Science
Grade 4

Sample Items

Introduction

The South Carolina State Department of Education provides districts and schools with tools to assist in delivering focused instruction aligned with the *South Carolina College- and Career-Ready Science Standards 2021*. This document contains a set of ten SC READY Science grade 4 test items that have been written to align with the 2021 standards for *Grade 4 Science*. These items were reviewed for content, fairness, and sensitivity prior to being field tested and approved for release to the public.

Purpose

This document is intended to be a resource for educators; it is not designed to be a practice test for students. The sample items are examples of college- and career-ready assessment items. The SC READY test assesses content standards in a variety of ways. This document does not include all item types. To see the full functionality of Technology-Enhanced items see Online Tools Training. https://portal.te.drcedirect.com/SC

Item Information Format

SC READY SCIENCE Grade 4 Sample Item (#)	
Standard Alignment	PE Code (2D or 3D) Science and Engineering Practice (SEP) Disciplinary Core Idea (DCI) Crosscutting Concept (CCC)
Standard Description	text from the *South Carolina College- and Career-Ready Science Standards 2021*
Item Type	Selected Response, Evidence-Based Selected Response (EBSR), Multi-select, Drag and Drop, Drop-down
Answer Key	correct answer
Depth of Knowledge	cognitive demand
Estimated Difficulty	estimate based on student responses

Links

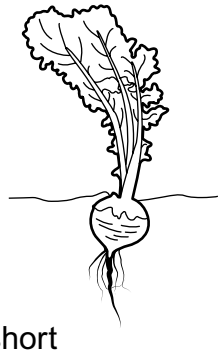
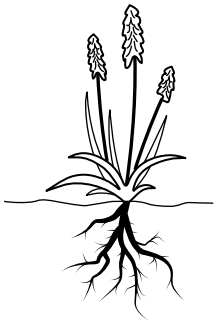
Assessment Quick Links for Teachers
https://ed.sc.gov/tests/assessment-information/quick-links-for-teachers/

South Carolina Science College- and Career-Ready Standards
https://ed.sc.gov/instruction/standards/science/standards/

Norman Webb's Depth-of-Knowledge for the Four Content Areas
https://www.webbalign.org/dok-summary-tables

1. A student observed the roots of two plants. The student's observations are shown below.

Plant Root Diagrams

Plant A	Plant B
	
• short • one main thick root • some smaller root structures	• short • many small roots with hair-like structures

The student concluded that plant B would survive better than plant A during a period without rain. Why did the student **most likely** make this conclusion?

A. The hair-like structures on the roots increase its ability to absorb light from the Sun.

B. The hair-like structures on the roots increase its ability to absorb water from the soil.

C. The hair-like structures on the roots increase its ability to store food made by the plant.

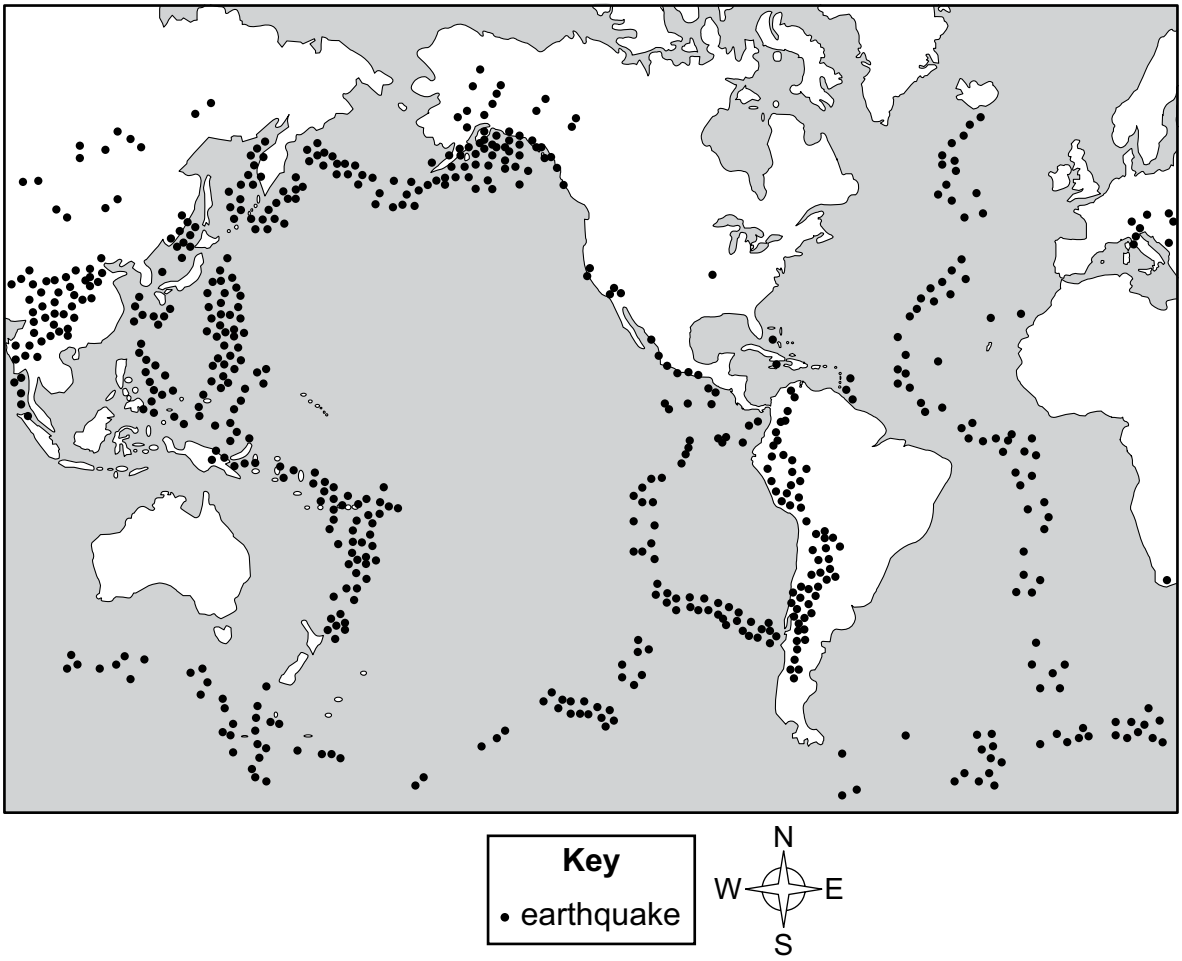
D. The hair-like structures on the roots increase its ability to release heat into the environment.

SC READY SCIENCE Grade 4 Sample Item 1	
Standard Alignment	4-LS1-1 (3D) SEP: Engaging in Argument from Evidence DCI: LS1.A CCC: Systems and System Models
Standard Description	Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction.
Item Type	Selected Response
Answer Key	B
Depth of Knowledge	2
Estimated Difficulty	Medium

Go On ☞

2. The map shows locations where earthquakes are frequent around the world.

Earthquake Locations around the World



Which statement **best** describes the data in the map?

A. Earthquakes occur in random locations.
B. Most earthquakes occur in the Southern Hemisphere.
C. The strongest earthquakes occur near the middle of oceans.
D. Most earthquakes occur along boundaries between continents.

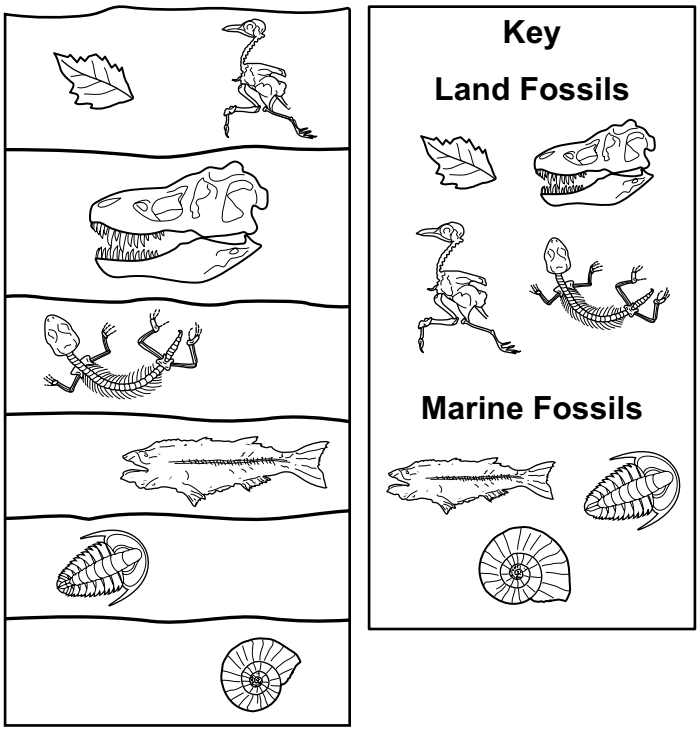
Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 2	
Standard Alignment	4-ESS2-2 (3D) SEP: Analyzing and Interpreting Data DCI: ESS2.B CCC: Patterns
Standard Description	Analyze and interpret data from maps to describe patterns of Earth's features.
Item Type	Selected Response
Answer Key	D
Depth of Knowledge	2
Estimated Difficulty	Medium

Go On ☞

3. The drawing shows the rock layers and fossils in an area.

Rock Layers and Fossils



Use the drop-down menus to **best** describe this area and how it has changed over time.

The oldest rock layer is the [ ] layer, and it has [ ] fossils.

This means that a very long time ago, the area was [ ].

More recently, the area has been [ ].

Key:

The oldest rock layer is the [bottom] layer, and it has [marine] fossils.

This means that a very long time ago, the area was [underwater].

More recently, the area has been [dry land].

Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 3	
Standard Alignment	4-ESS1-1 (3D) SEP: Constructing Explanations and Designing Solutions DCI: ESS1.C CCC: Patterns
Standard Description	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
Item Type	Drop-down
Answer Key	bottom, marine; underwater; dry land
Depth of Knowledge	2
Estimated Difficulty	Medium

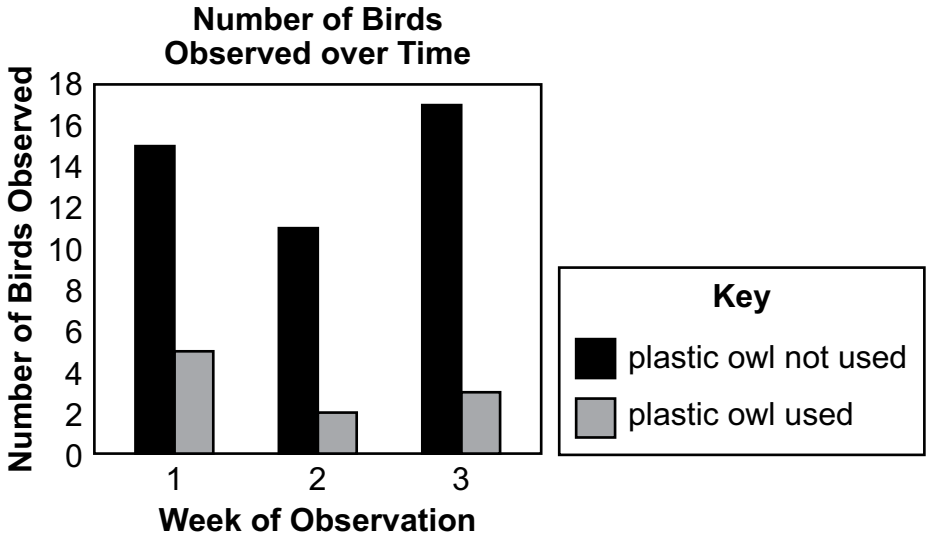
Go On ☞

4. This question has two parts.

A student read that some people place large plastic owls in areas where they want to prevent birds from gathering.

The student decided to conduct an investigation. Over three weeks, the student counted the number of birds that were present in an area when a plastic owl was not used. Then, over the next three weeks, the student counted the number of birds that were present in the same area when the plastic owl was used.

Plastic Owl



Part A

Which statement **most likely** explains what the student observed?

A. Other birds avoid owls.
B. Owls avoid other birds.

Part B

Which data **best** support the answer selected in part A?

A. More birds were observed when the plastic owl was used.
B. Fewer birds were observed when the plastic owl was used.

Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 4	
Standard Alignment	4-LS1-2 (3D) SEP: Developing and Using Models DCI: LS1.D CCC: Systems and System Models
Standard Description	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
Item Type	Evidence-Based Selected Response (EBSR)
Answer Key	A/B
Depth of Knowledge	2
Estimated Difficulty	Low

Go On ☞

5. A school wants a plan to keep people safe when there is a tornado.

Which **two** solutions are **most likely** to keep people at the school safe if a tornado is near?

A. announcing a warning
B. turning off building lights
C. locking classroom windows and doors
D. preparing students to ride home on school buses
E. moving students out of classrooms to inside hallways

SC READY SCIENCE Grade 4 Sample Item 5	
Standard Alignment	4-ESS3-2 (3D) SEP: Constructing Explanations and Designing Solutions DCI: ESS3.B CCC: Cause and Effect
Standard Description	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
Item Type	Multi-select
Answer Key	A, E
Depth of Knowledge	2
Estimated Difficulty	Medium

Go On ☞

6. A person opened a can of tuna fish to make a sandwich for lunch. A cat ran into the kitchen from another room and began to meow.

Which model **best** describes how the cat processed the information in its environment?

A. tuna can makes a sound → cat's brain receives a signal → cat runs into the kitchen

B. cat's brain receives a signal → tuna can makes a sound → cat runs into the kitchen

C. cat sees can being opened → cat runs into the kitchen → cat's brain receives a signal

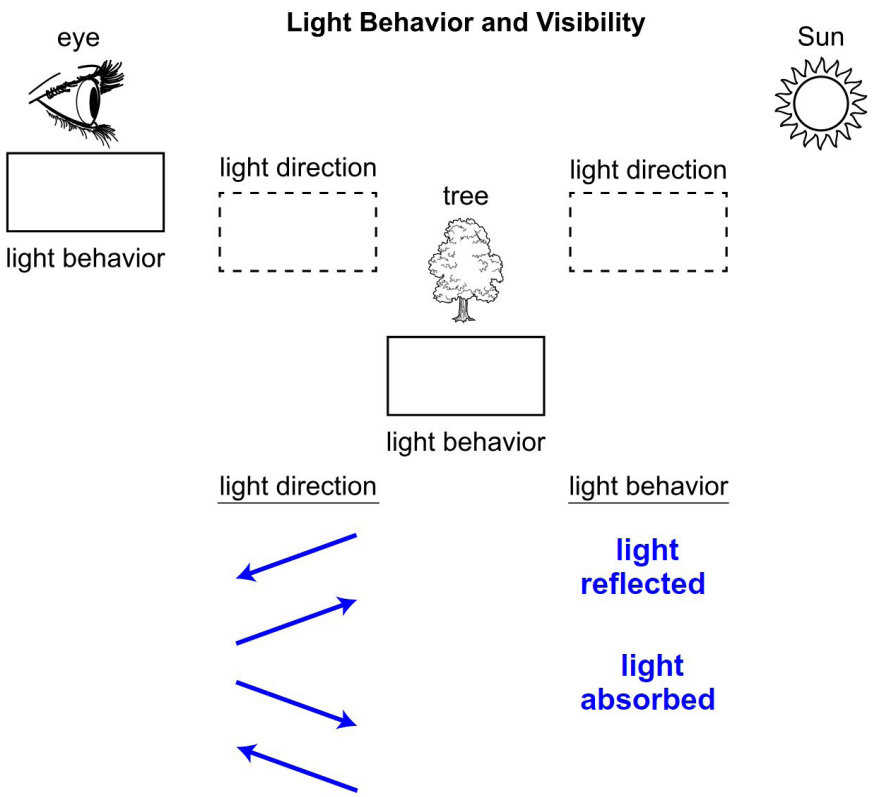
D. cat's brain receives a signal → cat sees can being opened → cat runs into the kitchen

SC READY SCIENCE Grade 4 Sample Item 6	
Standard Alignment	4-LS1-2 (3D) SEP: Developing and Using Models DCI: LS1.D CCC: Systems and System Models
Standard Description	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
Item Type	Selected Response
Answer Key	A
Depth of Knowledge	3
Estimated Difficulty	Medium

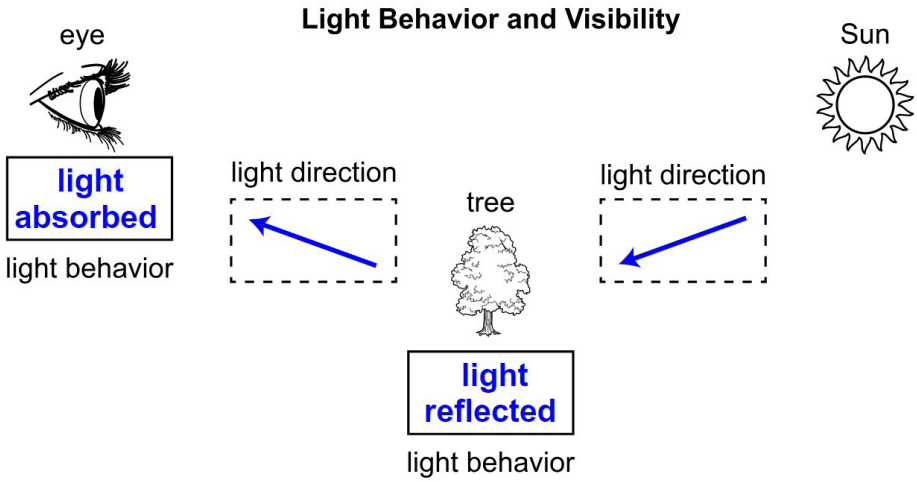
Go On ☞

7. A student wants to develop a model that shows how a tree can be viewed by the eye.

Drag arrows and labels into the boxes to complete the model.



Key:



Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 7	
Standard Alignment	4-PS4-2 (3D) SEP: Developing and Using Models DCI: PS4.B CCC: Cause and Effect
Standard Description	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
Item Type	Drag and Drop
Answer Key	See key
Depth of Knowledge	3
Estimated Difficulty	High

Go On ☞

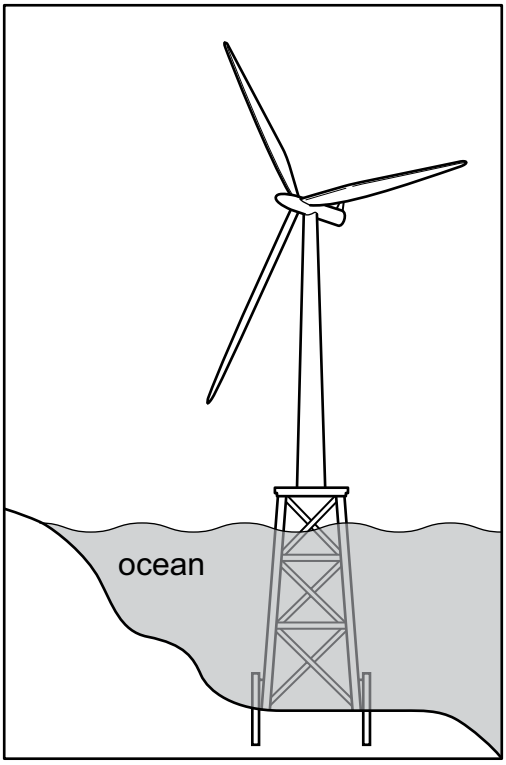
Use the passage to answer the next three questions.

Energy at the Beach

At the beach, the wind blows almost all the time. The wind is the main cause of waves at the beach.

People near the coast sometimes use wind as an energy source to provide electricity to homes and businesses. A wind turbine is shown.

Offshore Wind Turbine

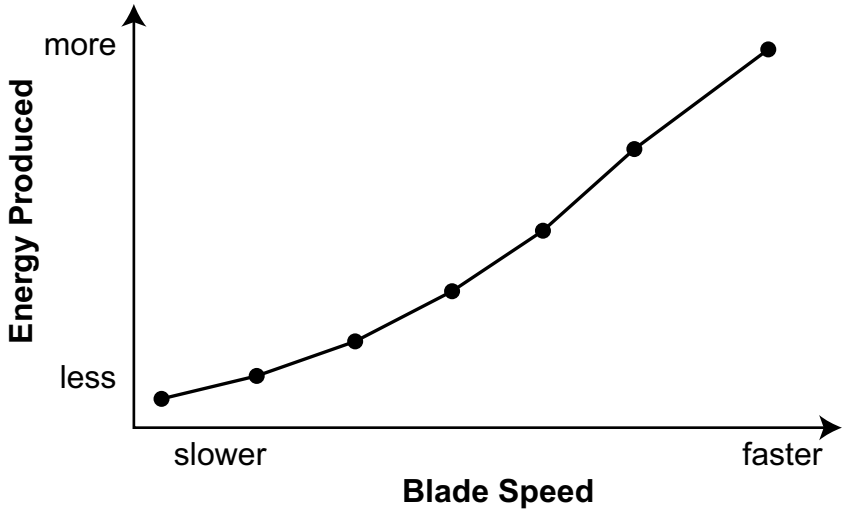


Offshore Wind Turbine Energy Facts

- fossil fuels not used
- air not polluted
- wind almost always available
- can negatively affect wildlife
- noise pollution
- expensive to build

8. Students collected data on how the speed of a wind turbine's blade affected the amount of energy the turbine produced.

Wind Turbine Blade Speed vs Energy Production



Which statement **best** explains the relationship shown on the graph?

A. A faster blade speed will produce more energy.
B. A slower blade speed will produce more energy.
C. More energy production will cause faster blade speeds.
D. Less energy production will cause slower blade speeds.

SC READY SCIENCE Grade 4 Sample Item 8	
Standard Alignment	4-PS3-1 (3D) SEP: Constructing Explanations and Defining Solutions DCI: PS3.A CCC: Energy and Matter
Standard Description	Use evidence to construct an explanation relating the speed of an object to the energy of that object.
Item Type	Selected Response
Answer Key	A
Depth of Knowledge	2
Estimated Difficulty	Medium

Go On ☞

9. Four students describe offshore wind turbines.

Descriptions of Wind Turbines

Student	Renewable	Fact
W	no	can harm wildlife
X	no	causes air pollution
Y	yes	can harm wildlife
Z	yes	causes air pollution

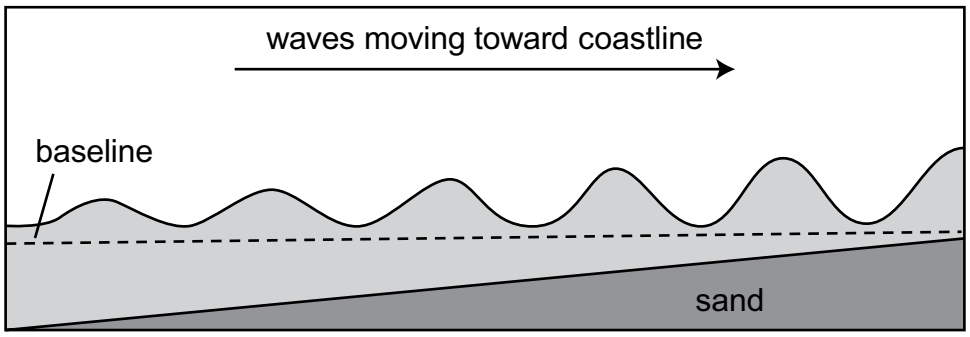
Which student **best** describes the offshore wind turbines?

A. Student W
B. Student X
C. Student Y
D. Student Z

SC READY SCIENCE Grade 4 Sample Item 9	
Standard Alignment	4-ESS3-1 (3D) SEP: Obtaining, Evaluating, and Communicating Information DCI: ESS3.A CCC: Cause and Effect
Standard Description	Obtain and combine information to describe that energy and fuels are derived from natural resources and how their uses affect the environment.
Item Type	Selected Response
Answer Key	C
Depth of Knowledge	2
Estimated Difficulty	High

10. Look at the model that shows waves moving toward a coastline.

Waves near the Coast



What change happens to a water wave as the wave gets closer to the coastline?

A. wavelength increases
B. amplitude increases
C. wavelength decreases
D. amplitude decreases

SC READY SCIENCE Grade 4 Sample Item 10	
Standard Alignment	4-PS4-1 (3D) SEP: Developing and Using Models DCI: PS4.A CCC: Patterns
Standard Description	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
Item Type	Selected Response
Answer Key	B
Depth of Knowledge	2
Estimated Difficulty	High

11. QR codes and bar codes use patterns to store information about products that are sold in stores.

QR Code

- information stored in two directions (horizontally and vertically)
- 4,000+ characters of information possible
- more secure

Bar Code

- information stored in one direction (horizontally)
- up to 12 digits of information
- less secure

Which statement is **best** supported by this information?

A. A QR code is less secure than a bar code.

B. A QR code can contain more information than a bar code.

C. A bar code can be read in more than one direction and a QR code cannot.

D. A bar code has a greater number of possible code combinations than a QR code.

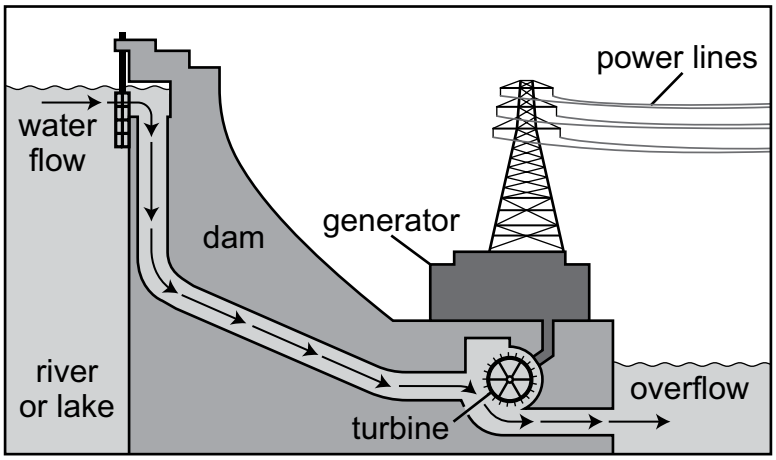
SC READY SCIENCE Grade 4 Sample Item 11	
Standard Alignment	4-PS4-3 (3D) SEP: Constructing Explanations and Designing Solutions DCI: PS4.C CCC: Patterns
Standard Description	Generate and compare multiple solutions that use patterns to transmit information.
Item Type	Selected Response
Answer Key	B
Depth of Knowledge	2
Estimated Difficulty	Medium

Go On ☞

12. This question has two parts.

People depend on energy to produce electricity. Water power plants get energy from moving water. Like the marble rolling down the ramp, water enters a dam and flows downward. The moving water provides energy that spins the turbine, causing the generator to produce electricity.

Water Power Plant



Water Power Plant Facts
- high cost to build
- negatively affects wildlife
- lake or river water is replaced by nature
- does not release air pollution
- used in areas with flowing water

Part A: Which claim can **best** be made about the electricity in the water power plant?

A. The electricity is made by using a human-made resource.
B. The electricity is made by using a renewable resource.
C. The electricity is made by using a nonrenewable resource.

Part B: Which evidence **best** supports the answer to part A?

A. Water power plants can only be used in areas with flowing water.
B. Water power plants need a dam to be built to make electricity.
C. Water power plants use water that is replaced by nature.

Item information on following page ☞

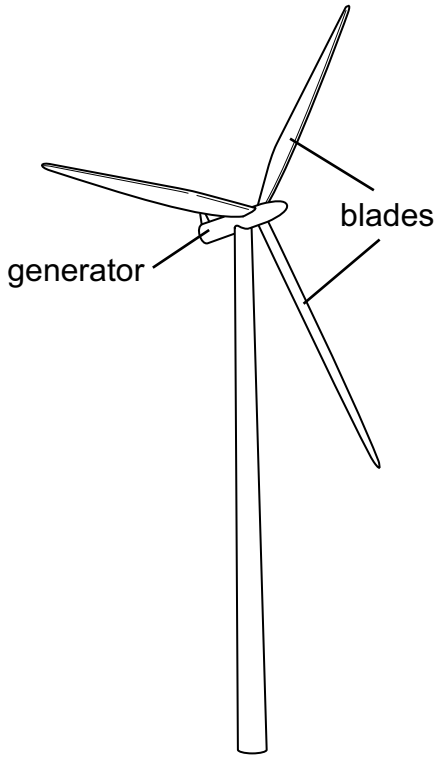
Go On ☞

SC READY SCIENCE Grade 4 Sample Item 12	
Standard Alignment	4-ESS3-1 (3D) SEP: Obtaining, Evaluating, and Communicating Information DCI: ESS3.A CCC: Cause and Effect
Standard Description	Obtain and combine information to describe that energy and fuels are derived from natural resources and how their uses affect the environment.
Item Type	Evidence-Based Selected Response (EBSR)
Answer Key	B / C
Depth of Knowledge	3
Estimated Difficulty	High

Go On ☞

13. Use the model of a wind turbine to answer the question.

Wind Turbine



Use the drop-down menus to describe the conversion of energy in a wind turbine.

Wind causes the blades of a wind turbine to spin, which is [ ] that is converted

(heat / motion)

into [ ] energy in the generator. Increased wind would cause [ ]

(light / electrical)

(less / more)

energy to be converted.

Item information on following page ☞

Key:

Wind causes the blades of a wind turbine to spin, which is [motion] that is converted into [electrical] energy in the generator. Increased wind would cause [more] energy to be converted.

SC READY SCIENCE Grade 4 Sample Item 13	
Standard Alignment	4-PS3-4 (3D) SEP: Constructing Explanations and Designing Solutions DCI: PS3.B CCC: Energy and Matter
Standard Description	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
Item Type	Drop-down
Answer Key	motion; electrical; more
Depth of Knowledge	2
Estimated Difficulty	Low

14. A teacher asked the class to compare the beak shapes of several kinds of birds.

Bird Beaks

Bird	hawk	woodpecker	cardinal	hummingbird
Beak Shape				

One student claimed that all the birds have different beak shapes because their beaks help the birds survive.

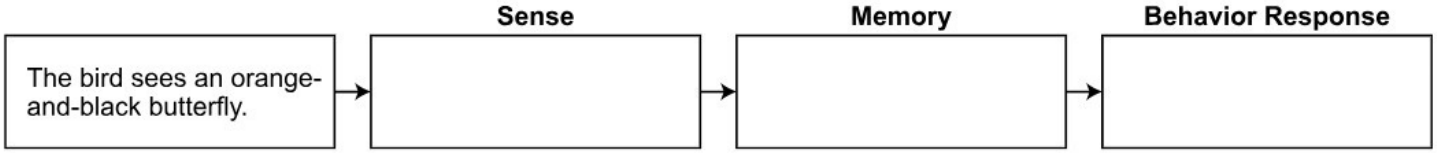
Which statement **best** supports the student's claim?

A. The main function of a beak is to obtain food.
B. The main function of a beak is to build nests.
C. The main function of a beak is to take in oxygen.
D. The main function of a beak is to protect the bird from predators.

SC READY SCIENCE Grade 4 Sample Item 14	
Standard Alignment	4-LS1-1 (2D) SEP: Engaging in Argument from Evidence DCI: LS1.A
Standard Description	Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction.
Item Type	Selected Response
Answer Key	A
Depth of Knowledge	1
Estimated Difficulty	Medium

15. Use the flowchart to answer the question.

Drag one word into the sense box to identify which sense a bird uses when seeing an orange-and-black butterfly. Then drag each sentence into the correct box to **best** describe the memory and behavior response that occur.



hearing
smell
taste
touch
sight

The bird avoids the orange-and-black butterfly.

Orange-and-black butterflies make birds sick when eaten.

Key:

SC READY SCIENCE Grade 4 Sample Item 15	
Standard Alignment	4-LS1-2 (3D) SEP: Developing and Using Models DCI: LS1.D CCC: Systems and System Models
Standard Description	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
Item Type	Drag and Drop
Answer Key	sight; Orange-and-black butterflies make birds sick when eaten.; The bird avoids the orange-and-black butterfly.
Depth of Knowledge	1
Estimated Difficulty	Medium

Go On ☞

16. During some storms, lightning can strike objects and cause them to burn. Also, lightning causes thunder, which observers can hear.

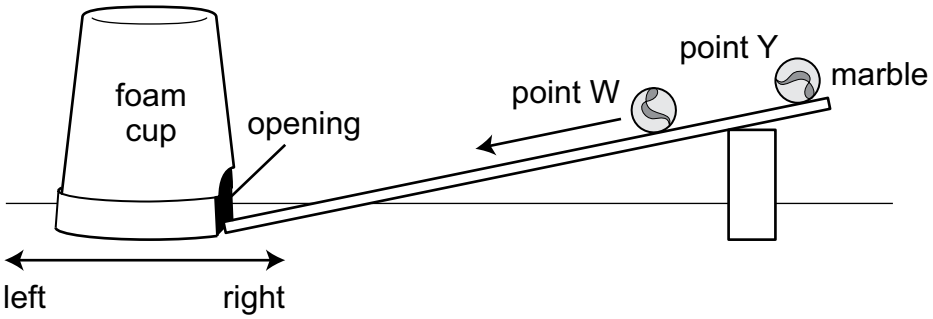
Which statement **best** describes how energy is transformed by lightning?

A. Sound energy is transformed into light and heat energy.
B. Light energy is transformed into electrical energy.
C. Electrical energy is transformed into light, heat, and sound energy.
D. Light, heat, and sound energy are transformed into electrical energy.

SC READY SCIENCE Grade 4 Sample Item 16	
Standard Alignment	4-PS3-2 (3D) SEP: Planning and Carrying Out Investigations DCI: PS3.B CCC: Energy and Matter
Standard Description	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
Item Type	Selected Response
Answer Key	C
Depth of Knowledge	1
Estimated Difficulty	Medium

17. A student investigated the effect of a moving marble on the motion of a foam cup. A marble was released from point Y located at the top of a ramp. The marble entered the cup's opening and collided with the back of the cup. This caused the cup to move three centimeters to the left.

Investigation Setup



Use the drop-down menus to predict the **most likely** result if the marble is released from point W.

The cup will slide [ ] to the [ ] because the marble will travel

[ ] than when it is released from point Y.

one centimeter
three centimeters
five centimeters

left
right

faster
slower

Key:

The cup will slide [one centimeter] to the [left] because the marble will travel

[slower] than when it is released from point Y.

Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 17	
Standard Alignment	4-PS3-3 (3D) SEP: Asking Questions and Defining Problems DCI: PS3.C CCC: Energy and Matter
Standard Description	Ask questions and predict outcomes about the changes in energy that occur when objects collide.
Item Type	Drop-down
Answer Key	one centimeter; left; slower
Depth of Knowledge	3
Estimated Difficulty	Medium

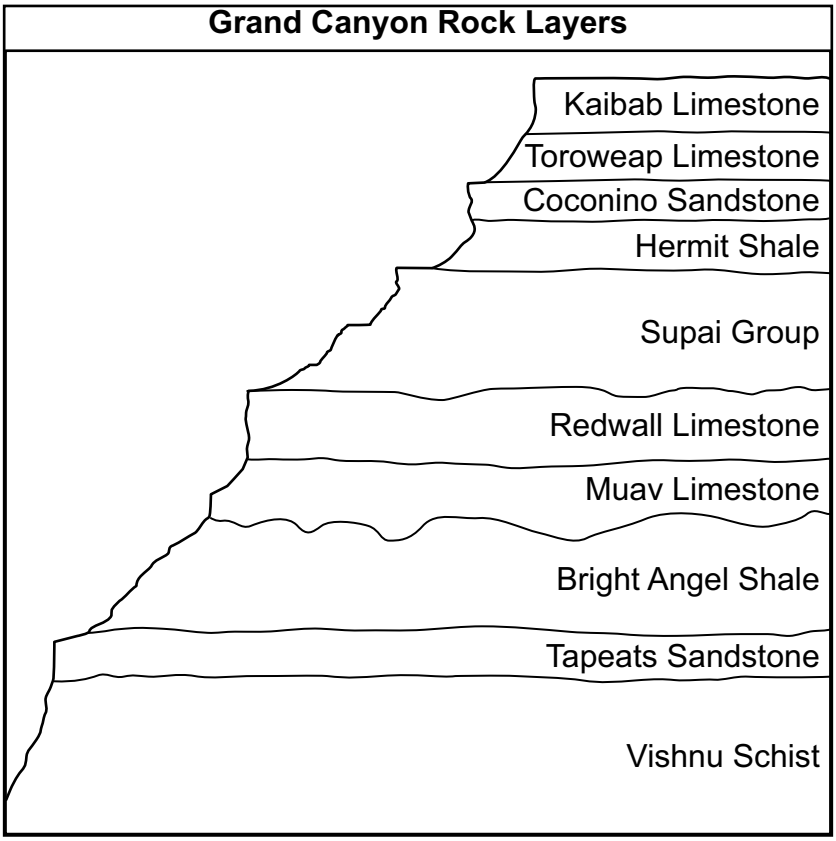
Go On ☞

Read the information below. Then answer the questions.

The Grand Canyon

The Grand Canyon is the second-largest canyon on Earth. It is located in northern Arizona in the southwestern United States. The Grand Canyon is about 5–6 million years in age and has exposed rocks that are about 1.8 billion years old.

The model shows the rock layers in the Grand Canyon.



At the bottom of the Grand Canyon is the Colorado River. This river begins in the Rocky Mountains and flows more than 2,300 kilometers to the Gulf of California in Mexico.

18. Look at the Grand Canyon Rock Layers model in the passage.

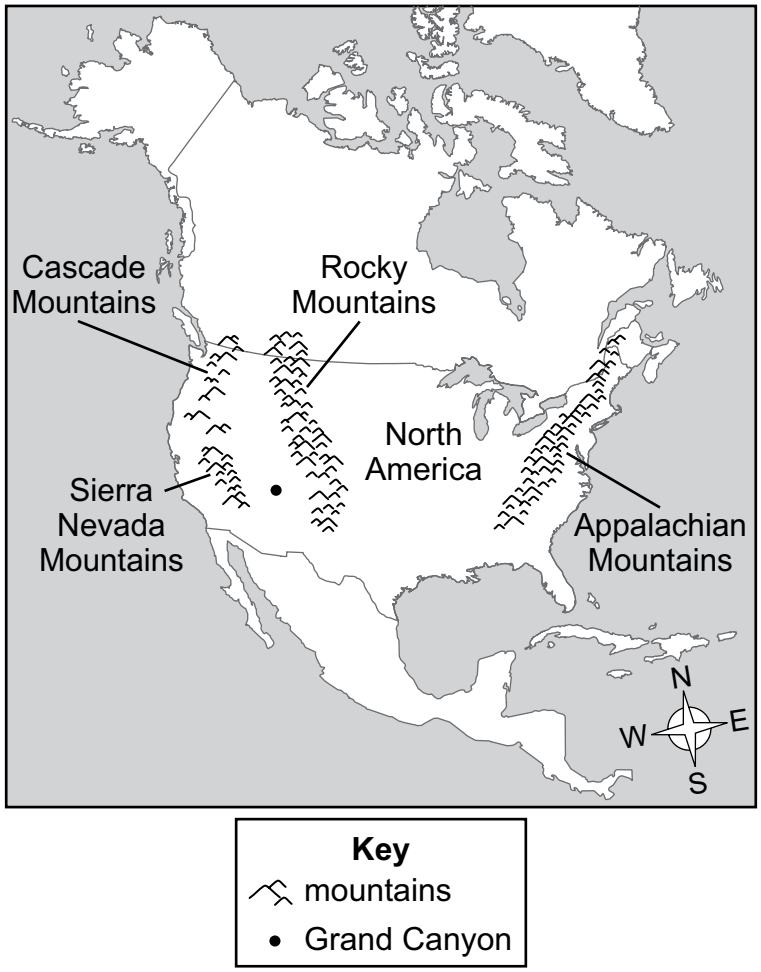
Which statement **best** describes the Redwall Limestone layer in the Grand Canyon?

A. It is older than the Bright Angel Shale layer because it is above the Bright Angel Shale layer.
B. It is the same age as the Kaibab Limestone layer because they are both limestone layers.
C. It is younger than the Supai Group layer because it is a thinner layer than the Supai Group layer.
D. It is older than the Coconino Sandstone layer because it is below the Coconino Sandstone layer.

SC READY SCIENCE Grade 4 Sample Item 18	
Standard Alignment	4-ESS1-1 (3D) SEP: Constructing Explanations and Designing Solutions DCI: ESS1.C CCC: Patterns
Standard Description	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
Item Type	Selected Response
Answer Key	D
Depth of Knowledge	2
Estimated Difficulty	Low

19. Look at the map below. It shows the locations of some mountain ranges and the Grand Canyon in North America.

Mountains in North America



Which conclusion about mountain ranges in North America can **best** be made based on the map above?

A. Mountain ranges formed evenly over North America.

B. Most mountain ranges formed near the edges of North America.

C. All mountain ranges in North America formed close to one another.

D. The mountain ranges in North America formed in the east and spread toward the west.

Item information on following page ☞

SC READY SCIENCE Grade 4 Sample Item 19	
Standard Alignment	4-ESS2-2 (3D) SEP: Analyzing and Interpreting Data DCI: ESS2.B CCC: Patterns
Standard Description	Analyze and interpret data from maps to describe patterns of Earth's features.
Item Type	Selected Response
Answer Key	B
Depth of Knowledge	2
Estimated Difficulty	Low

Go On ☞

20. A student wants to demonstrate how water helped in the formation of the Grand Canyon.

Which procedure would **best** model the process that formed the Grand Canyon?

A. Slowly add water to cover sand in a tray to model the effect of a flood.
B. Let several ice cubes melt in a tray of sand to model the effect of a melting glacier.
C. Lightly spray water from a hose above a tray of sand to model the effect of falling rain.
D. Pour a narrow stream of water down a tilted tray of sand to model the effect of flowing water.

SC READY SCIENCE Grade 4 Sample Item 20	
Standard Alignment	4-ESS2-1 (3D) SEP: Planning and Carrying Out Investigations DCI: ESS2.A CCC: Cause and Effect
Standard Description	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
Item Type	Selected Response
Answer Key	D
Depth of Knowledge	2
Estimated Difficulty	Medium

STOP.