

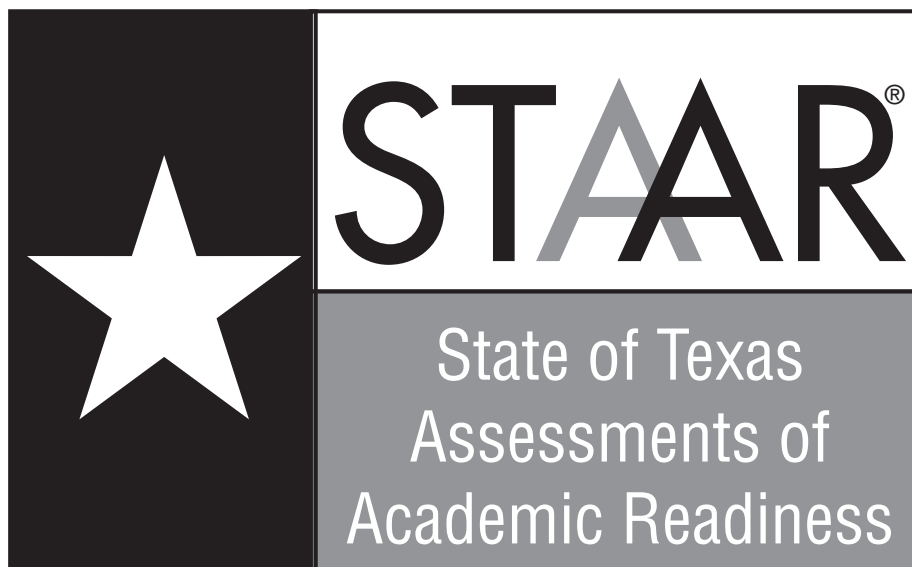
Texas STAAR 2021 Grade 5 Science

Exam Materials

Pages 2 - 27

Answer Key Materials

Pages 28 - 64



GRADE 5

Science

Administered May 2021

RELEASED

DIRECTIONS

Read each question carefully. Determine the best answer to the question from the four answer choices provided. Then fill in the answer on your answer document.

- 1** A student recorded the time it took for all the water in a puddle on a sidewalk to evaporate after a rain. Which kind of energy causes water to evaporate?

- A** Light energy from streetlights
- B** Sound energy from passing cars
- C** Thermal energy from the environment
- D** Mechanical energy from nearby streets

- 2** Earth continuously rotates on its axis while also moving in an orbit. About how much time does it take for Earth to make one complete rotation on its axis?

- F** 24 hours
- G** 30 days
- H** 60 minutes
- J** 365 days

- 3** For a class demonstration a student turned off the lights in the classroom. The student then shined light from a flashlight through a hole in a piece of cardboard. The class saw the narrow beam of light continue until another student placed a mirror in the light's path.

The light did not continue past the mirror because —

- A** light cannot travel very far
 - B** the mirror absorbed all the light
 - C** the light was refracted back to the light source
 - D** light travels in a straight line and cannot go around objects
-

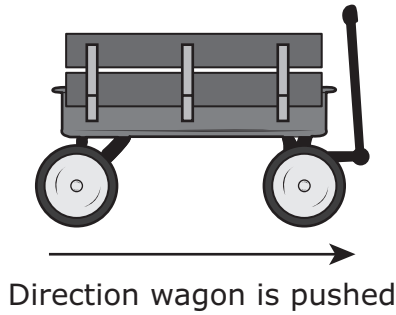
- 4** A table of different properties of four samples of matter is shown.

Sample	Conducts Electricity	Conducts Heat	Soluble in Water	Physical State at Room Temperature
1	No	No	Yes	Solid
2	Yes	Yes	No	Solid
3	No	Yes	Yes	Liquid
4	Yes	Yes	No	Liquid

Which conclusion can be made about the samples based on the table?

- F** Sample 1 is made of plastic.
- G** Sample 2 is made of metal.
- H** Sample 3 is attracted to magnets.
- J** Sample 4 is less dense than water.

- 5 A wagon is pushed and begins to move. As the wagon moves, it slows and comes to a stop. The wagon and the direction it is pushed are shown.



What force causes the wagon to stop?

- A The force of gravity which is acting in the same direction as the arrow
- B The force of friction which is acting in the same direction as the arrow
- C The force of gravity which is acting in the opposite direction of the arrow
- D The force of friction which is acting in the opposite direction of the arrow

-
- 6 Students made a chart classifying animal behaviors.

Animal Behaviors

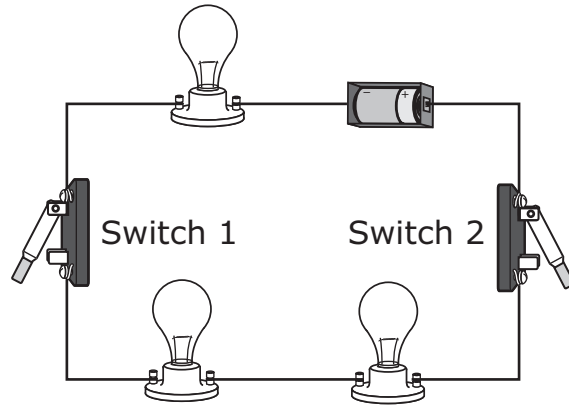
Inherited	Learned
Bear looking for food in a trash can	Dog coming when its name is called
Owl being active at night	Pony pulling a cart
Turtle burying eggs	Squirrel getting seeds from a bird feeder

Which animal behavior is NOT correctly classified?

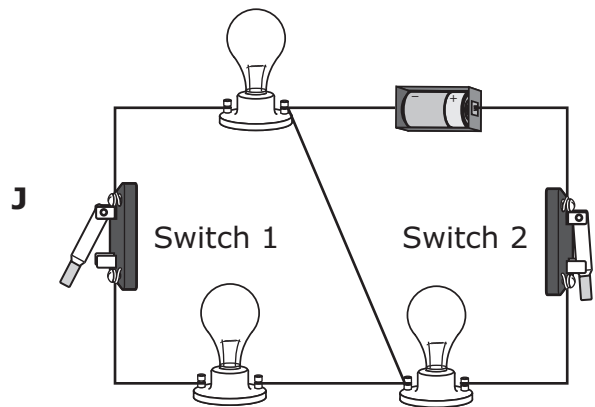
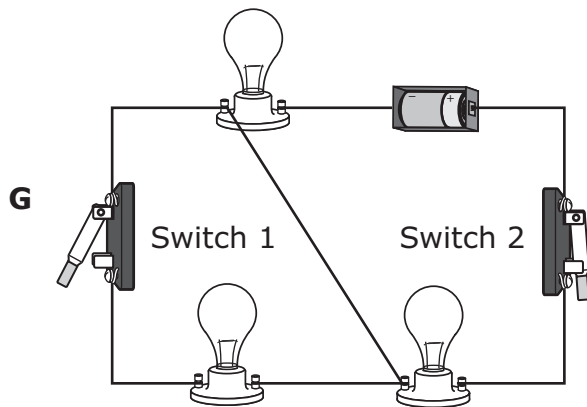
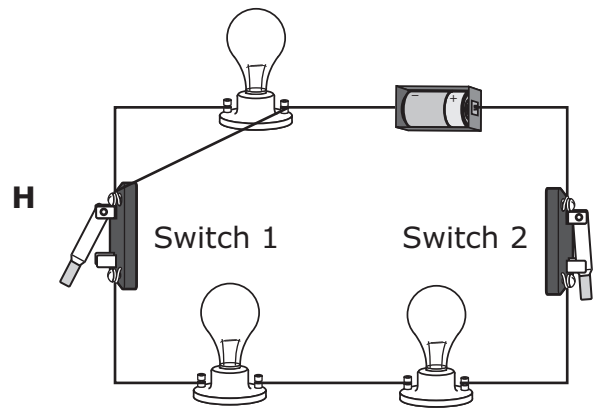
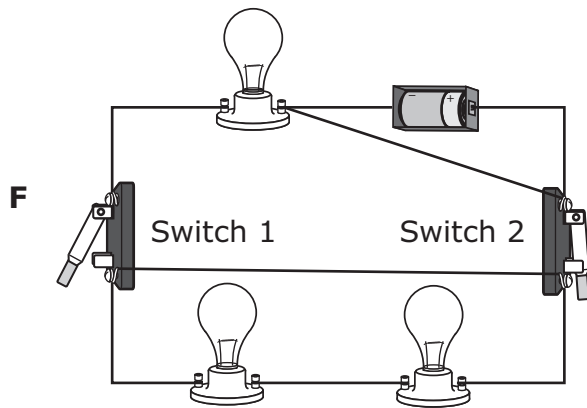
- F Bear looking for food in a trash can
- G Owl being active at night
- H Dog coming when its name is called
- J Squirrel getting seeds from a bird feeder

- 7** Canyons and mesas are two landforms found in the western part of the United States. Which statement best describes how canyons and mesas are similar?
- A** Both were formed by slow-moving glaciers.
 - B** Both were formed by erosion by wind and water.
 - C** Both were part of a mountain that was weathered by ice.
 - D** Both were part of a desert that was reshaped by a flood.

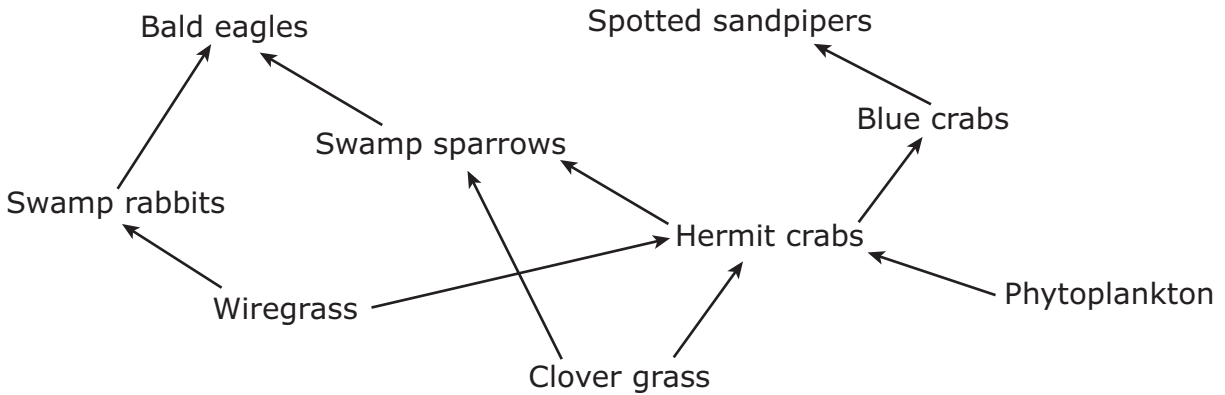
- 8 A student wants to make a change to the circuit shown below so that when Switch 1 is open and Switch 2 is closed, only one light will be on in the circuit.



Which diagram shows how the student should change the circuit?



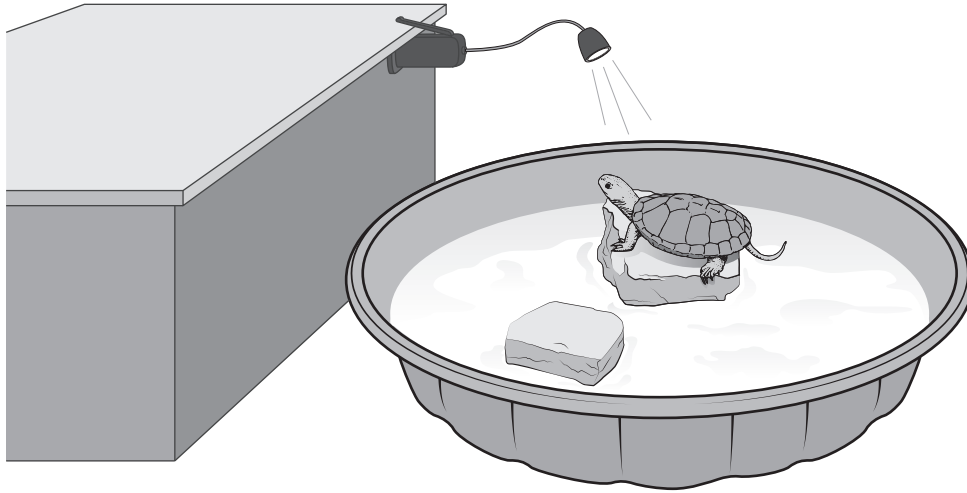
- 9 Students researching the relationships between some organisms in the Lavaca Bay ecosystem in Texas made this partial food web.



Which of these lists contains only organisms that receive some of their energy directly from other organisms that produce their own food?

- A** Bald eagles and spotted sandpipers
- B** Swamp rabbits, hermit crabs, and swamp sparrows
- C** Phytoplankton, hermit crabs, and blue crabs
- D** Wiregrass, clover grass, and phytoplankton

- 10** A science class is observing a pet turtle in a small plastic pool. The students turn on a portable camping lamp that is clamped on to a counter next to the pool.



Which kind of energy is used by the portable lamp to produce light?

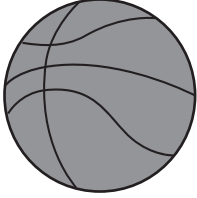





- F** Mechanical energy, because the lamp is clamped on to the counter
- G** Thermal energy, because the lamp increases the temperature of the water
- H** Electrical energy, because the lamp is battery-operated
- J** Sound energy, because the lamp vibrates when clicked on

-
- 11** Students observe a glass of ice and water. The glass is dry on the outside. After ten minutes students see drops of water on the outside of the glass.

Which statement best explains the students' observations?

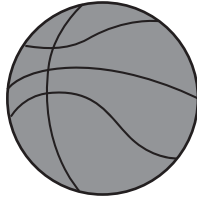

- A** The water vapor in the air changes to a liquid when it touches the cold glass.
- B** The cold water inside the glass rises and then slides down the outside of the glass.
- C** The ice in the glass melted and caused the water to overflow the glass.
- D** The water moved to the outside surface through tiny holes in the glass.

12 Students chose objects to model the relative sizes of Earth and the moon.



					
Basketball	Soccer ball	Baseball	Tennis ball	Golf ball	Marble

Which set of objects best compares the sizes of Earth and the moon?



F

	
Earth	Moon



H

	
Earth	Moon

G

	
Earth	Moon

J

	
Earth	Moon

13 A dinosaur fossil is shown.



Which question can scientists most likely answer from studying the fossil of the dinosaur?

- A** What was the pattern on the skin of the dinosaur?
 - B** What was the type of food the dinosaur ate?
 - C** How fast was the heart of the dinosaur beating?
 - D** How many eggs were in the nest of the dinosaur?
-

14 In the early 1600s, the astronomer Galileo used a telescope to make observations of Mercury and Venus. What are the positions of these planets in relation to the sun?

- F** Mercury is the planet closest to the sun, and Venus is the second planet from the sun.
- G** Mercury is the second planet from the sun, and Venus is the third planet from the sun.
- H** Venus is the planet closest to the sun, and Mercury is the second planet from the sun.
- J** Mercury is the third planet from the sun, and Venus is the planet closest to the sun.

- 15** This chart describes some beak and toe adaptations that help four bird species survive in different habitats.

Bird 1	Bird 2	Bird 3	Bird 4
<ul style="list-style-type: none"> • Long, sharp beak for hammering into tree trunks • Special toe placement that helps with support on tree trunk 	<ul style="list-style-type: none"> • Sharp beak for spearing fish • Long toes for walking on mud and grasping plants 	<ul style="list-style-type: none"> • Heavy, pointed beak with sharp edges for splitting open seeds • Special toe placement that helps with perching and hopping 	<ul style="list-style-type: none"> • Grooved beak for straining food from water • Webbed toes for moving through water

Based on these adaptations, which table best matches the bird species to its environment?

A

Species	Type of Environment
Bird 1	Prairie
Bird 2	Forest
Bird 3	Pond
Bird 4	Marsh

C

Species	Type of Environment
Bird 1	Prairie
Bird 2	Marsh
Bird 3	Pond
Bird 4	Forest

B

Species	Type of Environment
Bird 1	Forest
Bird 2	Pond
Bird 3	Marsh
Bird 4	Prairie

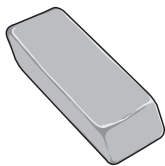
D

Species	Type of Environment
Bird 1	Forest
Bird 2	Marsh
Bird 3	Prairie
Bird 4	Pond

16 A student compares the physical properties of the four objects shown.



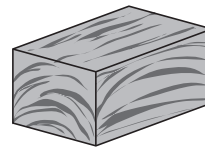
Rock



Rubber eraser



Paper cup

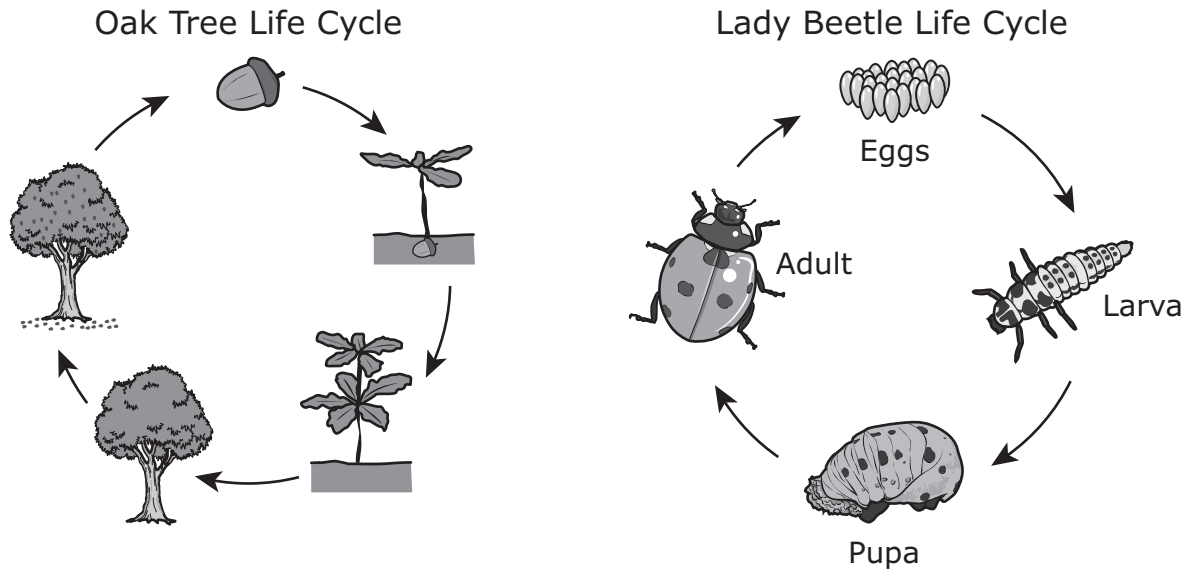


Wooden block

Which of these physical properties do all four objects have in common?

- F** They all have the same physical state and conduct electricity.
- G** They all conduct electricity and attract the same metal objects.
- H** They all attract the same metal objects and are not soluble in water.
- J** They all are not soluble in water and have the same physical state.

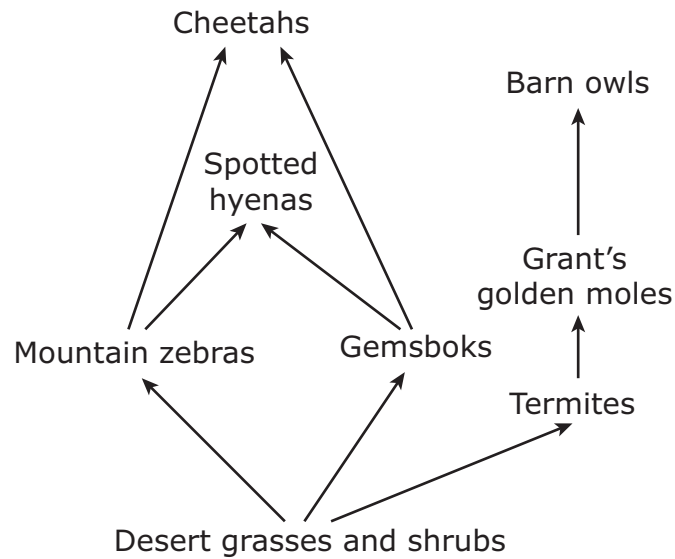
- 17** Students observe these diagrams showing the life cycles of an oak tree and a lady beetle.



Which inference can be made by comparing these diagrams?

- A** Plants require less energy than insects require to undergo changes from a young organism to a mature organism.
 - B** Insects and plants follow a series of changes that allows them to survive and reproduce.
 - C** Insects are more likely than plants are to adapt to changes in the environment to survive.
 - D** Insects and plants are dependent on one another for survival.
-
- 18** Which process will happen when the sun interacts with the ocean?
- F** Rain will fall only on the land.
 - G** Water will not evaporate at nighttime.
 - H** Salt water will become fresh water vapor.
 - J** Precipitation will happen less often.

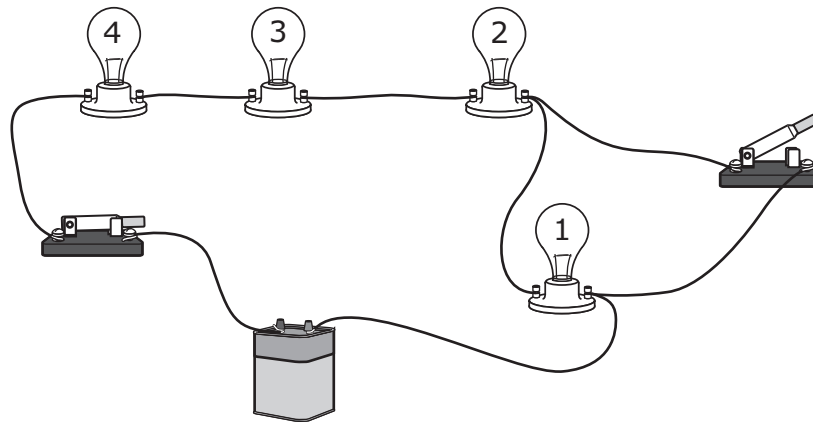
19 A partial desert food web is shown.



Which food chain shows one complete pathway in which energy flows through this food web?

- A** Desert grasses and shrubs → termites → barn owls
- B** Desert grasses and shrubs → mountain zebras → cheetahs
- C** Desert grasses and shrubs → termites → spotted hyenas
- D** Desert grasses and shrubs → gemsboks → Grant's golden moles

20 A student constructs the circuit shown for a science demonstration.



With the switches in these positions, which lights are on?

- F** All the lights
- G** Lights 1 and 2 only
- H** Lights 3 and 4 only
- J** None of the lights

21 A student prepared a snack that consisted of grapes, pecans, and strawberries sprinkled with white powdered sugar. The student stored the snack in a refrigerator. An hour later the student observed that the powdered sugar could no longer be seen but the fruit and nuts had not changed in appearance.

What most likely happened to the sugar in the mixture?

- A** The sugar evaporated at the lower temperature in the refrigerator without causing any changes to the fruit and nuts.
- B** The sugar was more dense than the other foods in the mixture, so it settled to the bottom of the container.
- C** The sugar dissolved in the moisture on the fruit.
- D** The sugar absorbed energy from the nuts and melted into a colorless liquid.

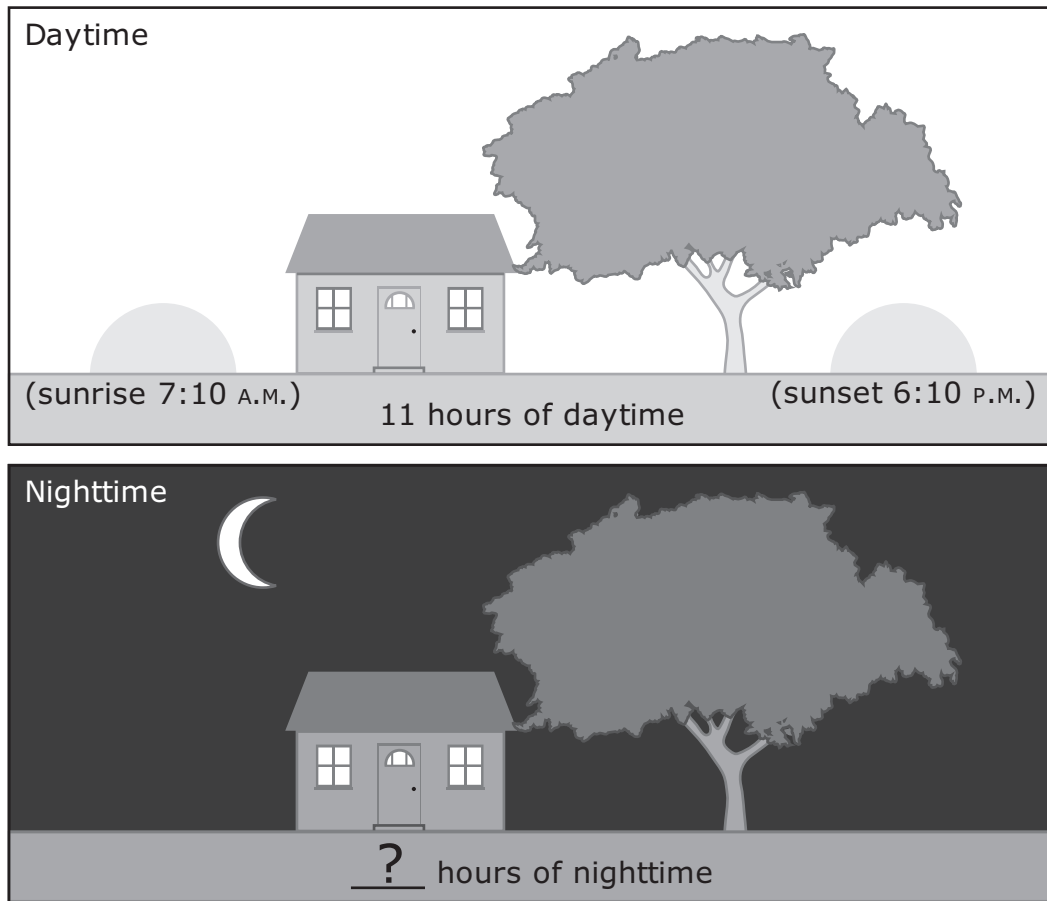
22 The chart lists plants and animals interacting with parts of an environment.

1. A hummingbird dips its beak inside a flower.
2. A lizard burrows into the sand to stay cool.
3. A fish absorbs oxygen through its gills.
4. A cactus wren eats seeds from a cactus fruit.
5. A sea star clings to a rock in a tidal pool.
6. A bear scratches its back against a tree.

Which statements describe an animal interacting with a living part of the environment?

- F** Statements 1, 4, and 6 only
- G** Statements 1, 3, and 5 only
- H** Statements 2, 5, and 6 only
- J** Statements 2, 3, and 4 only

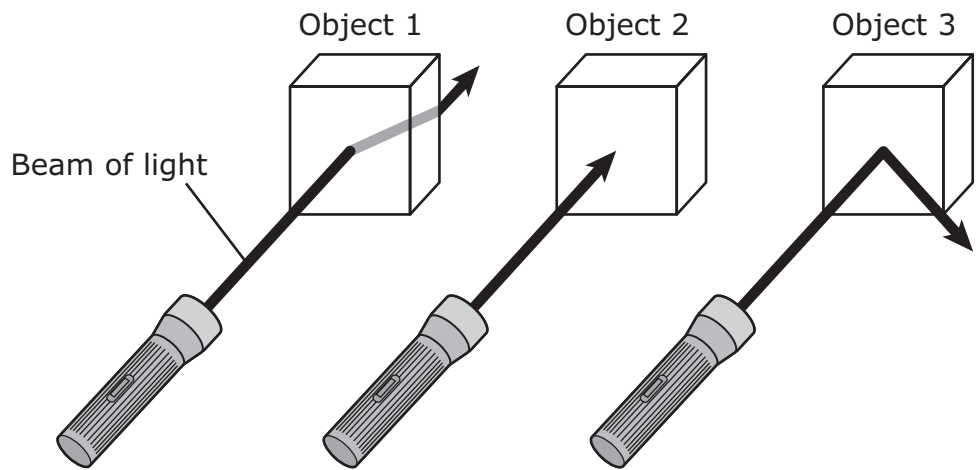
23 A student drew the following pictures to show the day-night cycle of Earth.



Based on the pictures, how many hours should the student record on the nighttime picture to complete a day-night cycle?

- A** 11 hours
- B** 12 hours
- C** 13 hours
- D** 24 hours

24 A student uses a flashlight to shine a beam of light on three different objects.



Which table describes what happens to the light beam as it interacts with each object?

F

Object	Light Beam
1	Scattered
2	Absorbed
3	Reflected

H

Object	Light Beam
1	Reflected
2	Absorbed
3	Refracted

G

Object	Light Beam
1	Refracted
2	Absorbed
3	Reflected

J

Object	Light Beam
1	Absorbed
2	Refracted
3	Scattered

- 25** White oak trees grow to be 24 to 30 meters tall. Their long branches are covered with leaves, and their roots reach deep into the soil to hold the tree in place. White oaks drop their leaves during the winter months.

Characteristics of Four Ecosystems

Ecosystem	Temperature	Yearly Precipitation	Soil
1	Long, cold winters with temperatures below 0 °C and short, cool summers	Less than 25 cm of rain	Thin layer of topsoil; frozen ground below
2	Warm throughout the year, very hot in summer	Less than 28 cm of rain	Sandy, rocky soil
3	Cold-to-moderate winters and warm summers	Between 76 and 152 cm of rain	Rich, deep soil
4	Warm and wet year-round	Between 200 and 1000 cm of rain	Soil drains quickly; thin top layer of humus

In which ecosystem would forests of white oak trees be most likely to survive?

- A** Ecosystem 1
- B** Ecosystem 2
- C** Ecosystem 3
- D** Ecosystem 4

-
- 26** A three-step process is shown.



Which of these are most likely formed by the process shown?

- F** Glaciers
- G** Mountains
- H** Sand dunes
- J** Sedimentary rocks

- 27** A group of students is given four small cubes of the same size and instructed to place them in a beaker of water. One cube floats to the surface of the water. Two of the cubes float in the middle of the beaker under the surface of the water. The last cube sinks to the bottom of the beaker.

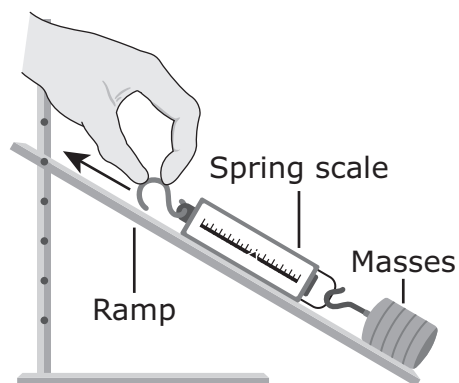
Which conclusion is best supported by what the students observed?

- A** Two of the four cubes are soluble in water.
 - B** All four cubes have different masses.
 - C** Each cube is made of a different type of solid material.
 - D** One of the cubes is more dense than the other three.
-

- 28** Which effect would most likely occur if a six-lane highway were built through an ecosystem?

- F** Competition for resources would be reduced.
- G** Habitats available to animals would be reduced.
- H** Air pollution would decrease.
- J** Water pollution would decrease.

- 29** Students investigate force. The masses they use begin at rest on the ramp. The setup the students use is shown.



Which change will reduce the amount of force needed to move the masses?

- A** Decrease the height of the ramp
- B** Increase the height of the ramp
- C** Add an additional mass
- D** Pull the spring scale with two hands

-
- 30** Students record characteristics of a tomato plant. One student's list is shown.

Tomato Plant Characteristics

- Stems with branches that have many wide leaves
- Roots growing out of lower stem into the ground
- Small yellow flowers
- Seven large red tomatoes
- Four small green tomatoes

Which tomato plant characteristic is least likely to be inherited?

- F** Flower color
- G** Leaf shape
- H** Type of roots
- J** Number of tomatoes

31 Students list resources that are used to heat buildings.

- Wood
- Coal
- Natural gas
- Petroleum
- Solar energy

Which of these tables correctly classifies the resources?

A

Renewable	Nonrenewable
Solar energy	Petroleum
Wood	Natural gas
	Coal

C

Renewable	Nonrenewable
Wood	Solar energy
Coal	Petroleum
	Natural gas

B

Renewable	Nonrenewable
Solar energy	Coal
Natural gas	Petroleum
	Wood

D

Renewable	Nonrenewable
Petroleum	Solar energy
Natural gas	Wood
Coal	

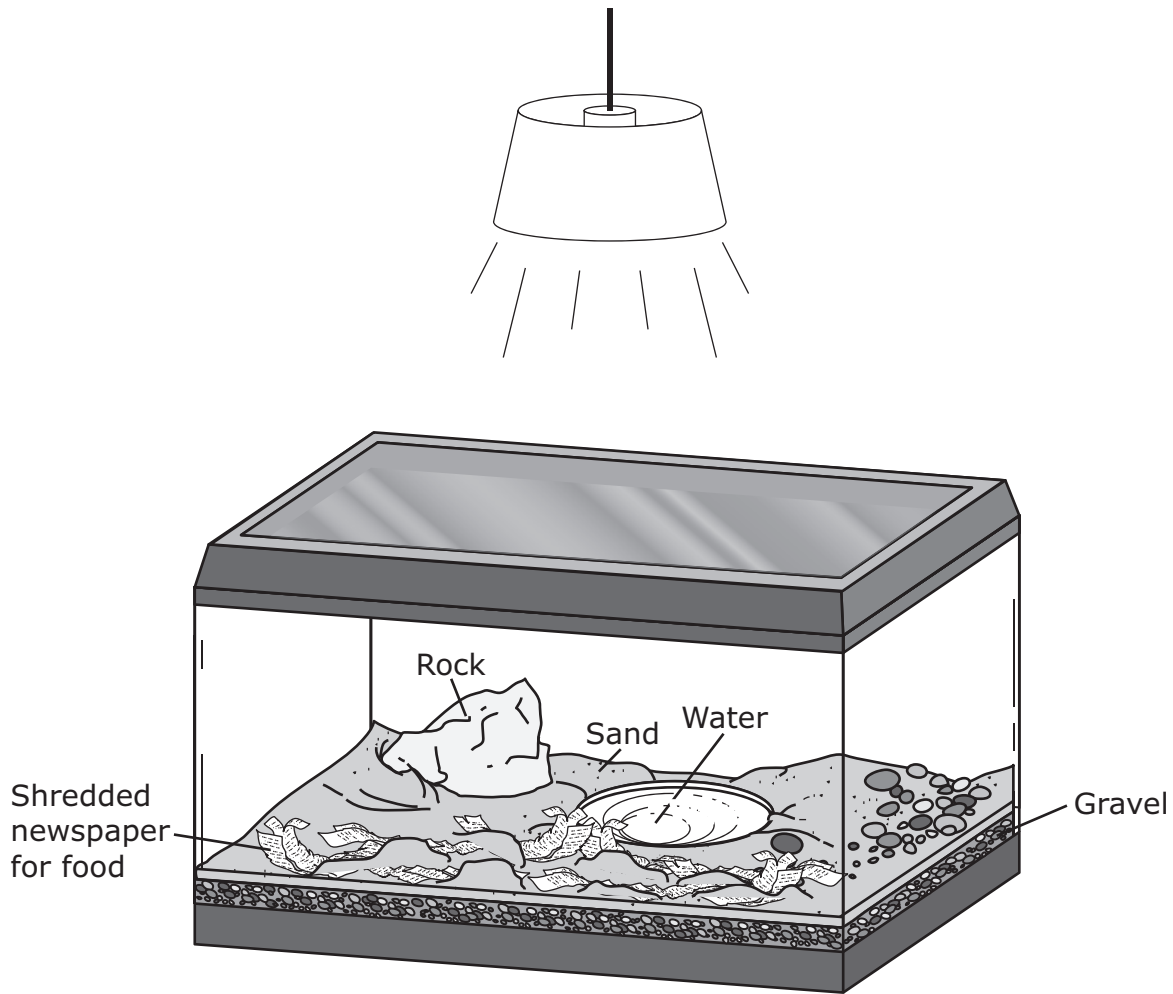
- 32** A student mixes a sample of stones with a sample of table salt. The mass and volume of the samples were determined before mixing the samples. The mass and volume of each sample is shown.

Material	Grams (g)	Milliliters (mL)
Stones	45	25
Salt	40	35

Which statement is true about the mixture?

- F** The mass of the mixture is 85 grams.
- G** The mass of the mixture is 60 milliliters.
- H** The volume of the mixture is 60 grams.
- J** The volume of the mixture is 85 milliliters.

- 33** A student's model of a closed ecosystem is shown. The student plans to add land snails to the model in order to show how the snails interact with different parts of the ecosystem.



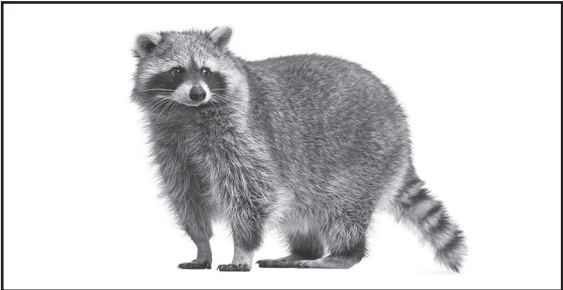

What should the student add to the model so that the snails will survive?

- A** Fish to provide food
- B** Sticks to provide a place to hide
- C** Deep water to provide carbon dioxide
- D** Living plants to provide oxygen

34 Deltas are large landforms found along coastlines. What process forms deltas?

- F** Cementation of sediments by rivers
- G** Deposition of sediments by rivers
- H** Erosion of sediments by ocean waves
- J** Deposition of sediments by ocean waves

35 The raccoon can be found in most areas of Texas. The coati has a smaller territory and is found from Big Bend to Brownsville. These two species are related. The chart shows the characteristics of these two species.

Raccoon	Coati
	
<ul style="list-style-type: none">• Sharp teeth and powerful claws• Paws with flexible toes• Good eyesight at night• Eats fruits, berries, insects, rodents, frogs, fish, eggs, corn• Long fluffy tail	<ul style="list-style-type: none">• Sharp teeth and long claws• Paws with flexible toes• Good eyesight at night• Eats insects, lizards, frogs, roots, fruits, nuts, and eggs• Long tail that helps in balancing

Which statement does NOT describe how the body structures of these animals help them escape predators?

- A** Paws with long claws on flexible toes help them climb trees.
- B** Sharp teeth allow them to catch prey on land or in water.
- C** Long tails allow them to balance on branches in trees.
- D** Good eyesight helps them to see at night.

36 Sediments are transported at different speeds. Which type of sediment transport is the slowest?

- F** Transport by rivers
- G** Transport by winds
- H** Transport by glaciers
- J** Transport by ocean currents



Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation	Process Student Expectation	Correct Answer
1	2	Readiness	5.6(A)	5.4(A)	C
2	3	Readiness	5.8(C)		F
3	2	Readiness	5.6(C)	5.3(A)	D
4	1	Readiness	5.5(A)	5.2(D)	G
5	2	Supporting	3.6(B)	5.2(D)	D
6	4	Readiness	5.10(B)		F
7	3	Readiness	5.7(B)		B
8	2	Readiness	5.6(B)	5.2(D)	J
9	4	Readiness	5.9(B)	5.2(D)	B
10	2	Readiness	5.6(A)		H
11	1	Supporting	3.5(C)		A
12	3	Supporting	5.8(D)	5.3(B)	H
13	4	Supporting	5.9(D)	5.2(B)	B
14	3	Supporting	3.8(D)	5.3(C)	F
15	4	Readiness	5.10(A)	5.2(D)	D
16	1	Readiness	5.5(A)		J
17	4	Supporting	3.10(B)	5.2(D)	B
18	3	Supporting	5.8(B)		H
19	4	Readiness	5.9(B)	5.3(B)	B
20	2	Readiness	5.6(B)	5.2(D)	F
21	1	Supporting	5.5(C)	5.2(F)	C
22	4	Readiness	5.9(A)		F
23	3	Readiness	5.8(C)		C
24	2	Readiness	5.6(C)	5.2(G)	G
25	4	Supporting	3.9(A)	5.2(D)	C
26	3	Readiness	5.7(A)		J
27	1	Readiness	5.5(A)	5.2(D)	D
28	4	Supporting	5.9(C)		G
29	2	Supporting	5.6(D)	5.2(A)	A
30	4	Readiness	5.10(B)		J
31	3	Supporting	4.7(C)		A
32	1	Supporting	5.5(B)	5.2(D)	F
33	4	Readiness	5.9(A)	5.2(D)	D
34	3	Readiness	5.7(B)		G
35	4	Readiness	5.10(A)	5.2(D)	B
36	3	Readiness	5.7(A)		H

2021 Grade 5 Science Rationales

Item#	Rationale	
1	Option C is correct	Thermal energy is the only type of energy listed that can cause water to change from a liquid to a gas.
	Option A is incorrect	Light energy from streetlights will not cause water to evaporate.
	Option B is incorrect	Sound energy from passing cars will not cause water to evaporate.
	Option D is incorrect	Mechanical energy from nearby streets will not cause water to evaporate.

2021 Grade 5 Science Rationales

Item#	Rationale	
2	Option F is correct	Earth makes a complete rotation on its axis once every 24 hours.
	Option G is incorrect	30 days is about the time for the moon to complete its cycle of phases.
	Option H is incorrect	60 minutes is the time it takes for one hour to pass.
	Option J is incorrect	365 days is about the time for Earth to complete one revolution around the sun.

2021 Grade 5 Science Rationales

Item#	Rationale	
3	Option D is correct	The light was not visible past the mirror because a mirror is not transparent, and light will not pass through it.
	Option A is incorrect	This statement is incorrect. Light can travel very long distances.
	Option B is incorrect	Although some light is absorbed and most of the light is reflected, the light cannot be seen past the mirror because the mirror does not allow light to pass through it.
	Option C is incorrect	A mirror reflects most of the light. In order for the light to be refracted, it would have to pass through the mirror.

2021 Grade 5 Science Rationales

Item#	Rationale	
4	Option G is correct	Sample 2 conducts electricity and heat, is not soluble in water, and is a solid at room temperature, which are characteristics of metals.
	Option F is incorrect	Sample 1 is soluble in water, and plastics are not soluble in water.
	Option H is incorrect	There is not enough information given in the table to determine if Sample 3 is attracted to magnets.
	Option J is incorrect	There is not enough information given in the table to determine the density of Sample 4.

2021 Grade 5 Science Rationales

Item#	Rationale	
5	Option D is correct	The wagon will slow when the friction is opposite of the direction of the force applied.
	Option A is incorrect	The force of gravity pulls objects down and would not act in the same direction of the arrow.
	Option B is incorrect	A force in the same direction as the arrow would make the wagon continue to move.
	Option C is incorrect	The force of gravity pulls objects down and would not act in the opposite direction of the arrow.

2021 Grade 5 Science Rationales

Item#	Rationale	
6	Option F is correct	A bear looking in a trash can for food is a learned behavior because bears must learn that food can be found inside trash cans. This is the behavior that is incorrectly classified.
	Option G is incorrect	An owl being active at night is an inherited trait, so this behavior is correctly classified.
	Option H is incorrect	A dog coming when its name is called is a learned behavior because the dog must learn what its name is. This behavior is correctly classified.
	Option J is incorrect	A squirrel getting seeds from a bird feeder is a learned behavior because the squirrel must learn that it can get seeds from the bird feeder. This behavior is correctly classified.

2021 Grade 5 Science Rationales

Item#	Rationale	
7	Option B is correct	Canyons and mesas are both formed from wind and water erosion. Mesas are part of a plateau that has been eroded. Canyons are v-shaped, which means they were formed by water.
	Option A is incorrect	Glaciers carve valleys to make a u-shape and do not form mesas.
	Option C is incorrect	Mesas are part of plateaus, which form differently than mountains.
	Option D is incorrect	Canyons and mesas are also found in areas that are not deserts.

2021 Grade 5 Science Rationales

Item#	Rationale	
8	Option J is correct	Only one bulb will be lit when a wire is added between the right post of the top bulb and the left post of the bottom right bulb because only one light will be on a complete circuit.
	Option F is incorrect	If a wire is added from the top bulb to Switch 2, and another wire from Switch 1 to Switch 2, then no bulbs will light.
	Option G is incorrect	If a wire is added from the left post of the top bulb to the left post of the bottom right bulb, then two bulbs will light.
	Option H is incorrect	If a wire is added from the right post of the top bulb to Switch 1, then no bulbs will light.

2021 Grade 5 Science Rationales

Item#	Rationale	
9	Option B is correct	According to the food web, swamp rabbits, hermit crabs, and swamp sparrows obtain their energy from plants, which produce their own food.
	Option A is incorrect	According to the food web, bald eagles and spotted sandpipers obtain their energy from other animals and do not directly eat plants.
	Option C is incorrect	According to the food web, phytoplankton produce their own food.
	Option D is incorrect	Wiregrass, clover grass, and phytoplankton produce their own food.

2021 Grade 5 Science Rationales

Item#	Rationale	
10	Option H is correct	The lamp uses batteries to produce electrical energy that provides light.
	Option F is incorrect	Even though the lamp is clamped to the counter by using mechanical energy, it is not using mechanical energy to produce light.
	Option G is incorrect	Even though the lamp produces thermal energy that warms the water, it is not the energy that produces light.
	Option J is incorrect	Even though the lamp may vibrate and produce sound when clicked on, sound energy is not the energy that produces the light from the lamp.

2021 Grade 5 Science Rationales

Item#	Rationale	
11	Option A is correct	When water vapor touches the cool glass, it cools and condenses, forming drops of water on the outside of the glass.
	Option B is incorrect	The water on the outside of the glass is formed when water vapor cools, not from the liquid water already present in the glass.
	Option C is incorrect	The water on the outside of the glass is formed when water vapor cools, not from the liquid water already present in the glass.
	Option D is incorrect	Glass does not allow water to pass through. It would not be a good material for a container if water could pass through the glass.

2021 Grade 5 Science Rationales

Item#	Rationale	
12	Option H is correct	The moon is about $\frac{1}{4}$ the diameter of Earth. The marble shown is about $\frac{1}{4}$ the size of the tennis ball.
	Option F is incorrect	The moon and Earth are not about the same size as shown by the basketball and soccer ball.
	Option G is incorrect	The moon and Earth are not about the same size, as shown by the baseball and tennis ball.
	Option J is incorrect	The moon is not larger than Earth, as shown by the golf ball and the baseball.

2021 Grade 5 Science Rationales

Item#	Rationale	
13	Option B is correct	By comparing the teeth of the dinosaur to animals alive today, scientists can determine which type of food the dinosaur most likely ate.
	Option A is incorrect	Skin is not often preserved as a fossil because it is too soft.
	Option C is incorrect	The head of the fossil dinosaur is not likely to give a clue as to how fast the heart was beating.
	Option D is incorrect	Fossilized eggs have been found, but the fossilized head of the dinosaur will not give a clue about how many eggs are in the nest.

2021 Grade 5 Science Rationales

Item#	Rationale	
14	Option F is correct	The order of the planets from the sun to Earth are Mercury, then Venus.
	Option G is incorrect	Mercury is the first planet from the sun and Venus is the second planet from the sun. Earth is the third planet from the sun.
	Option H is incorrect	Mercury is the closest planet to the sun, and Venus is the second planet from the sun.
	Option J is incorrect	Earth is the third planet from the sun, not Mercury. Mercury is the closest planet to the sun, not Venus.

2021 Grade 5 Science Rationales

Item#	Rationale	
15	Option D is correct	Bird 1 has toes and a beak that are best suited for trees in a forest. Bird 2 has toes and a beak that are best suited for the muddy waters of a marsh. Bird 3 has toes and a beak that are best suited for a grassland environment with few trees. Bird 4 has toes and a beak that are best suited for a body of water such as a pond.
	Option A is incorrect	Bird 1 is not well suited for a prairie, where few trees are found.
	Option B is incorrect	Bird 4 would need a water environment such as a pond, which would be more difficult to find in a prairie.
	Option C is incorrect	Bird 1 is not well suited for a prairie, where few trees are found.

2021 Grade 5 Science Rationales

Item#	Rationale	
16	Option J is correct	All of the objects are solids, and they do not dissolve in water.
	Option F is incorrect	The objects are all solids, but they do not conduct electricity.
	Option G is incorrect	The objects are not metals, so they do not conduct electricity and are not magnetic.
	Option H is incorrect	The objects are not metals, so they cannot be magnetic.

2021 Grade 5 Science Rationales

Item#	Rationale	
17	Option B is correct	The life cycle of the oak tree and the life cycle of the lady beetle both show that they go through a series of changes.
	Option A is incorrect	The life cycle of the oak tree and the life cycle of the lady beetle do not show how much energy is used by the organisms in their series of changes.
	Option C is incorrect	The life cycle of the oak tree and the life cycle of the lady beetle do not show how the organisms can adapt to changes in the environment.
	Option D is incorrect	The life cycle of the oak tree and the life cycle of the lady beetle do not show a relationship between the oak tree and the lady beetle.

2021 Grade 5 Science Rationales

Item#	Rationale	
18	Option H is correct	When salt water evaporates because of the sun's energy, all of the salts are left behind.
	Option F is incorrect	Rain falls on the ocean as well as on the land.
	Option G is incorrect	Water can evaporate during the nighttime.
	Option J is incorrect	It cannot be said that precipitation will happen less often because precipitation is part of the water cycle.

2021 Grade 5 Science Rationales

Item#	Rationale	
19	Option B is correct	Based on the food web, zebras feed on plants, and cheetahs feed on zebras.
	Option A is incorrect	Based on the food web, barn owls feed on moles, not on termites.
	Option C is incorrect	Based on the food web, spotted hyenas feed on zebras and gemsboks, not on termites.
	Option D is incorrect	Based on the food web, Grant's golden moles feed on termites, not on gemsboks.

2021 Grade 5 Science Rationales

Item#	Rationale	
20	Option F is correct	All of the lights are on because all of the lights are connected to each other. Light one is connected to the battery, and the left switch is closed.
	Option G is incorrect	Lights three and four are also on because they are part of a complete circuit.
	Option H is incorrect	Lights one and two are also on because they are part of the circuit. They are connected to each other and to a battery, and the switch is closed.
	Option J is incorrect	All of the lights will be lit.

2021 Grade 5 Science Rationales

Item#	Rationale	
21	Option C is correct	The water vapor in the air condenses on the chilled fruit. Sugar dissolves in this water. The sugar could no longer be seen because the sugar dissolved in the water.
	Option A is incorrect	The sugar will not evaporate.
	Option B is incorrect	If the sugar settled to the bottom of the container, it could still be seen.
	Option D is incorrect	Inside the refrigerator the temperature is too cold to melt sugar.

2021 Grade 5 Science Rationales

Item#	Rationale	
22	Option F is correct	The hummingbird interacts with a flower in statement 1. The flower and the hummingbird are both living. A cactus wren eats seeds from a cactus fruit in statement 4. The wren and the cactus are both living. A bear scratches its back against a tree in statement 6. The bear and the tree are both living.
	Option G is incorrect	A fish absorbs oxygen through its gills in statement 3. Oxygen is not living. A sea star clings to a rock in a tidal pool in statement 5. A rock is not living.
	Option H is incorrect	A lizard burrows into the sand in statement 2. Sand is not living. A sea star clings to a rock in a tidal pool in statement 5. A rock is not living.
	Option J is incorrect	A lizard burrows into the sand in statement 2. Sand is not living. A fish absorbs oxygen through its gills in statement 3. Oxygen is not living.

2021 Grade 5 Science Rationales

Item#	Rationale	
23	Option C is correct	The first diagram shows 11 hours of daytime. There are about 24 hours in a day-night cycle, so the hours of nighttime would be 13. $11 + 13 = 24$.
	Option A is incorrect	The first diagram shows 11 hours of daytime. There are about 24 hours in a day-night cycle, so the hours of nighttime would be 13. $11 + 13 = 24$. 11 hours of nighttime would only be 22 hours of the day-night cycle, not 24.
	Option B is incorrect	The first diagram shows 11 hours of daytime. There are about 24 hours in a day-night cycle, so the hours of nighttime would be 13. $11 + 13 = 24$. 12 hours of nighttime would only be 23 hours of the day-night cycle, not 24.
	Option D is incorrect	The first diagram shows 11 hours of daytime. There are about 24 hours in a day-night cycle, so the hours of nighttime would be 13. $11 + 13 = 24$. 24 hours of nighttime would be 35 hours of the day-night cycle, not 24.

2021 Grade 5 Science Rationales

Item#	Rationale	
24	Option G is correct	Object 1 shows the light bending or refracting when the light goes through it. Object 2 shows no light being reflected and no light going through it, so it is being absorbed. Object 3 shows the light bouncing off, so object 3 is reflecting the light.
	Option F is incorrect	Object 1 is refracting, not scattering, the light.
	Option H is incorrect	Object 1 is refracting the light, not reflecting the light. Object 3 is reflecting the light, not refracting the light.
	Option J is incorrect	Object 1 is refracting, not absorbing, the light. Object 2 is absorbing, not refracting, the light. Object 3 is reflecting, not scattering, the light.

2021 Grade 5 Science Rationales

Item#	Rationale	
25	Option C is correct	The soil is deep enough for the white oak tree roots.
	Option A is incorrect	The soil is too thin for the white oak tree roots.
	Option B is incorrect	The soil is too rocky for white oak tree roots, and there doesn't seem to be enough rain.
	Option D is incorrect	The amount of rain appears to be too high and the soil too thin for white oak trees.

2021 Grade 5 Science Rationales

Item#	Rationale	
26	Option J is correct	Sediments are deposited, compacted, and cemented to form sedimentary rocks.
	Option F is incorrect	Glaciers are formed from snow.
	Option G is incorrect	Mountains are formed from uplift and eruptions.
	Option H is incorrect	Sand dunes are formed from sand deposited by wind. Compaction and cementation would change the sand into sedimentary rock.

2021 Grade 5 Science Rationales

Item#	Rationale	
27	Option D is correct	The cubes are floating or sinking in water because of their density compared to water.
	Option A is incorrect	The cubes are not described as dissolving in water.
	Option B is incorrect	The two cubes that both float in the middle of the beaker could have the same masses.
	Option C is incorrect	The two cubes that both float in the middle of the beaker could be made of the same material.

2021 Grade 5 Science Rationales

Item#	Rationale	
28	Option G is correct	The construction of a six-lane highway through an ecosystem would reduce the number of places animals could live.
	Option F is incorrect	The competition for natural resources would be increased instead of reduced because there would be fewer resources available after the construction of the highway.
	Option H is incorrect	Air pollution would most likely increase instead of decrease due to more pollution from cars and fewer trees.
	Option J is incorrect	Water pollution would most likely increase instead of decrease due to increased littering.

2021 Grade 5 Science Rationales

Item#	Rationale	
29	Option A is correct	Decreasing the height of the ramp will require less effort to move the masses.
	Option B is incorrect	Increasing the height of the ramp will require more effort to move the masses.
	Option C is incorrect	Adding an additional mass will require more effort to move the masses.
	Option D is incorrect	Pulling the spring scale with two hands will not reduce the effort needed to move the masses. The amount of force needed to move the masses will not change. There is less force per hand, but the total amount of force remains the same.

2021 Grade 5 Science Rationales

Item#	Rationale	
30	Option J is correct	The number of tomatoes depends more on environmental conditions than on inherited traits.
	Option F is incorrect	The color of the flower is an inherited trait.
	Option G is incorrect	The shape of the leaves is an inherited trait.
	Option H is incorrect	The type of roots is an inherited trait.

2021 Grade 5 Science Rationales

Item#	Rationale	
31	Option A is correct	Solar energy and wood are renewable, and petroleum, natural gas, and coal are nonrenewable.
	Option B is incorrect	Natural gas is a fossil fuel and is therefore nonrenewable. Wood is renewable.
	Option C is incorrect	Coal is a fossil fuel and is therefore nonrenewable. Solar energy is renewable.
	Option D is incorrect	Solar energy and wood are renewable. Petroleum, natural gas, and coal are nonrenewable.

2021 Grade 5 Science Rationales

Item#	Rationale	
32	Option F is correct	Grams are a measure of mass. $45 + 40 = 85$ grams.
	Option G is incorrect	Milliliters are a measure of volume, not mass.
	Option H is incorrect	Grams are a measure of mass. The volume of the mixtures is 60 milliliters.
	Option J is incorrect	Milliliters are a measure of volume. The volume of the mixtures is 60 milliliters.

2021 Grade 5 Science Rationales

Item#	Rationale	
33	Option D is correct	Plants provide oxygen for the snails.
	Option A is incorrect	Snails do not eat fish.
	Option B is incorrect	There is nothing that would eat the snails, so they do not need to hide.
	Option C is incorrect	Snails do not use carbon dioxide to breathe.

2021 Grade 5 Science Rationales

Item#	Rationale	
34	Option G is correct	Deltas are formed when rivers slow and drop their sediment at the mouth of the river.
	Option F is incorrect	Rivers tend to move and deposit sediment instead of cementing them.
	Option H is incorrect	Deltas are formed by the accumulation of sediment, not the erosion of sediment.
	Option J is incorrect	Deltas are formed by rivers dropping sediment, not from ocean waves dropping sediment.

2021 Grade 5 Science Rationales

Item#	Rationale	
35	Option B is correct	Sharp teeth help them to survive by catching food to eat. This answer focuses more on how to get food rather than on how to escape.
	Option A is incorrect	Paws that help them climb trees can help them escape predators.
	Option C is incorrect	Long tails that help them balance in trees can keep them from falling.
	Option D is incorrect	Good eyesight at night can help them see predators and perhaps avoid them.

2021 Grade 5 Science Rationales

Item#	Rationale	
36	Option H is correct	Glaciers are very slow-moving “rivers” of ice.
	Option F is incorrect	Transport by rivers can take place very quickly, especially if the river is flooded.
	Option G is incorrect	Transport by winds can take place very quickly, especially if there is no protection for the topsoil.
	Option J is incorrect	Transport by ocean currents can take place very quickly.