# Texas STAAR 2019 Grade 5 Science

Exam Materials
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Answer Key Materials
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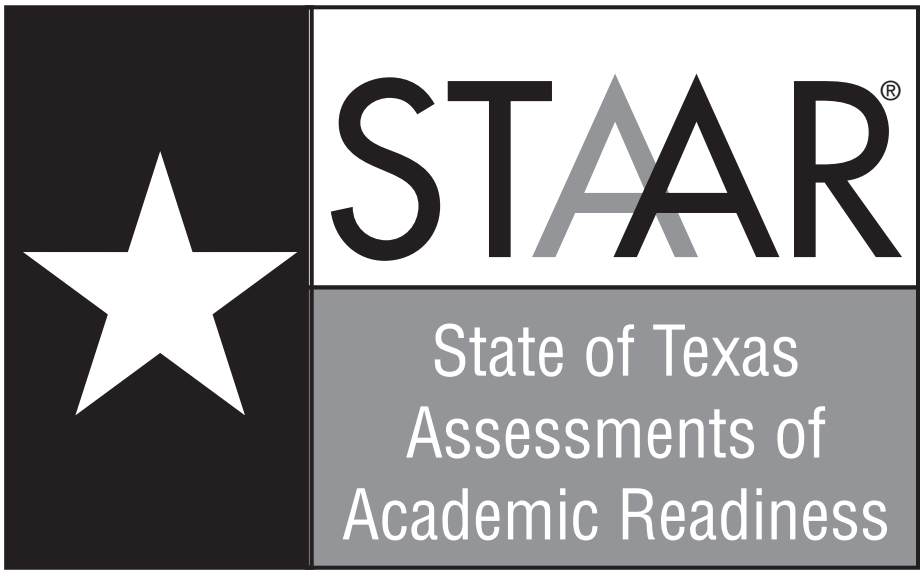



# GRADE 5

## Science

## Administered May 2019

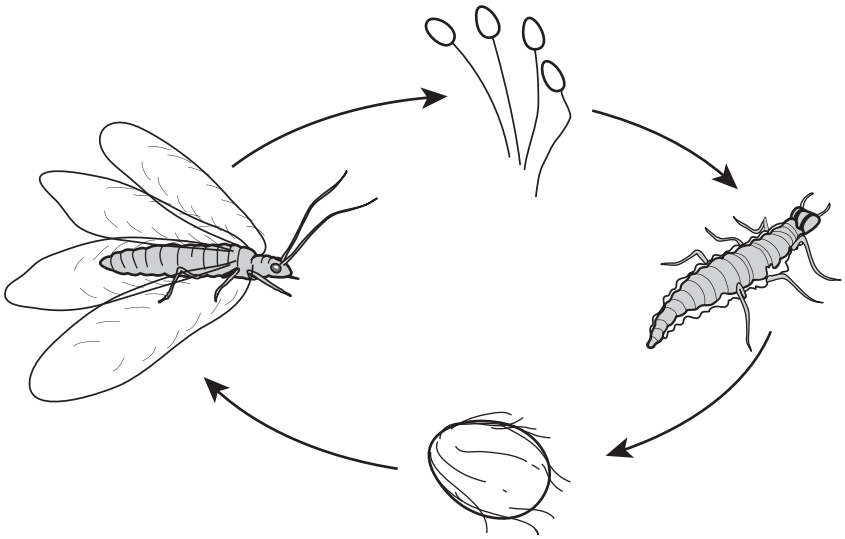
# RELEASED

**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

| ? | ? | ? |
|---|---|---|
| • Aluminum foil<br>• Brass key<br>• Gold ring | • Cooking oil<br>• Soap bubble<br>• Wood chip<br>• Feather | • Baking soda<br>• Drink mix<br>• White sugar |

Which column headings should the students use for their table?

**A**

| | | |
|---|---|---|
| Good Insulators of Thermal Energy | Is Attracted by Magnets | Same Physical State |

**B**

| | | |
|---|---|---|
| Good Conductors of Electrical Energy | Less Dense than Water | Soluble in Water |

**C**

| | | |
|---|---|---|
| Soluble in Water | Same Physical State | Less Dense than Water |

**D**

| | | |
|---|---|---|
| Is Attracted by Magnets | Good Conductors of Electrical Energy | Good Insulators of Thermal Energy |

**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.

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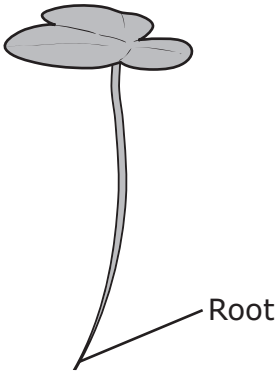
**5** Common duckweed is a small plant that grows on the surface of many ponds and lakes. It is free floating and has a single root.




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

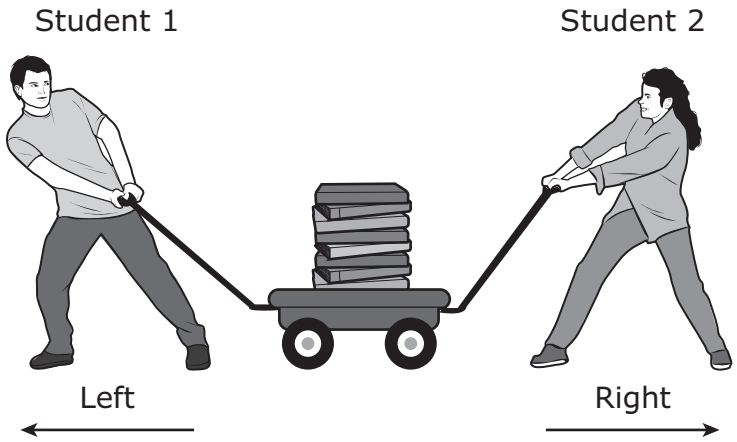
**A** A wetland ecosystem with slow-moving water

**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.




What does the picture demonstrate about light?

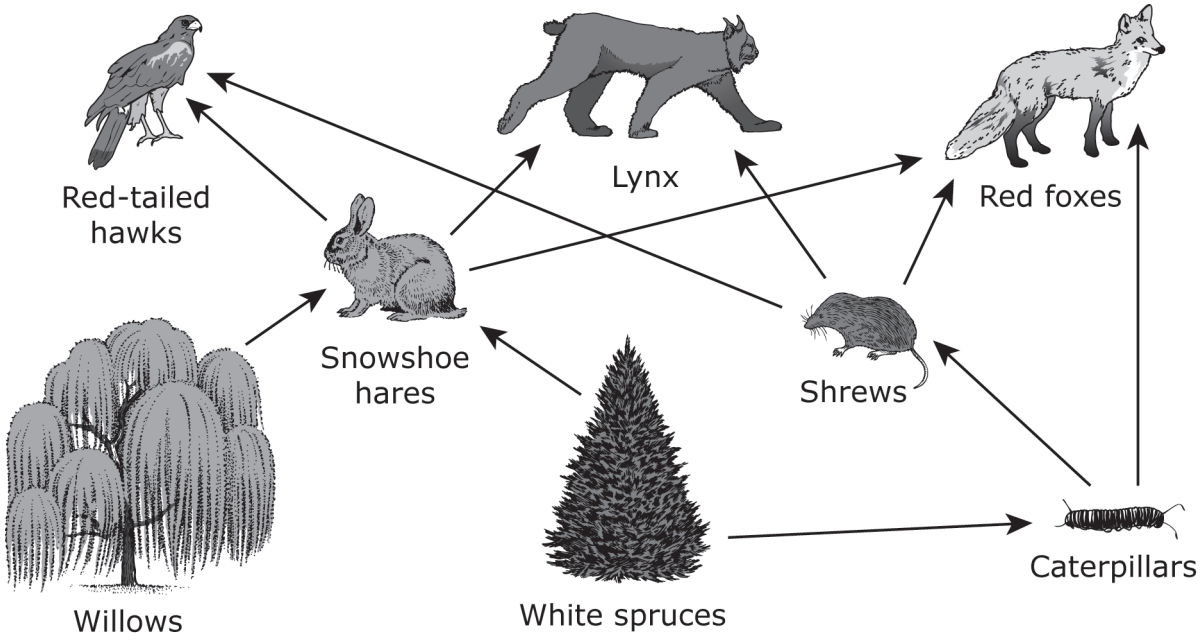
**A** Light and its reflections travel in straight lines.

**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?

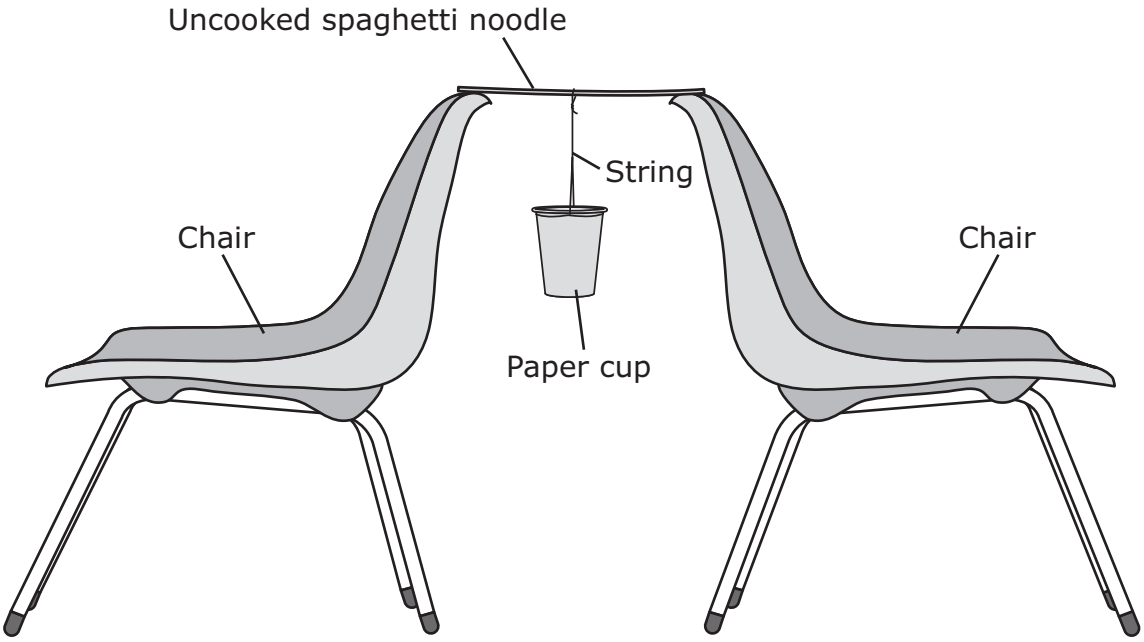
**F** Red-tailed hawks, snowshoe hares, and caterpillars

**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?

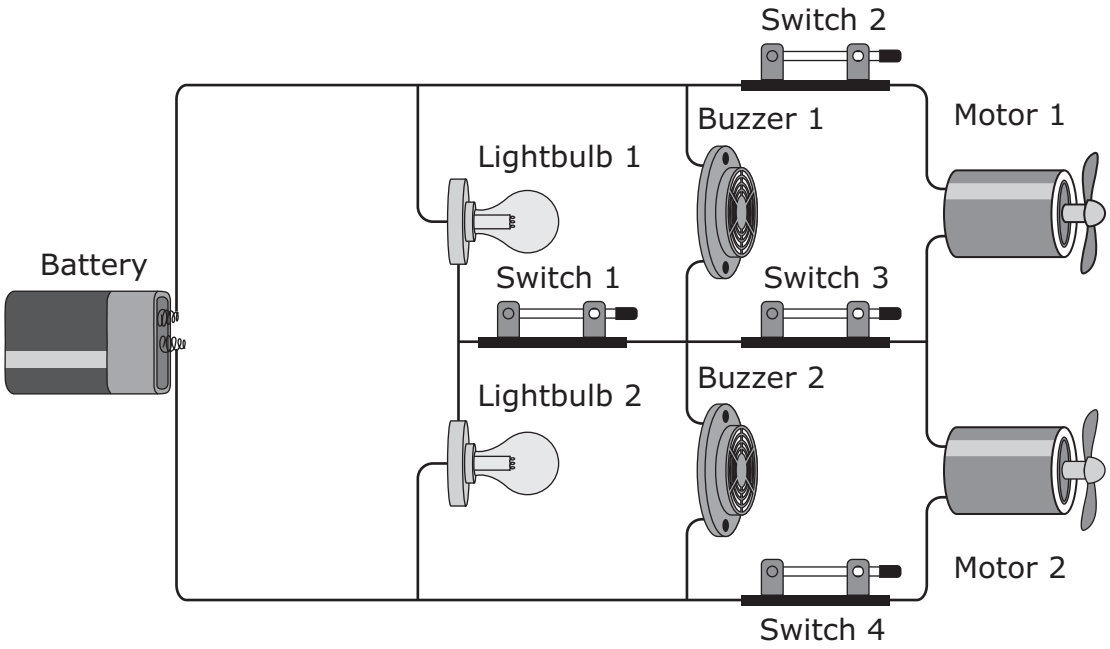
**A** How many spaghetti noodles will it take to hold up the mass of a penny?

**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

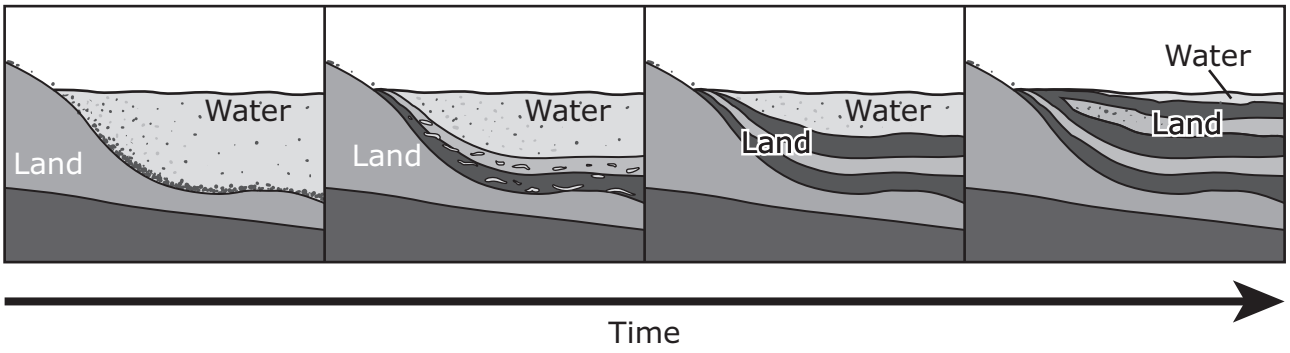
**G** Switches 1 and 4

**H** Switches 2 and 3

**J** Switches 3 and 4

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

Process Over Time




Which process does this diagram most likely represent?

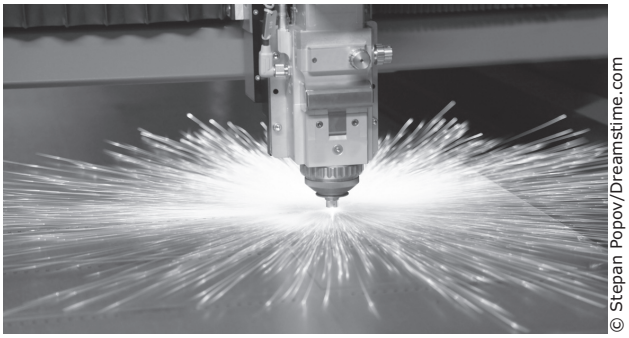
**A** The erosion of a coastline

**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.





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. |



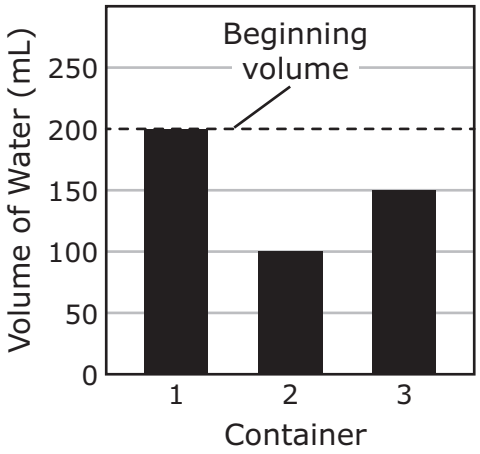
GO ON

**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.

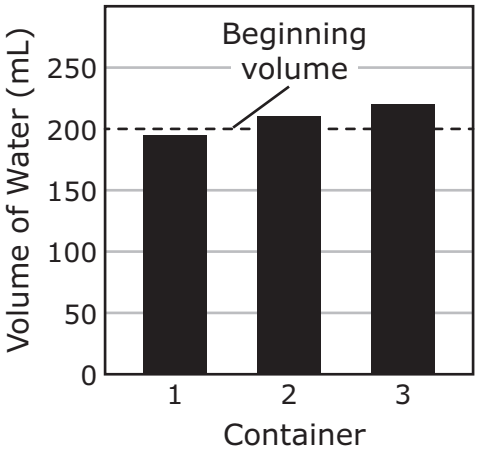
| Container | Volume of Water (beginning) | Temperature of Water (beginning) | Location of Container | Volume of Water (after five days) |
|---|---|---|---|---|
| 1 | 200 mL | 24°C | Inside a refrigerator | ? |
| 2 | 200 mL | 24°C | On a desk in front of low-speed fan | ? |
| 3 | 200 mL | 24°C | On a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

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

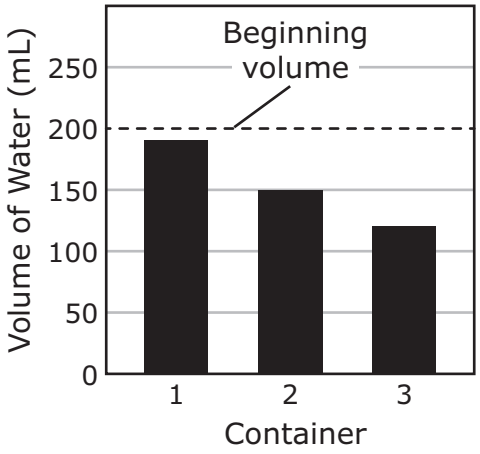
**A**



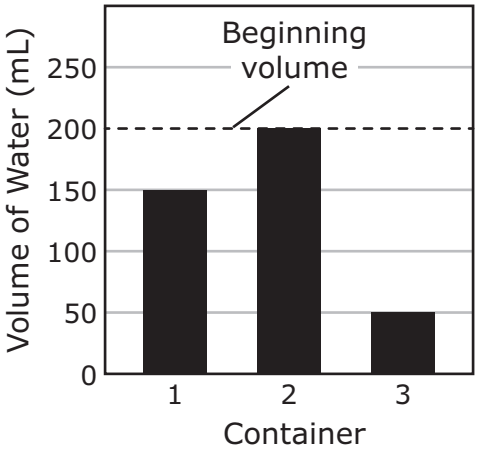

**C**




**B**



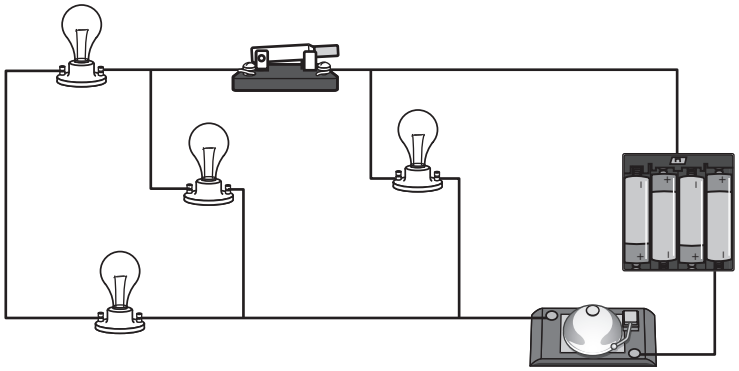

**D**



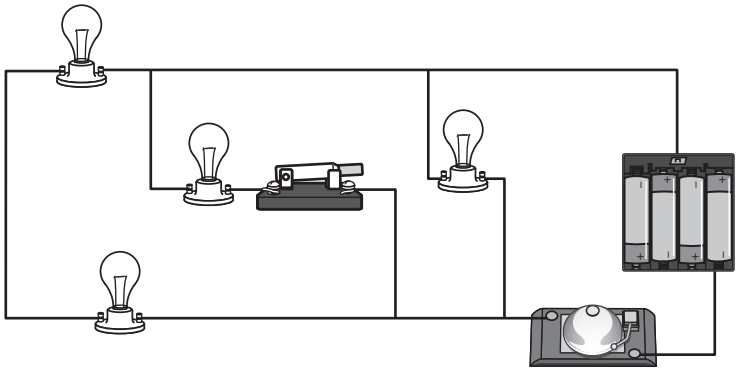
**16** A student wants to build a circuit with four lightbulbs and one bell. The student wants to place a switch in the circuit so that only one light will still be on and the bell will still ring when the switch is opened.

Which of these circuits should the student build?

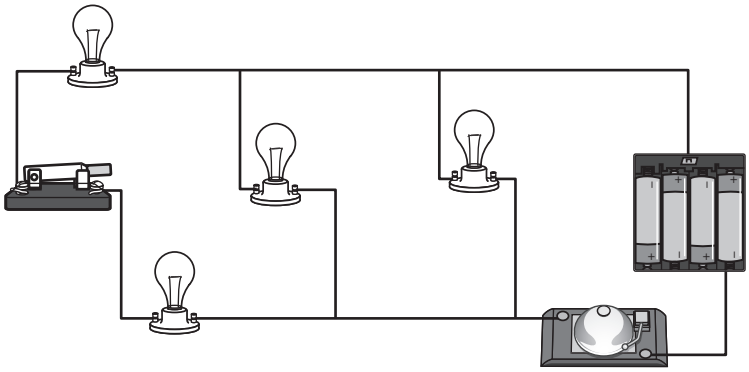
**F**



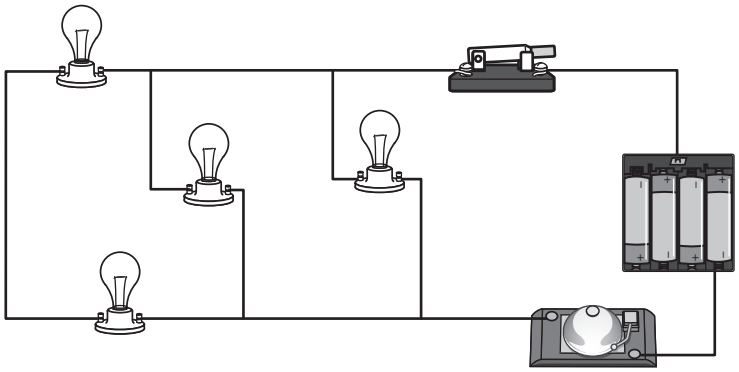
**G**



**H**



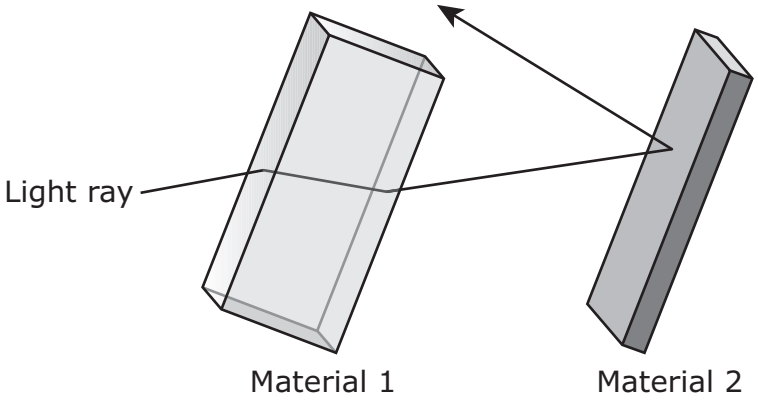
**J**





GO ON

**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**

© george kuna/Fotolia

**H**

© Podaril/Dreamstime.com

**G**

© kanonsky/Fotolia

**J**

© Cosmopol/Dreamstime.com

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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?

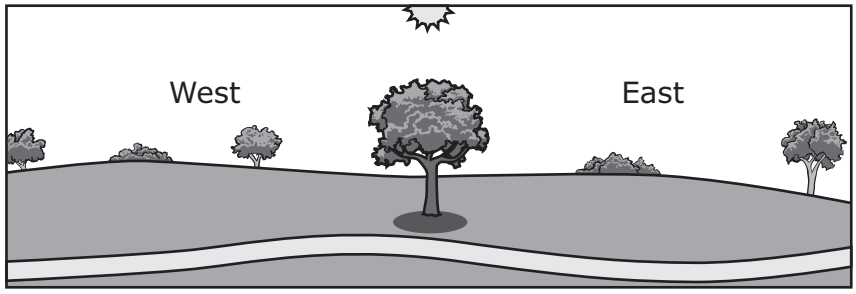
**A** The rabbit breathing air while running down a rocky path

**B** The rabbit licking its fur while feeding its young

**C** The rabbit hiding under plants from loud noises

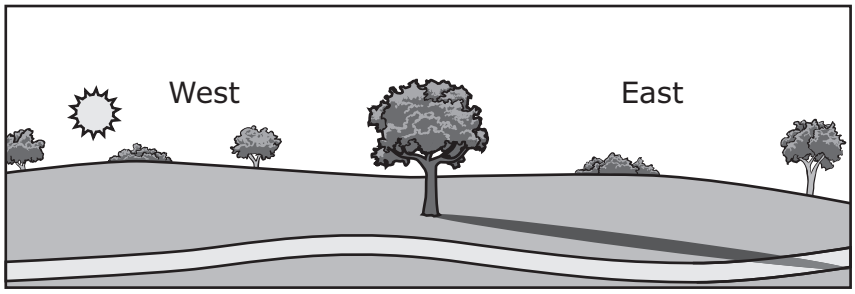
**D** The rabbit nibbling on vegetation inside the habitat

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

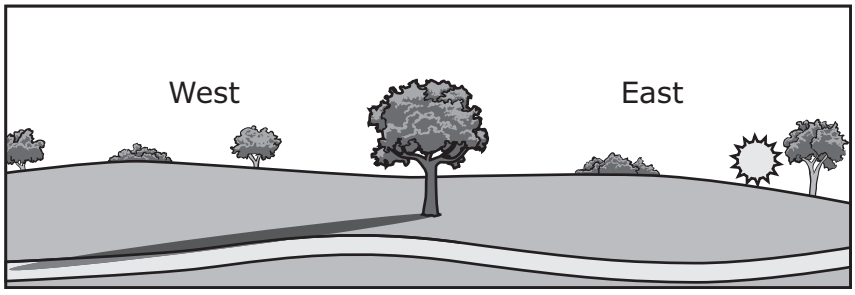



The sun rises at 7:00 A.M. on this day. Which diagram best shows the shadow of the tree at 10:00 A.M. on the same day?

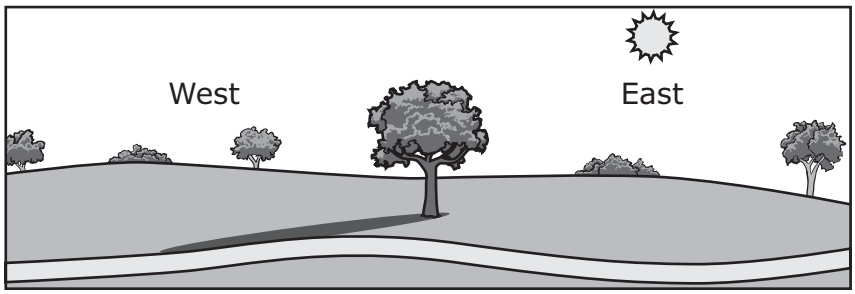
**F**



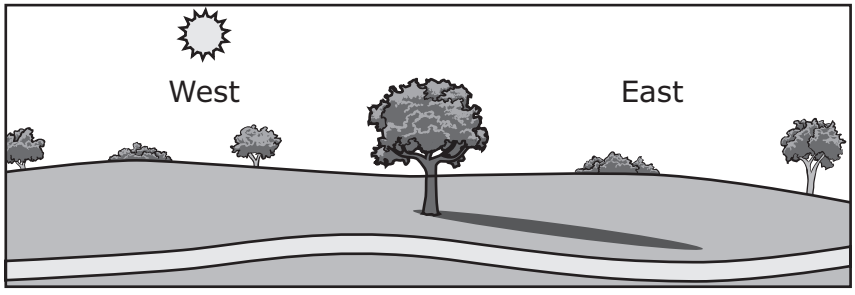

**G**




**H**



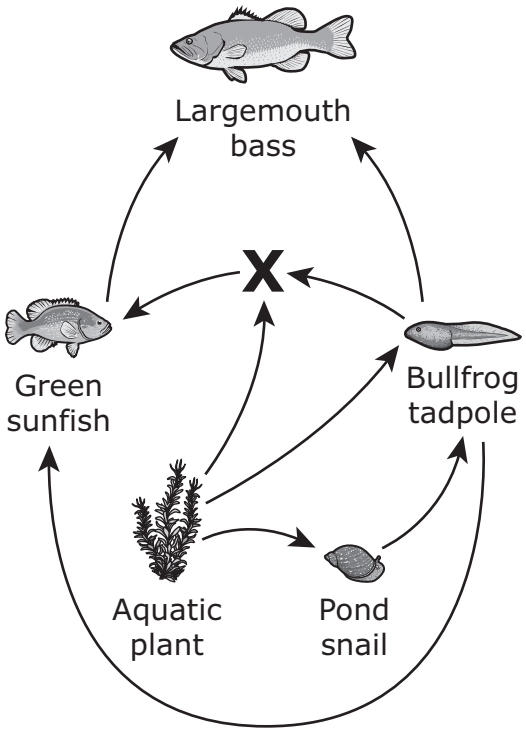

**J**






GO ON

**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

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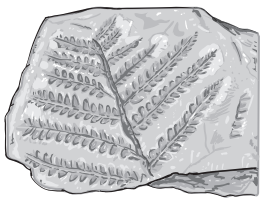
**23** A scientist finds the plant fossil shown.



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?

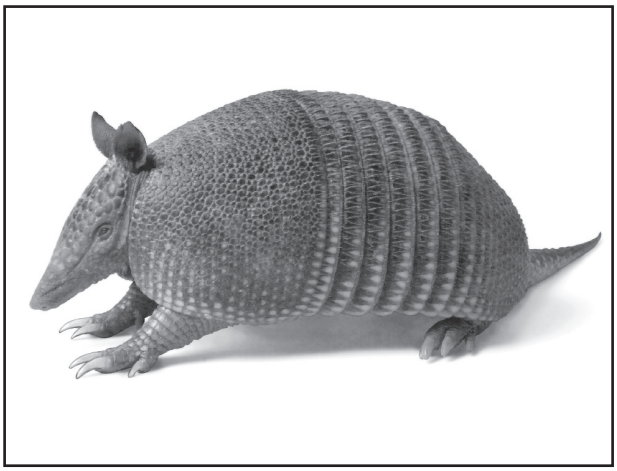
**A** U-shaped valley

**B** Limestone cave

**C** Mountain range

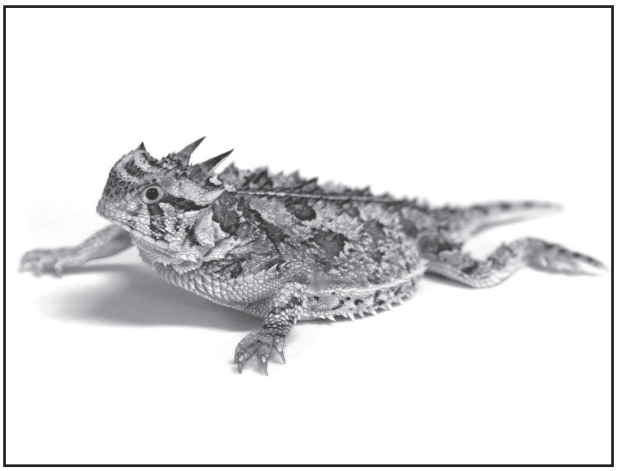
**D** Volcanic island

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





Texas Nine-banded Armadillo





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.
2. A snail crawls over colored rocks at the bottom of the aquarium.
3. A fish eats leaves from a plant in the aquarium.
4. A snail lays eggs in a corner of the aquarium.
5. A fish swims through air bubbles being pumped into the aquarium.
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. |

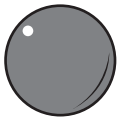
**30** A student wants to classify four different objects based on physical properties. The student uses the questions shown in the table to test each object.

| 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 |

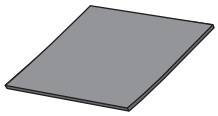
Materials

Aluminum washer

Copper wire



Rubber ball



Piece of cardboard

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?

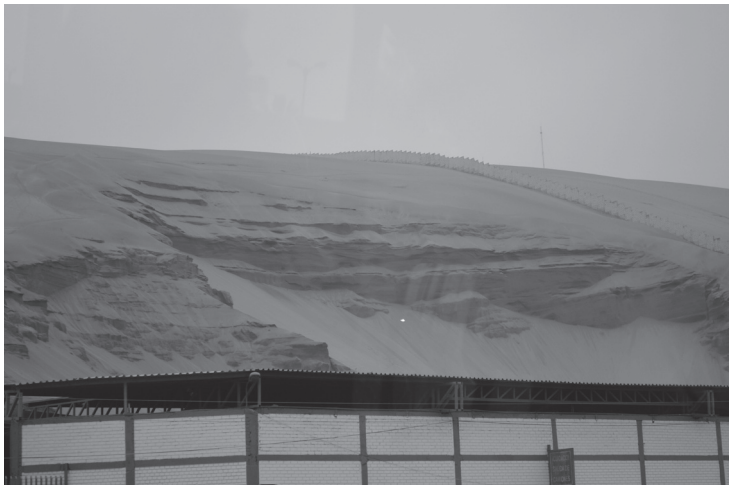
**A** Thermal

**B** Mechanical

**C** Electrical

**D** Sound

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





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.



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

BE SURE YOU HAVE RECORDED ALL OF YOUR ANSWERS ON THE ANSWER DOCUMENT.

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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). |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |

| 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. |