OKLAHOMA SCHOOL TESTING PROGRAM
OKLAHOMA MODIFIED ALTERNATE ASSESSMENT PROGRAM

Test and Item Specifications

Science
Grade 5

OKLAHOMA
STATE DEPARTMENT of EDUCATION
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Oklahoma State Department of Education
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OKLAHOMA MODIFIED ALTERNATE ASSESSMENT PROGRAM

TEST AND ITEM SPECIFICATIONS

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Purpose

The purpose of the Grade 5 Science Test is to measure Oklahoma students' level of proficiency. On this test, students are required to respond to a variety of items linked to the fifth-grade science process standards identified in the *Priority Academic Student Skills (PASS)* version 2002. All Science test forms will assess the identified standards and objectives listed below. The following standards and objectives are intended to summarize the knowledge as identified in *PASS*.

***PASS* Process Standards and Objectives**
Observe and Measure • SI Metric (P1.1) • Similar/different characteristics (P1.2)
Classify • Observable properties (P2.1) • Serial order (P2.2)
Experiment • Experimental design (P3.2) • Hazards/safety practices (P3.4)
Interpret and Communicate • Data tables/line/bar/trend/circle graphs (P4.2) • Prediction based on data (P4.3) • Explanations based on data (P4.4)

***PASS* Content Standards and Objectives**
Properties of Matter and Energy • Matter has physical properties (C1.1) • Physical properties can be measured (C1.2) • Energy can be transferred (C1.3)
Organisms and Environments • Dependence upon community (C2.1) • Individual organism and species survival (C2.2)
Structures of the Earth and the Solar System • Weather patterns (C3.2) • Earth as a planet (C3.3)

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General Considerations

It is necessary to create test items that are reliable, fair, and targeted to the PASS standards listed on the following pages. There are some general considerations and procedures for effective item development. These considerations include, but are not limited to, the following:

1. Each test form contains items assessing all process/inquiry and content standards and objectives listed in the Test Blueprint for fifth-grade science. In the *Priority Academic Student Skills* (*PASS*) document, asterisks have been used to identify standards and objectives that must be assessed by the local school district.

2. Test items attempt to focus on content that is authentic and that fifth-grade students can relate to and understand.

3. Test items are worded precisely and clearly. The better focused an item, the more reliable and fair it is certain to be, and the more likely all students will understand what is required of them.

4. All items are reviewed to eliminate language that shows bias or is otherwise likely to disadvantage a particular group of students. That is, items do not display unfair representations of gender, race, ethnicity, disability, culture, or religion; nor do items contain elements that are offensive to any such groups.

5. All multiple-choice items (the key and all distractors) are similar in length and syntax. Students should not be able to rule out a wrong answer or identify a correct response solely because it looks or sounds different from the other answer choices. Distractors are created so that students reason their way to the correct answer rather than simply identify incorrect responses because of a distractor's obviously inappropriate nature. Distractors should always be plausible (but incorrect) in the context of the item stem. Correct responses are approximately equally distributed among A's, B's, and C's.

Universal Test Design Considerations

Universal design, as applied to assessments, is a concept that allows the widest possible range of students to participate in assessments and may even reduce the need for accommodations and alternative assessments by expanding access to the tests themselves. In the Oklahoma Modified Alternate Assessment Program, modifications have been made to some items that simplify and clarify instructions, and provide maximum readability, comprehensibility, and legibility.

Universal Modifications
• Minimize the number of questions on the page (limit to 2 or 3) • Use a larger font size • Provide only three answer options instead of four • Highlight the main points in the question or passage by underlining and using boldface • Allow for the same accommodations as in the standard assessment • Avoid questions that require students to select the better/best answer • Eliminate answer choice that give students the option of making no changes to the item • Be consistent in wording of directions across grades and subjects • Minimize the use of pronouns and prepositional phrases • Avoid the use of multiple-meaning words and words that can function as more than one part of speech • Enlarge art when possible • Simplify art when possible, (i.e. removing unnecessary labels, use less gray scale, use thicker lines when outlining, etc.) • Box informational text in an item • Bullet information when possible (e.g. bullet detailed information or processes) • Reduce reading load of stem, stimuli, and answer options when possible • Use Verdana font • Revise answer options to address parallelism and minimize outliers
Science Items
• Reduce the amount of reading • Avoid complicated art • Simplify tables and charts by removing irrelevant rows or columns • Box formulas to make them stand out • Answer options align to content and process • Simplify reading load, including vocabulary, when possible • No stimuli sets • Delete cluster items, negative items, and items that cannot be modified based on guidelines • Delete extraneous information including irrelevant material and unnecessary words in items or graphics

- Simplify complex sentence structure and vocabulary in item and answer choices without eliminating science vocabulary
- Change passive voice to active voice when appropriate
- Change item from an open-ended statement to a direct question or vice versa, as necessary, for clarification
- Add precise language to provide additional context for clarification
- Use consistent language within an item in order to focus student attention on what is being asked
- Revise text as necessary to maintain the authenticity and logic of the item due to modifications
- Use bullets to clearly organize complex items into smaller, meaningful parts
- Direct student attention to graphics
- Simplify visual complexity of graphics
- Provide new text and/or reorganize existing text within the question to explain or clarify the graphic; science content must remain accurate
- Provide additional graphics to support text, emphasize ideas, and facilitate comprehension
- Reduce the number of variables and simplify digits in item when appropriate
- Limit the number of steps and/or operations in multi-step problems
- Provide appropriate formula and/or conversion near the item

Example of Item Modification for OMAAP Science

OCCT *PASS* Sample Item:

Content Objective: 3.2
Process Objective: 2.1
Depth of Knowledge: 3
Correct Answer: A

Students are asked to identify the clouds they saw one afternoon. The students observed that the clouds were low in the sky and were light gray. The students could not see any blue sky through the clouds.

Identification Key

Line	Characteristics	Identification
1a	clouds are low in the sky	go to 2
1b	clouds are high in the sky	go to 3
2a	clouds are gray	go to 4
2b	clouds are white or gray and white	go to 5
3	clouds are feathery	cirrus
4a	clouds are light gray and cover the sky like a blanket	stratus
4b	clouds are dark gray and hide the Sun; it is raining continuously	nimbus
5a	clouds are puffy like cotton balls	cumulus
5b	clouds are large, puffy, and tall like a tower; there may be a thunderstorm	cumulonimbus

Which cloud type was <u>most likely</u> observed by the students?

A stratus
B nimbus
C cumulus
D cumulonimbus

Modified *PASS* Sample Item:

Content Objective: 3.2
Process Objective: 2.1
Depth of Knowledge: 2
Correct Answer: C

Students are asked to identify the clouds they observed from their classroom. The clouds are low and are blocking the sun. It has just started to rain lightly.

Identification Key

Step		Characteristics	Identification
1	a	clouds are low in the sky	go to 2
	b	clouds are high in the sky	go to 3
2	a	clouds are lighty gray and cover the sky like a blanket	stratus
	b	clouds are dark gray and hide the Sun; it may be raining continuously	nimbostratus
3		clouds are feathery	cirrus

Which type of clouds are observed by the students?

A cirrus
B stratus
C nimbus

Multiple-Choice Item Rules

- All items clearly indicate what is expected in a response and help students focus on their response.
- Each multiple-choice item has a stem (question, statement, or incomplete statement and/or graphic component) and three answer (or completion) options, only one of which is correct.
- Multiple-choice item stems present a complete problem so that students know what to do before looking at the answer choices; students should not need to read all answer choices before knowing what is expected.
- Art incorporated within an item must be functional and assist the student in determining the correct response.

In summary, science-test items assess whether students: understand scientific concepts and procedures; communicate their understandings effectively in scientific terms; approach problems; and develop viable solutions.

All items developed using these specifications are reviewed by Oklahoma educators and approved by the Oklahoma State Department of Education. The distribution of newly developed or modified items is based on content and process alignment, difficulty, cognitive ability, percentage of art/graphics, and grade level appropriateness as determined by an annual Item Development Plan approved by the Oklahoma State Department of Education.

Test Structure, Format, and Scoring

The test will consist of 40–43 operational multiple-choice items, which will be written at a reading level two grades below a fifth-grade audience and will include three responses from which to choose: the correct answer and two distractors. Of the total items, 5 items are field-test items and do not contribute to the student's scaled score.

Grade 5

Content Assessment	Total Items	Total Operational Items*	Total Field Test Items
Science Grades 5	48	43	5

* The actual number of items scored for a student may be slightly lower pending a review of item statistics.

Each multiple-choice item is scored as correct or incorrect. The student's raw score is converted to a scaled score using the number-correct method.

Test Alignment with PASS

Criteria for Aligning the Test with the *PASS* Standards and Objectives
1. Categorical Concurrence The test is constructed so that there are at least six items measuring each *PASS* standard, with the content category consistent with the related standard. The number of items, six, is based on estimating the number of items that could produce a reasonably reliable estimate of a student's mastery of the content measured.
2. Depth of Knowledge Consistency The test is constructed using items from a variety of Depth of Knowledge levels that are consistent with the processes students need in order to demonstrate proficiency for each *PASS* objective.
3. Range of Knowledge Correspondence The test is constructed so that at least 50% of the objectives for a *PASS* standard are assessed.
4. Balance of Representation The test is constructed according to the Test Blueprint, which reflects the degree of representation given on the test to each *PASS* standard and objective in terms of the percent of total test items measuring each standard and the number of test items measuring each objective.
5. Source of Challenge Each test item is constructed in such a way that the major cognitive demand comes directly from the targeted *PASS* skill or concept being assessed, not from specialized knowledge or cultural background of the test taker.

Oklahoma School Testing Program
Oklahoma Modified Alternate Assessment Program
Grade 5 Science
Test Blueprint
School Year 2010-2011

The Test Blueprint reflects the degree to which each *PASS* standard and objective is represented on the test. The overall distribution of operational items in a test form is intended to look as follows:

PASS **Process Standards and Objectives**	**Ideal Number of Items**	**Ideal[1] Percentage of Items**
Observe and Measure (P1.0)	**8–10**	**19%–23%**
SI Metric (P1.1)	3–5	
Similar/different characteristics (P1.2)	3–5	
Classify (P2.0)	**8–10**	**19%–23%**
Observable properties (P2.1)	3–5	
Serial order (P2.2)	3–5	
Experiment (P3.0)	**9–11**	**21%–26%**
Experimental design (P3.2)	5–7	
Hazards/practice safety (P3.4)	3–5	
Interpret and Communicate (P4.0)	**12–14**	**28%–33%**
Data tables/line/bar/trend and circle graphs (P4.2)	4–6	
Prediction based on data (P4.3)	3–5	
Explanations based on data (P4.4)	3–5	
Total Test	**40–43[2]**	**100%**

1 Percentages are approximations and may result in a sum other than 100 due to rounding.

2 The actual number of items scored for a student may be slightly lower pending a review of item statistics. Student performance on the multiple-choice test will be reported at the standard level.

Oklahoma School Testing Program
Oklahoma Modified Alternate Assessment Program
Grade 5 Science (Continued)
Test Blueprint
School Year 2010-2011

PASS **Content Standards and Objectives**	**Ideal Number of Items**	**Ideal[1] Percentage of Items**
Properties of Matter and Energy (C1.0)	**15–17**	**35%–40%**
Matter has physical properties (C1.1)	4–6	
Physical properties can be measured (C1.2)	4–6	
Energy can be transferred (C1.3)	4–6	
Organisms and Environments (C2.0)	**10–12**	**23%–28%**
Dependence upon community (C2.1)	4–6	
Individual organism and species survival (C2.2)	4–6	
Structures of the Earth and the Solar System (C3.0)	**9–11**	**21%–26%**
Weather patterns (C3.2)	4–6	
Earth as a planet (C3.3)	4–6	
Total Test	**37–40[2]***	**93%****

* Three or four of the 43 total items assess the "Safety" process standard, for which there is no corresponding content standard.

** The approximate percentages are based on the total number of items on a test that are matched to the content standards and do not include items added for safety.

1 Percentages are approximations and may result in a sum other than 100 due to rounding.

2 The actual number of items scored for a student may be slightly lower pending a review of item statistics. Student performance on the multiple-choice test will be reported at the standard level.

Overview of Item Specifications

For each *PASS* standard, item specifications are organized under the following headings:

- *PASS* Standard and *PASS* Objective
- Item Specifications
  a. Emphasis
  b. Stimulus Attributes
  c. Format
  d. Assessment Limits
  e. Content Objectives May Include
  f. Distractor Domain
  g. Sample Test Items

The headings "*PASS* Standard" and "PASS Objective" state the standard and objective being measured as found in the fifth-grade science section of the *PASS* 2002 Version document.

The heading "Item Specifications" highlights important information about the item's development and provides examples to facilitate understanding. All items will measure one process objective and one content objective, with the exception of items for process objective 3.4, which measures safety only. All items will assess objectives using depth-of-knowledge levels 1, 2, or 3.

Note of explanation: i.e. (*id est* – that is) only items mentioned may be assessed. e.g. (*exempli gratia* – for example, for instance) item related to the content may be assessed.

Note about the Item Specifications and Sample Items:

With the exception of content limits, the item specifications give suggestions of what might be included but do not give an exhaustive list of what can be included.

These sample test items are not intended to be definitive in nature or construction, as the stimuli and test items may differ from one test form to another, as may their presentation.

Depth of Knowledge Assessed by Test Items

The Oklahoma Modified Alternate Assessments will, as closely as possible, reflect the following "Depth of Knowledge" (DOK) distribution of items.

Depth of Knowledge	Percentage of Items
Level 1—Recall and Reproduction	20–25%
Level 2—Skills and Concepts	65–70%
Level 3—Strategic Thinking	5–15%

This is the ideal depth of knowledge distribution of items. There may be slight differences in the actual distribution of the upcoming testing session.

Descriptions of the depth-of-knowledge levels for Grade 5 Science are as follows:

Level 1 (Recall and Reproduction) is the recall of information such as a fact, definition, term, or a simple procedure, 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 procedure (like a recipe), or perform a clearly defined series of steps. A "simple" procedure is well-defined and typically involves only **one step**. Verbs such as "identify," "recall," "recognize," "use," "calculate," and "measure" generally represent cognitive work at the recall and reproduction level. Simple word problems that can be directly translated into and solved by a formula are considered Level 1. Verbs such as "describe" and "explain" could be classified at different DOK levels, depending on the complexity of what is to be described and explained.

A student answering a Level 1 item either knows the answer or does not: that is, the answer does not need to be "figured out" or "solved." In other words, if the knowledge necessary to answer an item automatically provides the answer to the item, then the item is at Level 1. If the knowledge necessary to answer the item does not automatically provide the answer, the item is at least at Level 2.

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 a simple phenomenon.
- Perform a routine procedure such as measuring length.

Level 2 (Skills and Concepts) 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. Items require students to make some decisions as to how to approach the question or problem. Keywords that generally distinguish a Level 2 item include "classify," "organize," "estimate," "make observations," "collect and display data," and "compare data." These actions imply **more than one step**. For example, to compare data requires first identifying characteristics of the objects or phenomenon and then grouping or ordering the objects. Level 2 activities include making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

Some action verbs, such as "explain," "describe," or "interpret," could be classified at different DOK levels, depending on the complexity of the action. For example, interpreting information from a simple graph, requiring reading information from the graph, is at Level 2. An item that requires interpretation from a complex graph, such as making decisions regarding features of the graph that need to 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 relationship between facts, terms, properties, or variables.
- 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, represent, and interpret data.

Level 3 (Strategic and Extended Thinking) requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. The cognitive demands of Level 3 are **complex and abstract**. The complexity does not result only from the fact that there could be multiple answers, a possibility for both Levels 1 and 2, but 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 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 Level 3 performances are:

- Identify research questions and design investigations for a scientific problem
- Solve non-routine problems
- Develop a scientific model for a complex situation
- Form conclusions from experimental data

Note – The descriptions are adapted from Review Background Information and Instructions, Standards and Assessment Alignment Analysis, CCSSO TILSA Alignment Study, May 21-24, 2001, Version 2.0.

For an extended description of each Depth of Knowledge level, see the student assessment Web site at <http://sde.state.ok.us>

Note about the Item Specifications:

With the exception of content limits, the item specifications give suggestions of what might be included but do not give an exhaustive list of what can be included.

PRIORITY ACADEMIC STUDENT SKILLS (PASS)

Grade 5

Science

Asterisks (*) have been used to identify standards and objectives that must be assessed by the local school district. All other skills may be assessed by the Oklahoma School Testing Program (OSTP).

The skills should be taught by investigating content, concepts, and principles of major themes in Physical, Life, and Earth/Space Science.

Standard 1: Observe and Measure–Observing is the first action taken by the learner to acquire new information about an object, organism, or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.

1. Observe and measure objects, organisms, and/or events (e.g., mass, length, time, volume, temperature) using System International (SI) units (i.e., grams, milligrams, meters, millimeters, centimeters, kilometers, liters, milliliters, and degrees Celsius).
2. Compare and/or contrast similar and/or different characteristics (e.g., color, shape, size, texture, sound, position, change) in a given set of objects, organisms, or events.

Standard 2: Classify–Classifying establishes order. Objects, organisms, and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.

1. Classify a set of objects, organisms, and/or events using two or more observable properties (e.g., simple dichotomous keys).
2. Arrange objects, organisms, and/or events in serial order (e.g., least to greatest, fastest to slowest).

Standard 3: Experiment–Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.

1. *Ask questions about the world and formulate an orderly plan to investigate a question.
2. Evaluate the design of a scientific investigation.
3. *Design and conduct a scientific investigation.
4. Recognize potential hazards and practice safety procedures in all science investigations.

Standard 4: Interpret and Communicate–Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.

1. *Report data using tables, line, bar, trend, and/or simple circle graphs.
2. Interpret data tables, line, bar, trend, and/or simple circle graphs.
3. Make predictions based on patterns in experimental data.
4. Communicate the results of investigations and/or give explanations based on data.

Standard 5: Inquiry–Inquiry can be defined as the skills necessary to carry out the process of scientific or systemic thinking. In order for inquiry to occur, students must have the opportunity to ask a question, formulate a procedure, and observe phenomena. The student will accomplish these objectives to meet this process standard.

1. *Use different ways to investigate questions and evaluate the fairness of the test.
2. *Use a variety of measurement tools and technology.
3. *Formulate a general statement to represent the data.
4. *Share results of an investigation in sufficient detail so that data may be combined with data from other students and analyzed further.

PRIORITY ACADEMIC STUDENT SKILLS

PHYSICAL SCIENCE

Standard 1: Properties of Matter and Energy–Describe characteristics of objects based on physical qualities such as size, shape, color, mass, temperature, and texture. Energy can produce changes in properties of objects such as changes in temperature. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

1. Matter has physical properties that can be used for identification (e.g., color, texture, shape).
2. Physical properties of objects can be observed, described, and measured using tools such as simple microscopes, gram spring scales, metric rulers, metric balances, and Celsius thermometers).
3. Energy can be transferred in many ways (e.g., energy from the sun to air, water, and metal).

LIFE SCIENCE

Standard 2: Organisms and Environments–Organisms within a community are dependent on one another and the environment. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

1. Organisms in a community, interacting populations in a common location, depend on each other for food, shelter, and reproduction.
2. Changes in environmental conditions due to human interactions or natural phenomena can affect the survival of individual organisms and/or entire species.

EARTH/SPACE SCIENCE

Standard 3: Structure of Earth and the Solar System–Interaction between air, water, rocks/soil, and all living things. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:

1. *Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers.
2. Weather exhibits daily and seasonal patterns (i.e., air temperature, cloud type, wind direction, wind speed, and precipitation).
3. Earth is the third planet from the Sun in a system that includes the moon, the Sun, and eight other planets.

Process Standard:

Standard 1: Observe and Measure – Observing is the first action taken by the learner to acquire new information about an object, organism, or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.

Process Objective:

1. Observe and measure objects, organisms, and/or events (e.g., mass, length, time, volume, temperature) using Systems International (SI) units (i.e., grams, milligrams, meters, millimeters, centimeters, kilometers, liters, milliliters, and degrees Celsius).

Item Specifications:

Emphasis:

- Recognize and select units of measurement and/or measurement using SI units as appropriate.

Stimulus Attributes:

- Test items may include illustrations and descriptions.

Format:

- Identify appropriate type of SI units for measurements.
- Identify appropriate type of SI prefixes within a type of measurement.
- Identify accurate measurements using SI units.

Assessment Limits:

- Test items are limited to Systems International (SI) units listed in the objective above. Students will determine the correct unit of measurement for a particular object, organism, event, or the correct measurement tool.
- All metric – No conversions between metric and English units.
  Exception: Air temperature measurements, when used in a weather context, will be in °F.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

Distractor Domain:

- Incorrect use of metric unit
- Incorrect metric measure
- Incorrect measurement tool

Modified *PASS* Sample Item:

Process Objective: 1.1
Content Objective: 1.2
Depth of Knowledge: 1
Correct Answer: B

What is the height of the plant?

A 17 centimeters
B 27 centimeters
C 30 centimeters

Process Standard:

Standard 1: Observe and Measure–Observing is the first action taken by the learner to acquire new information about an object, organism, or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.

Process Objective:

2. Compare and/or contrast similar and/or different characteristics (e.g., color, shape, size, texture, sound, position, change) in a given set of objects, organisms, or events.

Item Specifications:

Emphasis:

- Compare similar and/or different characteristics (e.g., color, shape, size, texture) in a given set of objects or organisms.
- Compare observable characteristics.

Stimulus Attributes:

- Test items may include illustrations, graphs, and data tables.

Format:

- Use observable characteristics to compare similarities and/or differences in a given set of objects or organisms.

Assessment Limits:

- Test items are limited to compare similar and/or different characteristics. Students make comparisons between two sets of objects or organisms in terms of similar or different characteristics. Students also make comparisons within a single set of objects or organisms in terms of similar or different characteristics.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

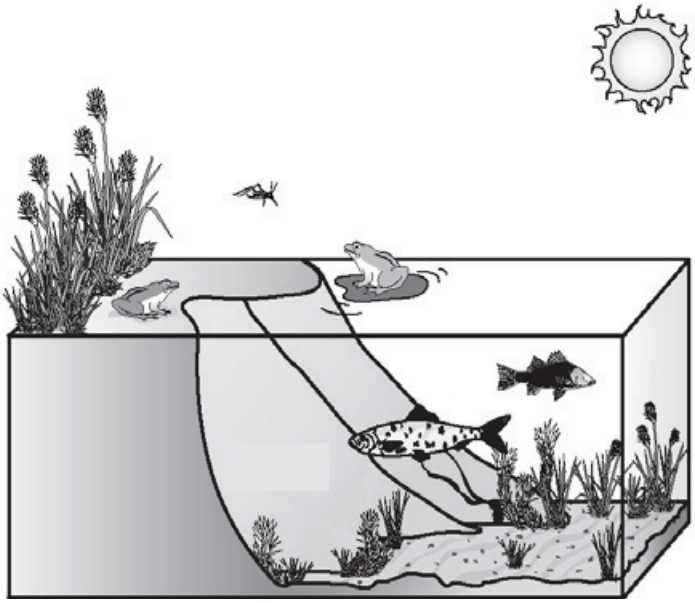
Distractor Domain:

- Shared characteristics
- Not shared characteristics

Modified *PASS* Sample Item:

Process Objective: 1.2
Content Objective: 2.1
Depth of Knowledge: 2
Correct Answer: C

A Food Web



Which organism in this food web gets its energy directly from the Sun?

Ⓐ fish
Ⓑ frog
Ⓒ plant

Process Standard:

Standard 2: Classify - Classifying establishes order. Objects, organisms, and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.

Process Objective:

1. Classify a set of objects, organisms, and/or events using two or more observable properties (e.g., simple dichotomous keys).

Item Specifications:

Emphasis:

- Apply classification skills based on observations. Place objects, organisms, and/or events into a classification system using observable properties.

Stimulus Attributes:

- Test items may include illustrations, data tables, graphs, and classification keys including simple dichotomous keys.

Format:

- Use a simple dichotomous key to place objects and organisms into a classification system.
- Identify similar and/or different characteristics used to classify objects, organisms, and/or events into a classification system.

Assessment Limits:

- Test items assess only observable properties that are presented in the graphics or written descriptions. Test items may include one or more objects or organisms that the student must correctly place in a classification scheme based on observable properties.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

Distractor Domain:

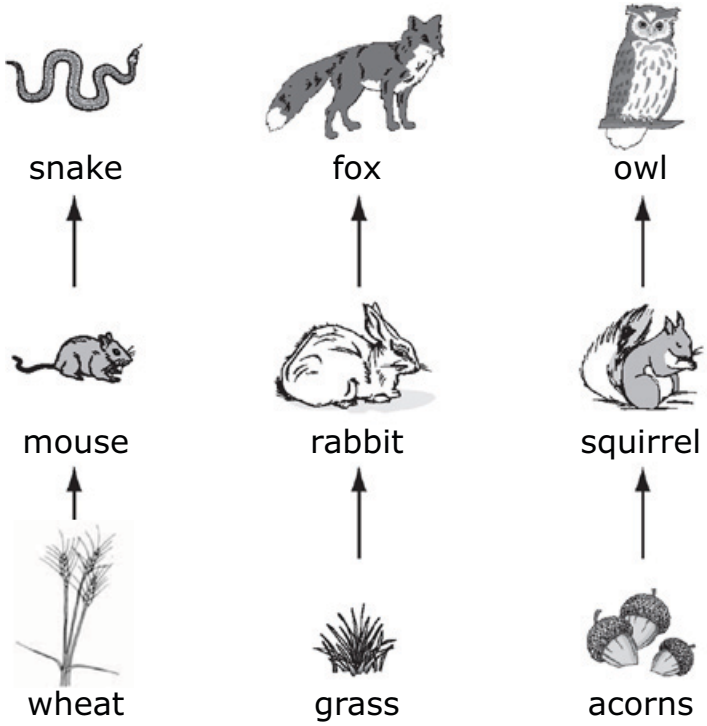
- Objects or organisms that do not fit into the classification scheme in question

Modified *PASS* Sample Item:

Process Objective: 2.1
Content Objective: 2.1
Depth of Knowledge: 2
Correct Answer: B

Characteristics of Organisms in Land Ecosystems

Produce	Organisms that produce their own energy
Consumers	Organisms that must consume other organisms for energy



Which of these organisms are only consumers?

(A) mouse, wheat, owl
(B) snake, rabbit, squirrel
(C) wheat, grasses, acorns

Modified *PASS* Sample Item:

Process Objective: 2.1
Content Objective: 3.2
Depth of Knowledge: 2
Correct Answer: C

Students are asked to identify the clouds they observed from their classroom. The clouds are low and are blocking the sun. It has just started to rain lightly.

Identification Key

Step		Characteristics	Identification
1	a	clouds are low in the sky	go to 2
	b	clouds are high in the sky	go to 3
2	a	clouds are lighty gray and cover the sky like a blanket	stratus
	b	clouds are dark gray and hide the Sun; it may be raining continuously	nimbus
3	a	clouds are feathery	cirrus

Which type of clouds are observed by the students?

A cirrus
B stratus
C nimbus

Process Standard:

Standard 2: Classify - Classifying establishes order. Objects, organisms, and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard.

Process Objective:

2. Arrange objects, organisms, and/or events in serial order (e.g., least to greatest, fastest to slowest).

Item Specifications:

Emphasis:

- Use given properties to select a serial order or determine proper placement in the order for objects, organisms, and/or events.

Stimulus Attributes:

- Test items may include illustrations, data tables, and graphs.

Format:

- Identify properties by which a set of objects, organisms, and/or events are ordered.
- Order a set of objects, organisms, and/or events.

Assessment Limits:

- Test items are limited to serial order. Items may include a set of misordered objects, organisms, or events that students must reorder in the correct sequence.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

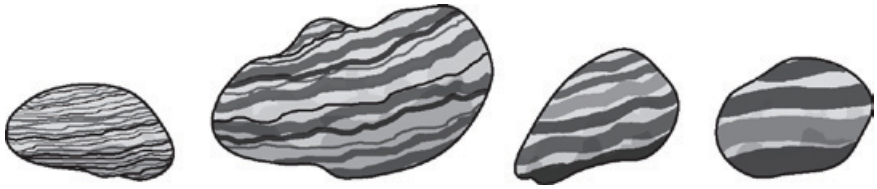
Distractor Domain:

- Objects, organisms, events that are out of correct sequence

Modified *PASS* Sample Item:

Process Objective: 2.2
Content Objective: 1.1
Depth of Knowledge: 1
Correct Answer: C

Jarrett used one property to place the rock samples in the order shown.



Which property of the rocks did Jarrett use?

Ⓐ size of the rock
Ⓑ shape of the rock
Ⓒ thickness of the rock's layers

Process Standard:

Standard 3: Experiment - Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.

Process Objective:

2. Evaluate the design of a scientific investigation.

Item Specifications:

Emphasis:

- Identify the design of a scientific investigation.
- Sequence steps in logical progression and determine what steps are not needed or have been left out; identify correct and incorrect scientific procedures; identify purpose of experiments.

Stimulus Attributes:

- Test items include a scenario of an experimental design and may include illustrations, graphs, and data tables.

Format:

- Determine the correct order for the steps of an experiment.
- Identify errors in experimental design.
- Identify appropriate graphical representations of data.
- Identify necessary and/or unnecessary steps in an experiment.
- Identify testable hypotheses.
- Determine specific steps of an experiment.

Assessment Limits:

- Test items are limited to determining what procedures are necessary and in what order they should be performed. Items may include identifying what is missing in a simple experimental procedure and steps of a scientific investigation listed in an incorrect order that the student must correctly reorder.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

Distractor Domain:

- Incorrectly ordered steps to the scientific problem
- Inappropriate experimental procedures
- Incorrect purpose for experiment

Modified *PASS* Sample Item:

Process Objective: 3.2
Content Objective: 2.2
Depth of Knowledge: 2
Correct Answer: B

Kara performed the following steps in her investigation.

Investigation Steps
1. Obtain two bowls with equal amounts of bread dough containing yeast.
2. Place one bowl in a warm place and the other bowl in a cool place.
3. Observe the size of the dough in each bowl.
4. After four hours, observe the size of the dough in each bowl.
5. Record your observations.

Kara determined the dough in the bowl in the warmer place was larger than the dough in the bowl in the cooler place.

What was Kara trying to find out with her investigation?

A If light affects how yeast grows.
B If temperature affects how yeast grows.
C If the size of the bowl affects how yeast grows.

Process Standard:

Standard 3: Experiment - Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard.

Process Objective:

4. Recognize potential hazards and practice safety procedures in all science investigations.

Item Specifications:

Emphasis:

- Identify potential hazards in science activities. Be aware of unsafe practices and appropriate procedures in science investigations conducted in the laboratory and/or field.

Stimulus Attributes:

- Test items may include illustrations and written descriptions.

Format:

- Identify potential safety hazards in science activities.
- Identify appropriate safety equipment for science activities.
- Identify appropriate safety procedures in science activities.

Assessment Limits:

- Test items are limited to hazards and safety procedures in science activities. Items may include grade-appropriate situations or problems reflecting potential dangers related to science activities. Items may ask students to select the appropriate safety practice to follow.

Content Objectives May Include:

- Items for this objective test safety only. They do not assess content knowledge.

Distractor Domain:

- Wrong safety hazard
- Not a safety concern
- Wrong safety procedure
- Not a safety procedure

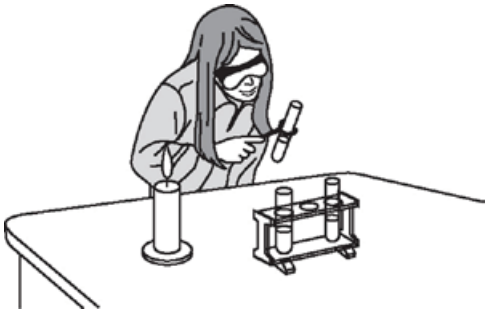
Modified *PASS* Sample Item:

Process Objective: 3.4
Content Objective: None
Depth of Knowledge: 1
Correct Answer: B

Which picture shows a student being unsafe in the laboratory?

A

B



C

Process Standard:

Standard 4: Interpret and Communicate–Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.

Process Objective:

2. Interpret data tables, line, bar, and/or simple circle graphs.

Item Specifications:

Emphasis:

- Recognize data tables, line, bar, and/or simple circle graphs.
- Apply basic thinking skills to interpret graphical data.

Stimulus Attributes:

- Test items may include data tables, line, bar, and/or simple circle graphs.

Format:

- Recognize trends in data.
- Interpret graphical representations of data.
- Identify data from graphical representations to determine missing data values.

Assessment Limits:

- Test items are limited to the interpretation of data tables, line, bar, and/or simple circle graphs. Items provide a data table, line, bar, or simple circle graph for students to interpret.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

Distractor Domain:

- Quantitative errors due to incorrect interpretations of graphs
- Qualitative errors due to incorrect interpretations of graphs

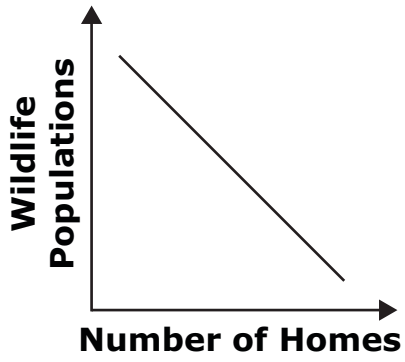
Modified *PASS* Sample Item:

Process Objective: 4.2
Content Objective: 2.2
Depth of Knowledge: 2
Correct Answer: A

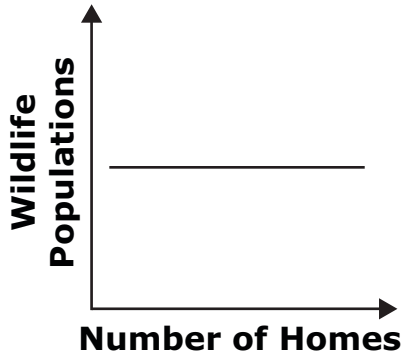
More homes are being built in places where animals live. This can cause the number of animals living in those areas to decrease.

Which graph shows the relationship between the number of homes to the wildlife population?

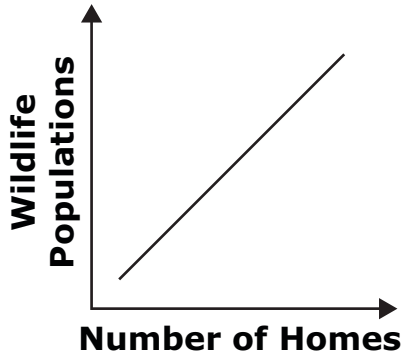
A



B



C



Process Standard:

Standard 4: Interpret and Communicate - Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.

Process Objective:

3. Make predictions based on patterns in experimental data.

Item Specifications:

Emphasis:

- Demonstrate the ability to make predictions on simple patterns based on evidence within given data.

Stimulus Attributes:

- Test items may include data tables, graphs, illustrations, or written descriptions.

Format:

- Use simple patterns and trends in data to make predictions.

Assessment Limits:

- Test items are limited to predictions based on simple patterns. Students use data in a table, graph, or written description to make a prediction about an experiment or event.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

Distractor Domain:

- Logic errors (e.g., errors in computation, sequence, order, and patterns)
- Misreading of data

Modified *PASS* Sample Item:

Process Objective: 4.3
Content Objective: 2.2
Depth of Knowledge: 2
Correct Answer: A

Troy placed male and female fish in three tanks on January 8. Four months later, on May 8, he counted the number of male and female fish in each tank. The data are shown below.

Number of Fish in Three Tanks

Tank #	January 8		May8	
	Males	Females	Males	Females
1	2	3	21	26
2	0	5	0	4
3	5	0	5	0

If no fish are added in the next four months, about how many fish will be in Tank 3 on September 8?

A 0 to 5 male fish
B 0 to 4 female fish
C 6 to 10 male and female fish

Process Standard:

Standard 4: Interpret and Communicate - Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.

Process Objective:

4. Communicate the results of investigations and/or give explanations based on data.

Item Specifications:

Emphasis:

- Given experimental data, students will clearly communicate results of experiments or events.

Stimulus Attributes:

- Test items may include illustrations, data tables, line, bar, and/or simple circle graphs.

Format:

- Interpret data to develop scientific explanations.

Assessment Limits:

- Test items are limited to communicating results of experiments or events. Items use graphs, data tables, drawings, or written descriptions that students interpret and communicate.

Content Objectives May Include:

- Items may be written to assess any of the content objectives.

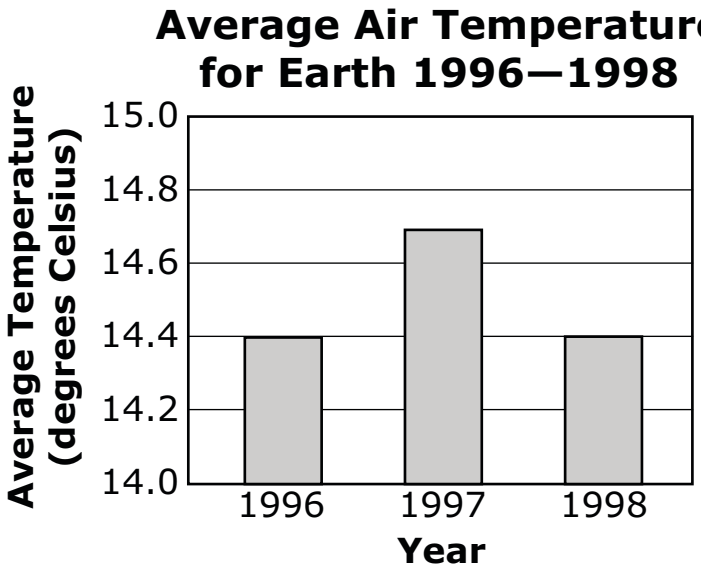
Distractor Domain:

- Logic errors (e.g., errors in computation, sequence, order, and patterns)
- Misinterpretation of data
- Ineffective or inaccurate communication of results
- Incorrect conclusions

Modified *PASS* Sample Item:

Process Objective: 4.4
Content Objective: 3.2
Depth of Knowledge: 2
Correct Answer: C

The graph shows the average air temperatures for Earth from 1996 to 1998.



During this period of time, Earth's air temperatures were

Ⓐ going up.
Ⓑ going down.
Ⓒ going up and then down.

Process Standard:

Standard 1: Properties of Matter and Energy—Describe characteristics of objects based on physical qualities such as size, shape, color, mass, temperature, and texture. Energy can produce changes in properties of objects such as changes in temperature. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Process Objective:

1. Matter has physical properties that can be used for identification (e.g., color, texture, shape).

Item Specifications:

Emphasis:

All objects have physical properties. Physical properties can be used to identify, organize, and classify objects. Physical properties can be changed by physical means. Energy is required to produce physical changes. The total amount of matter is the same before and after a change.

Stimulus Attributes:

Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:

- Identify physical properties (e.g., size, mass, shape, color, texture, hardness, density, phase changes, boiling point, melting point, and freezing point) for an object or group of objects.
- Identify correct Systems International (SI) unit used to observe, measure, and/or describe a physical property.
- Recognize that the mass of an object is equal to the sum of its parts after a physical change.
- Classify objects based on the identification of physical properties.
- Compare physical properties and describe the materials from which objects are made (e.g., color, texture, and hardness).
- Compare rates of change in physical properties given data or graphs (e.g., rate of melting of ice and candy with the same amount of heat applied, rate of melting of ice at different room temperatures).
- Predict changes or absence of changes in physical properties of objects caused by physical processes (e.g., changes in state of matter caused by changes in temperature, changes in shape caused by breaking, total mass remains the same after a physical change, different rates of change in different objects or materials).
- Infer the cause of a change in a physical property, such as cutting, heating, melting, grinding, or polishing.
- Infer the source of energy for a given physical change.
- Analyze groups of objects by identifying their common physical properties.

Assessment Limits:
Test items are limited to physical properties including states of matter. Items may include the physical properties of size, mass, shape, color, texture, hardness, density, and phase changes, but not calculations of physical properties, such as density. Test items will not focus on students' ability to identify or compare the definitions of these physical properties. Test items will not include the recognition of the terms boiling point or melting point from phase change graphs, graphic organizers, or data tables.

Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:
- Incorrect identification of physical properties
- Incorrect sources of energy for a given physical change
- Incorrect predictions from given information
- Incorrect comparisons of given materials
- Incorrect interpretation of given information
- Incorrect inferences from given information

Modified *PASS* Sample Item:

Content Objective: 1.1
Process Objective: 2.1
Depth of Knowledge: 3
Correct Answer: B

Kim observed three water plants under a microscope.

Plant X Plant Y Plant Z

Dichotomous Key of Four Microscopic Water Plants

Characteristics	Identification
1a. Has a round shape 1b. Does not have a round shape	go to line 2 go to line 3
2a. Has a rough texture 2b. Does not have a rough texture	*Pediastrum* *Cyclotella*
3a. Has parts that look like a chain 3b. Does not have parts that look like a chain	*Anabaena* *Scenedesmus*

Using this dichotomous key, what is the identity of plant Z?

A Cyclotella
B Anabaena
C Scenedesmus

Content Standard:

Standard 1: Properties of Matter and Energy—Describe characteristics of objects based on physical qualities such as size, shape, color, mass, temperature, and texture. Energy can produce changes in properties of objects such as changes in temperature. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

2. Physical properties of objects can be observed, described, and measured using tools such as simple microscopes, gram spring scales, metric rulers, metric balances, and Celsius thermometers.

Item Specifications:

Emphasis:
Physical properties of objects can be observed, described, and measured using scientific tools.

Stimulus Attributes:
Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:

- Identify tools to measure and/or observe physical properties (e.g., meter stick, metric ruler, metric balance, magnifying glass/hand lens, microscope, thermometer, graduated cylinder, spring scale, stopwatch) using Systems International (SI) units for an object or group of objects.
- Identify the correct measurement of a physical property on a grade-level-appropriate tool.
- Identify the physical property measured by a given tool.
- Compare and contrast physical properties collected through measurements and/or observations (e.g., color, texture, shape, size, sound, and position).
- Classify or group objects, organisms, and/or events based on measurements and/or observations of physical properties.
- Arrange objects, organisms, and/or events in serial order based on measurements and/or observations of physical properties.
- Evaluate the appropriateness of tools used in the collection of data for a scientific investigation.
- Make predictions based on patterns in experimental data collected using grade-level-appropriate tools.
- Communicate or analyze the results of an investigation of physical properties.
- Make inferences that are supported by observations and/or measurements of physical properties.
- Analyze objects or groups of objects by measuring and/or observing their common physical properties using grade-level-appropriate tools.

Assessment Limits:
Test items are limited to grade-level-appropriate physical properties of matter (e.g., mass, volume, length, temperature, hardness, color, shape) and scientific tools (e.g., metric ruler, metric balance, simple microscope, Celsius thermometer, spring scale, magnifying glass/hand lens, graduated cylinder). Items will not include the identification of tools used to identify the density or hardness of objects. Items will not require students to calculate the density of objects or use conversion formulas for temperature (i.e., converting between Celsius and Fahrenheit).

Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:
- Incorrect measurements and/or appropriate metric units of physical properties
- Incorrect scientific tools used to measure given physical properties
- Incorrect property that can be measured by a given tool
- Incorrect comparisons of the physical properties of objects
- Incorrect classification or grouping of objects or events from given information
- Incorrect arrangement of objects into a serial order based on physical properties
- Incorrect evaluation of a scientific investigation
- Predictions of physical properties not supported by given observations or data
- Results not supported by given observations or data
- Inferences, analyses, or conclusions not supported by given observations or data

Modified *PASS* Sample Item:

Content Objective: 1.2
Process Objective: 3.2
Depth of Knowledge: 2
Correct Answer: A

A student wants to know how water temperature changes after being placed in a refrigerator. He plans to use a spring scale to measure water temperature every 30 minutes.

Which statement explains the problem with the investigation?

A A spring scale does not measure the correct property.
B The investigation involves more than one measurement.
C The investigation involves measuring a liquid every half hour.

Content Standard:

Standard 1: Properties of Matter and Energy—Describe characteristics of objects based on physical qualities such as size, shape, color, mass, temperature, and texture. Energy can produce changes in properties of objects such as changes in temperature. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

3. Energy can be transferred in many ways (e.g., energy from the Sun to air, water, and metal).

Item Specifications:

Emphasis:

Energy can be transferred from one material to another. Energy can be changed from one form to another (e.g., electricity to heat, light to electricity, kinetic, and potential). Energy changes can be measured (e.g., increases in heat energy increase temperature, increases in sound energy increase loudness, increases in light energy increase brightness). Some substances are better able to transfer energy than others and are known as conductors (e.g., metals are good conductors of heat and electricity). Substances that transfer no or very little energy are called insulators (e.g., wood and cotton fabrics are poor conductors of heat and electricity).

Stimulus Attributes:

Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:

- Recognize, observe, and/or measure the transfer of energy in a system.
- Identify correct measures of change in energy using Systems International (SI) units.
- Compare and contrast the transfer of energy through different materials (e.g., conductors, insulators).
- Classify or group a set of materials using their ability to transfer a given form of energy.
- Arrange objects and/or events in serial order based on the transfer of energy.
- Evaluate the design of a scientific investigation exploring energy transfer.
- Interpret data in tables, line, bar, trend, and/or simple circle graphs that show evidence of energy transfer.
- Predict energy transfer based on patterns in given data (e.g., speed of energy transfer in different sizes of copper wire, variable metal mixtures in cooking pans).
- Communicate the results of energy transfer investigations.
- Draw conclusions and/or identify correct explanations based on data collected.
- Items are limited to grade-level-appropriate forms of energy (e.g., heat, light, sound, motion, and electrical), energy transformations (e.g., electrical to heat), and the effects of changes in the amount of energy

Assessment Limits:
Items will not include identifying or classifying different forms of heat energy (i.e., radiation, convection, and conduction), and chemical energy. Items will not include the kinetic molecular theory (e.g., molecules move more rapidly in heated substances).

Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:
- Incorrect observation or measurement of energy transfer within a system
- Incorrect measurements of changes in energy
- Incorrect comparison of the transfer of energy through different materials
- Incorrect classification or grouping of materials based on provided information
- Incorrect serial order of objects and/or events based on transfer of energy
- Incorrect evaluation of a scientific investigation exploring the transfer of energy
- Incorrect interpretation of data in tables, line, bar, trend, and/or simple circle graphs
- Incorrect prediction of energy transfer based on provided information
- Incorrect conclusion and/or explanation based on given data

Modified *PASS* Sample Item:

Content Objective: 1.3
Process Objective: 4.4
Depth of Knowledge: 3
Correct Answer: B

Susan investigated heat conduction of three different metals. She recorded her observations in the table.

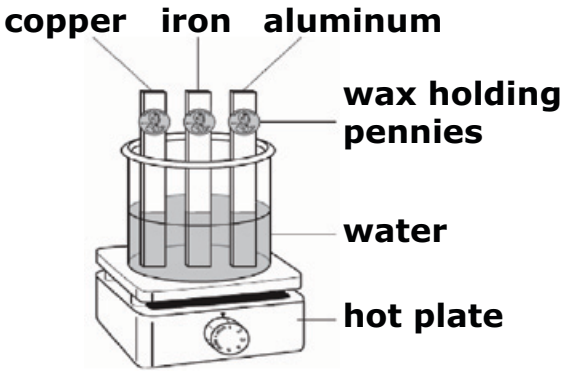
Heat Conduction Steps

- **Attach 1 penny to each of the 3 pieces of metal using wax**
- **Place the 3 pieces of metal into beaker**
- **Heat water in beaker**

Order in Which the Pennies Fell Off the Metals

Order	Metal
first	copper
second	aluminum
third	iron

Heat Conduction Experiment Setup



Which statement describes the correct observation of this activity?

(A) The iron transfers heat energy from the water faster than the other metals.

(B) The copper transfers heat energy from the water faster than the other metals.

(C) The aluminum transfers heat energy from the water faster than the other metals.

Content Standard:

Standard 2: Organisms and Environments—Organisms within a community are dependent on one another and the environment. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

1. Organisms in a community, interacting populations in a common location, depend on each other for food, shelter, and reproduction.

Item Specifications:

Emphasis:

Organisms in a common location are interdependent. In a community, organisms can be classified as producers, consumers, and decomposers. Producers are able to use energy (light or chemical) to help them make their own food. Consumers need to consume other organisms to obtain their energy. Decomposers are organisms that get their energy from dead plant or animal material. Organisms are part of food chains, food (energy) pyramids, and food webs. Organisms rely on other organisms to provide needs other than food energy (e.g., shelter, an area for nests, dispersal of seeds).

Stimulus Attributes:

Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions. Organisms likely to be unfamiliar to students at this grade level will be described and/or pictured.

Format:

- Complete food chains, food (energy) pyramids, and food webs.
- Identify and/or compare the role of organisms in a given community as producers, consumers, or decomposers.
- Classify or group organisms and/or populations based on how they meet their needs (e.g., shelter, reproduction).
- Evaluate the design of a scientific investigation exploring the relationships between populations and/or organisms in a community.
- Predict outcomes based on changes in populations and organism relationships.
- Predict interactions among organisms in a given situation or by using given data.
- Analyze the interactions of organisms in a community and/or populations based on data.

Assessment Limits:

Items are limited to grade-level-appropriate organisms and their interactions (e.g., producers, consumers, decomposers; organisms dependent on other organisms for seed dispersal or nest sites). Items will not include identifying levels of consumers (e.g., primary, secondary, and/or tertiary) or calculating energy transfer.

Process Objectives May Include:

Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:

- Incorrect completion of food chains, food (energy) pyramids, and food webs
- Incorrect identification of the role of given organisms
- Incorrect comparison of organisms in a given community
- Incorrect classification or grouping of organisms based on how they meet their needs
- Incorrect evaluation of a scientific investigation
- Incorrect predictions of changes in a community based on given information
- Incorrect predictions of organism interactions based on given data or situation
- Incorrect analysis of the interactions of organisms

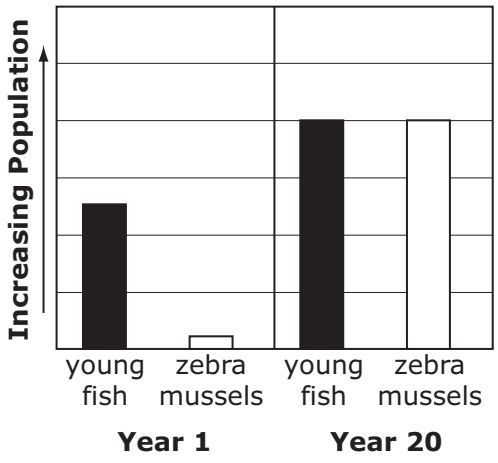
Modified *PASS* Sample Item:

Content Objective: 2.1
Process Objective: 4.2
Depth of Knowledge: 3
Correct Answer: C

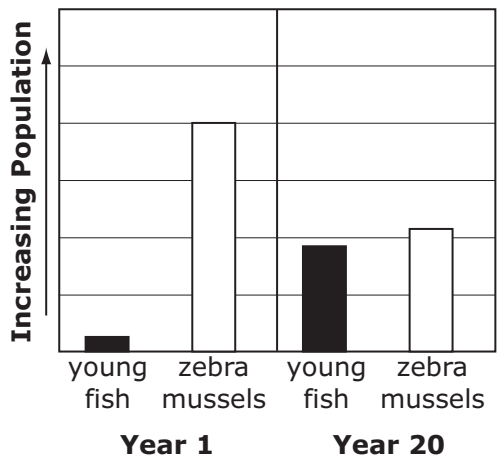
Zebra mussels are shelled animals that compete with young fish for food. The mussels are placed in a lake with young fish.

Which graph shows the population size for the zebra mussels and the young fish at 20 years?

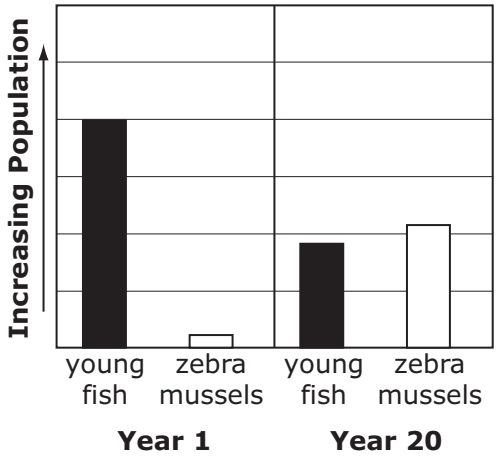
A



B



C



Content Standard:

Standard 2: Organisms and Environments—Organisms within a community are dependent on one another and the environment. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

2. Changes in environmental conditions due to human interactions or natural phenomena can affect the survival of individual organisms and/or entire species.

Item Specifications:

Emphasis:
Understand how a change or changes in environmental conditions can affect the survival of organisms, populations, entire species, and/or ecosystems.

Stimulus Attributes:
Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:

- Observe and/or measure positive or negative changes in environmental conditions that result from human interactions and/or natural phenomena (e.g., food supply, air quality, water quality, habitats).
- Predict the survival of different organisms based on given changes in environmental conditions.
- Compare human interactions and/or natural phenomena that affect the survival of organisms.
- Classify or group organisms based on the effects of a change in environmental conditions.
- Sequence changes in environmental conditions due to human interactions or natural phenomena.
- Evaluate the design of a scientific investigation exploring a change in environmental conditions and/or the effects on the survival of organisms.
- Predict the effects of changes in environmental conditions that result from human interactions and/or natural phenomena.
- Communicate the results of an investigation exploring the concept of environmental change.
- Predict the effect or effects of given changes in environmental conditions on organisms.

Assessment Limits:
Test items are limited to grade-level-appropriate human interactions and/or natural phenomena (e.g., human polluting activities, human clean-up activities, earthquakes, tornados, hurricanes, floods). Ecosystems and/or organisms likely to be unfamiliar to students at this grade level will be described and/or pictured.

Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:

- Incorrect observation and/or measure of changes in environmental conditions
- Incorrect prediction of the survival of organisms in given situations
- Incorrect comparisons among given human interactions and/or natural phenomena that affect the survival of organisms
- Incorrect classification or grouping of organisms based on the effects of a change in environmental conditions
- Incorrect sequence of events in environmental conditions
- Incorrect evaluation of the design of a scientific investigation
- Incorrect prediction of the effects of changes in environmental conditions
- Incorrect communication of the results of an investigation
- Incorrect prediction of the effect of changes in environmental conditions on organisms

Modified *PASS* Sample Item:

Content Objective: 2.2
Process Objective: 1.1
Depth of Knowledge: 3
Correct Answer: A

A scientist wants to see how a fish responds when a solid substance is added to the fish's tank.

How should the scientist measure the solid substance and what might he learn from the experiment?

A

Substance Measurement	What Might the Scientist Learn?
mass in grams	how changes to a fish's environment might affect its population

B

Substance Measurement	What Might the Scientist Learn?
mass in grams	how changes to an entire pond ecosystem are affected by a substance

C

Substance Measurement	What Might the Scientist Learn?
volume in liters	how changes to a fish's environment might affect its population

Content Standard:

Standard 3: Structure of Earth and the Solar System—Interaction between air, water, rocks/soil, and all living things. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

2. Weather exhibits daily and seasonal patterns (i.e., air temperature, cloud type, wind direction, wind speed, and precipitation).

Item Specifications:

Emphasis:
Earth is a dynamic system, and its weather conditions have predictable daily and seasonal patterns. Different cloud types are common under different weather conditions (e.g., cirrus, cumulus, stratus, cumulonimbus). The tilt of Earth plays a direct role in the seasonal patterns.

Stimulus Attributes:
Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:

- Identify tools and units used to measure and/or observe weather conditions (e.g., anemometer, barometer, rain gauge, meter stick, thermometer, weather vane).
- Identify the correct measurement on a grade-level-appropriate tool and units commonly used to report these measurements.
- Compare and/or classify daily and/or seasonal weather patterns (e.g., temperature, wind speed, wind direction, rainfall, snowfall, cloud types).
- Sequence daily and/or seasonal weather patterns from given information.
- Evaluate the design of a scientific investigation exploring daily and/or seasonal weather patterns.
- Recognize the relationship between the seasons and Earth's tilt in the Northern and Southern Hemispheres.
- Predict weather conditions based on given cloud types, seasonal weather patterns, temperature, wind speed, wind direction, and/or precipitation.
- Communicate or explain the results of an investigation exploring the concept of daily and/or seasonal weather patterns.

Assessment Limits:
Test items are limited to grade-level-appropriate weather conditions and seasonal patterns. Items will not include detailed weather maps (i.e., fronts, pressure systems, isobars, wind speed and direction). SI units will be used on all items except for measuring air temperatures when observing, measuring, and recording weather conditions (i.e., use degrees Fahrenheit).

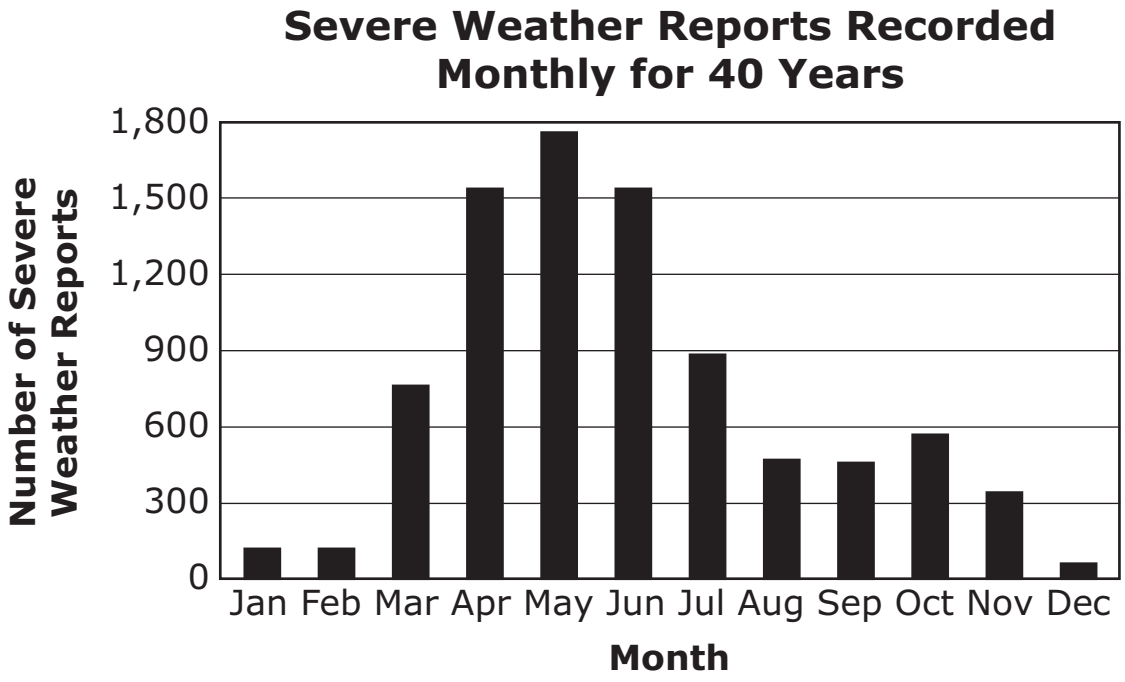
Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:

- Incorrect tool identified for measuring given weather conditions
- Incorrect observation and/or measurement of weather conditions, daily weather patterns, and/or seasonal weather patterns
- Incorrect comparison of daily and/or seasonal weather patterns
- Incorrect classification of daily and/or seasonal weather patterns
- Incorrect sequence of given daily and/or seasonal weather patterns
- Incorrect evaluation of a scientific investigation
- Incorrect relationship between the season and Earth's tilt in either hemisphere
- Incorrect predictions of weather conditions based on given information
- Incorrect results and/or explanation of daily and/or seasonal weather patterns

Modified *PASS* Sample Item:

Content Objective: 3.2
Process Objective: 4.2
Depth of Knowledge: 2
Correct Answer: A



Which statement describes the data shown in this graph?

A Weather conditions follow a pattern based on the change in seasons.

B Weather conditions stay the same when wind direction stays the same.

C Weather conditions do not follow a pattern based on the change in air temperature.

Content Standard:

Standard 3: Structure of Earth and the Solar System—Interaction between air, water, rocks/soil, and all living things. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objective:

Content Objective:

3. Earth is the third planet from the Sun in a system that includes the moon, the Sun, and eight other planets.

Item Specifications:

Emphasis:
The solar system is arranged in a predictable order. The solar system includes Earth, the moon, other planets and their moons, asteroids, meteoroids, comets, and the Sun.

Stimulus Attributes:
Test items may include grade-level-appropriate text, illustrations, data tables, graphs, graphic organizers, and descriptions.

Format:
- Recognize appropriate units of dimensions of objects in our solar system.
- Observe and/or describe objects in our solar system (e.g., relative size, number of moons, ring system, rocky/gaseous planets, inner/outer planets, relative temperature differences).
- Classify or compare objects in our solar system.
- Arrange objects in our solar system based on given criteria.
- Evaluate the design of a scientific investigation that examines objects in our solar system.
- Evaluate a description of a model of the solar system and/or its parts.
- Predict conditions on and/or locations of objects in our solar system based on experimental data (e.g., predict the surface temperature of an unknown planet given the surface temperatures of surrounding planets).
- Predict phases of the moon based on observations and/or data (i.e., new moon, first quarter, full moon, third quarter).
- Communicate the results of and/or give explanations based on data in an investigation exploring objects in our solar system (e.g., explain why the surface temperature on one planet is greater than that of another planet).
- Test items are limited to grade level-appropriate parts of the solar system including the planets and their moons, asteroids, meteoroids, comets, and the Sun.

Assessment Limits:
Items will not include the identification or recall of specific measurements or distances in the solar system or those of gravitational force.

Process Objectives May Include:
Items may be written to assess any of the process objectives except for 3.4.

Distractor Domain:

- Incorrect units for dimensions of objects in our solar system
- Incorrect observations or descriptions of objects in our solar system
- Incorrect classification or comparisons of object in our solar system
- Incorrect arrangement of objects in our solar system
- Incorrect evaluation of a scientific investigation
- Incorrect evaluation or description of a given model
- Incorrect prediction of conditions and/or locations of objects in our solar system
- Incorrect prediction of phases of the moon
- Incorrect results or explanations of results of an investigation

Modified *PASS* Sample Item:

Content Objective: 3.3
Process Objective: 2.2
Depth of Knowledge: 1
Correct Answer: A

Which data table shows the correct sequence of planets in our Solar System?

A

Planet Data

Planet closest to the sun	Mercury
	Venus
	Earth
	Mars
	Jupiter
	Saturn
Planet farthest from the sun	Uranus
	Neptune

B

Planet Data

Planet closest to the sun	Earth
	Venus
	Mercury
	Mars
	Saturn
	Uranus
Planet farthest from the sun	Neptune
	Jupiter

C

Planet Data

Planet closest to the sun	Neptune
	Uranus
	Saturn
	Jupiter
	Mars
	Earth
Planet farthest from the sun	Venus
	Mercury