

# **GRADE 5**

## **Science**

**Administered May 2019**

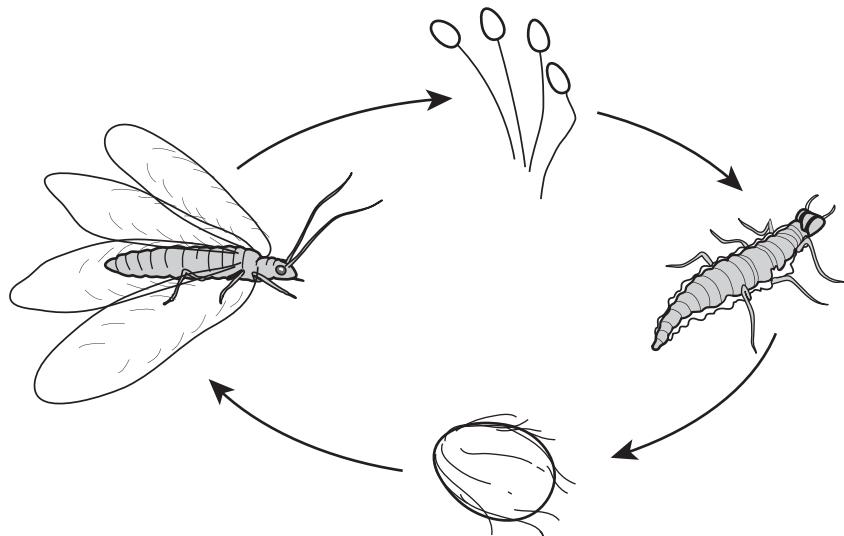
**RELEASED**

## 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** Lacewings are insects that hatch from eggs.

Lacewing Life Cycle



Which of these correctly compares the lacewing life cycle with the frog life cycle?

- A** Adult lacewings lay eggs, but adult frogs give birth to live larvae.
- B** When they hatch, young lacewings and young frogs look different from their adult forms.
- C** When they hatch, both lacewings and frogs have long legs for jumping.
- D** Both adult lacewings and adult frogs have more legs than they had as larvae.

**2** Which of the following explains how water undergoes a change of state in one stage of the water cycle in order to move from the ocean's surface into the air?

- F** Liquid water that is heated by the sun becomes a gas and rises.
- G** Gaseous water rises as it is cooled by the ocean.
- H** Liquid water that is heated by the sun condenses into rain.
- J** Gaseous water collects in drops of fog above the ocean's surface.

- 3** Students investigate the physical properties of some substances. They draw a table to show how the substances can be grouped. The students need to complete the table with column headings.

Physical Properties of Substances

?	?	?
<ul style="list-style-type: none"><li>• Aluminum foil</li><li>• Brass key</li><li>• Gold ring</li></ul>	<ul style="list-style-type: none"><li>• Cooking oil</li><li>• Soap bubble</li><li>• Wood chip</li><li>• Feather</li></ul>	<ul style="list-style-type: none"><li>• Baking soda</li><li>• Drink mix</li><li>• White sugar</li></ul>

Which column headings should the students use for their table?

**A**

Good Insulators of Thermal Energy	Is Attracted by Magnets	Same Physical State
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**B**

Good Conductors of Electrical Energy	Less Dense than Water	Soluble in Water
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**C**

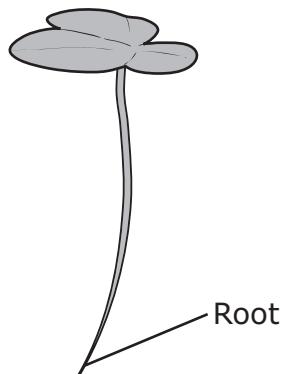
Soluble in Water	Same Physical State	Less Dense than Water
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**D**

Is Attracted by Magnets	Good Conductors of Electrical Energy	Good Insulators of Thermal Energy
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- 4** Which change occurs when lemon juice is mixed with water?
- F** The mass of the lemon juice decreases.
- G** The water becomes a solid.
- H** The lemon juice dissolves and spreads out evenly in the water.
- J** The volume of the water decreases.
- 

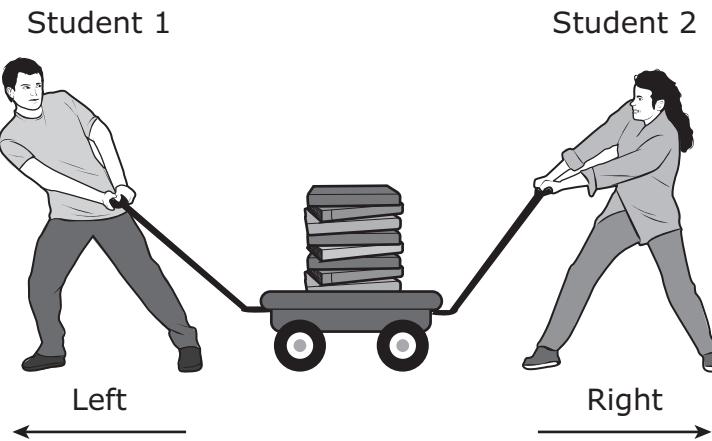
- 5** Common duckweed is a small plant that grows on the surface of many ponds and lakes. It is free floating and has a single root.



Which statement describes the type of ecosystem in which duckweed can most likely be observed?

- A** A wetland ecosystem with slow-moving water
- B** A coastal ecosystem with constant rough waves
- C** A desert ecosystem where rainfall drains away quickly
- D** An underground river ecosystem where the temperature remains constant

**6** Students fill a cart with books. The cart has a handle on each end.



Which actions will make moving the cart in one direction easiest for the students?

- F** Student 1 pulls the cart to the left while Student 2 pulls the cart to the right.
- G** Student 1 pulls the cart to the left while Student 2 pushes the cart to the left.
- H** Student 1 pushes the cart to the right while Student 2 pushes the cart downward.
- J** Student 1 pushes the cart to the right while Student 2 pulls the cart upward.

- 7** The table lists the ingredients of five different mixtures.

Mixtures and Their Ingredients

Mixture	Ingredients
1	Salt, hot water, sand
2	Sugar, hot water, salt
3	Iron filings and sand
4	Pebbles, wood chips, soil
5	Powdered soap and hot water

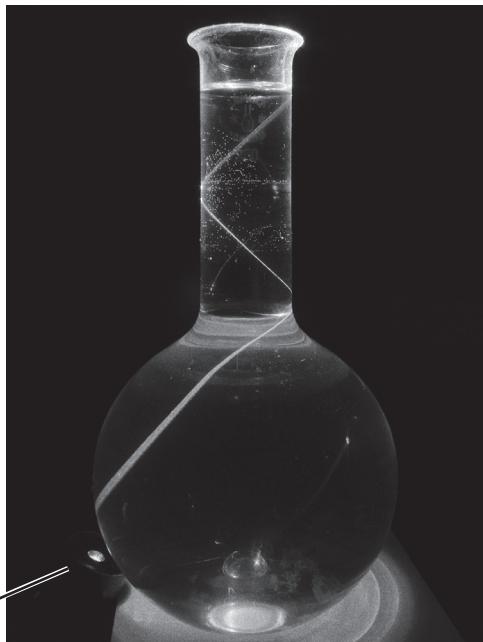
In which mixtures do all the ingredients maintain their physical state?

- A** Mixtures 3 and 4 only
  - B** Mixtures 1, 3, and 4
  - C** Mixtures 1, 2, and 5
  - D** Mixtures 2 and 5 only
- 

- 8** Which statement correctly describes how a landform is formed?

- F** A lake is formed when flowing water carves out the sides of a canyon.
- G** A mountain range is formed when glaciers slowly move across the landscape.
- H** A delta is formed at the mouth of a river when flowing water slows and deposits sediment.
- J** A U-shaped valley is formed when winds pick up and move sediment away from the landscape.

- 9 A thin beam of light is shown in this picture.

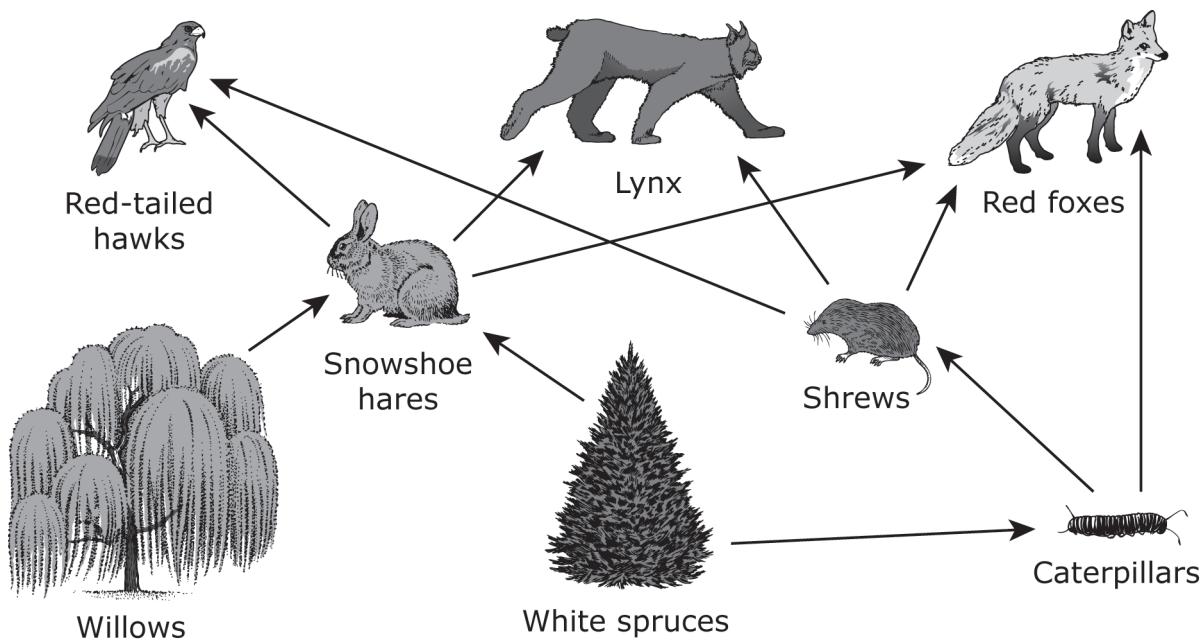


© Kyb007/Dreamstime.com

What does the picture demonstrate about light?

- A Light and its reflections travel in straight lines.
- B Light cannot reflect from more than one surface.
- C Light that goes through water cannot travel in straight lines.
- D Light can travel in a circular path.

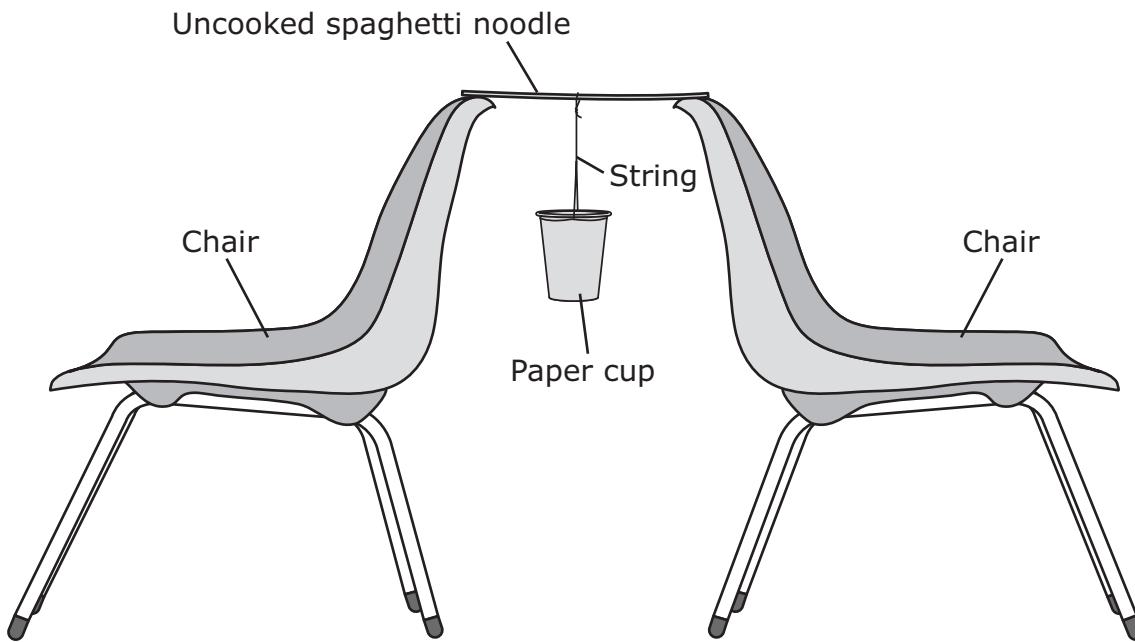
**10** A partial forest food web is shown.



Which list contains only animals that receive energy transferred directly from consumers in this food web?

- F** Red-tailed hawks, snowshoe hares, and caterpillars
- G** Snowshoe hares and caterpillars
- H** Snowshoe hares and shrews
- J** Shrews and red foxes

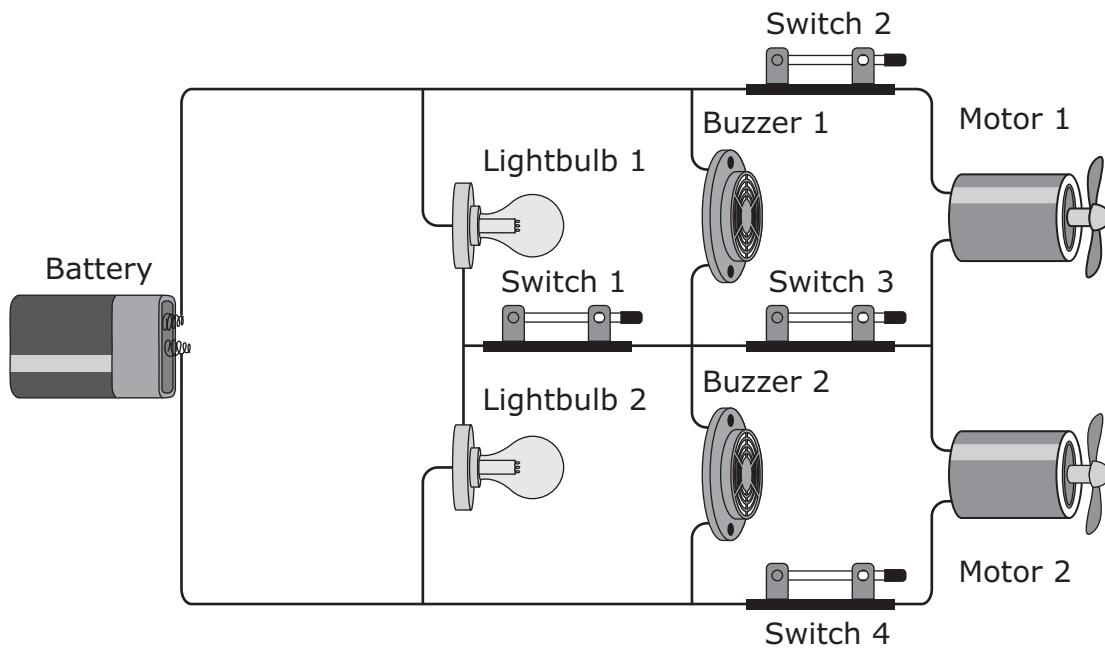
- 11** A student conducts the investigation shown in the diagram. In this experiment a paper cup hangs from a string tied to a single uncooked spaghetti noodle. The student measures and records the mass of a penny. The student then adds pennies to the paper cup one at a time.



Which question is the student most likely trying to answer with this investigation?

- A** How many spaghetti noodles will it take to hold up the mass of a penny?
- B** How much force will it take to break the spaghetti noodle?
- C** How long should the string that holds the paper cup be in order to support the greatest mass of pennies?
- D** How does the distance between the two chairs affect the amount of force it takes for the spaghetti noodle to break?

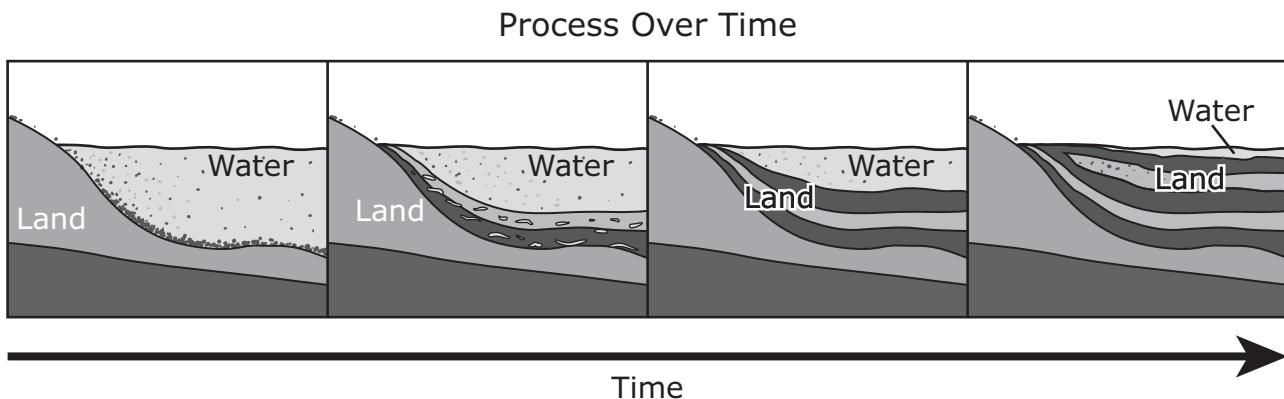
- 12** A student builds a circuit allowing the lightbulbs to light, the buzzers to make sound, and the motors to turn.



Which two switches can be open and still allow all of the parts to work?

- F** Switches 1 and 3
- G** Switches 1 and 4
- H** Switches 2 and 3
- J** Switches 3 and 4

- 13** The diagram shows parts of a process that occurred over time.



Which process does this diagram most likely represent?

- A** The erosion of a coastline
- B** The deposition of sediments
- C** The weathering of a mountain
- D** The formation of a sea

- 14** The photograph shows a laser cutting a sheet of metal as the laser moves from one end of the metal to the other.



© Stepan Popov/Dreamstime.com

Four groups of students each made a table of examples of the different types of energy involved in this process. Which of these tables is correct?

**F**

Type of Energy	Example
Mechanical	The laser moves across the metal.
Thermal	Light reflects off the metal.
Sound	Sparks hit the floor.
Light	The metal turns red.

**H**

Type of Energy	Example
Mechanical	The laser produces a beam of light.
Thermal	The temperature of the metal rises.
Electrical	The laser is part of a circuit.
Sound	Pieces of metal hit the floor.

**G**

Type of Energy	Example
Mechanical	The laser produces sparks.
Thermal	The laser is part of a circuit.
Electrical	The light cuts the metal.
Sound	Sparks hit the floor.

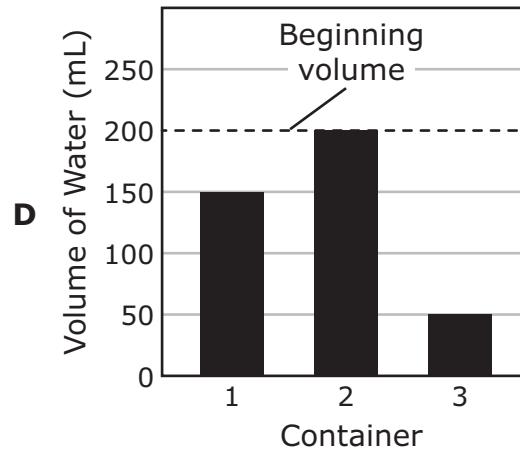
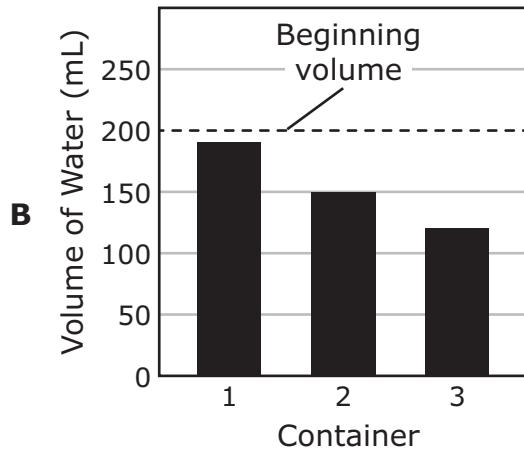
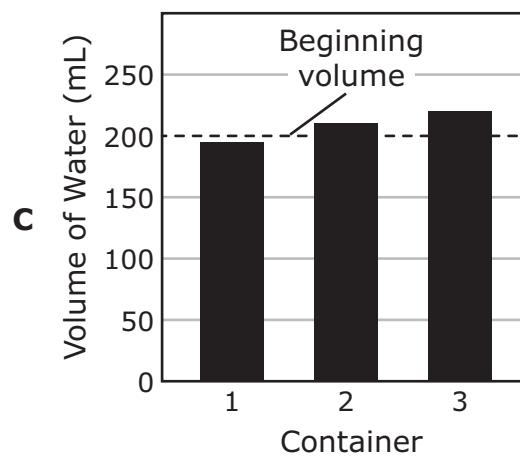
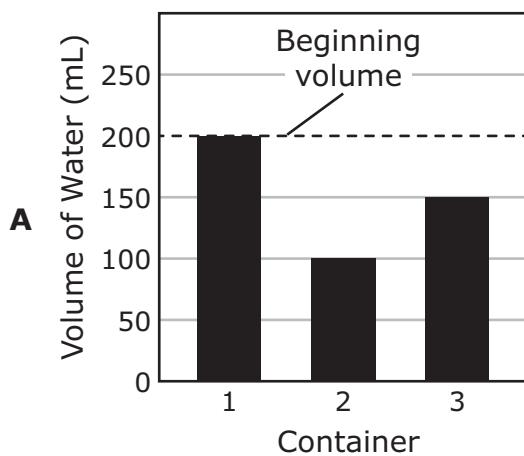
**J**

Type of Energy	Example
Mechanical	The laser moves across the metal.
Thermal	The laser produces sparks.
Sound	Pieces of metal hit the floor.
Light	The laser produces a beam of light.

- 15** Students plan to investigate the different states of matter. They will measure the volume of water in three containers after five days. They make this table to organize the data.

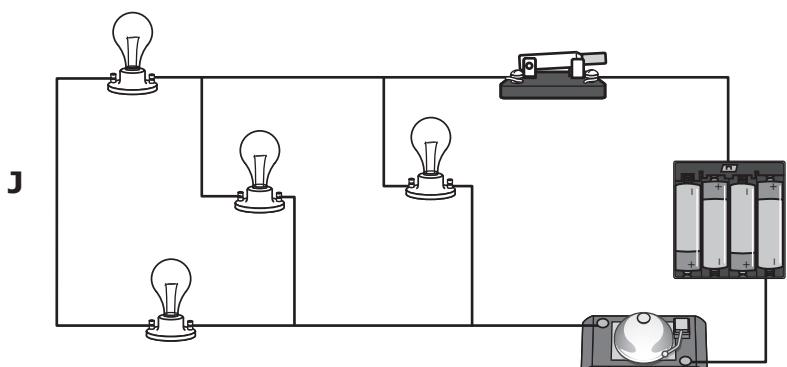
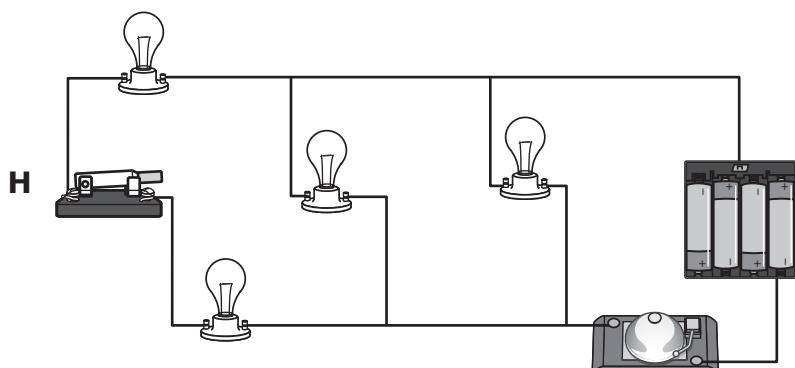
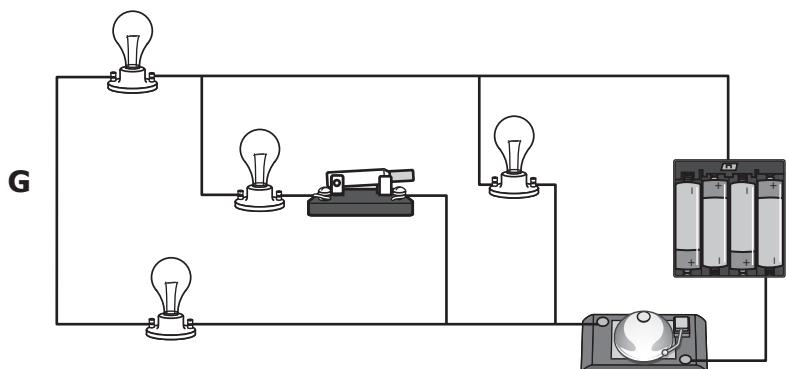
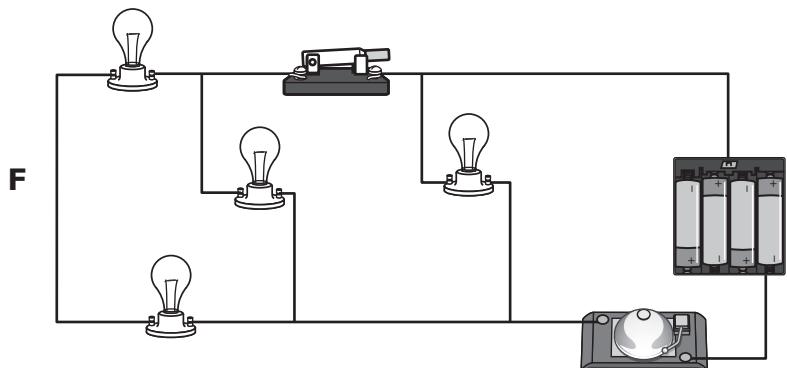
Container	Volume of Water (beginning)	Temperature of Water (beginning)	Location of Container	Volume of Water (after five days)
1	200 mL	24°C	Inside a refrigerator	?
2	200 mL	24°C	On a desk in front of low-speed fan	?
3	200 mL	24°C	On a sunny windowsill in front of an opened window	?

Which graph represents the volume of water most likely left in the containers after five days?

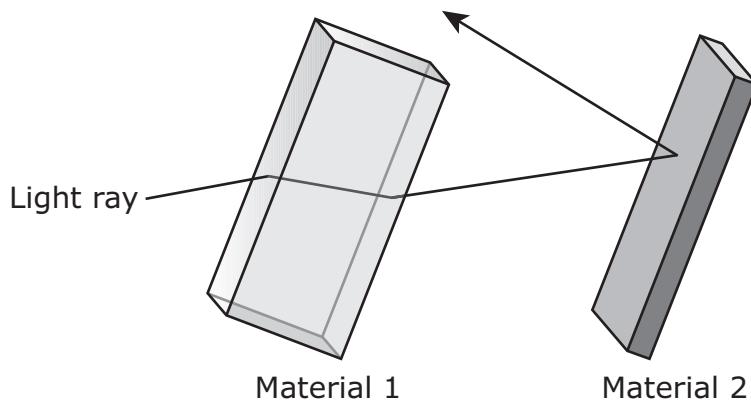


- 16** A student wants to build a circuit with four lightbulbs and one bell. The student wants to place a switch in the circuit so that only one light will still be on and the bell will still ring when the switch is opened.

Which of these circuits should the student build?



- 17** The picture shows how a light ray behaves with two different types of materials.



Which table best describes the behavior of the light ray as it encounters the materials?

**A**

Material 1	Material 2
The light ray is scattered in all directions.	The light ray is refracted.

**B**

Material 1	Material 2
The light ray is absorbed.	The light ray is reflected.

**C**

Material 1	Material 2
The light ray is transmitted.	The light ray is refracted.

**D**

Material 1	Material 2
The light ray is refracted.	The light ray is reflected.

**18** Which of these environments could form coal if the area is buried for a long time?



**F**

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**H**

© Podaril/Dreamstime.com



**G**

© Kanovsky/Fotolia



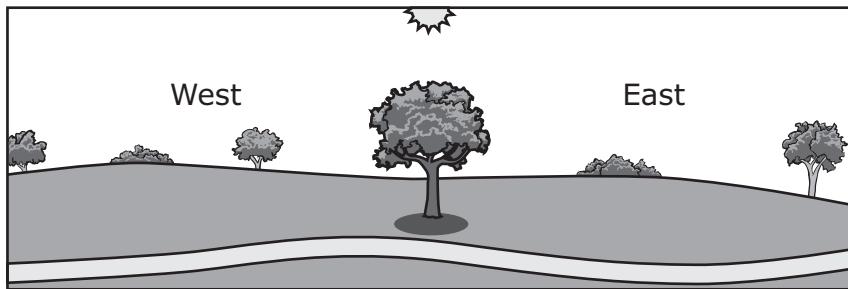
**J**

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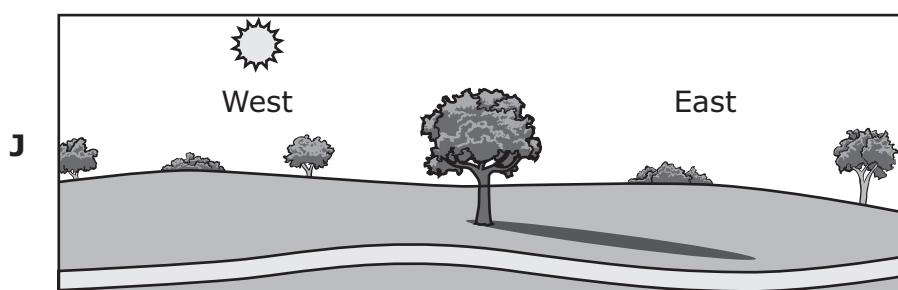
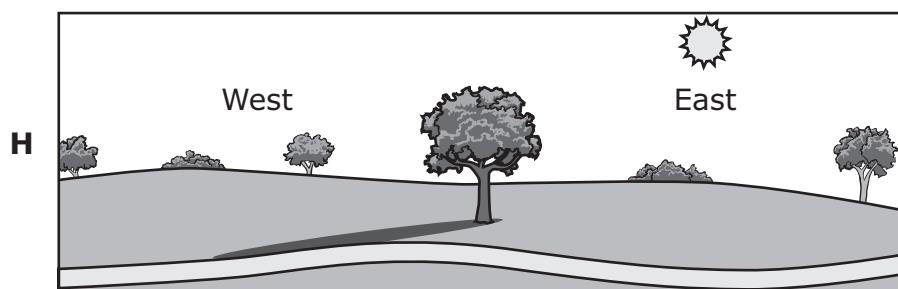
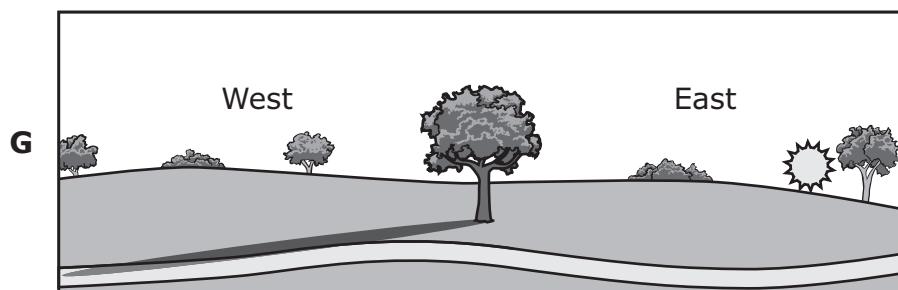
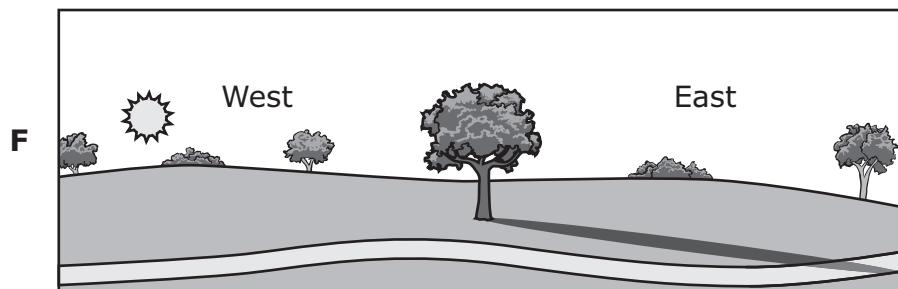
**19** A zookeeper sets up a habitat for a certain species of rabbit. Which answer choice describes the rabbit as it interacts with two nonliving parts of the rabbit's habitat?

- A** The rabbit breathing air while running down a rocky path
- B** The rabbit licking its fur while feeding its young
- C** The rabbit hiding under plants from loud noises
- D** The rabbit nibbling on vegetation inside the habitat

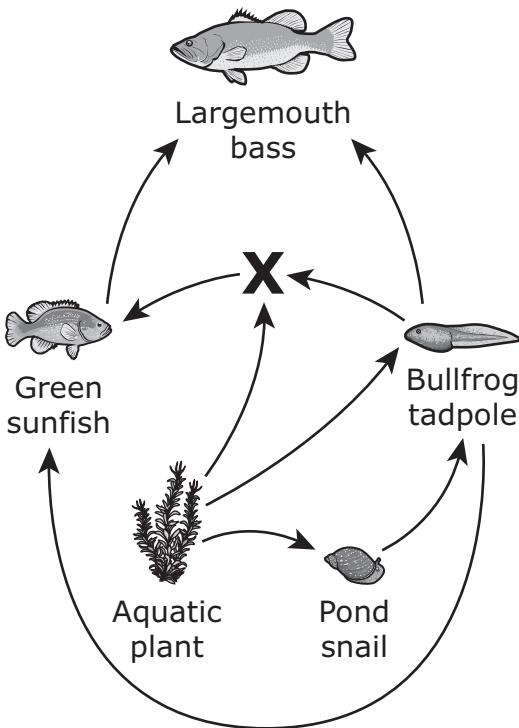
- 20** The diagram shows the shadow of a tree in a field at noon on a summer day.



The sun rises at 7:00 A.M. on this day. Which diagram best shows the shadow of the tree at 10:00 A.M. on the same day?



**21** A student makes a partial Texas aquatic food web as shown.



Which type of organism should replace the X in the food web?

- A** An omnivore
- B** An herbivore
- C** A carnivore
- D** A producer

- 22** A student filled each of four beakers with 100 mL of water at 25 °C. The student added an equal amount of a different substance to each of the beakers of water.

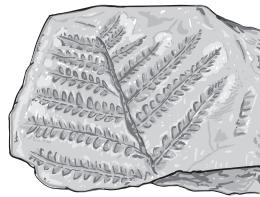
**Student Investigation**

Substance	Appearance	Observations When Stirring	Observations After Stirring Stopped
Iron filings	Silvery gray	Particles swirling around	Particles settled to bottom of beaker
Papain	White powder	Cloudy changing to clear	Clear; no visible particles
Talcum powder	White powder	Floating on surface in clumps	Collected on beaker walls above liquid
Vegetable oil	Yellow liquid	Oil in clumps moving around	Formed a layer on top of water

Based on the student's observations in the table, how many of the substances did NOT dissolve in the water?

- F** 1 substance
- G** 2 substances
- H** 3 substances
- J** 4 substances

- 
- 23** A scientist finds the plant fossil shown.



Which question can the scientist most likely answer by examining this fossil?

- A** What was the average monthly rainfall in the area?
- B** How much water was absorbed by the roots of the plant?
- C** How much oxygen was in the atmosphere surrounding the plant?
- D** What was the environment like in the area when the plant was alive?

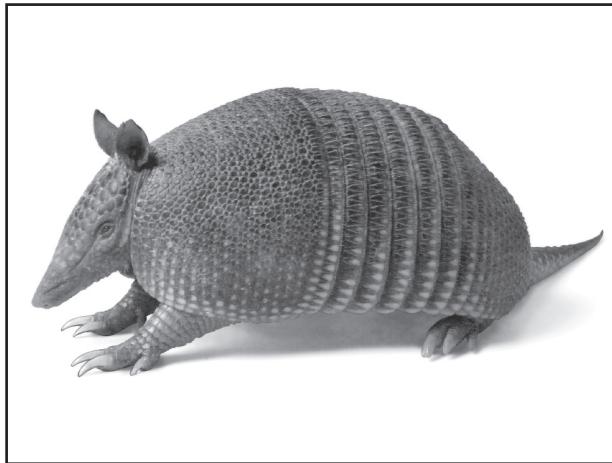
**24** The moon, the sun, and Earth have different physical characteristics. Which of these best describes a physical characteristic of the sun?

- F** It is solid and has many layers.
  - G** It rotates on its axis every 24 hours.
  - H** It is mostly made of hydrogen and helium.
  - J** It is smaller and has less gravity than Earth or the moon.
- 

**25** Which landform is a result of rapid changes to Earth's surface?

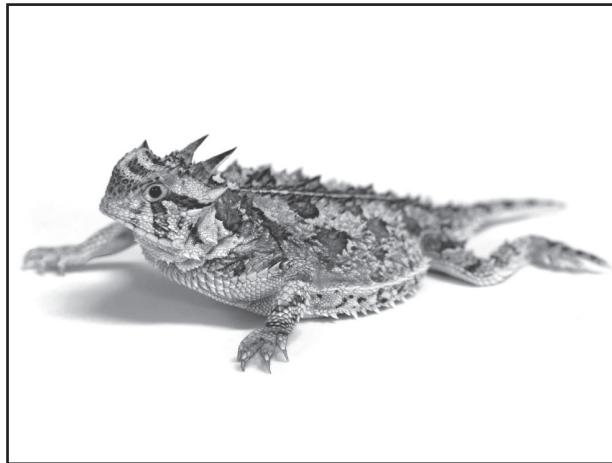
- A** U-shaped valley
- B** Limestone cave
- C** Mountain range
- D** Volcanic island

**26** The picture shows two animals that live in Texas.



© Batuque/Dreamstime #22660540

Texas Nine-banded Armadillo



© texcroc/iStockphoto #7216571

Texas Horned Lizard

Both animals have structures that help them survive. Which sentence best describes the function of the structures that these animals have in common?

- F** Both animals have small eyes that help them see clearly at night.
- G** Both animals have tough skin to keep them warm in cold weather.
- H** Both animals have sharp claws that help them to dig in sand.
- J** Both animals have pointed tails to attract predators.

- 27** A student observed and recorded some activities in an aquarium.

**Observations**

- |  |
|--|
| 1. A fish eats flakes of fish food dropped into the aquarium.<br>2. A snail crawls over colored rocks at the bottom of the aquarium.<br>3. A fish eats leaves from a plant in the aquarium.<br>4. A snail lays eggs in a corner of the aquarium.<br>5. A fish swims through air bubbles being pumped into the aquarium.<br>6. A snail moves up a wall of the aquarium. |
|--|

An interaction between two living parts of the environment is represented by —

- A** Observations 1 and 2
  - B** Observation 3
  - C** Observations 4 and 5
  - D** Observation 6
- 

- 28** A student read an article about natural resources and listed some resources in the chart shown.

**Natural Resources**

Coal	Air	Tree
Petroleum	Wheat	Natural gas
Sheep	Lake	Fish

Which answer choice best classifies the natural resources in the chart?

- F** Renewable: coal, air, tree  
Nonrenewable: petroleum, wheat, natural gas, sheep, lake, fish
- G** Renewable: coal, petroleum, natural gas, lake  
Nonrenewable: air, tree, wheat, sheep, fish
- H** Renewable: tree, wheat, sheep, fish  
Nonrenewable: coal, air, petroleum, natural gas, lake
- J** Renewable: air, tree, wheat, sheep, lake, fish  
Nonrenewable: coal, petroleum, natural gas

- 29** Which table correctly classifies statements about weather and climate?

**A**

Weather	Climate
Hail can form in thunderstorms that have strong winds.	The high temperature for Tuesday was 28 °C.

**B**

Weather	Climate
There will be thunderstorms tomorrow in the afternoon.	The month of February has had the coldest temperatures on record for thirty years.

**C**

Weather	Climate
August has the hottest temperatures each year.	A cold front is expected next week.

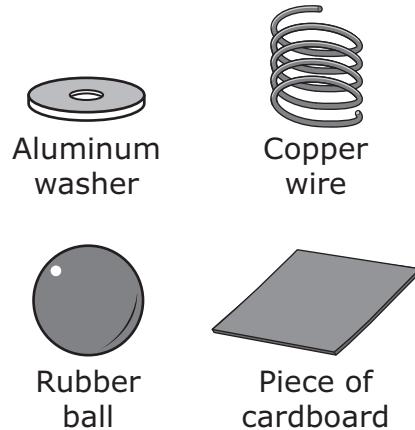
**D**

Weather	Climate
The high temperature for March is usually around 20 °C.	There are clear skies with no chance of rain for the next four days.

- 30** A student wants to classify four different objects based on physical properties. The student uses the questions shown in the table to test each object.

Materials	Physical Properties		
	Insulate Thermal Energy?	Float in Water?	Conduct Electrical Energy?
1	Yes	No	No
2	No	No	Yes
3	Yes	Yes	No
4	No	No	Yes

Materials



Which statement correctly identifies two of the materials based on the classification of properties in the table?

- F** Material 1 is a rubber ball.  
Material 2 is a piece of cardboard.
- G** Material 2 is an aluminum washer.  
Material 3 is a copper wire.
- H** Material 3 is a piece of cardboard.  
Material 4 is an aluminum washer.
- J** Material 1 is a copper wire.  
Material 4 is a rubber ball.

- 
- 31** Unlike humans, otters have special flaps that close off their nostrils and ears. These flaps help otters survive in an environment that is —

- A** terrestrial
- B** snowy
- C** windy
- D** aquatic

**32** A student raises a parrot from the time it hatches. Which of these behaviors did the parrot most likely learn from living in the student's home?

- F** The parrot flaps its wings while sitting on a perch.
  - G** The parrot has a loud scream that hurts the student's ears.
  - H** The parrot imitates the family dog barking.
  - J** The parrot tucks its head under its wing when it sleeps.
- 

**33** Eight activities that use energy are listed in the box.

1. A bus driver starts a bus.
2. A soccer player kicks a ball.
3. A teacher writes notes on a chalkboard.
4. A chef stirs soup on a stove.
5. A bird flaps its wings and chirps to attract a mate.
6. A basketball referee blows a whistle.
7. A waiter pours water into a glass.
8. A person changes the channel on a TV.

Each of these activities requires the use of which kind of energy?

- A** Thermal
- B** Mechanical
- C** Electrical
- D** Sound

- 34** This photograph shows a fence between a sand dune and a road.



© Light Traces Photography

What is most likely the main reason this fence was built?

- F** To stop sand from sliding or blowing onto the road and covering it up
- G** To prevent a delta from forming at the bottom of the dune
- H** To keep water off the road
- J** To prevent marine animals from nesting on the dune

**35** A wooded habitat changes as a new road is built.



© iStock.com/Nina Hiljukha

How will building this road most likely affect this habitat?

- A** Soil erosion will decrease.
- B** Precipitation will increase.
- C** Animal populations will decrease.
- D** Plant reproduction will increase.

- 36** A group of students makes observations about fish in a small aquarium.

Observations of Fish in an Aquarium

1. Most are about 10 cm long.
2. One of the fish looks sick.
3. Eight of the fish have black stripes.
4. Some fish can squeeze through small openings between rocks.
5. The fish swim to the surface when food is held over the water.
6. Some fish have wide tail fins.

Which observations are about inherited traits?

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



Item Number	Reporting Category	Readiness or Supporting	Content Student Expectation	Process Student Expectation	Correct Answer
1	4	Supporting	3.10(B)	5.2(D)	B
2	3	Supporting	5.8(B)		F
3	1	Readiness	5.5(A)	5.2(G)	B
4	1	Supporting	5.5(C)		H
5	4	Supporting	3.9(A)		A
6	2	Supporting	3.6(B)		G
7	1	Supporting	5.5(B)		A
8	3	Readiness	5.7(B)		H
9	2	Readiness	5.6(C)	5.2(C)	A
10	4	Readiness	5.9(B)	5.2(D)	J
11	2	Supporting	5.6(D)	5.2(B)	B
12	2	Readiness	5.6(B)	5.2(D)	F
13	3	Readiness	5.7(A)	5.3(B)	B
14	2	Readiness	5.6(A)	5.2(G)	J
15	1	Supporting	3.5(C)	5.2(G)	B
16	2	Readiness	5.6(B)	5.2(D)	F
17	2	Readiness	5.6(C)	5.4(A)	D
18	3	Readiness	5.7(A)		H
19	4	Readiness	5.9(A)	5.3(C)	A
20	3	Readiness	5.8(C)	5.2(C)	H
21	4	Readiness	5.9(B)	5.2(D)	A
22	1	Readiness	5.5(A)	5.2(G)	H
23	4	Supporting	5.9(D)	5.3(B)	D
24	3	Supporting	5.8(D)		H
25	3	Supporting	3.7(B)		D
26	4	Readiness	5.10(A)	5.2(D)	H
27	4	Readiness	5.9(A)	5.2(D)	B
28	3	Supporting	4.7(C)		J
29	3	Supporting	5.8(A)	5.2(G)	B
30	1	Readiness	5.5(A)	5.2(D)	H
31	4	Readiness	5.10(A)		D
32	4	Readiness	5.10(B)		H
33	2	Readiness	5.6(A)		B
34	3	Readiness	5.7(B)		F
35	4	Supporting	5.9(C)	5.1(B)	C
36	4	Readiness	5.10(B)		F

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
1	Option B is correct	Both frog and lacewing adults look very different from their young. This is the only answer choice that accurately compares the two life cycles.
	Option A is incorrect	Adult frogs and lacewings both lay eggs.
	Option C is incorrect	Frog larvae (tadpoles) do not have legs when they hatch from their eggs, and the legs of lacewing larvae are not used for jumping.
	Option D is incorrect	Lacewing larvae and adults have the same number of legs, but tadpoles begin with no legs and grow legs as they develop into adult frogs.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
2	Option F is correct	This is an accurate description of liquid water being heated by the sun and becoming a gas in the air above the ocean via evaporation.
	Option G is incorrect	Gaseous water sinks when cooled; it does not rise. If cooled to a low enough temperature, it condenses into liquid water and can fall out of the air as precipitation.
	Option H is incorrect	Liquid water evaporates when heated; it does not condense.
	Option J is incorrect	This describes condensation, when liquid drops of fog form from gaseous water vapor. This is the opposite of what is asked in the question.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
3	Option B is correct	All objects in column one are made of metal and will conduct electrical energy. All objects in column two will float on water and are therefore less dense than water. All objects in column three will dissolve (are soluble) in water.
	Option A is incorrect	The heading for column one is incorrect because metals readily transfer thermal energy and therefore are not good insulators. The heading for column two is incorrect because none of the objects are attracted by magnets.
	Option C is incorrect	The heading for column one is incorrect because none of the objects are soluble in water. The heading for column two is incorrect because the objects in the second column include a liquid (cooking oil) and a solid (wood chip), which are different physical states of matter. The heading for column three is incorrect because not all of the objects are less dense than water.
	Option D is incorrect	The objects in column two are not conductors of electrical energy. The objects in column three are not insulators.

## 2019 STAAR Grade 5 Science Rationales

Item #	Rationale	
4	Option H is correct	The lemon juice is soluble in water and spreads through the water.
	Option F is incorrect	The mass of the lemon juice remains the same.
	Option G is incorrect	The water remains a liquid unless the mixture is frozen or heated.
	Option J is incorrect	The volume of the water remains the same.

## 2019 STAAR Grade 5 Science Rationales

Item #	Rationale	
5	Option A is correct	Because the duckweed is a small plant that grows on the surface of many ponds and lakes, is free floating, and has a single root, the duckweed can best survive in a wetland ecosystem with slow-moving water.
	Option B is incorrect	Rough waves would interfere with the ability to float freely.
	Option C is incorrect	The duckweed grows on the surface of ponds and lakes, so it would not survive in an area with little water.
	Option D is incorrect	The duckweed is a plant that requires sunlight, so it would not survive in an underground river ecosystem.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
6	Option G is correct	These actions allow the cart to move with the least effort because the forces are added together by being in the same direction.
	Option F is incorrect	These actions make it difficult to move the cart because the forces are being applied in opposing directions.
	Option H is incorrect	This is not the easiest way to move the cart because the downward force does not contribute to the movement of the cart.
	Option J is incorrect	This is not the easiest way to move the cart because the forces are not being applied in the same direction.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
7	Option A is correct	The ingredients in mixtures 3 and 4 are all solids and will remain solids when they are combined. These are the only mixtures that contain only solids.
	Option B is incorrect	The salt in mixture 1 will dissolve in the hot water.
	Option C is incorrect	The salt, sugar, and powdered soap in mixtures 1, 2, and 5 will dissolve in the hot water.
	Option D is incorrect	The salt, sugar, and powdered soap in mixtures 2 and 5 will dissolve in the hot water.

## 2019 STAAR Grade 5 Science Rationales

Item #	Rationale	
8	Option H is correct	The formation of the delta is correctly described.
	Option F is incorrect	A V-shaped valley, not a lake, is formed when running water carves canyons.
	Option G is incorrect	A mountain is broken down by glaciers, not formed by glaciers.
	Option J is incorrect	A U-shaped valley is formed by glaciers, not formed by wind.

## 2019 STAAR Grade 5 Science Rationales

Item #	Rationale	
9	Option A is correct	The image shows light traveling in straight lines after reflecting off of a surface.
	Option B is incorrect	The image shows light reflecting from more than one surface.
	Option C is incorrect	The image shows light in the water traveling in straight lines.
	Option D is incorrect	The image shows light traveling in straight lines, not in circular paths.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
10	Option J is correct	A food web shows the transfer of energy among organisms in an ecosystem. Consumers are organisms that receive energy by eating other organisms rather than by producing their own food. In the food web, shrews eat caterpillars. Red foxes eat snowshoe hares, shrews, and caterpillars. Snowshoe hares, shrews, and caterpillars are all consumers.
	Option F is incorrect	In the food web snowshoe hares and caterpillars receive energy directly from willows and white spruces, which produce their own food.
	Option G is incorrect	In the food web, snowshoe hares and caterpillars receive energy directly from willows and white spruces, which produce their own food.
	Option H is incorrect	In the food web, snowshoe hares receive energy directly from willows and white spruces, which produce their own food.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
11	Option B is correct	The investigation is measuring how much force is needed to break the uncooked spaghetti noodle. As pennies are added to the paper cup, the weight of the cup increases. The more weight that is added to the cup, the more force is applied to the noodle. Eventually the noodle will break, and the force can be determined based on the number of pennies that were added to the cup.
	Option A is incorrect	The investigation only uses one spaghetti noodle.
	Option C is incorrect	The length of the string does not change.
	Option D is incorrect	The distance between the chairs does not change.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
12	Option F is correct	In order for a circuit to work, a complete path must exist from one end of the battery to the other. If Switches 1 and 3 are open, there is still a path through which the electricity can flow.
	Option G is incorrect	If Switch 4 is open, there will not be a complete path for the electricity to flow through Motor 2.
	Option H is incorrect	If Switch 2 is open, there will not be a complete path for the electricity to flow through Motor 1.
	Option J is incorrect	If Switch 4 is open, there will not be a complete path for the electricity to flow through Motor 2.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
13	Option B is correct	Sediments are small particles such as sand and dirt that can be transported by flowing water. The diagram shows that sediments were deposited, or sank to the bottom of the water, and built up the land over time.
	Option A is incorrect	The diagram shows deposition of sediments, not erosion, which is the removal of sediments.
	Option C is incorrect	The diagram shows the deposition of sediments, not weathering, which is the breaking of rocks into sediments.
	Option D is incorrect	The diagram shows that sediments filled the water, not the formation of a sea.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
14	Option J is correct	The types of energy are correctly paired with the examples.
	Option F is incorrect	The metal turning red is an example of thermal energy, not light energy. The light reflecting off the metal is an example of light energy, not thermal energy.
	Option G is incorrect	The laser producing sparks is an example of thermal energy, not mechanical energy.
	Option H is incorrect	The laser producing a beam of light is an example of light energy, not mechanical energy.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
15	Option B is correct	Water evaporates faster in warmer areas than in colder areas. The graph shows the volume of water in container 1 decreased only a small amount as expected in a cold refrigerator. More water evaporated from container 2 as expected on a warmer desk. The most water evaporated from container 3 as expected on a sunny windowsill. This is the only graph that represents the correct relationships between the containers and the remaining volumes of water after five days based on the locations of the containers.
	Option A is incorrect	The graph shows that more water evaporated from container 2 than from container 3. The opposite relationship is true, because more water is likely to evaporate from the container in a sunny location than from the container on the desk.
	Option C is incorrect	The graph shows the volume of water in containers 2 and 3 increased after five days. It is more likely that water evaporated from those containers based on their locations.
	Option D is incorrect	The graph shows that the volume of water in container 1 decreased and the volume of water in container 2 remained the same. More water is likely to evaporate from the container on the desk than from the container in the cold refrigerator.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
16	Option F is correct	When the switch is open, the bell and one light will still be on a complete circuit. There will be a complete path through which the electricity can flow.
	Option G is incorrect	When the switch is open three bulbs will light and the bell will ring.
	Option H is incorrect	When the switch is open two bulbs will light and the bell will ring.
	Option J is incorrect	When the switch is open none of the bulbs will light and the bell will not ring.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
17	Option D is correct	The light ray refracts, or bends, when it passes through Material 1. The light ray reflects, or bounces, off of Material 2.
	Option A is incorrect	The light ray is not scattered when it passes through Material 1. The light ray is not refracted, or bent, when it reaches Material 2.
	Option B is incorrect	The light ray is not absorbed, or taken in, when it passes through Material 1.
	Option C is incorrect	The light ray is not transmitted by, or does not go straight through, Material 1. The light ray is not refracted, or bent, when it reaches Material 2.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
18	Option H is correct	The photograph shows a swamp ecosystem that has enough plant material for the formation of coal.
	Option F is incorrect	The photograph shows a desert ecosystem that does not have enough plant material for the formation of coal.
	Option G is incorrect	The photograph shows a mountainous region that does not have enough plant material for the formation of coal.
	Option J is incorrect	The photograph shows a desert-like region that does not have enough plant material for the formation of coal.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
19	Option A is correct	The air and the rocky path are two nonliving parts of the rabbit's habitat.
	Option B is incorrect	The rabbit's young are a living part of the rabbit's habitat.
	Option C is incorrect	The plants are a living part of the rabbit's habitat.
	Option D is incorrect	The vegetation is a living part of the rabbit's habitat.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
20	Option H is correct	This picture shows the correct position of the sun and the shadow of the tree at 10:00 A.M. Because the sun will appear to rise in the east in the morning and will travel toward the west, the sun will not yet have reached the position shown at noon.
	Option F is incorrect	This picture shows the position of the sun and the shadow of the tree after noon as the sun sets in the west.
	Option G is incorrect	This picture shows the position of the sun and the shadow of the tree as the sun rises in the east before 10 A.M.
	Option J is incorrect	This picture shows the correct position of the sun and the shadow of the tree at a time later than noon. The sun has already passed the position shown at noon as the sun moves in the sky from east to west.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
21	Option A is correct	Organism X is an omnivore because X shows an organism that eats both plants and animals.
	Option B is incorrect	Organism X is not an herbivore because an herbivore eats only plants, and X shows an organism that eats both plants and animals.
	Option C is incorrect	Organism X is not a carnivore because a carnivore eats only animals, and X shows an organism that eats both plants and animals.
	Option D is incorrect	Organism X is not a producer because plants make energy from light, and X shows an organism that eats both plants and animals.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
22	Option H is correct	Iron filings, talcum powder, and vegetable oil remained visible in the water. Only papain disappeared in the water.
	Option F is incorrect	More than one substance was visible in the water.
	Option G is incorrect	More than two substances were visible in the water.
	Option J is incorrect	One of the substances disappeared in the water.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
23	Option D is correct	The fossil can give clues to the environment in which the plant lived because similar plants living today likely live in similar environments.
	Option A is incorrect	The fossil cannot give clues to the average monthly rainfall but can give clues as to whether the environment was rainy.
	Option B is incorrect	The fossil cannot help scientists to answer the question about how much water was absorbed by the roots of the plant but can tell scientists if the plant lived in a rainy environment.
	Option C is incorrect	The fossil cannot help scientists to answer how much oxygen was in the atmosphere surrounding the plants but can tell scientists that the plant produced oxygen based on similar plants living today.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
24	Option H is correct	The sun is made mostly of hydrogen and helium.
	Option F is incorrect	The sun is made mostly of gases and is not solid.
	Option G is incorrect	The sun rotates about once every 25 days at the equator and every 36 days at the poles. Earth rotates once every 24 hours.
	Option J is incorrect	The sun is about 100 times the diameter of Earth and has a greater gravitational pull than Earth.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
25	Option D is correct	A volcanic island can form in a matter of days.
	Option A is incorrect	U-shaped valleys are formed by glaciers and may take thousands of years to form.
	Option B is incorrect	The formation of caves takes hundreds or thousands of years.
	Option C is incorrect	Mountain ranges take millions of years to form.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
26	Option H is correct	The feature that the animals have in common that would most likely help them to survive is sharp claws to dig in sand and find food.
	Option F is incorrect	Small eyes would not help the animals see better at night and therefore would not help them to survive.
	Option G is incorrect	Tough skin to keep the animals warm would not help the organisms to survive in hot climates.
	Option J is incorrect	It is unlikely that the animals want to attract predators because attracting predators would not help them to survive.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
27	Option B is correct	Observation 3 describes an interaction between the fish and a plant which are both living parts of the environment.
	Option A is incorrect	Observation 2 describes an interaction between a snail (living) and a rock (nonliving).
	Option C is incorrect	Observation 5 describes an interaction between fish (living) and air bubbles (nonliving).
	Option D is incorrect	Observation 6 describes an interaction between a snail (living) and a wall of the aquarium (nonliving).

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
28	Option J is correct	The resources are correctly classified as renewable (taking a short time to form) and nonrenewable (taking a very long time to form).
	Option F is incorrect	Coal takes a long time to form and is nonrenewable.
	Option G is incorrect	Coal, petroleum, and natural gas take a long time to form and are nonrenewable. Plants and animals are considered renewable because they do not take a long time to form.
	Option H is incorrect	Air and water are considered to be renewable as they do not take a long time to form.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
29	Option B is correct	The statements are correctly classified as weather and climate; weather describes short-term conditions, and climate describes long-term conditions of the atmosphere.
	Option A is incorrect	The high temperature for one day is a statement about weather.
	Option C is incorrect	The statements for weather and climate are reversed.
	Option D is incorrect	The statements for weather and climate are reversed.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
30	Option H is correct	Material 3 could be cardboard because it does not conduct electrical energy, but it does float in water and insulate thermal energy. Material 4 could be aluminum because it does conduct electrical energy but does not insulate thermal energy or float in water.
	Option F is incorrect	Material 2 could not be cardboard because cardboard cannot conduct electricity.
	Option G is incorrect	Material 3 cannot be copper because copper conducts electricity.
	Option J is incorrect	Material 4 cannot be a rubber ball because rubber does not conduct electricity.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
31	Option D is correct	Aquatic environments are water environments. The special flaps help otters survive in aquatic environments by stopping water from entering their nostrils and ears.
	Option A is incorrect	Terrestrial environments are land environments. The special flaps would not be as useful to an animal that lives on land because there is less water in terrestrial environments than in aquatic environments.
	Option B is incorrect	The special flaps would not be as useful to an animal that lives in the snow because the flaps will not keep the otter warm in cold weather.
	Option C is incorrect	The special flaps would not be as useful to an animal in the wind because wind is not a problem for survival.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
32	Option H is correct	The imitation of a dog barking is a learned behavior.
	Option F is incorrect	Flapping wings is an inherited trait.
	Option G is incorrect	The loud scream is an inherited trait.
	Option J is incorrect	Tucking its head under its wings to sleep is an inherited trait.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
33	Option B is correct	Mechanical energy comes from the motion of an object. All of the activities require mechanical energy.
	Option A is incorrect	Thermal energy is the energy that comes from heat. Thermal energy is not required for the activities.
	Option C is incorrect	Electrical energy is the flow of energy that comes from an electric charge. Electrical energy is not required for the activities.
	Option D is incorrect	Sound energy is the type of energy formed when an object vibrates. Sound energy is not required for the activities.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
34	Option F is correct	Sand dunes are shaped and moved by wind, which can move the sand over the road. The fence helps to stop the sand from covering the road.
	Option G is incorrect	Deltas are formed by rivers, so the fence cannot prevent the formation of a delta.
	Option H is incorrect	The fence will not prevent water from flowing onto the road.
	Option J is incorrect	The fence will not prevent marine animals, such as seagulls, from nesting in the dune.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
35	Option C is correct	Building a road would remove some of the habitat. Smaller habitats (less space to live) support fewer animals because there are not as many resources needed to support greater numbers of animals.
	Option A is incorrect	Building a road will most likely increase soil erosion because there will be fewer plants to hold the soil with their roots to prevent the soil from washing away (erosion).
	Option B is incorrect	Building a road is unlikely to have a great effect on precipitation because water can evaporate from other areas and form clouds.
	Option D is incorrect	Building a road will most likely reduce plant reproduction because there will be less soil in which the plants can grow.

## 2019 STAAR Grade 5 Science Rationales

Item#	Rationale	
36	Option F is correct	Observations 1, 3, and 6 are inherited traits.
	Option G is incorrect	Observation 4 is most likely a learned behavior.
	Option H is incorrect	Observation 5 is most likely a learned behavior.
	Option J is incorrect	Observation 5 is most likely a learned behavior.