

FCAT Sample Test Materials

These sample test materials are designed to help students prepare to answer FCAT questions. These materials introduce them to the kinds of questions they will answer when they take FCAT and include hints for responding to the different kinds of FCAT questions. The FCAT Science sample test materials for Grade 5 are composed of the books described below:

- Sample Test Book**
Includes a science sample test and instructions for completing the sample test. (Copies are available for all students in the tested grade.)
- Sample Answer Key**
Includes answers and explanations for the questions in the sample test. (Copies are available for classroom teachers only.)
- = This book

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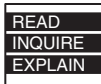
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FCAT Science Sample Answer Key



This book contains answers to the FCAT Science sample test questions. It also gives the *Sunshine State Standards* benchmark assessed by each item on the sample test. In addition, answer strategies or possible approaches to answering the questions are provided. Students may use approaches other than these and still receive credit if they also obtain a correct answer. For multiple-choice items, the reason an answer choice is incorrect (distractor rationale) is also provided.

Multiple-choice items are scored by awarding one point for each correct answer. The “Read, Inquire, Explain” questions allow partial credit for some answers, even if they are not 100 percent correct. Answers will be scored and points will be given based on the completeness and correctness of the answers. If a portion of an answer is correct, a portion of the points may be awarded. The scoring rubrics for the short- and extended-response questions are printed on pages 2 and 3 of this book.



Rubric for Short-Response Questions

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



Rubric for Extended-Response Questions

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

1 The correct answer is A (mixture).

Strand: A—The Nature of Matter

Benchmark: SC.A.1.2.4 The student knows that different materials are made by physically combining substances and that different objects can be made by combining different materials.

An understanding of mixtures is needed to answer this question. Mixtures are combinations of two or more different substances. Mixtures can be separated by physical processes such as filtering. Since substance J was separated from the other substances by filtering, the original combination of substances was a mixture.

Distractor Rationale

- B.** Solutions are a type of mixture where two or more substances are evenly dispersed. Solutions cannot be separated using filter paper. The mixture of K + L in the bottom of the flask may be a solution, but the original mixture of J + K + L was not, since J was separated by the filter paper.
- C.** A compound is a chemical combination of substances. Compounds cannot be separated into their components by filtering.
- D.** A pure substance is an element or a compound. Filtering cannot separate pure substances.

2 The correct answer is F (electrical).

Strand: B—Energy

Benchmark: SC.B.1.2.2 The student recognizes various forms of energy (e.g., heat, light, and electricity). (Also assesses SC.B.1.2.3 knows that most things that emit light also emit heat; SC.B.1.2.4 knows the many ways in which energy can be transformed from one type to another; SC.B.1.2.5 knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed; and SC.B.1.2.6 knows ways that heat can move from one object to another.)

An understanding of energy transformations is needed to answer this question. The picture illustrates the energy transformations that create an electromagnet. The energy in this circuit is provided by the battery. The chemical energy from the battery is transformed into electrical energy in the circuit. The electrical energy passing through the coils of wire around the nail causes the nail to become magnetized. The nail becomes an electromagnet when it has become magnetized.

Distractor Rationale

- G. While some energy is released as heat in every energy transformation, heat does not cause the nail to become magnetized.
- H. Light energy can be produced by batteries, but there is no light produced in this circuit. Light consists of electromagnetic energy, but light cannot cause a nail to become magnetized.
- I. Mechanical energy does not cause the nail to become magnetized.

3 The correct answer is D (Earth's atmosphere).

Strand: C—Force and Motion

Benchmark: SC.C.1.2.2 The student knows that waves travel at different speeds through different materials.

Knowledge of how waves move at different speeds through different materials is needed to answer this question. Electromagnetic waves, such as sunlight, change speed when they move from one medium to another. Light waves increase in speed as they leave the near vacuum of space and enter the denser atmosphere of Earth.

Distractor Rationale

- A. Light does not change speed as it passes Earth because of Earth's shape.
- B. Earth's gravity does not affect the speed of light to an observable degree.
- C. Mountains do not cause a change in the speed of light waves.

4 The correct answer is F (Ice Block).

Strand: C—Force and Motion

Benchmark: SC.C.2.2.4 The student knows that the motion of an object is determined by the overall effect of all of the forces acting on the object. (Also assesses SC.C.2.2.2 knows that an object may move in a straight line at a constant speed, speed up, slow down, or change direction dependent on net force acting on the object; and SC.C.2.2.3 knows that the more massive an object is, the less effect a given force has.)

Knowledge of how friction affects the movement of objects is needed to answer the question. Friction occurs when two substances rub or move relative to each other. The amount of the frictional force of the blocks depends on the mass of the blocks and the nature of the surfaces. Since the blocks are equally sized, they have the same mass, and the mass of the blocks will not affect the frictional force. The block of ice has the smoothest surface and will have the least friction. Some of the ice will melt, and the resulting water will also reduce the frictional force.

Distractor Rationale

- G.** A sponge has an uneven surface and will have more friction with the tray than the ice block.
- H.** Sandpaper is rough and will produce a greater frictional force with the tray than the ice block.
- I.** The plastic block may have a smooth surface, but the ice block will have less friction because its surface is smoother than the plastic block.

5 The correct answer is C (underground caves).

Strand: D—Processes that Shape the Earth

Benchmark: SC.D.1.2.4 The student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1 knows that larger rocks can be broken down into smaller rocks, which in turn can be broken down to combine with organic material to form soil; SC.D.1.2.2 knows that 75 percent of the surface of the Earth is covered by water; and SC.D.1.2.5 knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.)

An understanding of how erosion changes the surface of Earth is needed to answer this question. Layers of limestone are often porous. As water containing carbon dioxide (CO₂) travels through small openings in the limestone, the acid formed dissolves some of the rock. Over time, more limestone dissolves, and the openings become larger, forming underground caves.

Distractor Rationale

- A. Sandy flatlands are subject to erosion but are not formed by dissolving limestone.
- B. Offshore islands are formed by moving water, which causes erosion of sand and earth. Limestone is not involved in offshore island formations.
- D. Mangrove swamps occur when mangrove trees grow in muddy tidal areas. Limestone erosion is not involved in mangrove swamp formation.

6 The correct answer is shown below.

READ
INQUIRE
EXPLAIN

Strand: D—Processes that Shape the Earth

Benchmark: SC.D.1.2.4 The student knows that the surface of the Earth is in a continuous state of change as waves, weather, and shifts of the land constantly change and produce many new features. (Also assesses SC.D.1.2.1 knows that larger rocks can be broken down into smaller rocks, which in turn can be broken down to combine with organic material to form soil; SC.D.1.2.2 knows that 75 percent of the surface of the Earth is covered by water; and SC.D.1.2.5 knows that some changes in the Earth's surface are due to slow processes and some changes are due to rapid processes.)

Example of a Top-Score Response

An understanding of how erosion changes the surface of Earth over long periods of time is needed to answer this question. Water causes erosion as it passes over rocks and soil. Rivers wear down their banks and create canyons as soil and rocks are washed away.

An explanation similar to the one provided below would receive full credit.

Part A The similarities between the formation of the Grand Canyon and Jamie's grandfather's model are that the water in the river started to cause gaps or canyons in Earth to appear because of erosion, just like the water created crevices in the pan of soil. The river changed Earth by wearing down the rock in the Grand Canyon. The water wore down the soil in the model.

Part B Wind erosion caused the canyons to form the Grand Canyon by carrying away bits of rocks. Weathering also caused the breakdown of some rocks, which also aided in the formation of the Grand Canyon.

To receive full credit (4 points) for this question, the response should include a complete description of the similarities between the model and the Grand Canyon and an explanation of other factors in the formation of the Grand Canyon, including wind erosion and weathering. Partially correct answers will receive a score of 1, 2, or 3 points.

7 The correct answer is shown below.

READ
INQUIRE
EXPLAIN

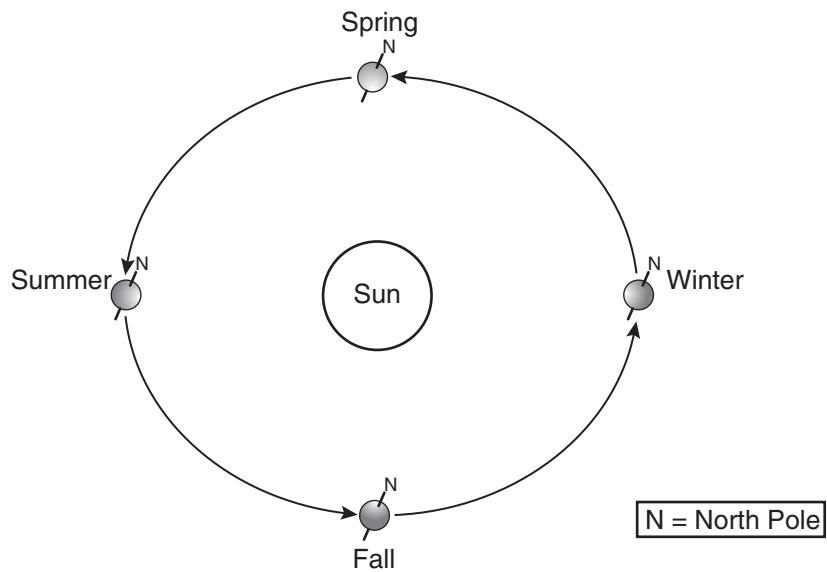
Strand: E—Earth and Space

Benchmark: SC.E.1.2.1 The student knows that the tilt of the Earth on its own axis as it rotates and revolves around the sun causes changes in season, length of day, and energy available.

Example of a Top-Score Response

An understanding of the tilt and position of Earth as it revolves around the Sun is needed to answer this question. Earth is tilted on its axis. As Earth revolves around the Sun, the tilt causes North America to be directed toward the Sun in summer and away from the Sun in winter.

A response similar to the one provided below would receive full credit.



To receive full credit (2 points) for this question, the response should include a correctly labeled diagram showing Earth’s tilt with the North Pole or North America labeled and correctly identified seasons. Partially correct answers will receive a score of 1 point.

8 The correct answer is I (the distance from the Sun).

Strand: E—Earth and Space

Benchmark: SC.E.1.2.4 The student knows that the planets differ in size, characteristics, and composition and that they orbit the sun in our Solar System. (Also assesses SC.E.1.2.5 understands the arrangement of planets in our Solar System.)

Knowledge of the placement and characteristics of the planets in the solar system is needed to answer this question. Earth's temperature is determined by its distance from the Sun. Earth has surface temperatures that allow the presence of water, plant growth, and other conditions that support life.

Distractor Rationale

- F. Other planets have a similar orbit shape to Earth's, yet do not support life.
- G. Mars is close to Earth, but Mars does not provide warmth or other conditions to support life.
- H. Moons are small satellites that orbit planets. Moons may have atmospheres and water, but the presence of a moon is not related to conditions on the planet it orbits.

9 The correct answer is C (heart).

Strand: F—Processes of Life

Benchmark: SC.F.1.2.3 The student knows that living things are different but share similar structures.

To answer this question, knowledge of the characteristics of animals is necessary. Rats, crabs, and spiders are all classified as animals. Animals are many-celled organisms that have body systems for various body functions. Rats, crabs, and spiders all have body systems for circulation. The circulatory system for each of these animals includes a heart.

Distractor Rationale

- A. Crabs and spiders are invertebrates and do not have bones. Both organisms have an exoskeleton or hard outer shell.
- B. Since crabs and spiders are invertebrates, they do not have ears. Both organisms have sensory “hairs” that enable them to detect changes in their environments.
- D. The organs for gas exchange for invertebrates and vertebrates are very different. The respiratory system for crabs includes gills. Spiders may have book lungs or other specialized organs for breathing.

- 10** The correct answer is I (Sawgrass and alligators depend on each other).

Strand: G—How Living Things Interact with Their Environment

Benchmark: SC.G.1.2.1 The student knows ways that plants, animals, and protists interact.

An understanding of the interactions of plants and animals and the roles of different animals in an ecosystem is needed to answer this question. Alligators depend on the presence of sawgrass to build their nests. Alligators help sawgrass grow by plowing travel lanes through it, which protects the sawgrass from flooding.

Distractor Rationale

- F. The travel lanes made by alligators help the flow of water through the sawgrass and keep it from being flooded. The travel lanes do not destroy the sawgrass.
- G. Alligators use sawgrass for nests. Alligators are carnivorous and do not eat sawgrass. They eat insects, fish, frogs, birds, and other animals.
- H. Alligators make travel lanes in the sawgrass, but the grass itself does not help the alligators travel. The role of sawgrass in the ecosystem is to provide food for other animals.

11 The correct answer is C (sugar).

Strand: G—How Living Things Interact with Their Environment

Benchmark: SC.G.1.2.3 The student knows that green plants use carbon dioxide, water, and sunlight energy to turn minerals and nutrients into food for growth, maintenance, and reproduction.

Knowledge of photosynthesis is needed to answer this question. Plants use carbon dioxide from the air, water, and the energy in sunlight to turn minerals and nutrients into sugar. Sugar is a nutrient that is needed for plant growth, maintenance, and reproduction.

Distractor Rationale

- A. Carbon dioxide is needed for photosynthesis. It is not a product.
- B. Chloroplasts are the structures where photosynthesis in green plants occurs.
- D. Sunlight is needed for photosynthesis. It is not a product.

12 The correct answer is G (hawk).

Strand: G—How Living Things Interact with Their Environment

Benchmark: SC.G.1.2.5 The student knows that animals eat plants or other animals to acquire the energy they need for survival.

An understanding of the roles of organisms in food chains and food webs is needed to answer this question. Energy is passed on through a food chain when one organism uses another organism for food. In an ecosystem, many food chains interact to form food webs. In the meadow food web, the arrows show how energy is transferred from plants to other organisms. Hawks can get their energy from rabbits, mice, snakes, and lizards. Snakes can get their energy from mice, rabbits, lizards, and birds. Since hawks eat snakes, and snakes eat birds, hawks can get energy from birds.

Distractor Rationale

- F.** The arrow from the plant to the grasshopper indicates that the grasshopper gets its energy from plants. Grasshoppers are eaten by birds and lizards.
- H.** The mouse gets its energy directly from plants, as shown by the arrow from the plant to the mouse. Mice are eaten by hawks and snakes.
- I.** The rabbit gets its energy directly from plants, as shown by the arrow from the plant to the rabbit. Rabbits are eaten by hawks and snakes.

- 13** The correct answer is A (Record when the seeds sprout and begin to grow).

Strand: H—The Nature of Science

Benchmark: SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

An understanding of the reasons for keeping records during an experiment is needed to answer this question. Hannah's mother wants to know which depth is best to plant seeds. Hannah should first record how long it takes the seeds to sprout. Hannah can analyze the data and draw a conclusion about which seeds sprouted to answer her mother's question.

Distractor Rationale

- B.** Providing enough light will be important for plants, but this will not have a major impact on the sprouting of seeds planted under the surface.
- C.** Hannah could make a prediction, but this would not give her mother any specific information from the experiment.
- D.** Hannah has planted four seeds at each depth, so planting more seeds would not provide any information.

- 14** The correct answer is H (Seedling Data Table #3, which specifies the exact dates data were collected).

Strand: H—The Nature of Science

Benchmark: SC.H.1.2.1 The student knows that it is important to keep accurate records and descriptions to provide information and clues on causes of discrepancies in repeated experiments.

An understanding of the reasons for keeping records during an experiment is needed to answer this question. Data should be collected and recorded so that it is clear how much time passed between each measurement of plant height. The data chart for the seedlings should be clear about when data were collected so that the growth of the seedlings can be compared over a specific time interval.

Distractor Rationale

- F.** In Seedling Data Table #1, it is not clear exactly when the July and August data were collected. Specific dates are needed for each table.
- G.** In Seedling Data Table #2, it is not clear if data have been collected at specific, regular intervals of time over the three months.
- I.** In Seedling Data Table #4, it is not clear when the seedling height was measured, so it will be hard to tell how fast the seedlings are growing.

- 15** The correct answer is B (Mealworms prefer apples).

Strand: H—The Nature of Science

Benchmark: SC.H.1.2.2 The student knows that a successful method to explore the natural world is to observe and record, and then analyze and communicate the results. (Also assesses SC.H.1.2.4 knows that to compare and contrast observations and results is an essential skill in science; and SC.H.3.2.2 knows that data are collected and interpreted in order to explain an event or concept.)

Knowledge of analyzing data to form a conclusion is needed to answer this question. In each experiment, Alejandro's data show that many more mealworms were near the apple than were near the pear. Alejandro can conclude from his experiments that mealworms preferred apples over pears.

Distractor Rationale

- A. In each experiment, fewer mealworms preferred pears to apples.
- C. In each experiment, most mealworms preferred either apples or pears; only a few mealworms did not move toward either fruit.
- D. In each experiment, most mealworms moved either toward the apples or toward the pears.

Notes



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