



Science Grade 6

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 Academic Standards and Performance Indicators for Science. This document contains a set of twenty South Carolina Palmetto Assessment of State Standards (SCPASS) for 6th Grade Science test items that have been written to align with the South Carolina Academic Standards and Performance Indicators for Science. These items were reviewed for content and bias 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. These items were chosen to reflect the increased rigor of assessing two-dimensional standards that blend disciplinary knowledge with science and engineering practices. The SCPASS assesses content standards in a variety of ways. This document does not include all item types.

Item Information Format

Indicator Alignment	South Carolina Academic Standards and Performance Indicators for Science
Indicator Description	text from the South Carolina Academic Standards and Performance Indicators for Science
Answer Key	correct answer
Depth of Knowledge	cognitive demand
Estimated Difficulty	estimate based on student responses

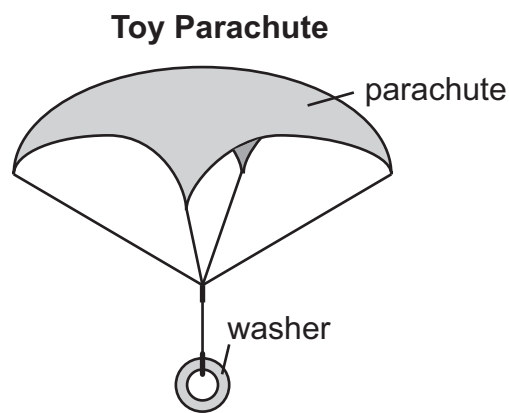
Links

South Carolina Academic Standards and Performance Indicators for Science
<https://ed.sc.gov/instruction/standards-learning/science/standards/>

Norman Webb's Depth-of-Knowledge for the Four Content Areas
<http://www.webbalign.org/Webbs-DOK-Levels-Summary.pdf>

1. A student attaches a washer to a toy parachute to investigate the relationship between parachute size and falling time. The student drops the parachute from a height of three meters and then repeats the procedure with a parachute of a different size. Each time, the student records the following measurements.

Tool	Measurement
1. ?	size of parachute (cm)
2. ?	drop height of parachute (m)
3. ?	falling time (s)



Which tools would provide the **most** accurate measurements to complete the chart?

A.

Tool
1. ruler
2. balance scale
3. clock

B.

Tool
1. calculator
2. meterstick
3. stopwatch

C.

Tool
1. calculator
2. meterstick
3. clock

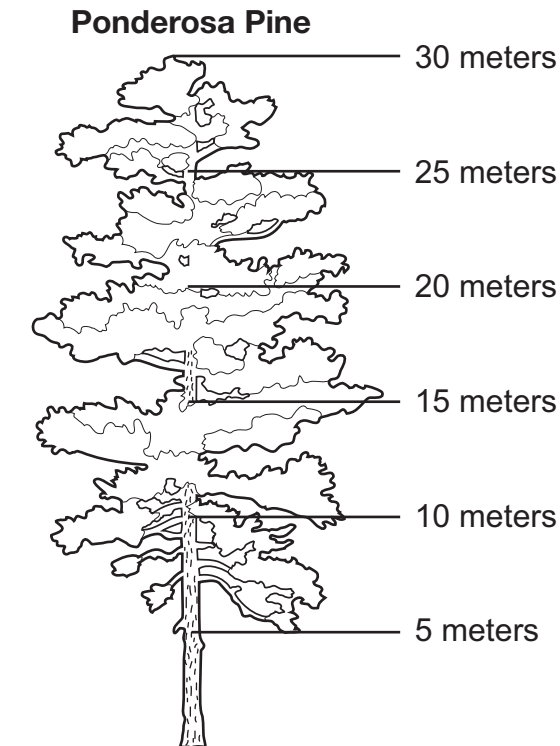
D.

Tool
1. ruler
2. meterstick
3. stopwatch

Item Information on following page

Indicator Alignment	6.S.1A.3 (6.P.3A.2)
Indicator Description	Plan and conduct controlled scientific investigations to answer questions, test hypotheses, and develop explanations: (1) formulate scientific questions and testable hypotheses, (2) identify materials, procedures, and variables, (3) select and use appropriate tools or instruments to collect qualitative and quantitative data, and (4) record and represent data in an appropriate form. Use appropriate safety procedures.
Answer Key	D
Depth of Knowledge	2
Estimated Difficulty	Medium Difficulty

2. The diagram shows a ponderosa pine tree.



How far must water travel from the bottom leaves to the top of this ponderosa pine tree?

- A. 5 meters
- B. 15 meters
- C. 20 meters
- D. 25 meters

SCPASS Sample Item	2	Indicator Alignment	6.S.1A.5 (6.L.5B.1)
		Indicator Description	Use mathematical and computational thinking to (1) use and manipulate appropriate metric units, (2) collect and analyze data, (3) express relationships between variables for models and investigations, or (4) use grade-level appropriate statistics to analyze data.
		Answer Key	D
		Depth of Knowledge	2
		Estimated Difficulty	Low Difficulty

3. A student observing animals at a zoo answers the following questions.

1. How many limbs does the animal have?
2. Does the animal have gills or lungs?
3. Does the animal have a backbone?

During which task is the student **most likely** to use this information?

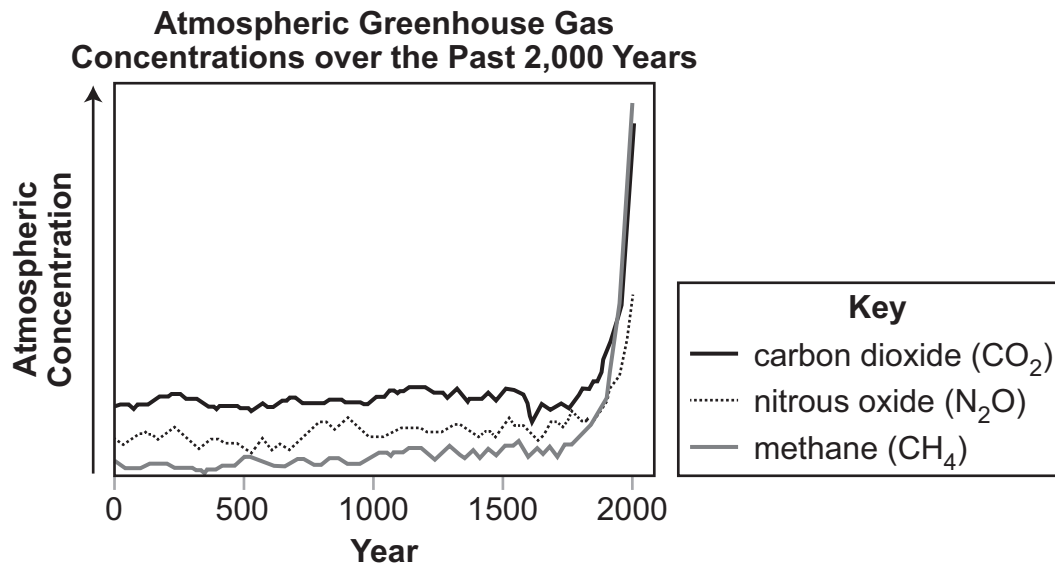
- A. drawing a food chain containing each animal
- B. using physical characteristics to classify each animal
- C. identifying the preferred food sources of each animal
- D. understanding how traits are inherited by each animal

SCPASS Sample Item	3	Indicator Alignment	6.S.1A.8 (6.L.4A.2)
		Indicator Description	Obtain and evaluate scientific information to (1) answer questions, (2) explain or describe phenomena, (3) develop models, (4) evaluate hypotheses, explanations, claims, or designs or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by (1) evaluating grade-appropriate primary or secondary scientific literature, or (2) reporting the results of student experimental investigations.
		Answer Key	B
		Depth of Knowledge	2
		Estimated Difficulty	Low Difficulty

4. Which gas makes up most of Earth's atmosphere?
- A. argon
 - B. hydrogen
 - C. nitrogen
 - D. oxygen

4	Indicator Alignment	6.E.2A.1
	Indicator Description	Develop and use models to exemplify the properties of the atmosphere (including the gases, temperature and pressure differences, and altitude changes) and the relative scale in relation to the size of Earth.
	Answer Key	C
	Depth of Knowledge	1
	Estimated Difficulty	High Difficulty

5. A student researches changes in the concentrations of greenhouse gases in the atmosphere over the past 2,000 years.



- Forests help absorb CO₂.
- Burning and deforestation add CO₂ to the atmosphere.
- Agriculture and fossil fuel use result in CH₄ production.
- The average lifetime of N₂O in the atmosphere is 121 years and of CH₄ is 12.4 years.
- The industrial era began around the year 1750.

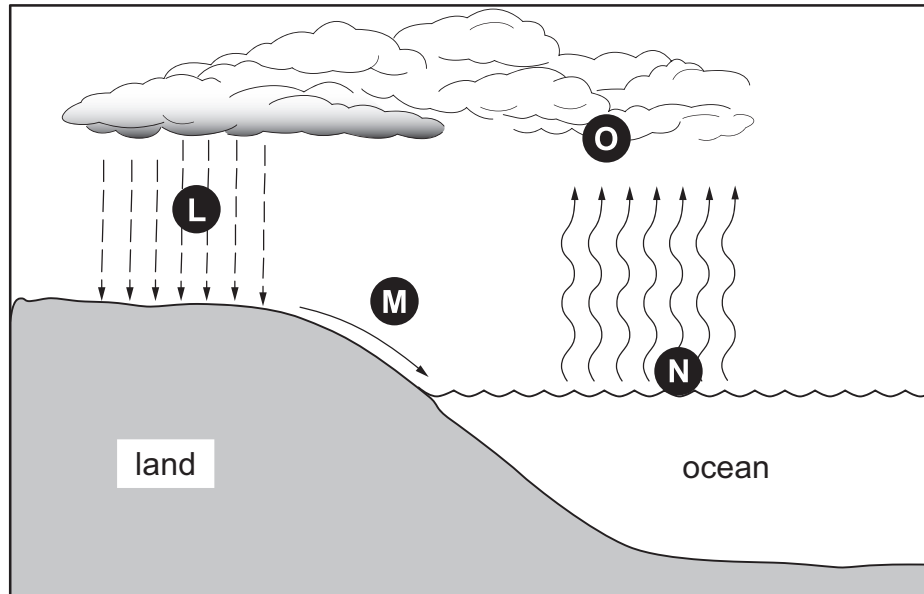
Which argument about the primary cause for the atmospheric changes is **best** supported by the evidence?

- A. The changes are caused by deforestation because it removes trees that absorb CO₂.
- B. The changes are mostly caused by Earth's current position in the solar system, which is different than it was 2,000 years ago.
- C. The changes are caused by the long periods of time needed for N₂O and CH₄ to break down in the atmosphere.
- D. The changes are mostly caused by industrial activities since those activities began at a similar time as the major changes in greenhouse gas concentrations.

Item Information on following page

5	Indicator Alignment	6.E.2A.2
	Indicator Description	Critically analyze scientific arguments based on evidence for and against how different phenomena (natural and human induced) may contribute to the composition of Earth's atmosphere.
	Answer Key	D
	Depth of Knowledge	3
	Estimated Difficulty	High Difficulty

6. This diagram shows four phases of the water cycle.



Which phase of the water cycle is affected **most** directly by heat from the Sun?

- A. phase L
- B. phase M
- C. phase N
- D. phase O

SCPASS Sample Item

6

Indicator Alignment

6.E.2A.3

Indicator Description

Construct explanations of the processes involved in the cycling of water through Earth's systems (including transpiration, evaporation, condensation and crystallization, precipitation, and downhill flow of water on land).

Answer Key

C

Depth of Knowledge

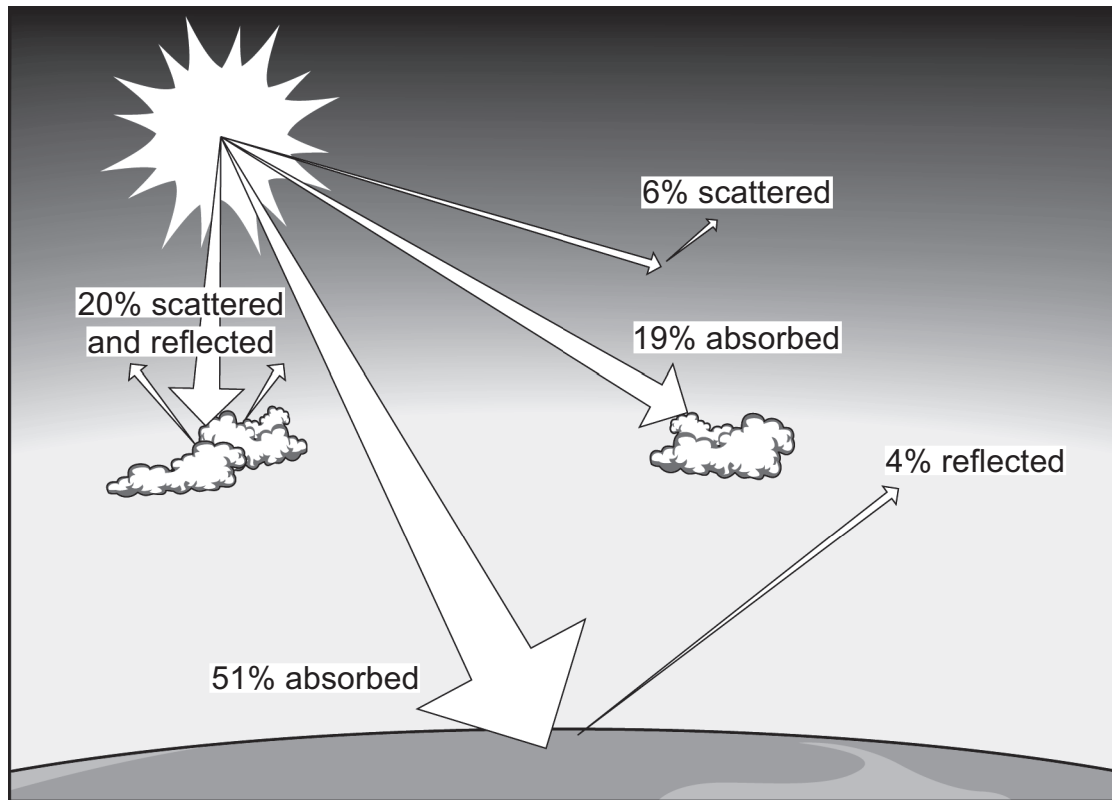
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Estimated Difficulty

Low Difficulty

7. Use the diagram to answer the question.

Solar Energy



What happens to most of the solar energy directed to Earth?

- A. It is absorbed by Earth.
- B. It is reflected by Earth.
- C. It is scattered by clouds.
- D. It is absorbed by clouds.

SCPASS Sample Item

7

Indicator Alignment

6.E.2B.3

Indicator Description

Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).

Answer Key

A

Depth of Knowledge

2

Estimated Difficulty

Medium Difficulty

8. This map shows the normal path of the subtropical jet stream over North America.



Scientists have observed that the subtropical jet stream is moving farther north. How could this movement affect climatic conditions in North America?

- A. Rainfall in the southern states could decrease.
- B. Air pressure over North America could increase.
- C. The number of hurricanes in the Atlantic Ocean could decrease.
- D. Warm, tropical conditions in the southern states could increase.

SCPASS Sample Item

8

Indicator Alignment 6.E.2B.3

Indicator Description

Develop and use models to represent how solar energy and convection impact Earth's weather patterns and climate conditions (including global winds, the jet stream, and ocean currents).

Answer Key

D

Depth of Knowledge

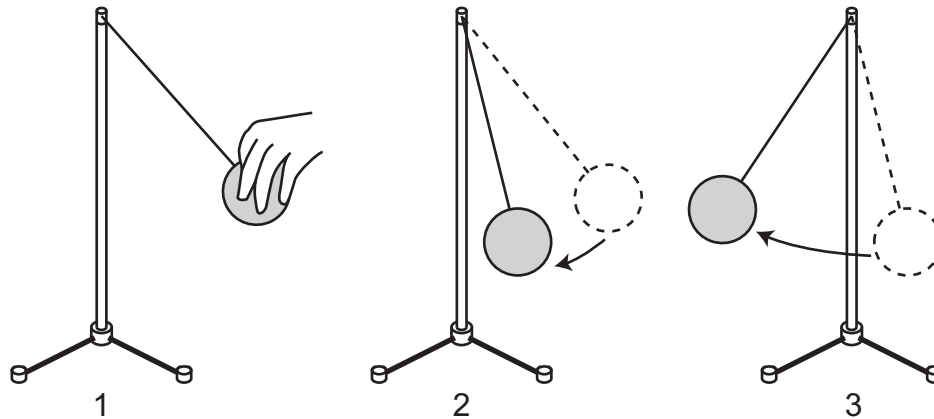
2

Estimated Difficulty

High Difficulty

9. A student is using a pendulum to demonstrate energy transformation. The student pulls the ball back before releasing it.

Student Using a Pendulum

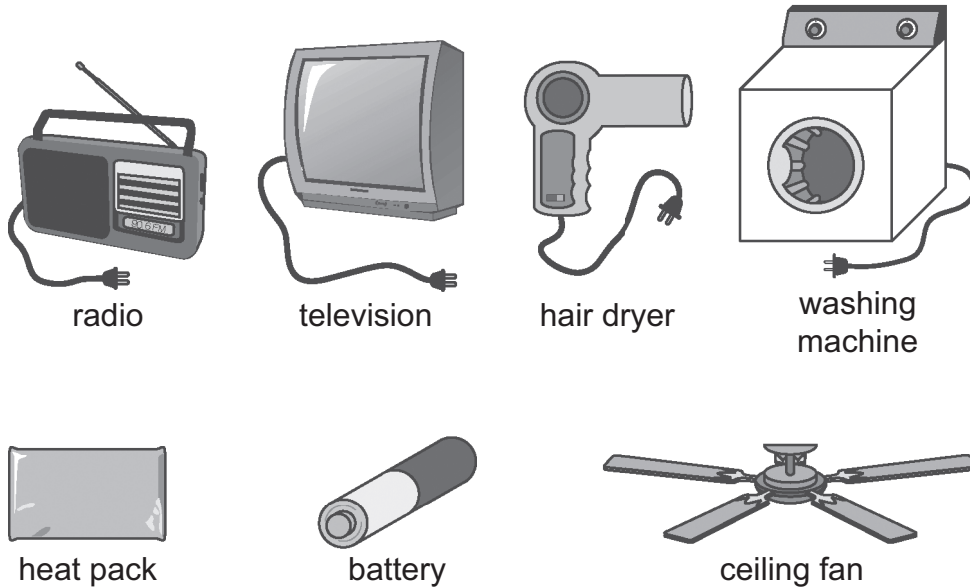


Which list **best** describes the energy of the ball on the pendulum in each diagram?

- A. 1. all potential energy
2. potential energy transferring to kinetic energy
3. kinetic energy transferring to potential energy
- B. 1. all kinetic energy
2. kinetic energy transferring to potential energy
3. potential energy transferring to kinetic energy
- C. 1. all potential energy
2. kinetic energy transferring to potential energy
3. potential energy transferring to kinetic energy
- D. 1. all kinetic energy
2. potential energy transferring to kinetic energy
3. kinetic energy transferring to potential energy

SCPASS Sample Item	Indicator Alignment 6.P.3A.2	
	Indicator Description	Develop and use models to exemplify the conservation of energy as it is transformed from kinetic to potential (gravitational and elastic) and vice versa.
	9 Answer Key	A
	Depth of Knowledge	2
	Estimated Difficulty	Medium Difficulty

10. Use the pictures to answer the question.



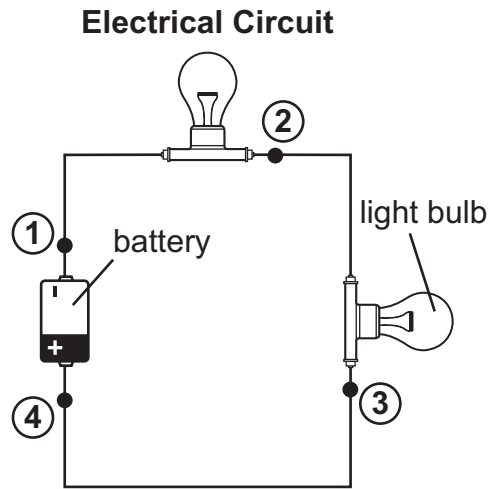
Which two objects transform electrical energy into mechanical energy?

- A. radio and heat pack
- B. television and battery
- C. battery and hair dryer
- D. washing machine and ceiling fan

SCPASS Sample Item

	Indicator Alignment	6.P.3A.3
	Indicator Description	Construct explanations for how energy is conserved as it is transferred and transformed in electrical circuits.
10	Answer Key	D
	Depth of Knowledge	2
	Estimated Difficulty	Medium Difficulty

11. Electrical energy flowing through a circuit is measured in voltage. A teacher measured the voltage at four points on an electrical circuit.



Voltage

Point	Voltage Measured
1	12
2	10
3	2
4	0

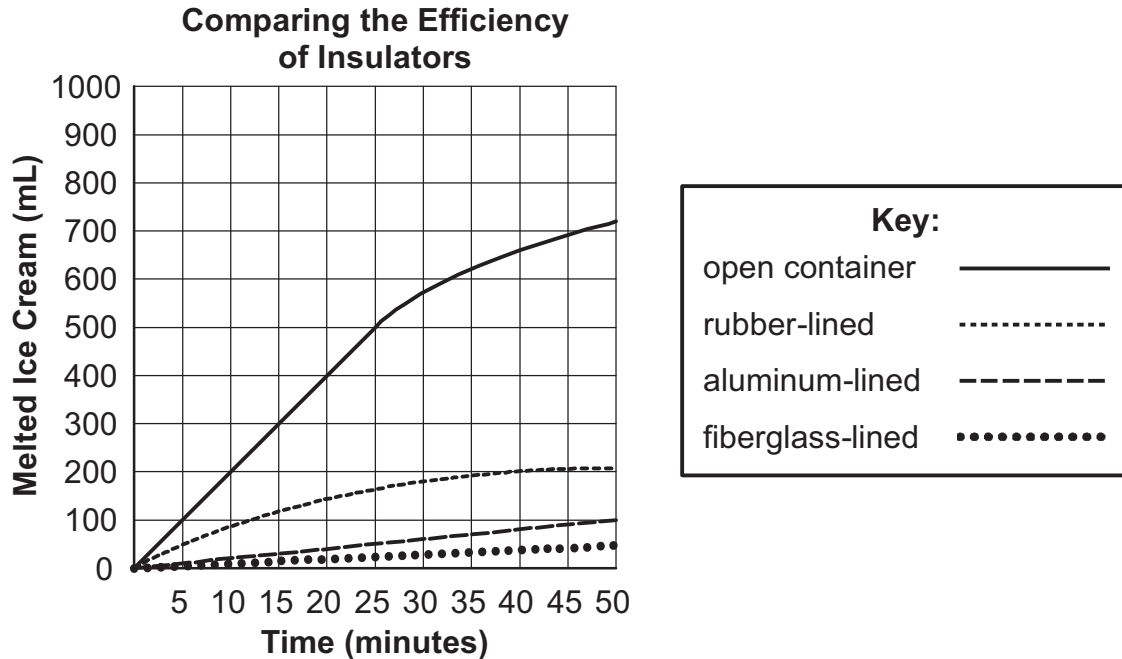
Which statement **best** explains the voltage change as the current moves through the electrical circuit?

- A. The voltage decrease is due to the chemical energy of the battery transforming into light and heat energy.
- B. The voltage decrease shows energy being destroyed as the current moves through the electrical circuit.
- C. The voltage decrease is due to the light energy of the battery transforming into heat and chemical energy.
- D. The voltage decrease shows energy being created as the current moves through the electrical circuit.

Item Information on following page

SCPASS Sample Item	11	Indicator Alignment	6.P.3A.3
		Indicator Description	Construct explanations for how energy is conserved as it is transferred and transformed in electrical circuits.
		Answer Key	A
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

12. One open container and three insulated, closed containers are filled with 1000 mL of ice cream. Each container is placed in the same location for one hour and the ice cream is checked for melting. The data are recorded in the graph.



According to the graph, which container is **most** effective in keeping the ice cream from melting?

- A. the open container
- B. the rubber-lined container
- C. the aluminum-lined container
- D. the fiberglass-lined container

SCPASS Sample Item

Indicator Alignment	6.P.3A.6
Indicator Description	Design and test devices that minimize or maximize heat transfer by conduction, convection, or radiation.
12 Answer Key	D
Depth of Knowledge	3
Estimated Difficulty	Medium Difficulty

13. A group of students wants to build a ramp to move boxes from the floor up to a stage. How can the students reduce the amount of effort needed to push the boxes up the ramp?
- A. by making the ramp as long as possible
 - B. by making the ramp's height and length equal
 - C. by building the ramp out of a lightweight material
 - D. by covering the ramp's surface with a soft rubber mat

SCPASS Sample Item	13	Indicator Alignment	6.P.3B.2
		Indicator Description	Design and test solutions that improve the efficiency of a machine by reducing the input energy (effort) or the amount of energy transferred to the surrounding environment as it moves an object.
		Answer Key	A
		Depth of Knowledge	2
		Estimated Difficulty	High Difficulty

14. Which structure of a dolphin has the same function as the gills of a fish?

- A. fin
- B. heart
- C. lung
- D. mouth

SCPASS Sample Item	14	Indicator Alignment	6.L.4B.1
		Indicator Description	Analyze and interpret data related to the diversity of animals to support claims that all animals (vertebrates and invertebrates) share common characteristics.
		Answer Key	C
		Depth of Knowledge	1
		Estimated Difficulty	Medium Difficulty

15. Which pair of statements **best** explains an environmental stimulus and a bear's response to survive winter?
- A. Environmental stimulus: The bear senses that food is becoming scarce.
Response: The bear consumes less food, and its heart rate increases.
 - B. Environmental stimulus: The days are becoming shorter.
Response: The bear consumes more food, and its heart rate decreases.
 - C. Environmental stimulus: The bear is hungry.
Response: The bear consumes more food, and its heart rate increases.
 - D. Environmental stimulus: The days are becoming longer.
Response: The bear consumes less food, and its heart rate decreases.

15	Indicator Alignment	6.L.4B.3
	Indicator Description	Construct explanations of how animal responses (including hibernation, migration, grouping, and courtship) to environmental stimuli allow them to survive and reproduce.
	Answer Key	B
	Depth of Knowledge	2
	Estimated Difficulty	High Difficulty

16. Study the table.

Effects of Sunlight Exposure on Body Temperature

Sunlight Exposure	Body Temperature (°C)	
	Species A	Species B
low	39	31
moderate	39	35
high	39	40

Based on this information, what inference can be made?

- A. Both species are cold-blooded.
- B. Both species are warm-blooded.
- C. Species A is cold-blooded and Species B is warm-blooded.
- D. Species A is warm-blooded and Species B is cold-blooded.

SCPASS Sample Item

16

Indicator Alignment

6.L.4B.5

Indicator Description

Analyze and interpret data to compare how endothermic and ectothermic animals respond to changes in environmental temperature.

Answer Key

D

Depth of Knowledge

2

Estimated Difficulty

High Difficulty

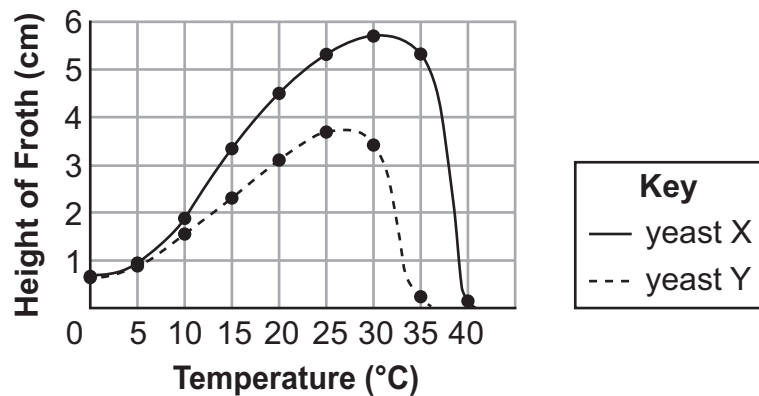
17. A student investigated the growth of yeast X and yeast Y at different temperatures by using the following procedure.

Procedure

- Each type of yeast was placed in individual test tubes containing identical sugar solutions.
- The test tubes were then heated at varying temperatures.
- The student recorded growth by measuring the height of froth (foam) produced by each yeast mixture.

The graph shows the results of this investigation.

Yeast Growth at Different Temperatures



Which explanation of yeast growth is **best** supported by the student's data?

- Yeast Y can grow at greater temperatures than yeast X can.
- Both yeasts experience peak growth at about the same temperature.
- Yeast Y shows more growth above a temperature of 30°C than yeast X shows.
- Both yeasts show increasing growth at increasing temperatures of 25°C or less.

Item Information on following page

SCPASS Sample Item

17

Indicator Alignment	6.L.5A.2
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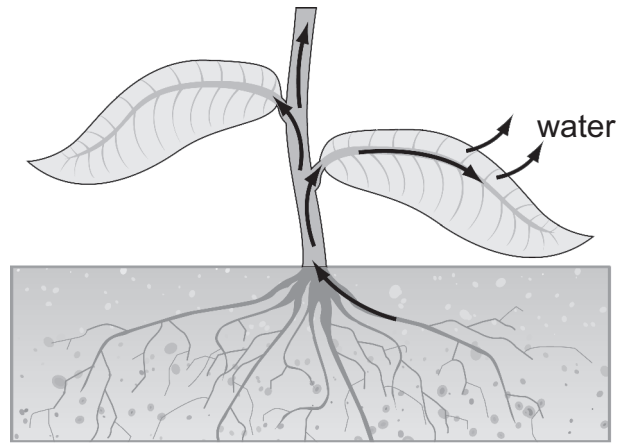
Indicator Description	Analyze and interpret data to describe how fungi respond to external stimuli (including temperature, light, touch, water, and gravity).
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Answer Key	D
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Depth of Knowledge	2
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Estimated Difficulty	High Difficulty
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18. Study the diagram.



Which plant process is shown?

- A. respiration
- B. germination
- C. transpiration
- D. photosynthesis

SCPASS Sample Item

18

Indicator Alignment

6.L.5B.2

Indicator Description

Analyze and interpret data to explain how the processes of photosynthesis, respiration, and transpiration work together to meet the needs of plants.

Answer Key

C

Depth of Knowledge

2

Estimated Difficulty

Medium Difficulty

19. A student claims that plants grow and develop. The student plans to perform an investigation using seedlings to obtain evidence to support this claim. The chart shows the steps of the investigation.

Plant Growth Investigation

Step	Procedure
1	Place small seedlings in containers and cover roots with soil.
2	Place the containers on a windowsill.
3	Give seedlings 5 mL of water daily.
4	Measure plant height daily and record data.

Which step of the investigation would provide evidence to support the student's claim?

- A. step 1
- B. step 2
- C. step 3
- D. step 4

SCPASS Sample Item

19

Indicator Alignment 6.L.5B.4

Indicator Description

Plan and conduct controlled scientific investigations to determine how changes in environmental factors (such as air, water, light, minerals, or space) affect the growth and development of a flowering plant.

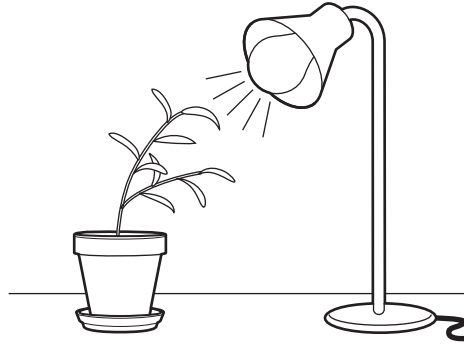
Answer Key D

Depth of Knowledge 2

Estimated Difficulty High Difficulty

20. When a plant is lit from one side, cells on its unlit side become longer. This bends the plant toward the light source.

Plant near a Light



Which two properties of living organisms does this **best** demonstrate?

- A. growing and developing
- B. responding to stimuli and reproducing
- C. obtaining energy resources and reproducing
- D. obtaining energy resources and responding to stimuli

SCPASS Sample Item

20

Indicator Alignment	6.L.5B.5
Indicator Description	Analyze and interpret data to describe how plants respond to external stimuli (including temperature, light, touch, water, and gravity).
Answer Key	D
Depth of Knowledge	2
Estimated Difficulty	Medium Difficulty