2004

FCAT

Florida Comprehensive Assessment Test

SCIENCE
SAMPLE ANSWER KEY

GRADE

5

FC00000155

FCAT Sample Test Materials

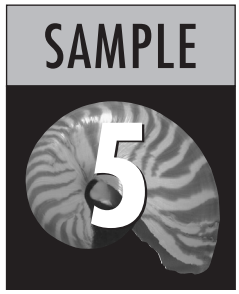
These sample test materials are designed to help students prepare to answer FCAT questions. These materials introduce them to the kinds of questions they will answer when they take FCAT and include hints for responding to the different kinds of questions. The FCAT Science sample test materials for Grade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

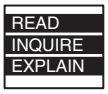
FCAT Science
Sample Answer Key



This answer key 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, possible approaches to solving 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 for partial credit for some answers, even if they are not 100% 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 rubrics are printed on pages 2 and 3 of this book.

The scoring rubrics for the short-response questions and the extended-response questions are shown below:



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 provided a completely incorrect or uninterpretable response, or no response at all.

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 provided a completely incorrect solution or uninterpretable response, or no response at all.

1 **The correct answer is B (Block B).**

Strand: A—The Nature of Matter

Benchmark: SC.A.1.2.1 The student determines that the properties of materials (e.g., density and volume) can be compared and measured (e.g., using rulers, balances, and thermometers).

Answer Strategy:

To determine which block has the greatest mass, look at each balance and compare the block with the identified mass. If the block tips the balance lower than the identified mass, it has more mass. If the block tips the balance higher than the identified mass, it has less mass. The block that tips the balance lower than 45 grams would have the most mass because this is the greatest mass identified. According to the balances, Block B's mass is more than 45 grams while the masses of Blocks A, C, and D are equal to or less than 45 grams.

Distractor Rationale:

A. The mass of Block A is equal to 45 grams.

C. The mass of Block C is less than 25 grams, which is less than 45 grams.

D. The mass of Block D is equal to 25 grams, which is less than 45 grams.

2 **The correct answer is H (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.

Answer Strategy:

A mixture is comprised of several substances that are mixed together yet retain their original properties. When the ingredients are combined, a new material (cereal) is created yet the substances maintain their original properties.

Distractor Rationale:

F. A compound is a substance containing two or more elements in a fixed ratio.

G. An element is a substance that cannot be broken down into other substances.

I. In a solution, all substances are equally dispersed throughout a single phase (such as in a liquid phase).

3 **The correct answer is D (to be a source of energy).**

Strand: B—Energy

Benchmark: SC.B.1.2.1 The student knows how to trace the flow of energy in a system (e.g., as in an ecosystem).

Answer Strategy:

In this food chain, energy is transferred from one living thing to the next. When a living thing is eaten by something above it on the food chain, the living thing that consumes it absorbs its energy. Just as the rabbit gets energy from eating the carrot, the fox gets energy from eating the rabbit.

Distractor Rationale:

A. A habitat is a place where an organism lives. The rabbit does not help the fox or carrot to form a habitat. The rabbit is an energy source for the fox.

B. The role of the rabbit is not to find a space for the fox or carrot to live. The rabbit is an energy source for the fox.

C. The rabbit is not the primary source of water for the fox. Although water, as well as energy, is transferred, the fox's primary source of water is not the rabbit.

4 **The correct answer is F (light and heat).**

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.1.2.4 knows the many ways in which energy can be transformed from one type to another.)

Answer Strategy:

Energy is given off in many forms. All objects always emit some radiation (energy). At room temperature or below, the amount of energy given off is minimal. Only at much higher temperatures is the energy of the radiation (light) sufficient to make it visible. When the wick of the candle burns, it produces the visible light energy and heat (the transfer of thermal energy from one substance to another).

Distractor Rationale:

G. Fire produces no sound, though burning objects do produce sound. Some chemical reactions do occur.

H. Fire is not a source of magnetic or nuclear energy. Even though light is part of the electromagnetic spectrum, the magnetic component is too small to be useful.

I. Fire is not a good source of electrical or mechanical energy. Even though light is part of the electromagnetic spectrum, the electrical energy (flow of electrons) is negligible.

5 **The correct answer is A (friction).**

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.)

Answer Strategy:

Water affects friction. Water can create a smooth layer between two surfaces (e.g., the floor and the sole of a shoe) by filling in any gaps or holes in the rough surface. Molecules in a liquid slide past each other more easily than particles in a solid, thus providing lubrication. This reduces the amount of friction objects would normally experience as one rough surface rubs against another rough surface.

Distractor Rationale:

B. A wet floor does not affect gravitational force.

C. A wet floor would provide lubrication, increasing inertia.

D. Magnetism does not apply in this situation.

6 **The correct answer is H (A flowing river cut into the rocks to form the canyon).**

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.)

Answer Strategy:

Moving water erodes rock and soil over long periods of time. The different exposed layers of rock in the Grand Canyon today show that the river cut a path as it ran through the canyon, taking some soil and rock with it as it flowed and leaving the rest.

Distractor Rationale:

F. A waterfall would only erode rock at the waterfall site.

G. Although rainstorms cause erosion, the canyon was formed as a result of thousands of years of water erosion.

I. Rocks from other locations could not have formed a canyon because a canyon is a result of erosion, not a result of deposition.

7 **The correct answer is A (There is a day and a night).**

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.

Answer Strategy:

It takes 24 hours for Earth to make a complete rotation on its axis. Because of this rotation, the Sun shines on different portions of Earth as it rotates, creating periods of day and night on the surface of the Earth.

Distractor Rationale:

B. One revolution results in approximately 365 days in an earth year.

C. The phases of the Moon are a result of the relative positions of Earth, the Moon, and the Sun as Earth and the Moon together revolve around the Sun.

D. Earth's seasons are the result of its tilt and revolution around the Sun.

8 **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.

Answer Strategy:

Consider the position of Earth as it moves around the Sun to answer this question. The Sun remains visible 24 hours a day during the summer for the areas near the North and South Poles because of the direction Earth tilts as it revolves around the Sun. The pole tilted toward the Sun has sunlight all the time while the other pole that is tilted away from the Sun is dark all the time.

To receive full credit (2 points) for this question, the response should include an explanation of the tilt of Earth and the pole closest to the Sun receiving 24 hours of sunlight. Partially correct answers will receive a score of 1 point.

9 **The correct answer is H (They can see well at night).**

Strand: F—Processes of Life

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

Answer Strategy:

A cat is a mammal and the owl is a bird, but both animals rely on their night vision for survival.

Distractor Rationale:

F. The owl is a bird, not a mammal.

G. Eye color does not affect night vision.

I. The cat has fur; the owl has feathers.

10 **The correct answer is B (They have ways to protect themselves).**

Strand: G—How Living Things Interact with Their Environment

Benchmark: SC.G.1.2.2 The student knows that living things compete in a climatic region with other living things and that structural adaptations make them fit for an environment.

Answer Strategy:

Even though both animals live in the same environment, the armadillo is a mammal and the coral snake is a reptile. The question explains how the animals use different techniques to protect themselves from their enemies: the armadillo curls up into an armored ball and the coral snake uses its tail to confuse its enemies. Though the techniques differ, both animals have ways to protect themselves.

Distractor Rationale:

A. Both animals live on land.

C. Armadillos do not attack their enemies.

D. Snakes do not have a hard outer layer of skin.

11 **The correct answer is H (3).**

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.

Answer Strategy:

Green plants release oxygen from their leaves into the atmosphere as a byproduct of photosynthesis. Arrow 3 on the drawing goes from the leaves to the atmosphere.

Distractor Rationale:

F. Arrow 1 represents water and minerals moving from the soil into the roots.

G. Arrow 2 does not represent a step in photosynthesis.

I. Arrow 4 represents the carbon dioxide (CO_2) that goes from the atmosphere into the leaves.

12 **The correct answer is B (It must compete with other goldfish for resources).**

Strand: G—How Living Things Interact with Their Environment

Benchmark: SC.G.2.2.1 The student knows that all living things must compete for Earth's limited resources; organisms best adapted to compete for the available resources will be successful and pass their adaptations (traits) to their offspring. [Also assesses SC.B.2.2.2 recognizes the costs and risks to society and the environment posed by the use of nonrenewable energy, and SC.B.2.2.3 knows that the limited supply of usable energy sources (e.g., fuels such as coal or oil) places great significance on the development of renewable energy sources.]

Answer Strategy:

When living things are placed into new environments, in order to survive, they must compete for resources. The goldfish must compete with the other fish that are already in the tank to get the resources it needs to live.

Distractor Rationale:

A. The goldfish does not change its physical characteristics to camouflage itself.

C. It would not allow other goldfish to use the limited resources first because the goldfish has to compete for resources to stay alive.

D. A goldfish in an aquarium does not build a habitat.

13 **The correct answer is G (write down what he sees in the jar).**

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.

Answer Strategy:

An understanding of experimental design is required to answer this question. To gain the most information from his experiment, Jim must track the results to draw appropriate conclusions and to have a record of the findings. Accurate notes also allow the experiment to be recreated in the future.

Distractor Rationale:

F. Adding more worms will not help Jim find out what worms do for a garden.

H. Predictions should be made throughout the experiment, but keeping an accurate record of observations is the most critical step.

I. Planning should be completed before the start of the experiment.

14 **The correct answer is shown below.**

READ
INQUIRE
EXPLAIN

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.)

Answer Strategy:

Part A Robert's experiment must include a way to measure the amount of force needed to lift the object each time he repositions the fulcrum. Robert also needs to decide how to measure the amount of force needed to lift the object with and without the lever. He should plan to do this several times with the fulcrum in different places and record the results.

Part B The experiment could be improved by including a way to measure the amount of force needed to lift the object. That would show how the fulcrum placement affects the amount of force needed. After determining how to measure the amount of force, then a comparison of results is possible.

To receive full credit (4 points) for this question, the response should include a complete description of the need for at least two of these elements of experimental design:

- Measurement of force
- Repetition
- Record of results
- Location of fulcrum

Partially correct answers will receive a score of 1, 2, or 3 points.

15 **The correct answer is D (It helps people by purifying the water to make it safer to use).**

Strand: H—The Nature of Science

Benchmark: SC.H.3.2.1 The student understands that people, alone or in groups, invent new tools to solve problems and do work that affects aspects of life outside of science. (Also assesses SC.H.3.2.3 knows that before a group of people build something or try something new, they should determine how it may affect other people.)

Answer Strategy:

Tap water in cities may come from different sources, but it all goes through a water purification process before it is tapped. This process involves removing potentially harmful elements (bacteria) and pollutants from the water by filtering them out or by using chemicals to kill them. This makes the water safer for humans to drink.

Distractor Rationale:

A. Factories may filter water for many reasons, but factories do not supply tap water for people in cities.

B. The purification process does not increase the availability of water.

C. The purification of water does not affect air quality.

16 **The correct answer is I (variable).**

Strand: H—The Nature of Science

Benchmark: SC.H.3.2.4 The student knows that through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas.

Answer Strategy:

The bucket with no added minerals represents the control in the experiment. The different minerals added to each of the other buckets represent the variables in the experiment. By comparing the growth of the chickens eating each type of altered feed (the variables) to the growth of the chickens eating unaltered feed (the control group), the farmer can determine if the added minerals affected animal growth.

Distractor Rationale:

F. A control is used as a basis of comparison for evaluation of the results. In this experiment, the control is the feed without added minerals.

G. A hypothesis is a prediction based on observations. In this experiment, the hypothesis is minerals affect growth in chickens.

H. A specimen is a sample that is used for testing or study. In this experiment, the chickens are the specimens.

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Florida Department of Education
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