XVI. Science and Technology/Engineering, Grade 5
Grade 5 Science and Technology/Engineering Test


- Earth and Space Science (Framework, pages 26–29)
- Life Science (Biology) (Framework, pages 46–49)
- Physical Sciences (Chemistry and Physics) (Framework, pages 64–66)
- Technology/Engineering (Framework, page 86)

The Massachusetts Science and Technology/Engineering Curriculum Framework is available on the Department website at www.doe.mass.edu/frameworks/current.html.

Science and Technology/Engineering test results are reported under four MCAS reporting categories, which are identical to the four framework content strands listed above.

The tables at the conclusion of this chapter indicate each released and unreleased common item’s reporting category and the framework learning standard it assesses. The correct answers for released multiple-choice questions are also displayed in the released item table.

Test Sessions

The grade 5 Science and Technology/Engineering test included two separate test sessions. Each session included multiple-choice and open-response questions. Approximately half of the common test items are shown on the following pages as they appeared in test booklets.

Reference Materials and Tools

During both Science and Technology/Engineering test sessions, the use of bilingual word-to-word dictionaries was allowed for current and former English language learner students only. No other reference tools or materials were allowed.
Grade 5 Science and Technology/Engineering
SESSION 1

DIRECTIONS
This session contains six multiple-choice questions and two open-response questions. Mark your answers to these questions in the spaces provided in your Student Answer Booklet.

1. In a particular region, a change in climate would likely have a greater effect on organisms than a change in weather would. Which of the following statements best explains why?
   A. A change in climate causes more earthquakes than a change in weather does.
   B. A change in climate causes clouds to form faster than a change in weather does.
   C. A change in climate affects the number of daylight hours more than a change in weather does.
   D. A change in climate affects an environment for a longer period of time than a change in weather does.

2. Wildebeests are herbivores that live in very large herds in Africa. The map below shows how wildebeest herds typically move around in an area during the year.

Which of the following reasons best explains why the wildebeest herds move around in the area each year?

A. to find more food
B. to escape a thunderstorm
C. to develop stronger muscles
D. to follow other animal species
A teacher places four small cubes on a table in front of a science class. Each cube is the same size and painted the same color. However, each cube is made of a different material: copper, iron, wood, or plastic.

Which of the following tools would most help the students identify the cube made of iron?

A. hot plate  
B. bar magnet  
C. metric ruler  
D. magnifying lens

Which of the following statements best explains how the decomposition of plant and animal matter helps to form rich soils?

A. Decomposition adds silt to soil.  
B. Decomposition adds water to soil.  
C. Decomposition adds oxygen to soil.  
D. Decomposition adds nutrients to soil.
5 Tortoises are turtles that live mostly on land. Marine turtles are turtles that spend nearly all their lives in the sea. Over time, marine turtles have developed adaptations that help them survive in their environment. These adaptations are different from the adaptations that tortoises have developed.

Which of the following describes an adaptation of marine turtles that makes them different from tortoises?

A. Marine turtles are cold blooded.
B. Marine turtles lay eggs on land.
C. Marine turtles have a protective shell.
D. Marine turtles have legs shaped like flippers.

6 Which of the following diagrams correctly shows the four planets closest to the Sun and their moons?

A. [Diagram A]
B. [Diagram B]
C. [Diagram C]
D. [Diagram D]
Questions 7 and 8 are open-response questions.

- **BE SURE TO ANSWER AND LABEL ALL PARTS OF EACH QUESTION.**
- Show all your work (diagrams, tables, or computations) in your Student Answer Booklet.
- If you do the work in your head, explain in writing how you did the work.

Write your answer to question 7 in the space provided in your Student Answer Booklet.

7 Earthworms live underground in burrows. They stay underground unless it is cloudy or dark, and the air is damp. Earthworms must have wet skin to breathe.

An earthworm’s waste is called castings. An earthworm deposits castings at the top of its burrow, as shown in the picture below.

![Image of an earthworm in a burrow with castings at the top](Image courtesy of USDA-NRCS)

a. Describe **one** way that earthworm castings help an ecosystem.

Earthworm burrows are small tunnels that may be many feet long.

b. Identify **two** ways that burrowing in soil helps earthworms survive.

c. Describe **two** ways that earthworm burrows might help an ecosystem. Explain **each** of your answers.
Write your answer to question 8 in the space provided in your Student Answer Booklet.

8 An anteater is an animal that has long, sharp claws and a long, sticky tongue for finding and catching ants inside anthills. The picture below shows the South American giant anteater.

- Identify a garden tool that can be used like the anteater’s claws.
- Describe how the tool you identified in part (a) and the anteater’s claws can be used in a similar way.
- Identify another animal that uses a body part in the same way as the tool you identified in part (a) is used. Explain your answer.

A student wants to catch different types of insects.

- Describe a method that could be used to catch insects that is similar to how an anteater uses its tongue to catch ants.
Clouds and precipitation moved across western Massachusetts one evening. The temperature changed from 41°F to 28°F. Which of the following changes in precipitation most likely occurred on this evening?

A. sleet changing to hail  
B. snow changing to rain  
C. rain changing to sleet  
D. snow changing to hail

Four reptiles are shown below. Which of the following questions about an animal’s physical characteristics is best to use when deciding whether an animal is a reptile?

A. How big is it?  
B. Does it have scales?  
C. Does it have a shell?  
D. How many legs does it have?
11. What form of energy makes a compass needle point north?
   A. electrical  
   B. heat  
   C. light  
   D. magnetic

12. Jupiter is the largest planet in the solar system. It rotates on its axis once about every 10 hours.
   What time period on Earth would be 10 hours long if Earth rotated on its axis once every 10 hours?
   A. a day  
   B. a week  
   C. a month  
   D. a year

13. Which of the following is the main role of flowers found on most flowering plants?
   A. to take in air  
   B. to produce seeds  
   C. to absorb nutrients  
   D. to protect the stem

14. Which of the following describes water changing from liquid to solid?
   A. ice forming on a lake  
   B. dew forming on grass  
   C. snow melting into a puddle  
   D. water evaporating from a pond

15. Which of the following is a mineral?
   A. diamond  
   B. plastic  
   C. steel  
   D. wood
The pictures below show how an island changed over time.

Which of the following processes most likely caused the island to change?

A. earthquakes over many days
B. hurricanes over several months
C. rain and flooding over several years
D. weathering and erosion over millions of years
17 Three bar magnets are placed inside a plastic tube. Which of the following pictures best shows how the three bar magnets will move after being placed inside the tube?

A. 

B. 

C. 

D. 

18 The picture below shows a wind-up toy train. The key on the side of the train is turned to wind up the toy.

The key used to wind up the train is an example of which simple machine?

A. pulley  
B. wedge  
C. inclined plane  
D. wheel and axle
At the beginning of a science class, the teacher opened a small sealed jar and placed it on a table. The contents of the jar spread throughout the room during class. Which of the following did the jar most likely contain?

A. cloth fibers
B. oxygen gas
C. saltwater
D. snowflakes

After playing the instrument, the student wanted it to have a higher pitch. Which of the following changes will give the instrument a higher pitch?

A. lengthening the string
B. plucking the string harder
C. tightening the string
D. using a thicker string
Which of the following diagrams best represents how light travels from a flashlight to a piece of paper that is 40 cm away?

A. 

B. 

C. 

D. 

Flashlight 

Flashlight 

Flashlight 

Flashlight 

Piece of paper 

Piece of paper 

Piece of paper 

Piece of paper 

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* Answers are provided here for multiple-choice items only. Sample responses and scoring guidelines for open-response items, which are indicated by the shaded cells, will be posted to the Department’s website later this year.
## Grade 5 Science and Technology/Engineering
### Spring 2015 Unreleased Common Items:
#### Reporting Categories and Standards

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