy; • describe the relationship between energy and motion and how changing the matter of an object can create motion; and • investigate and create motion and motion changes by using wind or solar energy to sail a model boat, or move a model car, or cause a fan to spin.
Content Limits	Items will not include any mathematical calculations or formulas. Scenarios should include students identifying visuals of energy types in everyday life and in nature.

Benchmark SC.4.P.10.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.4.P.10.3: Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define sound, vibration, and pitch; • describe the requirements/components in order for sound to be produced; • investigate how sound is produced by using tuning forks, hollow tubes, vocal cords, or water bottles played as instruments with different amounts of water in them; • investigate further by experimenting with water bottle liquids, rulers, or straws to determine how the size or length of an object affects pitch; and • describe why the size of the object plucked or played is related to the pitch heard.
Content Limits	Items will not include any mathematical calculations or formulas. Scenarios should include identifying the components of a produced sound.

Benchmark SC.4.P.10.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.4.P.10.4: Describe how moving water and air are sources of energy and can be used to move things.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • locate local sources of hydropower, such as oceans, lakes rivers, and dams; • locate and investigate the uses of wind energy; and • investigate how hydropower and wind energy are used in different communities in Florida.
Content Limits	Items will not include types of hydropower or detailed knowledge about how wind turbines generate electricity. Items may include examples of air and water energy sources found in nature, such as rivers and wind.

Benchmark SC.4.P.11.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformation**
Benchmark	**SC.4.P.11.1: Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • demonstrate heat transfer from a hot object to a cold object; • record their observations of heat transfer in the form of temperature changes within graphs and charts; and • form conclusions based on their recorded observations and data.
Content Limits	Items will not include details of thermodynamic laws. Scenarios should include analyzing heat transfer in the form of charts and graphs.

Benchmark SC.4.P.11.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformation**
Benchmark	**SC.4.P.11.2: Identify common materials that conduct heat well or poorly.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • investigate and infer which materials are best for conducting heat; this includes materials such as clay, metals, and glass; • make observations and collect temperature readings during their investigations; • record their observations and data in the form of graphs and charts; and • form conclusions about which materials conduct heat well or poorly based on their investigations.
Content Limits	Items will not include details on insulators vs. conductors. Scenarios should include analyzing data in the form of charts and graphs.

Benchmark SC.4.P.12.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 12: Motion of Objects**
Benchmark	**SC.4.P.12.1: Recognize that an object in motion always changes its position and may change its direction.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • define an object's position and motion in space; • demonstrate that objects can move in different ways; and • demonstrate that sometimes an object in motion changes its direction.
Content Limits	Items will not include any mathematical calculations or formulas. Scenarios and examples may include pushing and pulling objects, toy cars, balls, marbles, moving vehicles, aircraft, walking, running, etc.

Benchmark SC.4.P.12.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 12: Motion of Objects**
Benchmark	**SC.4.P.12.2: Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 4 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • demonstrate (by using manipulatives) that an object's speed can change over time; • investigate a moving object over a period of time; • use tools and technology to determine the speed of a traveling object; and • record obtained speeds in chart or graph format.
Content Limits	Items will not assess velocity or acceleration. Items should include calculations to determine the speed of an object.

C. Grade 5 Item Specifications

Course Number: 5020060

Benchmark HE.5.C.1.6	
Body of Knowledge/ Strand	**Health Education Concepts**
Standard	**Health Standard 1: Comprehend concepts related to health promotion and disease prevention to enhance health.**
Benchmark	**HE.5.C.1.6: Explain how human body parts and organs work together in healthy body systems, including the endocrine and reproductive systems.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe or explain how the digestive and circulatory systems receive and distribute nutrients to provide energy; • describe or explain how the endocrine glands influence the reproductive system; • describe or explain how the respiratory system provides oxygen to the circulatory system; and • explain how the major external and internal body parts work together, such as the nose and lungs for breathing and the mouth and stomach for digesting food.
Content Limits	Items will not address the excretory system. Items will assess an understanding of body systems appropriate for a grade 5 student (e.g., appropriate content in grade 5 items may include that blood circulates through the heart, lungs, and body; the circulatory system is made up of blood, the heart, and blood vessels; the endocrine system controls body function with glands, etc.).

Benchmark SC.5.E.5.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.5.E.5.1: Recognize that a galaxy consists of gas, dust, and many stars, including any objects orbiting the stars. Identify our home galaxy as the Milky Way.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will identify the basic components of a galaxy.
Content Limits	Items will not assess the name of our galaxy in isolation. Items will not assess objects orbiting stars.

Benchmark SC.5.E.5.2	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.5.E.5.2: Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that planets orbit around a star, such as the Sun; • recognize other common characteristics of all planets including orbit, rotation, axial tilt, atmosphere, gravity, and mass; • recognize that there are two main types of planets: large "gas giants" and smaller, terrestrial planets; • recognize that inner planets tend to be orbited by few or no moons, while outer planets tend to be orbited by several moons; and • be able to identify the four inner terrestrial planets (Mercury, Venus, Earth, and Mars) and the four outer gas giants (Jupiter, Saturn, Uranus, and Neptune).
Content Limits	Items assessing inner and outer planet groups are limited to surface composition (whether they are mostly solid or gas), presence of an atmosphere, size, relative position to the Sun, presence of moons or rings, relative temperature, and relative length of a year.

Benchmark SC.5.E.5.3	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 5: Earth in Space and Time**
Benchmark	**SC.5.E.5.3: Distinguish among the following objects of the Solar System—Sun, planets, moons, asteroids, comets—and identify Earth's position in it.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will distinguish among objects in our solar system based on their relative positions and/or their characteristics.
Content Limits	Items will address a conceptual understanding of our solar system and the characteristics of objects in our solar system. Items will not • require specific knowledge of quantitative astronomical data; • assess interactions of objects in our solar system; or • assess the force of gravity.

Benchmark SC.5.E.7.1	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.1: Create a model to explain the parts of the water cycle. Water can be a gas, a liquid, or a solid and can go back and forth from one state to another.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify and/or explain the parts of the water cycle, using models; • identify the states of water associated with each part of the water cycle and/or explain the phase changes that occur as water moves from one part of the water cycle to another; and • create a basic model of the water cycle showing the processes of evaporation, condensation, and precipitation.
Content Limits	Items will not address or assess transpiration, infiltration, or percolation as processes of the water cycle. Items assessing the phases of water are limited to a water cycle context. Scenarios referring to the water cycle will not use the term reservoir.

Benchmark SC.5.E.7.2	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.2: Recognize that the ocean is an integral part of the water cycle and is connected to all of Earth's water reservoirs via evaporation and precipitation processes.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize that • the ocean is an important part of the water cycle, providing most of the water that is evaporated from Earth's surface; and • some of the water that evaporates from the ocean into the atmosphere condenses and falls as precipitation over other parts of Earth (i.e., over land and freshwater bodies).
Content Limits	Items will not address or assess transpiration, infiltration, or percolation as processes of the water cycle. Items assessing the phases of water are limited to a water cycle context. Scenarios referring to the water cycle will not use the term reservoir.

Benchmark SC.5.E.7.3	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.3: Recognize how air temperature, barometric pressure, humidity, wind speed and direction, and precipitation determine the weather in a particular place and time.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	N/A
Content Limits	Items assessing weather are limited to conceptual understanding. Items will not • address or assess the interpretation of specific characteristics used to forecast weather; • require knowledge of specific geographic locations; or • assess fronts. Items addressing the types of clouds are limited to cumulus, cirrus, stratus, and cumulonimbus as they relate to weather but will not require differentiation among these types of clouds. Items may • refer to common tools used to measure air temperature, barometric pressure, humidity, wind speed and direction, and precipitation but will not assess specific knowledge of the tools; and • include a weather map with a key explaining weather symbols. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer. Wind speeds will be shown in miles per hour (mph). The phrase air pressure should be used rather than the phrase barometric pressure.

Benchmark SC.5.E.7.4	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.4: Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will identify or distinguish the forms of precipitation (rain, snow, sleet, and hail) and their related weather conditions (e.g., hail develops during strong thunderstorms).
Content Limits	Items will not • address or assess the interpretation of specific characteristics used to forecast weather; • require knowledge of specific geographic locations; or • assess fronts. Items addressing the types of clouds are limited to cumulus, cirrus, stratus, and cumulonimbus as they relate to weather but will not require differentiation among these types of clouds. Items may • refer to common tools used to measure air temperature, barometric pressure, humidity, wind speed and direction, and precipitation but will not assess specific knowledge of the tools; and • include a weather map with a key explaining weather symbols. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer. Wind speeds will be shown in miles per hour (mph). The phrase air pressure should be used rather than the phrase barometric pressure.

Benchmark SC.5.E.7.5	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.5: Recognize that some of the weather-related differences, such as temperature and humidity, are found among different environments, such as swamps, deserts, and mountains.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will distinguish weather conditions among different environments (e.g., the weather over a desert is more likely to be dry and hot, and the weather over a swamp is more likely to be warm and rainy).
Content Limits	Items will not • address or assess the interpretation of specific characteristics used to forecast weather; • require knowledge of specific geographic locations; or • assess fronts. Items assessing weather-related differences among different environments may include desert, grassland, rainforest, tundra, and wetland. Items may • refer to common tools used to measure air temperature, barometric pressure, humidity, wind speed and direction, and precipitation but will not assess specific knowledge of the tools; and • include a weather map with a key explaining weather symbols. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer. Wind speeds will be shown in miles per hour (mph). The phrase air pressure should be used rather than the phrase barometric pressure.

Benchmark SC.5.E.7.6	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.6: Describe characteristics (temperature and precipitation) of different climate zones as they relate to latitude, elevation, and proximity to bodies of water.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe the temperature and precipitation of different climate zones as they relate to latitude (polar, temperate, and tropical), elevation (e.g., mountains and valleys), and/or proximity to bodies of water (e.g., coastal versus inland, ocean currents).
Content Limits	Items will not • assess albedo or Coriolis effect; • assess specific reference to the term "microclimate"; • assess knowledge of specific vegetation zones; • require knowledge of specific geographic locations; or • assess fronts. Items assessing climate zones are limited to polar, temperate, and tropical. Items may • refer to common tools used to measure air temperature, barometric pressure, humidity, wind speed and direction, and precipitation but will not assess specific knowledge of the tools; and • include a weather map with a key explaining weather symbols. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer.

Benchmark SC.5.E.7.7	
Body of Knowledge/ Strand	**Earth and Space Science**
Standard	**Big Idea 7: Earth Systems and Patterns**
Benchmark	**SC.5.E.7.7: Design a family preparedness plan for natural disasters and identify the reasons for having such a plan.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that Florida's subtropical climate, proximity to the ocean, and geography make it vulnerable to a number of potential natural disaster threats, such as hurricanes, tropical storms, tornadoes, wildfires, and flooding; and • describe/design a preparedness plan for a natural disaster, including an evacuation route, emergency food and water storage, first aid kit (bandages, insect repellent, blankets, etc.) flashlights, batteries, generators, weather radio, etc.
Content Limits	Items may not assess specific knowledge/policies of natural disaster agencies (such as FEMA) or disaster insurance.

Benchmark SC.5.L.14.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 14: Organization and Development of Living Organisms**
Benchmark	**SC.5.L.14.1: Identify the organs in the human body and describe their functions, including the skin, brain, heart, lungs, stomach, liver, intestines, pancreas, muscles and skeleton, reproductive organs, kidneys, bladder, and sensory organs.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will identify organs in the human body and/or describe their functions.
Content Limits	Items will not • assess human body systems; • require specific knowledge of the parts of organs; or • require the memorization of the names of muscles or bones. Items referring to • the intestines may assess the small intestines and/or the large intestines; and • muscles will assess only the function of muscles as a group.

Benchmark SC.5.L.14.2	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 14: Organization and Development of Living Organisms**
Benchmark	**SC.5.L.14.2: Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support—some with internal skeletons others with exoskeletons—while some plants have stems for support.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	N/A
Content Limits	Items will assess only general functions and physical characteristics of insects, mammals, birds, reptiles, amphibians, and fish. Items addressing • and/or assessing the functions of organs or the comparison of physical structures are limited to the brain, heart, lungs, gills, stomach, liver, intestines, pancreas, muscles, bones, exoskeleton, testes, ovaries, kidneys, bladder, skin or body covering, eyes, ears, nose, and tongue; and • the comparison of the structure and/or function of plants and animals are limited to skin compared to plant covering, skeleton compared to stem, and reproductive organs compared to flower. Items referring to the functions of plant structures are limited to flower, fruit, leaf, root, seed, and spore. Items will not require specific knowledge of the parts of organs. Scenarios will use common names of organisms and will not include scientific names.

Benchmark SC.5.L.15.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 15: Diversity and Evolution of Living Organisms**
Benchmark	**SC.5.L.15.1: Describe how, when the environment changes, differences between individuals allow some plants and animals to survive and reproduce while others die or move to new locations.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe some of the basic strategies and behaviors that plants and animals use to survive in a changing environment, which may include (but is not limited to): • increased competition for food • increased predators • disease • climate change • pollution • drought Students will recognize that individuals of the same kind of plant or animal can have different physical or behavioral characteristics that can help them survive when an environment changes (e.g., Peppered moths: Compared to light speckled individuals, dark-colored peppered moths better avoided predation from birds when industrial soot covered tree trunks during the late nineteenth century.).
Content Limits	Items should focus on plants and animals common in Florida. Items may not include references to genetic terms such as trait, phenotype, genotype, genes, or mutation. Items may allude to but not specifically include the following terms or phrases: adaptation, survival of the fittest, natural selection, theory of evolution, resistance, or extinction.

Benchmark SC.5.L.17.1	
Body of Knowledge/ Strand	**Life Science**
Standard	**Big Idea 17: Interdependence**
Benchmark	**SC.5.L.17.1: Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will explain, compare, and/or contrast how adaptations displayed by animals or plants enable them to survive in different environments (e.g., body/stem covering, body fat, leaf shape, body shape, teeth, claws, acute eyesight/hearing, etc.).
Content Limits	Items referring to the adaptation of organisms to different environments may address but will not assess the different stages of the organism's life cycle. Items may require knowledge of how animals living in a particular environment are adapted to survive the seasonal changes in that environment. The term *characteristic* should be used rather than the term *trait.*

Benchmark SC.5.N.1.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.1: Define a problem, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types such as: systematic observations, experiments requiring the identification of variables, collecting and organizing data, interpreting data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • evaluate a written procedure or experimental setup; • identify appropriate forms of record keeping; and • interpret and analyze data to generate appropriate explanations based on that data.
Content Limits	Items will not • require the identification or evaluation of a hypothesis; • require mathematical computations; • require the differentiation between outcome variables (dependent variables) and test variables (independent variables); or • assess the reason for differences in data across groups that are investigating the same problem. Items should not use the term hypothesis. Items will assess only topics covered in grade 5 science. Items referring to conclusions will not require the formation of a conclusion.

Benchmark SC.5.N.1.2	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.2: Explain the difference between an experiment and other types of scientific investigation.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe and/or explain differences between an experimental investigation (i.e., variables are defined/known and a test is done) and other types of scientific investigation, particularly a descriptive investigation (used to observe, describe, or identify) or a comparative investigation (used to compare, differentiate, or classify).
Content Limits	Items may assess only experimental, descriptive, and comparative investigations. Items will not require • the identification or evaluation of a hypothesis; • mathematical computations; or • the differentiation between outcome variables (dependent variables) and test variables (independent variables). Items should not use the term hypothesis. Items referring to conclusions will not require the formation of a conclusion. Items will assess only topics covered in grade 5 science.

Benchmark SC.5.N.1.3	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.3: Recognize and explain the need for repeated experimental trials.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize and explain that repeated experimental trials are needed to improve the reliability and validity of the test results; • recognize when an experiment can be replicated and produce similar results; • recognize that the results of experimental trials can vary; and • recognize that the same documented scientific procedure must be used to repeat experimental trials.
Content Limits	Items will not require • the design of a procedure; or • mathematical computations. Items referring to conclusions will not require the formation of a conclusion. Items will assess only topics covered in grade 5 science.

Benchmark SC.5.N.1.4	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.4: Identify a control group and explain its importance in an experiment.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify a control group as the group not given a treatment being tested (and therefore not affected by the variable being tested [independent variable]); • recognize that all conditions (other than the treatment being tested) between a control group and an experimental group must be kept the same; and • explain that a control group is important because it helps ensure that the results of an experiment can be explained only by the treatment or variable being tested (independent variable) and not some other factor.
Content Limits	Items may imply a certain type of variable (i.e., treatment or variable being tested) but not specifically use the terms "independent variable" or "dependent variable." Items will not • require the differentiation between outcome variables (dependent variables) and test variables (independent variables); or • assess the reason for differences in data across groups that are investigating the same problem. Scenarios describing a scientific experiment are limited to one control group. Items will assess only topics covered in grade 5 science.

Benchmark SC.5.N.1.5	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.5: Recognize and explain that authentic scientific investigation frequently does not parallel the steps of "the scientific method."**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize and explain that authentic scientific investigation is a dynamic process often going beyond the traditional steps of the scientific method (i.e., question, hypothesis, experiment, results, discussion, and analysis). True scientific investigation involves creativity, ingenuity, and careful study of the fundamentals of science (e.g., theories and laws) and related (foundational and current) research.
Content Limits	Items may frame a hypothesis as a proposed explanation but not specifically use the term "hypothesis" at this grade level. Items will not • require mathematical computations; • require the differentiation between outcome variables (dependent variables) and test variables (independent variables); or • assess the reason for differences in data across groups that are investigating the same problem. Items referring to conclusions will not require the formation of a conclusion. Items will assess only topics covered in grade 5 science.

Benchmark SC.5.N.1.6	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 1: The Practice of Science**
Benchmark	**SC.5.N.1.6: Recognize and explain the difference between personal opinion/interpretation and verified observation.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize and explain that a verified observation is objective and has been tested and supported by direct evidence/ facts, while a personal opinion/interpretation is a subjective expression of a thought that may be based on logic and reason but is not necessarily based on testable evidence/facts.
Content Limits	Items will not • assess scientific topics and content that goes beyond the appropriate grade level; or • require the design of a procedure. Items will assess only topics covered in grade 5 science.

Benchmark SC.5.N.2.1	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 2: The Characteristics of Scientific Knowledge**
Benchmark	**SC.5.N.2.1: Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will distinguish between personal interpretation and verified observation. Students will distinguish between examples of evidence or observations (empirical) and personal opinions.
Content Limits	Items will not assess steps or order of scientific method.

Benchmark SC.5.N.2.2	
Body of Knowledge/ Strand	**Nature of Science**
Standard	**Big Idea 2: The Characteristics of Scientific Knowledge**
Benchmark	**SC.5.N.2.2: Recognize and explain that when scientific investigations are carried out, the evidence produced by those investigations should be replicable by others.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • explain the reason for differences in data across groups as a result of using different tools and/or procedures; and • identify and/or explain the need for repeated trials in a scientific investigation.
Content Limits	Items may use the terms "accurate" and/or "valid" in context but should not assess these terms or the difference between these terms.

Benchmark SC.5.P.8.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.5.P.8.1: Compare and contrast the basic properties of solids, liquids, and gases, such as mass, volume, color, texture, and temperature.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will compare and/or contrast the physical properties of solids, liquids, and/or gases. Students will describe or classify a material as a solid, liquid, or gas.
Content Limits	Items may refer to common tools used to measure basic properties of solids, liquids, and gases but will not assess specific knowledge of the tools. Items will not • address or assess particle behavior in each state of matter or between states of matter; • address or assess the water cycle; • address or assess density as a property; • assess the difference between weight and mass; • assess unit of measure; or • require unit conversions to compare data. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer.

Benchmark SC.5.P.8.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.5.P.8.2: Investigate and identify materials that will dissolve in water and those that will not and identify the conditions that will speed up or slow down the dissolving process.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify common household materials that will dissolve in water such as salt and sugar; • identify common household materials that will not dissolve in water such as cooking oil and animal fat; and • investigate and identify ways that speed up or slow down the dissolving process such as the temperature, agitation/ turbulence, and surface area.
Content Limits	Items will not • address types of bonds (e.g., covalent bonds); • address types of compounds (e.g., polar, non-polar, and ionic); • use the terms “solvent,” “solute,” “saturation,” or “catalyst”; or • assess the difference between a mixture and a solution. Dual thermometers showing degrees Fahrenheit and degrees Celsius must be used if the scenario requires an illustration of a thermometer.

Benchmark SC.5.P.8.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.5.P.8.3: Demonstrate and explain that mixtures of solids can be separated based on observable properties of their parts such as particle size, shape, color, and magnetic attraction.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe and/or explain how mixtures of common solids (e.g., soil, sand, iron filings) can be separated based on their observable properties.
Content Limits	Items will not • use the terms "filtration" or "evaporation"; and • expect the students to be familiar with the terms or relative particle type differences in soil (i.e., silt, clay, loam, etc.). Items may include examples of dissolving one solid to separate from another solid.

Benchmark SC.5.P.8.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 8: Properties of Matter**
Benchmark	**SC.5.P.8.4: Explore the scientific theory of atoms (also called atomic theory) by recognizing that all matter is composed of parts that are too small to be seen without magnification.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will recognize that • all matter is made up of atoms; and • atoms are not visible, even with a microscope. However, the presence of atoms can be tested.
Content Limits	Items will not address • the parts of the atom (e.g., nucleus); or • more advanced components of atomic theory, such as Bohr models, isotopes, nuclear particles, atomic orbitals, etc.

Benchmark SC.5.P.9.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 9: Changes in Matter**
Benchmark	**SC.5.P.9.1: Investigate and describe that many physical and chemical changes are affected by temperature.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe • how the rates of chemical reactions are affected by temperature (i.e., heat speeds up reactions); • how physical changes are affected by temperature (e.g., water changing states from a solid to liquid to gas); and • how some familiar changes in materials result in other materials with different characteristics (chemical changes).
Content Limits	Items will not • assess particle motion in changes of states of matter; • address knowledge of specific types of chemical reactions affected by temperature (e.g., reactions involving enzymes); or • address specific comparisons or differences between physical and chemical changes. Items will assess only a basic understanding of how temperature affects physical or chemical changes.

Benchmark SC.5.P.10.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.5.P.10.1: Investigate and describe some basic forms of energy, including light, heat, sound, electrical, chemical, and mechanical.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe that light travels in a straight line until it strikes an object or travels from one material to another; • explain that heat is produced when two objects are rubbed against each other; • explain that sound is produced by vibrations and/or that pitch depends on how fast or slow the object vibrates; • explain that electrical energy is the flow of a charge/current through a material; • explain that chemical energy is stored or released in a chemical reaction; and • explain that mechanical energy is stored at a position or released in motion.
Content Limits	The terms “material” or “substance” should be used rather than the terms “medium” or “media.” Items assessing • basic forms of energy are limited to light, heat (thermal), sound, electrical, chemical, and mechanical energy; and • light reflection, refraction, or absorption should use the terms reflect, bend, or absorb to describe light’s behavior. Items will not assess the transfer of energy. Items will not include the following terms: • conductor • insulator • potential energy • kinetic energy

Benchmark SC.5.P.10.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.5.P.10.2: Investigate and explain that energy has the ability to cause motion or create change.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • recognize that energy may be defined as the ability to cause motion/do work (a force acting on an object) or create change (transforming energy from one form to another); and • identify and/or describe examples where energy has caused motion or created changes (e.g, a car moving a distance, hitting a baseball with bat, cooking food, etc.).
Content Limits	Comparative words such as greater than, less than, faster, or slower should be used when describing motion. Items will not use the terms “potential” or “kinetic” energy.

Benchmark SC.5.P.10.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.5.P.10.3: Investigate and explain that an electrically-charged object can attract an uncharged object and can either attract or repel another charged object without any contact between the objects.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will describe or explain • that oppositely-charged objects attract each other and like-charged objects repel each other without any contact needed between the objects; and • that an electrically-charged object, whether positively or negatively charged, will attract an uncharged (neutral) object.
Content Limits	Items assessing electricity will not refer to electrons or the movement of electrons in producing an electrical charge. Items will not • assess specific knowledge of or reference to Newton's laws; • address how to charge an object; or • assess which items can hold a charge and which items cannot hold a charge. Items that refer to positive and negative charges in attraction and repulsion properties must be in the context of static electricity.

Benchmark SC.5.P.10.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 10: Forms of Energy**
Benchmark	**SC.5.P.10.4: Investigate and explain that electrical energy can be transformed into heat, light, and sound energy, as well as the energy of motion.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will use examples to explain that electrical energy can be transformed into other forms of energy (e.g., lamp, heater, generator, motor, stove, mobile device, etc.).
Content Limits	Items will not • include more than two energy conversions; or • assess conversion of other forms of energy into electrical energy. Items will be limited to energy conversions as indicated in the Benchmark.

Benchmark SC.5.P.11.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformations**
Benchmark	**SC.5.P.11.1: Investigate and illustrate the fact that the flow of electricity requires a closed circuit (a complete loop).**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • identify open and closed circuits; and • determine which circuit can carry electricity to power an object.
Content Limits	Items will not assess the difference between parallel circuits, series circuits, or short circuits. Items may include illustrations or references to the parts of a single, complete loop closed (or open) circuit (i.e., battery/energy source, switch, wire).

Benchmark SC.5.P.11.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 11: Energy Transfer and Transformations**
Benchmark	**SC.5.P.11.2: Identify and classify materials that conduct electricity and materials that do not.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will identify and/or classify materials that conduct electricity (metal/steel/copper/gold) and materials that do not (e.g., rubber, plastic, glass, wood).
Content Limits	Items may allude to but not specifically refer to the terms "conductor" or "insulator." Items will not assess • relative conductivity of different metals; or • water as a conductor of electricity (i.e., pure water is a poor conductor and impure water is a good conductor). Items assessing electricity will not refer to electrons or the movement of electrons in producing an electrical charge.

Benchmark SC.5.P.13.1	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 13: Forces and Changes in Motion**
Benchmark	**SC.5.P.13.1: Identify familiar forces that cause objects to move, such as pushes or pulls, including gravity acting on falling objects.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	N/A
Content Limits	Items assessing familiar forces are limited to pushes, pulls, friction, gravity, and magnetic force. Items may require the interpretation of only two forces at a time. Items referring to friction will assess the force of friction only as a resistance to movement. Items that assess magnetic attraction will not use the context of separating mixtures and solutions.

Benchmark SC.5.P.13.2	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 13: Forces and Changes in Motion**
Benchmark	**SC.5.P.13.2: Investigate and describe that the greater the force applied to it, the greater the change in motion of a given object.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will • describe that the amount of force applied to an object affects the speed at which it moves; and • recognize that force affects the direction an object moves.
Content Limits	Items will not require mathematical computations above grade level. Items may require the identification of the direction of motion but not the magnitude of motion. Items assessing forces applied to objects are limited to pushes, pulls, and friction. Scenarios should use Newtons (N) as the unit of measure for forces.

Benchmark SC.5.P.13.3	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 13: Forces and Changes in Motion**
Benchmark	**SC.5.P.13.3: Investigate and describe that the more mass an object has, the less effect a given force will have on the object's motion.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will explain that objects with greater mass require more force to move compared with objects with less mass. Students will explain that more force is required to slow down an object in motion with greater mass compared with an object with less mass.
Content Limits	Scenarios should use Newtons (N) as the unit of measure for forces. Items will demonstrate Newton's laws of motion but items will not require students to identify the laws.

Benchmark SC.5.P.13.4	
Body of Knowledge/ Strand	**Physical Science**
Standard	**Big Idea 13: Forces and Changes in Motion**
Benchmark	**SC.5.P.13.4: Investigate and explain that when a force is applied to an object but it does not move, it is because another opposing force is being applied by something in the environment so that the forces are balanced.**
Common Core State Standard Connections	Indicate appropriate alignments to the Grade 5 CCSS Mathematics and/or Literacy Standards for Science whenever applicable. (See Appendix B.)
Benchmark Clarifications	Students will explain that when an object does not move, opposing forces are holding the object in place (e.g., a book laying on a table is being acted upon by the table pushing up on the book from below and gravity pushing down from above).
Content Limits	Items may include diagrams showing balanced forces. Scenarios should use Newtons (N) as the unit of measure for forces.

Appendix A: Sample Items

Sample Item 1

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
4/Science	SR	2	SC.4.N.1.1: Raise questions about the natural world, use appropriate reference materials that support understanding to obtain information (identifying the source), conduct both individual and team investigations through free exploration and systematic investigations, and generate appropriate explanations based on those explorations.	n/a	1

A student is performing an experiment with three objects made of different metals: an aluminum can, an iron nail, and a copper wire. She touches each metal object to a bar magnet and slowly lifts up the magnet. The student records her observations.

Which question is the student **most** likely testing?

A. Can a magnet lift metal objects?

B. Are certain types of metals attracted to magnets?*

C. Are heavier metal objects more attracted to magnets?

D. Is it easier for a magnet to lift metal objects with less mass?

Correct Answer: B

Rationales:

A	Incorrect. Some students may select this response because objects are being lifted with the magnet. However, it is not likely that the student in the scenario is testing whether a magnet can lift metal objects as she selected objects made of three different types of metal.
B	Correct.
C	Incorrect. Some students may select this response because the objects being tested may have different masses. However, it is not likely that the student in the scenario is testing whether heavier objects are more attracted to magnets as she does not measure the mass of any of the objects and all of the objects are different.
D	Incorrect. Some students may select this response because it is logical to assume that it is easier to lift objects with less mass. However, it is not likely that the student in the scenario is testing whether the magnet can lift objects with less mass as she does not measure the mass of the objects and all of the objects are different.

Sample Item 2

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
3/Science	SHR	1	SC.3.P.10.1: Identify some basic forms of energy such as light, heat, sound, electrical, and mechanical.	n/a	1

A student turns on a radio that is plugged into the wall. What form of energy allows a radio plugged into an outlet to work?

Correct answer: Electrical

Rationales:

Correct Answer	Electrical energy travels from the power outlet through the cord and into the radio making it work.

A. Sample Item 3

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
5/Science	CR	2	SC.5.E.5.2: Recognize the major common characteristics of all planets and compare/contrast the properties of inner and outer planets.	LACC.4.W.3.8: 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.	2

The inner and outer planets of the solar system have different characteristics. Compare and contrast the characteristics of the inner and outer planets.

Scoring Rubric and Exemplar

Rubric	
2	A score of two indicates that the student has demonstrated a thorough understanding of the scientific concepts and/or procedures embodied in the task. The student has completed the task correctly, in a scientifically sound manner. When required, student explanations and/or interpretations are clear and complete. The response may contain minor flaws that do not detract from the demonstration of a thorough understanding.
1	A score of one indicates that the student has provided a response that is only partially correct. For example, the student may arrive at an acceptable conclusion or provide an adequate interpretation but may demonstrate some misunderstanding of the underlying scientific concepts and/or procedures. Conversely, a student may arrive at an unacceptable conclusion or provide a faulty interpretation but could have applied appropriate and scientifically sound concepts and/or procedures.
0	A score of zero indicates that the student has not provided a response or has provided a response that does not demonstrate an understanding of the scientific concepts and/or procedures embodied in the task. The student's explanation may be uninterpretable, lack sufficient information to determine the student's understanding, or contain clear misunderstandings of the underlying scientific concepts and/or procedures, or it may be incorrect.

Exemplar	
2	A complete student response should correctly describe one similarity and one difference between the inner and outer planets. For example: all planets have mass, gravity, and orbit the sun. The outer planets are larger than the inner planets and have more moons. The inner planets are rocky while the outer planets are more gaseous.

A. Sample Item 4

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
5	ER	3	SC.5.L.14.2: Compare and contrast the function of organs and other physical structures of plants and animals, including humans, for example: some animals have skeletons for support—some with internal skeletons others with exoskeletons—while some plants have stems for support.	LACC.4.W.3.8: 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.	4

Some features of plants and animals have similar functions. Describe two ways that an animal skeleton is like a plant stem. Describe two ways that an animal skeleton is different from a plant stem.

Scoring Rubric and Exemplar

Rubric	
4	A score of four indicates that the student has demonstrated a thorough understanding of the scientific concepts and/or procedures embodied in the task. The student has completed the task correctly, used scientifically sound procedures, and provided clear and complete explanations and interpretations. The response may contain minor flaws that do not detract from a demonstration of a thorough understanding.
3	A score of three indicates that the student has demonstrated an understanding of the scientific concepts and/or procedures embodied in the task. The student's response to the task is essentially correct but the scientific procedures, explanations, and/or interpretations provided are not thorough. The response may contain minor flaws that reflect inattentiveness or indicate some misunderstanding of the underlying scientific concepts and/or procedures.
2	A score of two indicates that the student has demonstrated only a partial understanding of the scientific concepts and/or procedures embodied in the task. Although the student may have arrived at an acceptable conclusion or provided an adequate interpretation of the task, the student's work lacks an essential understanding of the underlying scientific concepts and/or procedures. The response may contain errors related to misunderstanding important aspects of the task, misuse of scientific procedures/processes, or faulty interpretations of results.
1	A score of one indicates that the student has demonstrated a very limited understanding of the scientific concepts and/or procedures embodied in the task. The student's response is incomplete and exhibits many flaws. Although the student's response has addressed some of the conditions of the task, the student has reached an inadequate conclusion and/or provided reasoning that is faulty or incomplete. The response exhibits many flaws or may be incomplete.
0	A score of zero indicates that the student has not provided a response or has provided a response that does not demonstrate an understanding of the scientific concepts and/or procedures embodied in the task. The student's explanation may be uninterpretable, lack sufficient information to determine the student's understanding, or contain clear misunderstandings of the underlying scientific concepts and/or procedures, or it may be incorrect.

Exemplar	
4	A full-credit student response would correctly provide four key points of information: two ways that an animal skeleton is like a plant stem and two ways that it is different.

Sample Item 5

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
4/Science	ESR	3	SC.4.P.10.1: Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion.	LACC.4.W.3.8: 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.	6

Sometimes energy is present in more than one form at a time. Identify the different forms of energy present in each of the following:

1. a drumstick hitting a drum
2. a power outlet
3. a campfire
4. a diver standing on a diving board

Scoring Rubric and Exemplar

Rubric	
6	Complete and correct response is made to all parts of the prompt. Appropriate scientific terminology is used. There are no major conceptual errors, though there may be nondetracting minor errors. In-depth understanding of the scientific concepts applicable to the prompt is demonstrated. Thorough understanding of the connection between the scientific concepts and the real-life application is demonstrated.
5	Complete and correct response is made to all parts of the prompt. Appropriate scientific terminology is used correctly. There are no major conceptual errors, though there may be minor conceptual errors. Understanding of the scientific concepts applicable to the prompt is demonstrated. Connections are made between the scientific concepts and real-life application.
4	Complete and correct response is made to all parts of the prompt. There are minor errors in the use of scientific terminology. There are minor conceptual errors or omissions. The response may attempt connections between the scientific concepts and real-life application.
3	Response to two or more parts of the prompt is attempted. There is limited use of scientific terminology. Response contains some major conceptual errors or omissions. Response shows limited understanding.
2	Response to one or more parts of the prompt is attempted. The use of scientific terminology may be missing. Response contains many major conceptual errors and omissions. Response shows minimal understanding.
1	Little attempt to answer the prompt is evident. Scientific terminology is missing. Response contains many major conceptual errors and omissions. Explanation shows no understanding.
0	Response addresses an entirely different prompt or is completely unintelligible.

Exemplar	
6	**A full-credit student response should contain similar points of information that are presented in a logical flow of ideas that is similar to the following:** When a drumstick hits a drum, there is energy of motion and sound. A power outlet has electrical energy and stored energy if an object that has been plugged in is not in use. A campfire has heat and light energy. It also has chemical energy because something is burning. A diver standing on a diving board has stored energy until he or she dives, and then it will change to energy of motion.

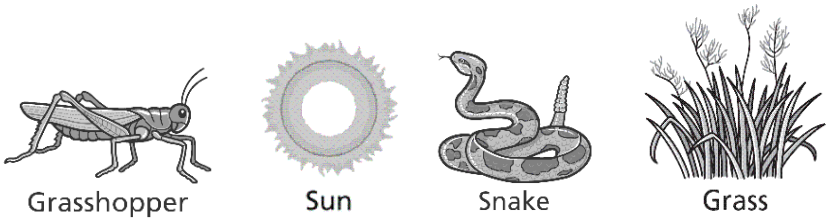
Sample Item 6

Grade/Course	Item Type	DOK	NGSSS Benchmark	CCSS Benchmark	Point Value
4/Science	PT	2	SC.4.L.17.3: Trace the flow of energy from the Sun as it is transferred along the food chain through the producers to the consumers.	LACC.4.WHST.3.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.	3

All living things need energy to survive. They get energy from food. Some living things make their own food using energy directly from the sun, while some living things get energy by eating other living things.

Student Instructions:

Conduct research in the library or on the Internet, using scientific texts, on food chains. After you have researched food chains, look at the pictures below.



Construct a food chain using the organisms and Sun shown. Cut out each picture then order the organisms and the Sun to show the flow of energy. Use arrows to show the direction of energy flow from one object to the next.

Place/Clip/Paste your diagram here:

Scoring Rubric and Exemplar

Teacher Instructions:

The following task will ask students to research scientific texts, either in the library or online, and then build a simple food chain using the knowledge from their research.

Scoring Rubric and Exemplar	
3	A full-credit student response would correctly diagram all four objects in a food chain showing the flow of energy between them. Sun → Grass → Grasshopper → Snake

Appendix B: Common Core State Standard Connections

A. Grade 3 Reading Standards for Literacy in Science and Technical Subjects

LACC.3.RI.1.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
LACC.3.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 3 topic or subject area*.
LACC.3.RI.4.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.
LACC.3.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 *topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.

B. Grade 3 Writing Standards for Literacy in Science and Technical Subjects

LACC.3.W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

C. Grade 3 Mathematics Standards in Science and Technical Subjects

MACC.3.MD.1.2	Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.
MACC.3.MD.2.4	Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

D. Grade 4 Reading Standards for Literacy in Science and Technical Subjects

LACC.4.RI.1.3	Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.
LACC.4.RI.2.4	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*.
LACC.4.RI.4.10	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.
LACC.4.SL.1.1	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 (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.

E. Grade 4 Writing Standards for Literacy in Science and Technical Subjects

LACC.4.W.3.8	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.
LACC.4.W.3.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 4 Reading standards to literature (e.g., "Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character's thoughts, words, or actions]."). b. Apply grade 4 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text").

F. Grade 4 Mathematics Standards in Science and Technical Subjects

MACC.4.MD.1.1	Know relative sizes of measurement units within one system of units including 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. *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), ...*
MACC.4.MD.2.4	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.*

G. Grade 5 Reading Standards for Literacy in Science and Technical Subjects

LACC.5.RI.1.3	Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
LACC.5.RI.2.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.
LACC.5.RI.4.10	By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 4–5 text complexity band independently and proficiently.
LACC.5.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 *topics and texts*, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). c. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others. d. Explain their own ideas and understanding in light of the discussion.

H. Grade 5 Writing Standards for Literacy in Science and Technical Subjects

LACC.5.W.3.8	Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.
LACC.5.W.3.9	Draw evidence from literary or informational texts to support analysis, reflection, and research. a. Apply grade 5 Reading standards to literature (e.g., "Compare and contrast two or more characters, settings, or events in a story or a drama, drawing on specific details in the text [e.g., how characters interact]"). b. Apply grade 5 Reading standards to informational texts (e.g., "Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]").

I. Grade 5 Mathematics Standards in Science and Technical Subjects

MACC.5.G.1.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).
MACC.5.MD.2.2	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*