# 5th Grade Science

# Chapter 3: *i*LEAP Science, Grade 5

This section describes the overall design of the *i*LEAP Science test to be administered to students in grade 5. Test specifications and sample test questions are provided so that teachers may align classroom practices with the state assessment.

## Test Structure

The Science test consists of one part and is administered in a single day.

The science test is a criterion-referenced test (CRT) that includes items based entirely on Louisiana's science content standards. These items are aligned with Louisiana's Grade-Level Expectations (GLEs) and were developed specifically for Louisiana.

## Item Types

The test has forty-six (46) multiple-choice items.

The multiple-choice items consist of an interrogatory stem and four answer options. These items assess a student's knowledge and conceptual understanding, and responses will be scored 1 if correct and 0 if incorrect.

To maximize the meaningfulness of multiple-choice test items, questions are typically cast in a practical problem-solving context, referring to a single stimulus (e.g., chart) or to a description of a single scenario. The reading difficulty level of test questions is minimized to the extent possible (except for necessary scientific terms) so that students' reading ability does not interfere with their ability to demonstrate their science knowledge and skills.

## Description of the Science Test

The Science test was developed specifically for Louisiana. Committees of Louisiana educators reviewed all items for content and alignment with Louisiana's standards, benchmarks, and GLEs. Separate committees reviewed the items for potential bias and sensitive material.

The Science test is **untimed.** About one hour (60 minutes) is the suggested time to allow students to answer the questions.

The grade 5 Science test assesses student learning in the five science strands delineated in the Louisiana Science Framework and the Comprehensive Curriculum: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, and Science and the Environment.

## Description of Stimulus Material

The stimulus material may include:

- Data tables or graphs presenting data to be read or interpreted;
- Charts, illustrations, or graphic organizers;
- Descriptions of science investigations; and/or
- Maps showing geographical features.

## Scoring Information

The *i*LEAP Science test contains multiple-choice items only. These items have four response options (A, B, C, D) and are scored right or wrong. Correct answers receive a score of 1; incorrect answers receive a score of 0.

## Science Test Specifications

Table 3.1 provides the test specifications for the grade 5 *i*LEAP science assessment. The values in the table are approximations due to slight variations in the content across test forms.

**Table 3.1: Grade 5 Science Test Specifications**

| Strand/Category | % of Total Points |
|---|---|
| **Science as Inquiry** | 22 |
| A. The Abilities Necessary to Do Scientific Inquiry | |
| B. Understanding Scientific Inquiry | |
| **Physical Science** | 20 |
| A. Properties and Changes of Properties in Matter | |
| B. Motions and Forces | |
| C. Transformations of Energy | |
| **Life Science** | 20 |
| A. Structure and Function in Living Systems | |
| B. Reproduction and Heredity | |
| C. Populations and Ecosystems | |
| D. Adaptations of Organisms | |
| **Earth and Space Science** | 22 |
| A. Structure of Earth | |
| B. Earth History | |
| C. Earth in the Solar System | |
| **Science and the Environment** | 16 |
| **Total** | **100** |

## Strands, Benchmarks, and GLEs Assessed

Louisiana's Science Framework encompasses five strands: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, and Science and the Environment. At grade 5, all five strands are taught.

The Louisiana science strands are each associated with a single standard, which present broad goals for what all students in Louisiana should know and be able to do in science:

**Science as Inquiry (SI) Strand**

**Standard:** Students will do science by engaging in partial and full inquiries that are within their developmental capabilities.

**Physical Science (PS) Strand**

**Standard:** Students will develop an understanding of the characteristics and interrelationships of matter and energy in the physical world.

**Life Science (LS) Strand**

**Standard:** The students will become aware of the characteristics and life cycles of organisms and understand their relationships to each other and to their environment.

**Earth and Space Science (ESS) Strand**

**Standard:** The students will develop an understanding of the properties of earth materials, the structure of the Earth systems, the Earth's history, and the Earth's place in the universe.

**Science and the Environment (SE) Strand**

**Standard:** In learning environmental science, students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. As consumers and citizens, they will be able to recognize how our personal, professional, and political actions affect the natural world.

The focus for grade 5 Louisiana students is general science concepts. The content explored at this grade level includes properties of matter, reactions, forces, motion, and energy transformations, cells to living organisms, ecosystems, Earth and its atmosphere, cycles and climates, and space. For this reason, the grade 5 *i*LEAP Science test assesses the following strands: Science as Inquiry, Physical Science, Life Science, Earth and Space Science, and Science and the Environment.

Science as Inquiry is a **process** strand; the others are **content** strands. The organization into strands does not imply that science should be taught in isolated units. In fact, teachers are encouraged to integrate study units. Inquiry should be integrated across all the science content strands.

GLEs further define the knowledge and skills students are expected to master by the end of each grade or high school course. The GLEs for each grade are developmentally appropriate and increase in complexity to build the knowledge and skills students need.

Most of the grade 5 GLEs are eligible for assessment on the grade 5 *i*LEAP. Some, however, do not lend themselves to testing on a statewide assessment in multiple-choice format. For example, some GLEs require students to use a particular technology, construct models, write

the steps in an investigation, draw a diagram, measure, construct food chains, or demonstrate constructive and destructive forces. Other GLEs, in accordance with the Comprehensive Curriculum, may not be taught prior to the spring test administration and therefore will not be assessed. Science as Inquiry GLEs 7, 8, 9, 14, 15, 19, 20, 24, and 37 are not assessed. Physical Science GLEs 1 and 9 are not assessed. Life Science GLE 23 is not assessed. Earth and Space Science GLEs 32, 40, 42, and 47 are not assessed. It is important, however, that the skills represented by these GLEs are taught at this grade level to prepare students for classroom assessment purposes as well as the grade 8 LEAP test.

### Explanation of Codes

GLEs are numbered consecutively in each grade level and grouped by strand and thematic category. For example:

**Strand:** Physical Science
**Categories:** A. Properties and Changes of Properties of Matter
B. Motions and Forces
C. Transformations of Energy

Benchmarks are coded by strand, grade cluster (E, M, H), and benchmark number. The first term in the code refers to the strand. The second term refers to the grade cluster, and the third term refers to the category and benchmark number. Categories are indicated by letters.

Table 3.2 provides three examples of benchmark codes.

**Table 3.2: Examples of Science Codes**

| Code | Translation |
|---|---|
| SI-E-A5 | SI strand, Elementary level, category A, benchmark 5 |
| PS-M-B4 | PS strand, Middle School level, category B, benchmark 4 |
| SE-H-A6 | SE strand, High School level, category A, benchmark 6 |

For most grade clusters, strands are divided into categories, or major topical areas. However, the SE strand has no substrands for prekindergarten through 4 and 5 through 8.

Science GLEs are numbered consecutively in Science as Inquiry and consecutively within the content strands.

Science As Inquiry—GLEs 1–40

Physical Science—GLEs 1–14

Life Science—GLEs 15–29

Earth and Space Science—GLEs 30–47

Science and the Environment—GLEs 48–51

## Key Concepts for the Grade 5 Assessment

The key concepts are provided to guide teachers in their classroom instruction as it relates to the assessment. These concepts describe important content emphasis regarding the knowledge and skills eligible for assessment of each strand.

### Science as Inquiry

1. Designing an Investigation
    - Identify testable questions, questions that guide investigations/experiments, and questions to consider during an investigation
    - Identify problems in an investigation
    - Identify the components of an investigation
    - Use multiple sources to answer questions
    - Select appropriate experimental design or setup
    - Predict outcomes of an investigation
    - Identify correct procedure in an investigation
    - Identify the independent variable, dependent variable, and/or variables that should be controlled or constant in an investigation
    - Select appropriate tools, equipment, and technology to use in an investigation
    - Use metric system of measure using appropriate or accurate units
    - Identify appropriate safety tools and procedures
    - Identify correct setup between varying investigations
    - Identify ways to improve the investigation
    - Identify mistakes in procedures
    - Identify alternate methods for investigation using same tools

2. Communication
    - Understand and be able to identify the difference between a description and an explanation
    - Use data tables, charts, circle graphs, line graphs, bar graphs, diagrams, scatter plots, and symbols to collect, record, and report data
    - Develop an explanation of experimental results
    - Identify patterns in data
    - Use models to explain natural phenomena or conclusions from investigations
    - Predict trends supported by data
    - Recognize there are multiple ways to interpret data that may result in alternate explanations
    - Identify statements not supported by data or identify faulty reasoning
    - Understand and be able to identify the difference between an observation and an inference
    - Communicate results of investigations
    - Identify statements that explain data

3. Technology and the Work of Scientists
   - Recognize that scientists use logical processes to solve problems
   - Review other scientists' work before beginning an investigation
   - Recognize how technology expands the human senses
   - Recognize that present technology limits answering all questions
   - Recognize that there is an acceptable range of variation in collected data
   - Identify mean, median, mode, and range from a given set of data
   - Identify problems in models, experiment design
   - Understand how scientists communicate about investigations in progress and findings
   - Describe how/why scientific theories change
   - Verify experiments through multiple investigation/trials
   - Solve problems and form new ideas as a result of scientific investigations
   - Identify how technology has changed human life
   - Evaluate the impact of research on scientific thought, society, and the environment

**Physical Science**

1. Chemical and Physical Properties of Matter
   - Compare physical properties of objects of the same material
   - Identify the electrical charge of protons, neutrons, and electrons and describe where they are found in an atom
   - Identify physical and chemical properties of various substances
   - Group substances by observable and measurable physical or chemical properties
   - Explain how water changes from a solid to a liquid to a gas
   - Identify new substances formed during common chemical reactions

2. Forces, Motion, and Energy
   - Compare, calculate, and graph the average speeds of objects in motion (metric and U.S. system)
   - Identify that gravity accelerates all falling objects at the same rate in the absence of air resistance
   - Identify examples of potential and kinetic energy
   - Classify energy resources as renewable, nonrenewable, or inexhaustible
   - Use photosynthesis and the water cycle to identify the Sun as Earth's primary energy source
   - Identify size and shape of a shadow when the change in position of a light source occurs
   - Explain that heat, light, and mechanical energy are produced by electricity

**Life Science**

1. Plant and Animal Cells
   - Identify the cell as the basic unit of living things
   - Identify the components of the cell and describe the functions of each
   - Compare plant and animal cells
   - Describe the metamorphosis of a frog
   - Describe the process of photosynthesis and respiration in green plants

2. Plant and Animal Characteristics
   - Identify the levels of organization in living things from cells to organ systems
   - Identify how disease caused by germs can be transmitted from person to person
   - Use a simple dichotomous key to classify common plants and animals
   - Describe the roles of producers, consumers, and decomposers in a food chain
   - Compare food chains and food webs
   - Describe various Louisiana ecosystems (marsh, forest, prairie, estuary, swamp, wetland)
   - Describe common traits and adaptations that help animals to survive in ecosystems
   - Identify predator/prey relationships

**Earth and Space Science**

1. Characteristics of the Lithosphere, Hydrosphere, and Atmosphere
   - Identify organic and inorganic matter in soil samples
   - Identify common rocks and minerals and explain their economic significance
   - Identify the processes that prevent or cause erosion
   - Identify the components of the hydrosphere
   - Describe the atmosphere as a mixture of gases, water vapor, and particulate matter
   - Describe and compare the polar, temperate, and tropical climate zones
   - Identify typical and international weather map symbols and the type of weather they represent
   - Recognize the amount of time it takes for natural events to occur (within seconds, over millions of years)

2. Characteristics of Objects in the Solar System
   - Identify the physical characteristics of the Sun
   - Explain that the rotation of Earth on its axis cause the Moon, Sun, and stars to appear to move from east to west across the sky
   - Describe the characteristics of the inner and outer planets
   - Use models or illustrations to explain rotation and revolution
   - Identify Earth's position in the solar system
   - Explain the processes of the water cycle

**Science and the Environment**

- Identify the ability of an ecosystem to support a population (carrying capacity) and identify the resources needed
- Identify pollutants found in water, air, and soil
- Describe how human activities have a positive or negative impact on local ecosystems
- Describe the carbon, nitrogen, water, and oxygen cycles and where they occur (e.g., soil, atmosphere)

## Grade 5 Science Standards, Benchmarks, and GLEs

The following chart presents **all** grade 5 science strands and standards, benchmarks, and GLEs.

| GRADE 5<br>SCIENCE STANDARDS, BENCHMARKS, AND GLES | |
|---|---|
| **Science as Inquiry: The students will <u>do</u> science by engaging in partial and full inquiries that are within their developmental capabilities.** | |
| ***A. The Abilities Necessary to Do Scientific Inquiry*** | |
| **Benchmarks** | **Grade-Level Expectations** |
| **SI-M-A1:** identifying questions that can be used to design a scientific investigation | 1. Generate testable questions about objects, organisms, and events that can be answered through scientific investigation (SI-M-A1)<br>2. Identify problems, factors, and questions that must be considered in a scientific investigation (SI-M-A1)<br>3. Use a variety of sources to answer questions (SI-M-A1) |
| **SI-M-A2:** designing and conducting a scientific investigation | 4. Design, predict outcomes, and conduct experiments to answer guiding questions (SI-M-A2)<br>5. Identify independent variables, dependent variables, and variables that should be controlled in designing an experiment (SI-M-A2) |
| **SI-M-A3:** using mathematics and appropriate tools and techniques to gather, analyze, and interpret data | 6. Select and use appropriate equipment, technology, tools, and metric system units of measurement to make observations (SI-M-A3)<br>7. Record observations using methods that complement investigations (e.g., journals, tables, charts) (SI-M-A3)<br>8. Use consistency and precision in data collection, analysis, and reporting (SI-M-A3)<br>9. Use computers and/or calculators to analyze and interpret quantitative data (SI-M-A3) |

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| **SI-M-A4:** developing descriptions, explanations, and graphs using data | 10. Identify the difference between description and explanation (SI-M-A4)<br>11. Construct, use, and interpret appropriate graphical representations to collect, record, and report data (e.g., tables, charts, circle graphs, bar and line graphs, diagrams, scatter plots, symbols) (SI-M-A4)<br>12. Use data and information gathered to develop an explanation of experimental results (SI-M-A4)<br>13. Identify patterns in data to explain natural events (SI-M-A4) |
| **SI-M-A5:** developing models and predictions using the relationships between data and explanations | 14. Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)<br>15. Identify and explain the limitations of models used to represent the natural world (SI-M-A5)<br>16. Use evidence to make inferences and predict trends (SI-M-A5) |
| **SI-M-A6:** comparing alternative explanations and predictions | 17. Recognize that there may be more than one way to interpret a given set of data, which can result in alternative scientific explanations and predictions (SI-M-A6)<br>18. Identify faulty reasoning and statements that misinterpret or are not supported by the evidence (SI-M-A6) |
| **SI-M-A7:** communicating scientific procedures, information, and explanations | 19. Communicate ideas in a variety of ways (e.g., symbols, illustrations, graphs, charts, spreadsheets, concept maps, oral and written reports, equations) (SI-M-A7)<br>20. Write clear step-by-step instructions that others can follow to carry out procedures or conduct investigations (SI-M-A7)<br>21. Distinguish between *observations* and *inferences* (SI-M-A7)<br>22. Use evidence and observations to explain and communicate the results of investigations (SI-M-A7) |
| **SI-M-A8:** utilizing safety procedures during scientific investigations | 23. Use relevant safety procedures and equipment to conduct scientific investigations (SI-M-A8)<br>24. Provide appropriate care and utilize safe practices and ethical treatment when animals are involved in scientific field and laboratory research (SI-M-A8) |

| *B. Understanding Scientific Inquiry* | |
|---|---|
| **SI-M-B1:** recognizing that different kinds of questions guide different kinds of scientific investigations | 25. Compare and critique scientific investigations (SI-M-B1)<br>26. Use and describe alternate methods for investigating different types of testable questions (SI-M-B1)<br>27. Recognize that science uses processes that involve a logical and empirical, but flexible, approach to problem solving (SI-M-B1) |
| **SI-M-B2:** communicating that current scientific knowledge guides scientific investigations | 28. Recognize that investigations generally begin with a review of the work of others (SI-M-B2) |
| **SI-M-B3:** understanding that mathematics, technology, and scientific techniques used in an experiment can limit or enhance the accuracy of scientific knowledge | 29. Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge (SI-M-B3)<br>30. Describe why all questions cannot be answered with present technologies (SI-M-B3)<br>31. Recognize that there is an acceptable range of variation in collected data (SI-M-B3)<br>32. Explain the use of statistical methods to confirm the significance of data (e.g., mean, median, mode, range) (SI-M-B3) |
| **SI-M-B4:** using data and logical arguments to propose, modify, or elaborate on principles and models | 33. Evaluate models, identify problems in design, and make recommendations for improvement (SI-M-B4) |
| **SI-M-B5:** understanding that scientific knowledge is enhanced through peer review, alternative explanations, and constructive criticism | 34. Recognize the importance of communication among scientists about investigations in progress and the work of others (SI-M-B5)<br>35. Explain how skepticism about accepted scientific explanations (i.e., hypotheses and theories) leads to new understanding (SI-M-B5)<br>36. Explain why an experiment must be verified through multiple investigations and yield consistent results before the findings are accepted (SI-M-B5)<br>37. Critique and analyze their own inquiries and the inquiries of others (SI-M-B5) |
| **SI-M-B6:** communicating that scientific investigations can result in new ideas, new methods or procedures, and new technologies | 38. Explain that, through the use of scientific processes and knowledge, people can solve problems, make decisions, and form new ideas (SI-M-B6) |
| **SI-M-B7:** understanding that scientific development/ technology is driven by societal needs and funding | 39. Identify areas in which technology has changed human lives (e.g., transportation, communication, geographic information systems, DNA fingerprinting) (SI-M-B7)<br>40. Evaluate the impact of research on scientific thought, society, and the environment (SI-M-B7) |

| **Physical Science: Students will develop an understanding of the characteristics and interrelationships of matter and energy in the physical world.** | |
|---|---|
| ***A. Properties and Changes of Properties in Matter*** | |
| **Benchmarks** | **Grade-Level Expectations** |
| **PS-M-A1:** investigating, measuring, and communicating the properties of different substances which are independent of the amount of the substance | 1. Measure a variety of objects in metric system units (PS-M-A1)<br>2. Compare the physical properties of large and small quantities of the same type of matter (PS-M-A1) |
| **PS-M-A2:** understanding that all matter is made up of particles called atoms and that atoms of different elements are different | 3. Describe the structure of atoms and the electrical charge of protons, neutrons, and electrons (PS-M-A2) |
| **PS-M-A3:** grouping substances according to similar properties and/or behaviors | 4. Identify the physical and chemical properties of various substances and group substances according to their observable and measurable properties (e.g., conduction, magnetism, light transmission) (PS-M-A3) |
| **PS-M-A4:** understanding that atoms and molecules are perpetually in motion | Not addressed at grade 5 |
| **PS-M-A5:** investigating the relationships among temperature, molecular motion, phase changes, and physical properties of matter | 5. Describe the properties and behavior of water in its solid, liquid, and gaseous phases (states) (PS-M-A5) |
| **PS-M-A6:** investigating chemical reactions between different substances to discover that new substances formed may have new physical properties and do have new chemical properties | 6. Describe new substances formed from common chemical reactions (e.g., burning paper produces ash) (PS-M-A6) |
| **PS-M-A7:** understanding that during a chemical reaction in a closed system, the mass of the products is equal to that of the reactants | Not addressed at grade 5 |
| **PS-M-A8:** discovering and recording how factors such as temperature influence chemical reactions | |
| **PS-M-A9:** identifying elements and compounds found in common foods, clothing, household materials, and automobiles | |
| ***B. Motions and Forces*** | |
| **PS-M-B1:** describing and graphing the motions of objects | 7. Compare, calculate, and graph the average speeds of objects in motion using both metric system and U.S. system units (PS-M-B1) |
| **PS-M-B2:** recognizing different forces and describing their effects (gravity, electrical, magnetic) | Not addressed at grade 5 |
| **PS-M-B3:** understanding that when an object is not being subjected to a force, it will continue to move at a constant speed and in a straight line | 8. Explain that gravity accelerates all falling objects at the same rate in the absence of air resistance (PS-M-B3) |
| **PS-M-B4:** describing how forces acting on an object will reinforce or cancel one another, depending upon their direction and magnitude | Not addressed at grade 5 |

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| **PS-M-B5:** understanding that unbalanced forces will cause changes in the speed or direction of an object's motion | 9. Demonstrate a change in speed or direction of an object's motion with the use of unbalanced forces (PS-M-B5) |
| ***C. Transformations of Energy*** | |
| **PS-M-C1:** identifying and comparing the characteristics of different types of energy | 10. Compare potential and kinetic energy and give examples of each (PS-M-C1)<br>11. Classify energy resources as renewable, nonrenewable, or inexhaustible (PS-M-C1) |
| **PS-M-C2:** understanding the different kinds of energy transformations and the fact that energy can be neither destroyed nor created | Not addressed at grade 5 |
| **PS-M-C3:** understanding that the Sun is a major source of energy and that energy arrives at the Earth's surface as light with a range of wavelengths | 12. Identify the Sun as Earth's primary energy source and give examples (e.g., photosynthesis, water cycle) to support that conclusion (PS-M-C3) |
| **PS-M-C4:** observing and describing the interactions of light and matter (reflection, refraction, absorption, transmission, scattering) | 13. Investigate how changes in the position of a light source and an object alter the size and shape of the shadow (PS-M-C4) |
| **PS-M-C5:** investigating and describing the movement of heat and the effects of heat in objects and systems | Not addressed at grade 5 |
| **PS-M-C6:** describing the types of energy that can be involved, converted, or released in electrical circuits | 14. Identify other types of energy produced through the use of electricity (e.g., heat, light, mechanical) (PS-M-C6) |
| **PS-M-C7:** understanding that energy is involved in chemical reactions | Not addressed at grade 5 |
| **PS-M-C8:** comparing the uses of different energy resources and their effects upon the environment | |
| | |
| **Life Science: The students will become aware of the characteristics and life cycles of organisms and understand their relationships to each other and to their environment.** | |
| ***A. Structure and Function in Living Systems*** | |
| **Benchmarks** | **Grade-Level Expectations** |
| **LS-M-A1:** describing the observable components and functions of a cell, such as the cell membrane, nucleus, and movement of molecules into and out of cells | 15. Identify the cell as the basic unit of living things (LS-M-A1)<br>16. Observe, identify, and describe the basic components of cells and their functions (e.g., cell wall, cell membrane, cytoplasm, nucleus) (LS-M-A1) |
| **LS-M-A2:** comparing and contrasting the basic structures and functions of different plant and animal cells | 17. Compare plant and animal cells and label cell components (LS-M-A2) |
| **LS-M-A3:** observing and analyzing the growth and development of selected organisms, including a seed plant, an insect with complete metamorphosis, and an amphibian | 18. Describe the metamorphosis of an amphibian (e.g., frog) (LS-M-A3) |

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| **LS-M-A4:** describing the basic processes of photosynthesis and respiration and their importance to life | 19. Describe the processes of photosynthesis and respiration in green plants (LS-M-A4) |
| **LS-M-A5:** investigating human body systems and their functions (including circulatory, digestive, skeletal, respiratory) | 20. Describe the levels of structural organization in living things (e.g., cells, tissues, organs, organ systems) (LS-M-A5) |
| **LS-M-A6:** describing how the human body changes with age and listing factors that affect the length and quality of life | Not addressed at grade 5 |
| **LS-M-A7:** describing communicable and noncommunicable diseases | 21. Identify diseases caused by germs and how they can be transmitted from person to person (LS-M-A7) |
| ***B. Reproduction and Heredity*** | |
| ***There are no Grade-Level Expectations for benchmarks in grade 5 for this substrand.*** | |
| ***C. Populations and Ecosystems*** | |
| **LS-M-C1:** constructing and using classification systems based on the structure of organisms | 22. Develop and use a simple dichotomous key to classify common plants and animals (LS-M-C1) |
| **LS-M-C2:** modeling and interpreting food chains and food webs | 23. Construct food chains that could be found in ponds, marshes, oceans, forests, or meadows (LS-M-C2)<br>24. Describe the roles of producers, consumers, and decomposers in a food chain (LS-M-C2)<br>25. Compare food chains and food webs (LS-M-C2) |
| **LS-M-C3:** investigating major ecosystems and recognizing physical properties and organisms within each | 26. Identify and describe ecosystems of local importance (LS-M-C3)<br>27. Compare common traits of organisms within major ecosystems (LS-M-C3) |
| **LS-M-C4:** explaining the interaction and interdependence of nonliving and living components within ecosystems | 28. Explain and give examples of predator/prey relationships (LS-M-C4) |
| ***D. Adaptations of Organisms*** | |
| **LS-M-D1:** describing the importance of plant and animal adaptation, including local examples | 29. Describe adaptations of plants and animals that enable them to thrive in local and other natural environments (LS-M-D1) |
| **LS-M-D2:** explaining how some members of a species survive under changed environmental conditions | Not addressed at grade 5 |
| | |
| **Earth and Space Science: The students will develop an understanding of the properties of earth materials, the structure of the Earth system, the Earth's history, and the Earth's place in the universe.** | |
| ***A. Structure of the Earth*** | |
| **Benchmarks** | **Grade-Level Expectations** |
| **ESS-M-A1:** understanding that the Earth is layered by density with an inner and outer core, a mantle, and a thin outer crust | Not addressed at grade 5 |

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| **ESS-M-A2:** understanding that the Earth's crust and solid upper mantle are dividing plates that move in response to convection currents (energy transfers) in the mantle | Not addressed at grade 5 |
| **ESS-M-A3:** investigating the characteristics of earthquakes and volcanos and identifying zones where they may occur | |
| **ESS-M-A4:** investigating how soils are formed from weathered rock and decomposed organic material | 30. Identify organic and inorganic matter in soil samples with the aid of a hand lens or microscope (ESS-M-A4) |
| **ESS-M-A5:** identifying the characteristics and uses of minerals and rocks and recognizing that rocks are mixtures of minerals | 31. Identify common rocks and minerals and explain their uses and economic significance (ESS-M-A5) |
| **ESS-M-A6:** explaining the processes involved in the rock cycle | Not addressed at grade 5 |
| **ESS-M-A7:** modeling how landforms result from the interaction of constructive and destructive forces | 32. Demonstrate the results of constructive and destructive forces using models or illustrations (ESS-M-A7)<br>33. Identify the processes that prevent or cause erosion (ESS-M-A7) |
| **ESS-M-A8:** identifying the man-made and natural causes of coastal erosion and the steps taken to combat it | Not addressed at grade 5 |
| **ESS-M-A9:** compare and contrast topographic features of the ocean floor to those formed above sea level | |
| **ESS-M-A10:** explaining (illustrating) how water circulates—on and through the crust, in the oceans, and in the atmosphere—in the water cycle | See GLE no. 46 |
| **ESS-M-A11:** understanding that the atmosphere interacts with the hydrosphere to affect weather and climate conditions | 34. Identify the components of the hydrosphere (ESS-M-A11)<br>35. Identify the atmosphere as a mixture of gases, water vapor, and particulate matter (ESS-M-A11)<br>36. Identify, describe, and compare climate zones (e.g., polar, temperate, tropical) (ESS-M-A11) |
| **ESS-M-A12:** predicting weather patterns through use of a weather map | 37. Identify typical weather map symbols and the type of weather they represent (ESS-M-A12) |
| ***B. Earth History*** | |
| **ESS-M-B1:** investigating how fossils show the development of life over time | Not addressed at grade 5 |
| **ESS-M-B2:** devising a model that demonstrates supporting evidence that the Earth has existed for a vast period of time | |
| **ESS-M-B3:** understanding that earth processes such as erosion and weathering affect the Earth today and are similar to those which occurred in the past | 38. Estimate the range of time over which natural events occur (e.g., lightning in seconds, mountain formation over millions of years) (ESS-M-B3) |

| *C. Earth in the Solar System* | |
|---|---|
| **ESS-M-C1:** identifying the characteristics of the Sun and other stars | 39. Identify the physical characteristics of the Sun (ESS-M-C1)<br>40. Describe the significance of Polaris as the North Star (ESS-M-C1)<br>41. Explain why the Moon, Sun, and stars appear to move from east to west across the sky (ESS-M-C1) |
| **ESS-M-C2:** comparing and contrasting the celestial bodies in our solar system | 42. Differentiate among moons, asteroids, comets, meteoroids, meteors, and meteorites (ESS-M-C2)<br>43. Describe the characteristics of the inner and outer planets (ESS-M-C2) |
| **ESS-M-C3:** investigating the force of gravity and the ways gravity governs motion in the solar system and objects on Earth | Not addressed at grade 5 |
| **ESS-M-C4:** modeling the motions of the Earth-Moon-Sun system to explain day and night, a year, eclipses, moon phases, and tides | 44. Explain rotation and revolution by using models or illustrations (ESS-M-C4) |
| **ESS-M-C5:** modeling the position of the Earth in relationship to other objects in the solar system | 45. Identify Earth's position in the solar system (ESS-M-C5) |
| **ESS-M-C6:** modeling and describing how radiant energy from the Sun affects phenomena on the Earth's surface, such as winds, ocean currents, and the water cycle | 46. Identify and explain the interaction of the processes of the water cycle (ESS-M-C6) (ESS-M-A10) |
| **ESS-M-C7:** modeling and explaining how seasons result from variations in amount of the Sun's energy hitting the surface due to the tilt of Earth's rotation on its axis and the length of the day | Not addressed at grade 5 |
| **ESS-M-C8:** understanding that space exploration is an active area of scientific and technological research and development | 47. Identify and explain advances in technology that have enabled the exploration of space (ESS-M-C8) |

**Science and the Environment: In learning environmental science, students will develop an appreciation of the natural environment, learn the importance of environmental quality, and acquire a sense of stewardship. As consumers and citizens, they will be able to recognize how our personal, professional, and political actions affect the natural world.**

| **Benchmarks** | **Grade-Level Expectations** |
|---|---|
| **SE-M-A1:** demonstrating knowledge that an ecosystem includes living and nonliving factors and that humans are an integral part of ecosystems | Not addressed at grade 5 |
| **SE-M-A2:** demonstrating an understanding of how carrying capacity and limiting factors affect plant and animal populations | 48. Determine the ability of an ecosystem to support a population (carrying capacity) by identifying the resources needed by that population (SE-M-A2) |
| **SE-M-A3:** defining the concept of pollutant and describing the effects of various pollutants on ecosystems | 49. Identify and give examples of pollutants found in water, air, and soil (SE-M-A3) |

| | |
|---|---|
| **SE-M-A4:** understanding that human actions can create risks and consequences in the environment | 50. Describe the consequences of several types of human activities on local ecosystems (e.g., polluting streams, regulating hunting, introducing nonnative species) (SE-M-A4) |
| **SE-M-A5:** tracing the flow of energy through an ecosystem and demonstrating a knowledge of the roles of producers, consumers, and decomposers in the ecosystem | Not addressed at grade 5 |
| **SE-E-A6:** distinguishing between renewable and nonrenewable resources and understanding that nonrenewable natural resources are not replenished through the natural cycles and thus are strictly limited in quantity | |
| **SE-M-A7:** demonstrating knowledge of the natural cycles, such as the carbon cycle, nitrogen cycle, water cycle, and oxygen cycle | 51. Describe naturally occurring cycles and identify where they are found (e.g., carbon, nitrogen, water, oxygen) (SE-M-A7) |
| **SE-M-A8:** investigating and analyzing how technology affects the physical, chemical, and biological factors in an ecosystem | Not addressed at grade 5 |
| **SE-M-A9:** demonstrating relationships of characteristics of soil types to agricultural practices and productivity | |
| **SE-M-A10:** identifying types of soil erosion and preventive measures | |

# Sample Test Items: Grade 5 Science

**Science as Inquiry**
**The Abilities Necessary to Do Scientific Inquiry**
**GLE 5**—*Identify independent variables, dependent variables, and variables that should be controlled in designing an experiment (SI-M-A2)*

**Use the data table below to answer question 1.**

| Plant No. | Amount of water each day (mL) | Amount of sunlight each day (hours) | Amount of plant food each day (mL) | Height at beginning of experiment (cm) | Height at end of experiment (cm) |
|---|---|---|---|---|---|
| 1 | 100 | 8 | 5 | 41 | 45 |
| 2 | 100 | 12 | 5 | 37 | 48 |
| 3 | 100 | 16 | 5 | 36 | 57 |
| 4 | 100 | 20 | 5 | 44 | 61 |

**1** Maria grew four plants in an experiment about plant growth. The table shows the design and results of Maria's experiment.

What was the **independent variable** in this investigation?

**A** the amount that each plant grew
**B** the amount of food each plant received
**C** the amount of water each plant received
**D** the amount of sunlight each plant received

**Correct response: D**

*Match to GLE: This item asks students to identify an independent variable in an experiment. Other grade 5 iLEAP items that measure this GLE may address other variables in the design of an experiment.*

**Science as Inquiry**
**The Abilities Necessary to Do Scientific Inquiry**
**GLE 6—***Select and use appropriate equipment, technology, tools, and metric system units of measurement to make observations (SI-M-A3)*

**2** Elaine wants to measure the volume of a large pitcher of lemonade. Which units should Elaine use?

**A** liters
**B** grams
**C** meters
**D** degrees

**Correct response: A**

*Match to GLE: This item asks students to identify an appropriate metric unit of volume. Other items that measure this GLE may relate to equipment, technology, or tools.*

**Science as Inquiry**
**The Abilities Necessary to Do Scientific Inquiry**
**GLE 11—***Construct, use, and interpret appropriate graphical representations to collect, record, and report data (e.g., tables, charts, circle graphs, bar and line graphs, diagrams, scatter plots, symbols) (SI-M-A4)*

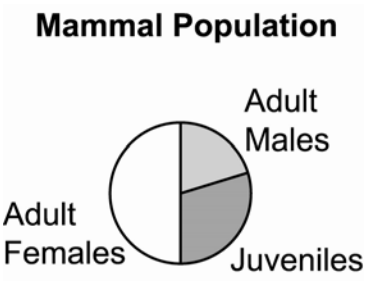
**3** A scientist was studying a mammal population. The data table below shows some of her results.

**Mammal Population**

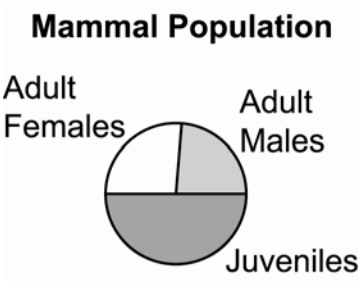
| Segment of Mammal Population | Number of Individuals in Population |
|---|---|
| Adult Males | 49 |
| Adult Females | 52 |
| Juveniles | 104 |

Which graph best represents the information in the table?

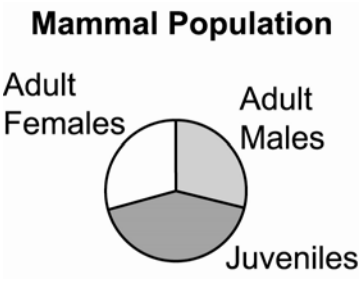
**A**



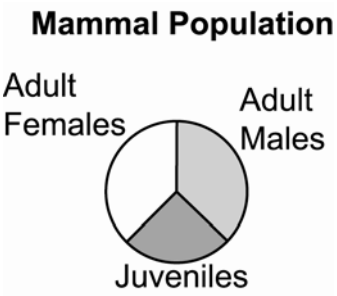

**C**




**B**




**D**




**Correct response: C**

*Match to GLE: This item asks students to relate data in a table to data in a circle graph. Other grade 5 iLEAP items that measure this GLE may involve other types of data displays.*

**Science as Inquiry**
**The Abilities Necessary to Do Scientific Inquiry**
**GLE 21—***Distinguish between observations and inferences (SI-M-A7)*

**4** Miguel was conducting an experiment. He wrote the following sentences in his notebook:

- The starting temperature of the water was 10 degrees Celsius.
- An object weighing 5 grams was placed in the water.
- The temperature of the water increased to 15 degrees.
- The object must have been hotter than 10 degrees.

In which sentence did Miguel make an inference?

**A** sentence 1
**B** sentence 2
**C** sentence 3
**D** sentence 4

**Correct response: D**

*Match to GLE: This item asks students to identify an inference. Other grade 5 iLEAP items that measure this GLE may relate to observations or inferences in other ways.*

**Science as Inquiry**
**Understanding Scientific Inquiry**
**GLE 29—***Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge (SI-M-B3)*

**5** Which statement **best** explains how a microscope helps scientists?

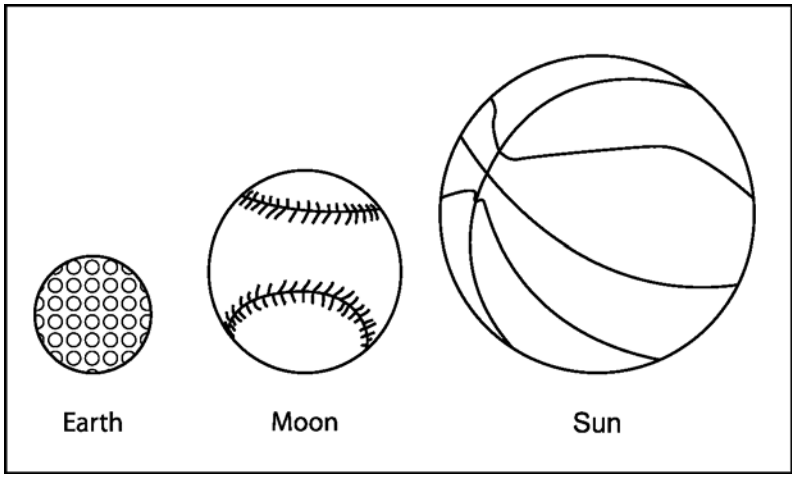
**A** A microscope allows scientists to see things that are far away.
**B** A microscope allows scientists to see things that are very small.
**C** A microscope allows scientists to hear sounds that are far away.
**D** A microscope allows scientists to hear sounds that are very quiet.

**Correct response: B**

*Match to GLE: This item relates to the sense of sight and how it is expanded by the microscope. Other grade 5 iLEAP items that measure this GLE may address other ways that technology affects scientific observation and knowledge.*

**Science as Inquiry**
**Understanding Scientific Inquiry**
**GLE 33—***Evaluate models, identify problems in design, and make recommendations for improvement (SI-M-B4)*

**6** Dwight made this model using a golf ball, a baseball, and a basketball.




How could Dwight improve his model?

**A** Make the Moon smaller than Earth.
**B** Use a flat object, such as a coin, for Earth.
**C** Place Earth between the Moon and the Sun.
**D** Place the Sun is between the Moon and Earth.

**Correct response: A**

*Match to GLE: This item asks students to identify a way that a model can be made more realistic. Other grade 5 iLEAP items that measure this GLE may address other ways that models or designs can be improved.*

**Science as Inquiry**
**Understanding Scientific Inquiry**
**GLE 38—***Explain that, through the use of scientific processes and knowledge, people can solve problems, make decisions, and form new ideas (SI-M-B6)*

**Use the list below to answer question 7.**

**Steps in an Experiment**

1. Run a scientific test
2. Form a hypothesis
3. Form a conclusion
4. Analyze data

**7** George will conduct a scientific experiment. In what order should George follow the steps?

**A** 1 → 3 → 2→ 4
**B** 4 → 3 → 2→ 1
**C** 3 → 2 → 4→ 1
**D** 2 → 1 → 4→ 3

**Correct Response: D**

*Match to GLE: This item asks students to place the steps of an experiment in order according to the scientific method. Other grade 5 iLEAP items that measure this GLE may address scientific processes in other ways.*

**Science as Inquiry**
**Understanding Scientific Inquiry**
**GLE 39—***Identify areas in which technology has changed human lives (e.g., transportation, communication, geographic information systems, DNA fingerprinting) (SI-M-B7)*

**8** DNA technology has improved greatly in the last twenty years. Which task has been made easier by the development of DNA technology?

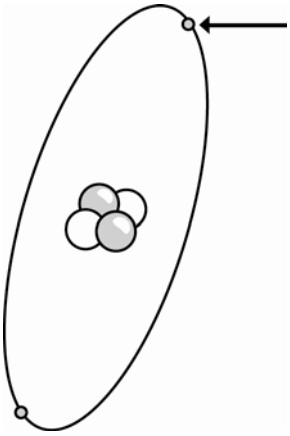
**A** identifying genetic disorders
**B** determining the parts of an atom
**C** observing distant objects in space
**D** making very accurate measurements

**Correct Response: A**

*Match to GLE: This item asks students to identify a consequence of DNA technology. Other grade 5 iLEAP items that measure this GLE may address other ways that technology has changed human lives.*

**Physical Science**
**Properties and Changes of Properties in Matter**
**GLE 3—***Describe the structure of atoms and the electrical charge of protons, neutrons, and electrons (PS-M-A2)*

**Use the picture of an atom below to answer question 9.**



**9** Which statement **best** describes the part of the atom that is shown by the arrow?

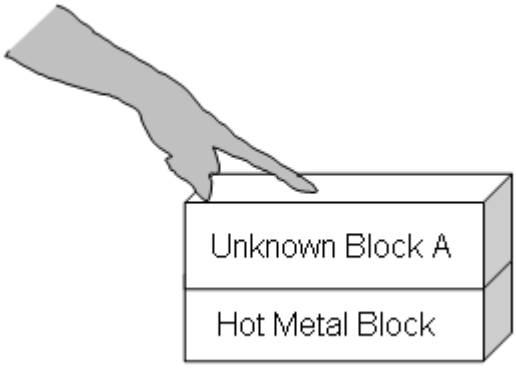
**A** It is an electron, and it has a negative charge.
**B** It is an electron, and it has a positive charge.
**C** It is a proton, and it has a negative charge.
**D** It is a proton, and it has a positive charge.

**Correct Response: A**

*Match to GLE: This item asks students to identify and describe a property of the electron. Other grade 5 iLEAP items that measure this GLE may relate to neutrons or protons.*

**Physical Science**
**Properties and Changes of Properties in Matter**
**GLE 4—***Identify the physical and chemical properties of various substances and group substances according to their observable and measurable properties (e.g., conduction, magnetism, light transmission) (PS-M-A3)*

**Use the diagram below to answer question 10.**




**10** Antonia is testing the properties of block A.

- She puts block A on top of a hot metal block and then touches the block A with her finger.
- She keeps her finger on the block A for several minutes, but block A still does not get hot.

What can Antonia conclude about block A?

**A** It is a good conductor.
**B** It is a poor conductor.
**C** It is highly magnetic.
**D** It is nonmagnetic.

**Correct Response: B**

*Match to GLE: This item relates to heat conduction properties of a material. Other grade 5 iLEAP items that measure this GLE may address other properties of materials.*

**Physical Science**
**Motions and Forces**
**GLE 5—***Describe the properties and behavior of water in its solid, liquid, and gaseous phases (states) (PS-M-A5)*

**11** What happens when the temperature of water changes from 10° Celsius to −10° Celsius?

**A** The water changes from a solid into a gas.
**B** The water changes from a liquid into a gas.
**C** The water changes from a liquid into a solid.
**D** The water changes from a solid into a liquid.

**Correct Response: C**

*Match to GLE: This item relates to the change of state from liquid to solid for water. Other grade 5 iLEAP items that measure this GLE may address other changes of state for water.*

**Physical Science**
**Motions and Forces**
**GLE 7—***Compare, calculate, and graph the average speeds of objects in motion using both metric system and U.S. system units (PS-M-B1)*

**Use the data table to answer question 12.**

**100-Meter Dash Results**

| Friend | Distance (meters) | Time (seconds) |
|---|---|---|
| Tori | 100 | 19 |
| Miguel | 100 | 21 |
| Jason | 100 | 23 |
| Howard | 100 | 24 |

**12** Four friends raced in the 100-meter dash. How many of the friends ran faster than 5 meters per second?

**A** one
**B** two
**C** three
**D** four

**Correct Response: A**

*Match to GLE: This item asks students to calculate and compare speeds using metric units. Other grade 5 iLEAP items that measure this GLE may involve the U.S. system of units.*

**Physical Science**
**Transformations of Energy**
**GLE 10—***Compare potential and kinetic energy and give examples of each (PS-M-C1)*

**13** Which example **best** illustrates kinetic energy?

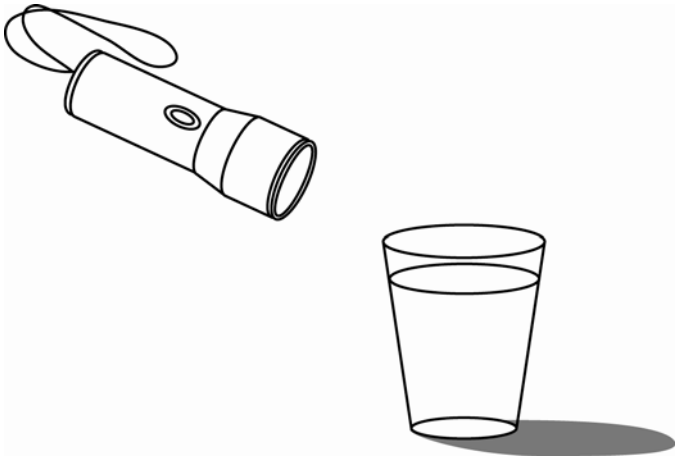
**A** a light bulb that is turned on
**B** a car that is parked on top of a hill
**C** a comet that is flying through space
**D** a battery that is connected to a circuit

**Correct Response: C**

*Match to GLE: This item asks students to identify an example of kinetic energy. Other grade 5 iLEAP items that measure this GLE may relate to potential energy.*

**Physical Science**
**Transformations of Energy**
**GLE 13—***Investigate how changes in the position of a light source and an object alter the size and shape of the shadow (PS-M-C4)*

**Use the diagram to answer question 14.**



**14** The diagram shows the position of a flashlight, a cup, and the shadow of the cup. What should Susan do to make the shadow **longer**?

**A** Use a shorter cup.
**B** Add more liquid to the cup.
**C** Place the flashlight directly above the cup.
**D** Rotate the flashlight so it is more horizontal.

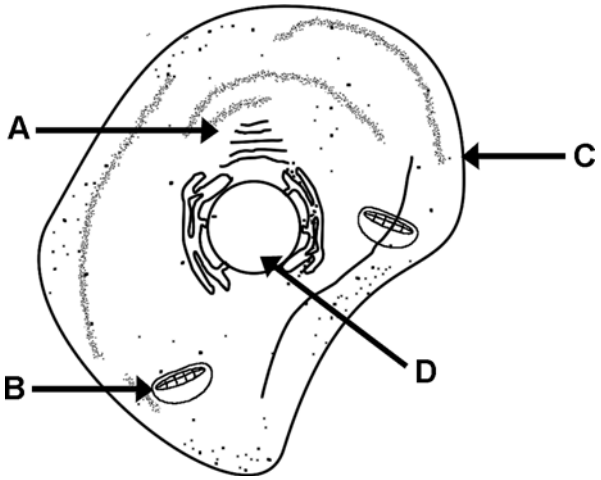
**Correct Response: D**

*Match to GLE: This item relates to the affect the positioning of a light source has on the shadow of an object. Other grade 5 iLEAP items that measure this GLE may relate to other properties of light sources and shadows.*

**Life Science**
**Structure and Function in Living Systems**
**GLE 16—***Observe, identify, and describe the basic components of cells and their functions (e.g., cell wall, cell membrane, cytoplasm, nucleus) (LS-M-A1)*

**Use the diagram to answer question 15.**

**Cell Diagram**




**15** Which arrow indicates the location of the cell membrane?

**A** arrow A
**B** arrow B
**C** arrow C
**D** arrow D

**Correct Response: C**

*Match to GLE: This item asks students to identify a component of a cell. Other grade 5 iLEAP items that measure this GLE may address the functions of various cell components.*

**Life Science**
***Structure and Function in Living Systems***
**GLE 19—***Describe the processes of photosynthesis and respiration in green plants (LS-M-A4)*

**Use the diagram to answer question 16.**

**Gases and Photosynthesis**


**16** The diagram shows the gases that enter and leave a plant during the process of photosynthesis. Which gases do arrows 1 and 2 represent?

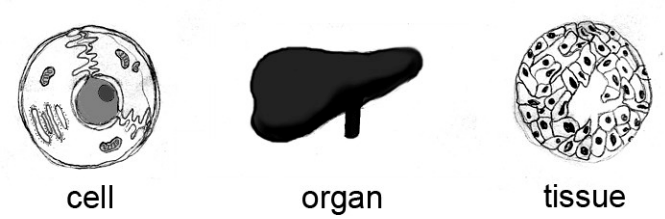
**A** Arrow 1 is nitrogen, and arrow 2 is oxygen.
**B** Arrow 1 is oxygen, and arrow 2 is nitrogen.
**C** Arrow 1 is oxygen, and arrow 2 is carbon dioxide.
**D** Arrow 1 is carbon dioxide, and arrow 2 is oxygen.

**Correct Response: D**

*Match to GLE: This item asks students to identify the role of two gases in the process of photosynthesis. Other grade 5 iLEAP items that measure this GLE may relate to respiration.*

**Life Science**
**Structure and Function in Living Systems**
**GLE 20—***Describe the levels of structural organization in living things (e.g., cells, tissues, organs, organ systems) (LS-M-A5)*

**Use the pictures below to answer question 17.**




**17** Which shows the correct order from simplest to most complex?

**A** Cell → Tissue → Organ
**B** Organ → Tissue → Cell
**C** Cell → Organ → Tissue
**D** Tissue → Organ → Cell

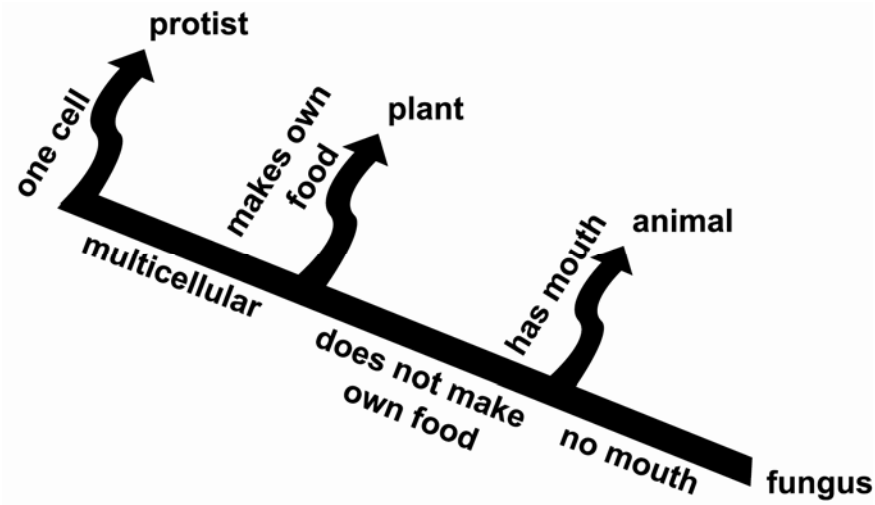
**Correct Response: A**

*Match to GLE: This item asks students to order components of the human body in order of complexity. Other grade 5 iLEAP items that measure this GLE may relate to structural organization in other ways.*

**Life Science**
**Populations and Ecosystems**
**GLE 22—***Develop and use a simple dichotomous key to classify common plants and animals (LS-M-C1)*

**Use this key to answer question 18.**

**Kingdoms of Life**




**18** This key is used to classify certain kinds of living organisms into kingdoms. According to the key, which kind of organism is multicellular, doesn't make its own food, and doesn't have a mouth?

**A** a protist
**B** a plant
**C** an animal
**D** a fungus

**Correct Response: D**

*Match to GLE: This item asks students to use a dichotomous key to identify a fungus. Other grade 5 iLEAP items that measure this GLE may use other dichotomous keys to classify life forms.*

**Life Science**
**Populations and Ecosystems**
**GLE 24—***Describe the roles of producers, consumers, and decomposers in a food chain (LS-M-C2)*

**19** What is the role of decomposers in a food chain?

**A** They consume other organisms.
**B** They break down dead organic matter.
**C** They use the Sun's energy to make food.
**D** They convert inorganic matter into organic matter.

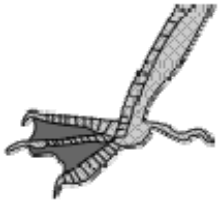
**Correct Response: B**

*Match to GLE: This item asks students to describe the role of decomposers in a food chain. Other grade 5 iLEAP items that measure this GLE may address the role of producers or consumers.*

**Life Science**
**Adaptations of Organisms**
**GLE 29—***Describe adaptations of plants and animals that enable them to thrive in local and other natural environments (LS-M-D1)*

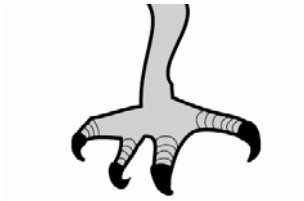
**20** Which foot would **most likely** help a bird live in water?

**A**



**C**

**B**



**D**

**Correct Response: A**

*Match to GLE: This item relates to an adaptation in aquatic birds such as ducks. Other grade 5 iLEAP items that measure this GLE may address other adaptations of plants or animals.*

**Earth and Space Science**
**Structure of Earth**
**GLE 31—***Identify common rocks and minerals and explain their uses and economic significance (ESS-M-A5)*

**21** What is a common use of the mineral graphite?

**A** to make glass
**B** as a source of iron
**C** to make pencil leads
**D** as a household cleaner

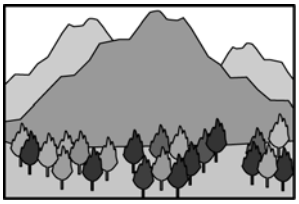
**Correct Response: C**

*Match to GLE: This item asks students to identify a use of the mineral graphite. Other grade 5 iLEAP items that measure this GLE may address other rocks or minerals.*

**Earth and Space Science**
**Structure of Earth**
**GLE 34—***Identify the components of the hydrosphere (ESS-M-A11)*

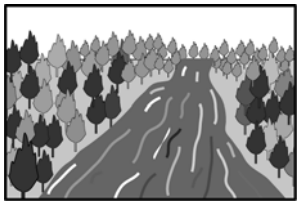
**22** Which picture **best** illustrates a part of the hydrosphere?

**A**



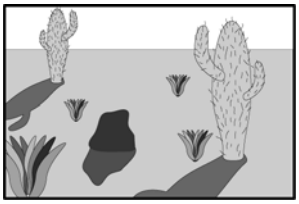
**Mountain**

**C**



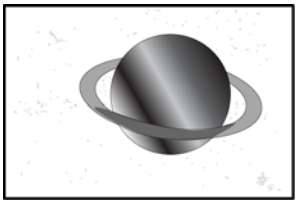
**River**

**B**



**Desert**

**D**



**Outer Space**

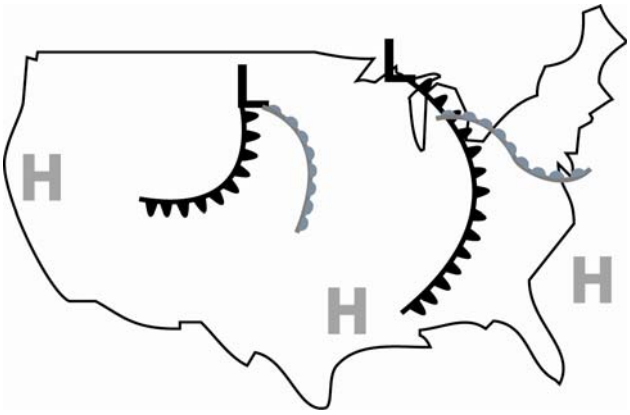
**Correct Response: C**

*Match to GLE: This item asks students to identify rivers as components of the hydrosphere. Other grade 5 iLEAP items that measure this GLE may relate to other components of the hydrosphere.*

**Earth and Space Science**
**Structure of Earth**
**GLE 37—***Identify typical weather map symbols and the type of weather they represent (ESS-M-A12)*

**Use the weather map below to help you answer question 23.**

**Weather Map**




**23** Which symbol on the map shows a cold front?

**A** H

**B** L

**C** 

**D** 

**Correct Response: C**

*Match to GLE: This item asks students to identify a cold front on a weather map. Other grade 5 iLEAP items that measure this GLE may relate to other weather symbols.*

**Earth and Space Science**
**Earth History**
**GLE 38—***Estimate the range of time over which natural events occur (e.g., lightning in seconds, mountain formation over millions of years) (ESS-M-B3)*

**24** Which natural event would take the longest time to happen?

**A** a cloud forming
**B** a mountain forming
**C** a pond evaporating
**D** a river flooding its banks

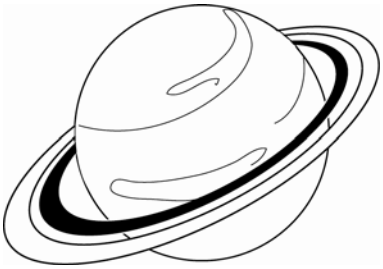
**Correct Response: B**

*Match to GLE: This item asks students to compare the time duration of natural events. Other grade 5 iLEAP items that measure this GLE may address the duration of natural events in other ways.*

**Earth and Space Science**
**Earth in the Solar System**
**GLE 43—***Describe the characteristics of the inner and outer planets (ESS-M-C2)*

**Use the picture of Saturn shown below to answer question 25.**

**Saturn**



**25** Which statement is true about the planet Saturn?

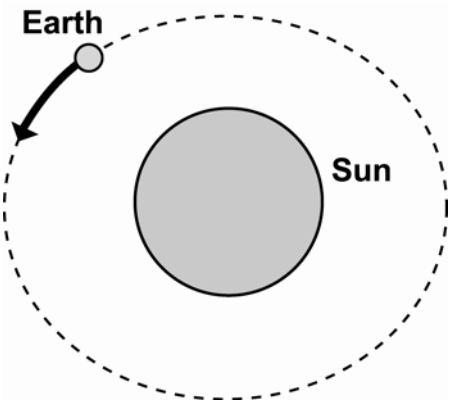
**A** It is bigger than Earth and farther from the Sun.
**B** It is bigger than Earth and closer to the Sun.
**C** It is smaller than Earth and farther from the Sun.
**D** It is smaller than Earth and closer to the Sun.

**Correct Response: A**

*Match to GLE: This item asks students to identify two properties of the planet Saturn. Other grade 5 iLEAP items that measure this GLE may address other planets in the solar system.*

**Earth and Space Science**
**Earth in the Solar System**
**GLE 44—***Explain rotation and revolution by using models or illustrations (ESS-M-C4)*

**Use this diagram to answer question 26.**




**26** Which statement **best** describes the diagram?

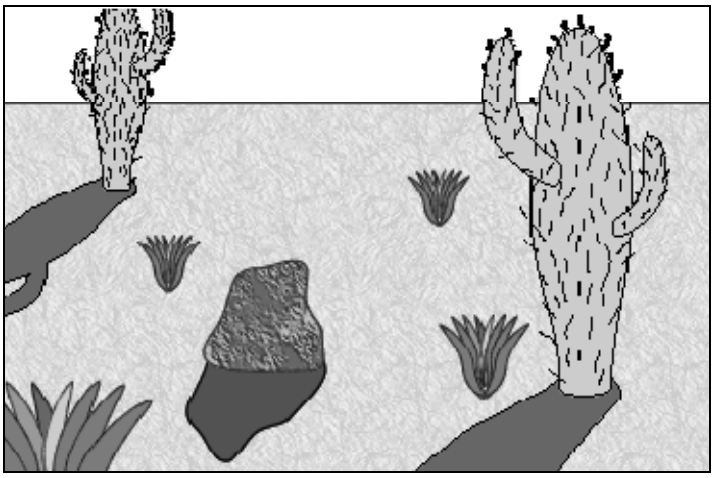
**A** Earth is rotating around the Sun.
**B** The Sun is rotating around Earth.
**C** Earth is revolving around the Sun.
**D** The Sun is revolving around Earth.

**Correct Response: C**

*Match to GLE: This item asks students to distinguish between rotation and revolution in the context of the Earth-Sun system. Other grade 5 iLEAP items that measure this GLE may address rotation or revolution in other ways.*

**Science and the Environment**
**GLE 48—***Determine the ability of an ecosystem to support a population (carrying capacity) by identifying the resources needed by that population (SE-M-A2)*

**Use the desert picture below to answer question 27.**



**27** Which factor **most likely** limits the desert's carrying capacity for plant life?

**A** the number of herbivores
**B** the amount of sunlight
**C** the availability of water
**D** the availability of land

**Correct Response: C**

*Match to GLE: This item asks students to identify a key feature of deserts that limit their ability to support life. Other grade 5 iLEAP items that measure this GLE may address other ecosystems and resources.*

**Science and the Environment**
**GLE 49—***Identify and give examples of pollutants found in water, air, and soil (SE-M-A3)*

**28** Many human activities, such as driving a car, cause the release of air pollutants. Which substance is a common air pollutant when driving a car?

**A** carbon monoxide
**B** chlorine
**C** nitrogen
**D** iron oxide

**Correct Response: A**

*Match to GLE: This item asks students to identify a key pollutant produced by most automobiles. Other grade 5 iLEAP items that measure this GLE may address other pollutants found in water, air, and soil.*

**Science and the Environment**
**GLE 50—***Describe the consequences of several types of human activities on local ecosystems (e.g., polluting streams, regulating hunting, introducing nonnative species) (SE-M-A4)*

**29** Runoff from farms that use fertilizers is entering a small lake. This will **most directly** affect the lake by causing

**A** the lake to dry up.
**B** algae to grow in the lake.
**C** the lake to become deeper.
**D** water in the lake to become solid.

**Correct Response: B**

*Match to GLE: This item asks students to identify an effect of farming on nearby lakes. Other grade 5 iLEAP items that measure this GLE may address other consequences of human activity on ecosystems.*

**Science and the Environment**
**GLE 51—***Describe naturally occurring cycles and identify where they are found (e.g., carbon, nitrogen, water, oxygen) (SE-M-A7)*

**30** Where would nitrogen **most easily** be found in the nitrogen cycle?

**A** in animal waste
**B** in drinking water supplies
**C** in underground mineral deposits
**D** in carbon dioxide released by factories into the atmosphere

**Correct Response: A**

*Match to GLE: This item asks students to identify a stage in the nitrogen cycle. Other grade 5 iLEAP items that measure this GLE may address other naturally occurring cycles*