

GRADE 5
Science

Administered May 2018

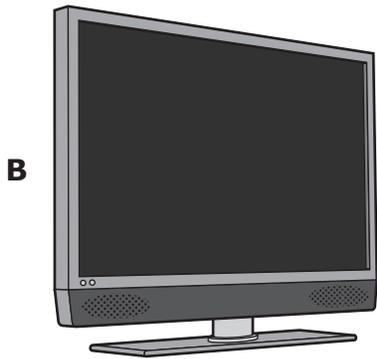
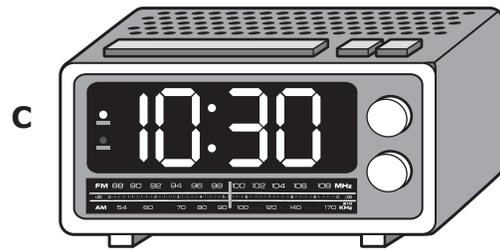
RELEASED

SCIENCE

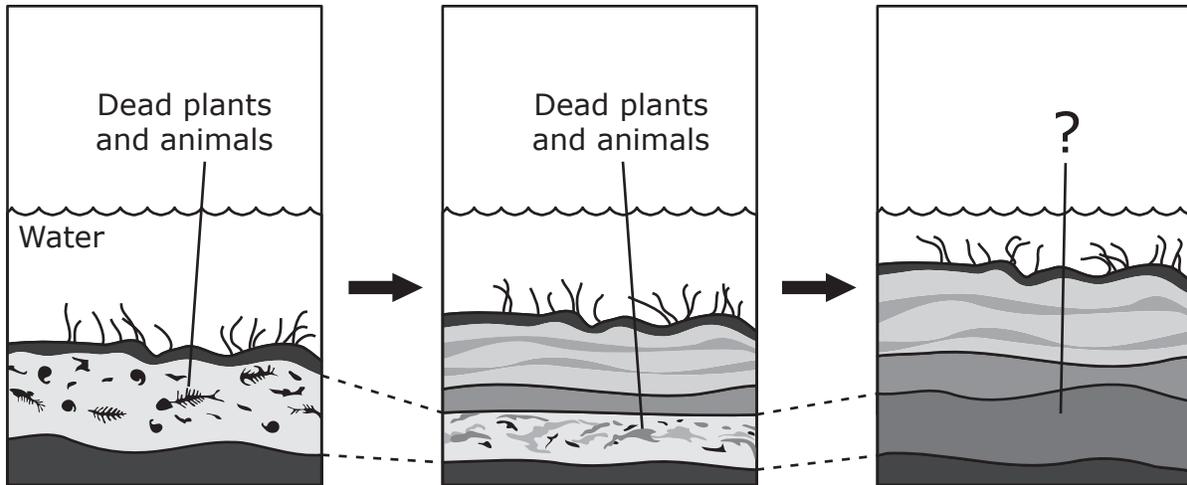
DIRECTIONS

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 Which of these devices is the only one NOT designed to produce both sound and light energy?



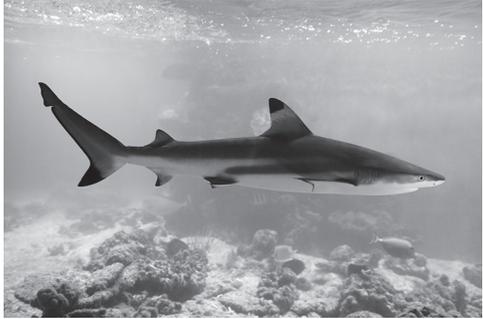
- 2 The diagram shows layers deposited under a body of water. This layering continued for millions of years.



What most likely happened to the dead plants and animals?

- F** They were eaten by scavengers.
- G** They became fossil fuels.
- H** They were washed away by water.
- J** They became an underground aquifer.

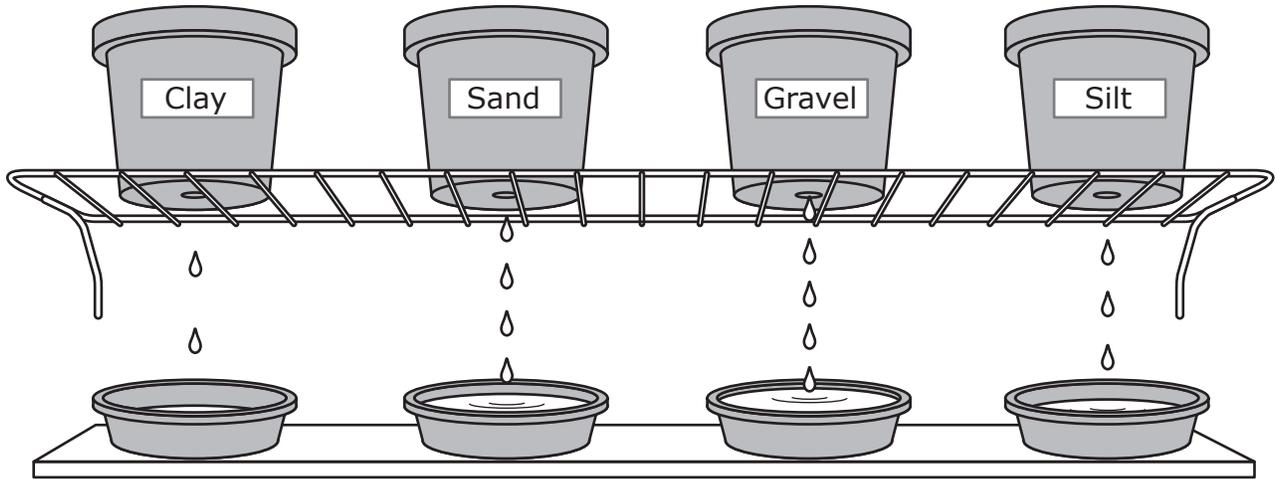
- 3 After a trip to an aquarium, some students compared the tail fin of sharks with the tail fin of bony fish. The students made a chart listing characteristics of each type of tail fin.

| Shark Tail Fin | Bony Fish Tail Fin |
|---|---|
| <ul style="list-style-type: none">• Fin with two lobes of different sizes• Stiff fin• No bone in fin• No muscle control of fin• Can swim only forward | <ul style="list-style-type: none">• Fin with two lobes of the same size• Flexible fin• Thin, bony spines in fin• Control of fin by muscles• Can swim forward and backward |
|  <p>© Mikhail Kokhanchikov/Dreamstime.com</p> |  <p>© Michael Gray/Dreamstime.com</p> |

Based on this information, what is most likely an advantage of the bony fish tail fin over the shark tail fin?

- A** It is easier for a bony fish to change direction quickly since muscles control the movement of the tail fin.
- B** The bones in the tail fin help a bony fish sink to lower depths in the water when searching for food.
- C** The flexible tail fin is fanned by the water, so a bony fish uses less energy to swim.
- D** The thin spines of the tail fin prevent a bony fish from being seen by larger predator fish.

- 4 A student places 250 g samples of clay, sand, gravel, and silt in separate flower pots. The pots are set on a wire rack, and dishes are placed beneath the pots so that water can drip through holes and collect. The student then pours 100 mL of water over the sample in each pot. The student measures the time it takes for water to begin dripping from the bottom of each pot.



What property of soils is the student most likely examining with this procedure?

- F The differences in texture between wet and dry soils
- G How well different soils retain water
- H How much water is needed to dissolve different soils
- J The amount of time it takes different soils to dry

5 The table lists some physical properties of two objects.

| Object 1 | Object 2 |
|---------------------------|---------------------------|
| Solid | Solid |
| Insulates thermal energy | Conducts thermal energy |
| Less dense than water | More dense than water |
| Poor electrical conductor | Good electrical conductor |

Based on their properties, which of the objects is most likely a metal?

- A Object 1, because it is a solid that is less dense than water
 - B Object 2, because all metals float in water
 - C Object 2, because metals conduct thermal energy and electricity
 - D Object 1, because it can be used to provide insulation for thermal energy
-

6 Which of these describes one or more living organisms that depend on another living organism to survive?

- F Bacteria living in the mouth of a horse
- G Ivy plants growing up a fence to obtain more sunlight
- H Mold living on a hard, rocky surface
- J An angelfish releasing carbon dioxide into pond water

7 The picture shows an athlete hitting a ball with a tennis racquet.

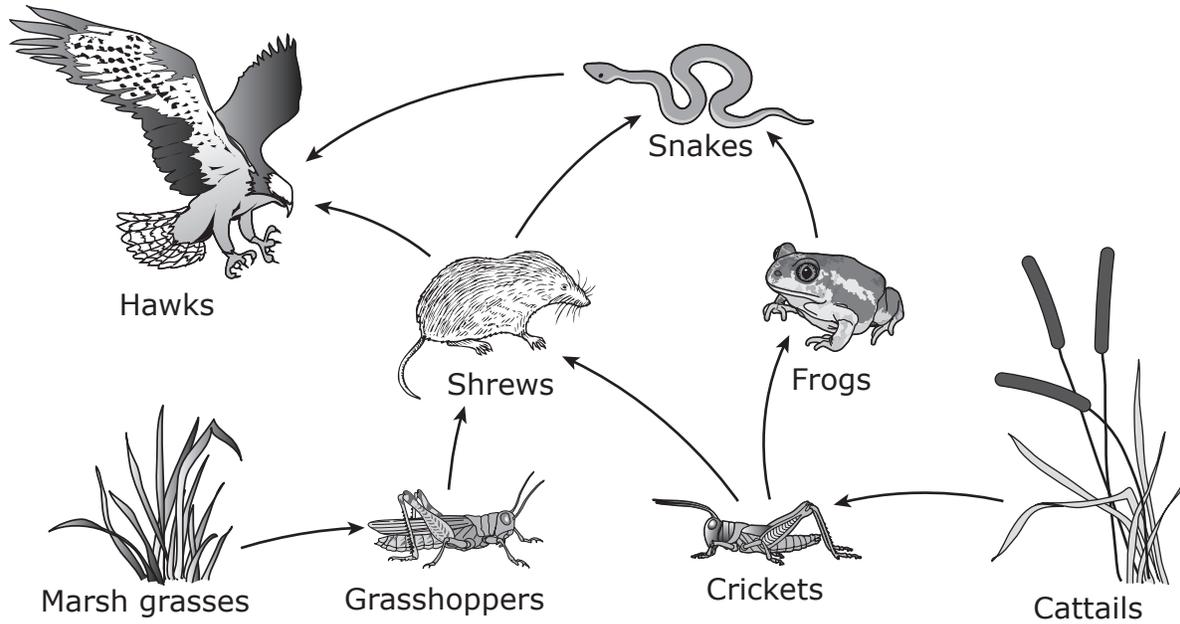


© Galina Barskaya/Dreamstime.com

What is the athlete demonstrating in the picture?

- A** Doing work by pushing the ball and changing its motion and position
- B** Changing the position but not the motion of the ball
- C** Doing work by pulling the racquet and changing the ball's position but not its motion
- D** Changing the position and motion of the ball without doing any work

8 A partial wetland food web is shown.



Which statement correctly describes the transfer of energy in a food chain in this wetland?

- F Energy is transferred from hawks to shrews to grasshoppers to marsh grasses.
- G Energy is transferred from marsh grasses to crickets to hawks to frogs.
- H Energy is transferred from grasshoppers to crickets to frogs to hawks.
- J Energy is transferred from cattails to crickets to shrews to hawks.

9 A group of students is performing an investigation to measure how much liquid water is produced from a 10 L sample of snow. What must occur in order for the students to perform this investigation?

- A The sample must be kept in a freezer.
- B The temperature of the sample must change.
- C The investigation must be performed outside.
- D The physical state of the sample must remain the same.

10 A bright-red male cardinal comes to a school bird feeder every morning. Like other cardinals, this bird makes a sharp chirping sound as it hops around the bird feeder.

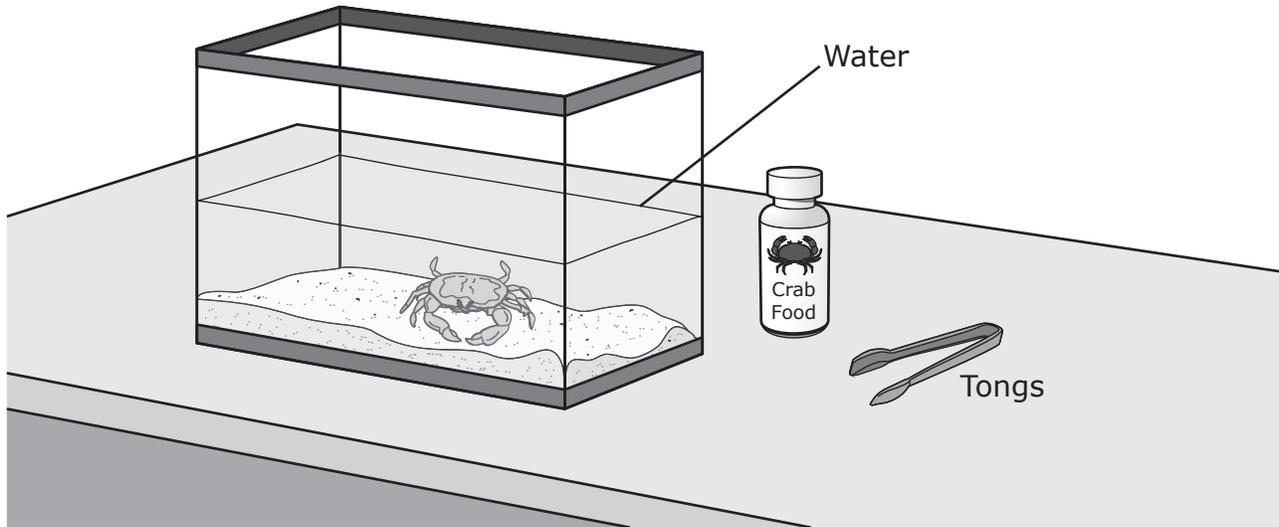
Which of these is a learned behavior of this bird?

- F** Having red feathers
 - G** Eating seeds during the day
 - H** Coming to the bird feeder each morning
 - J** Making a chirping sound
-

11 One type of fuel was used for thousands of years before other fuels were commonly used. Which fuel is an alternative resource that was most likely the first fuel used by humans?

- A** Coal
- B** Natural gas
- C** Petroleum
- D** Wood

- 12** Some students are feeding a crab in an aquarium. They use tongs to place the food directly in front of the crab.



The students look through the side of the aquarium. They notice that the image of the tongs appears to break as the tongs enter the water.

Which property of light are the students observing in this situation?

- F** Light can be refracted and separated into different colors as it moves from air to a different medium.
- G** Light is refracted as it moves from one medium to another medium.
- H** Light travels in a straight line and can be reflected off the surface of water.
- J** Light is absorbed by water and reflected off glass.

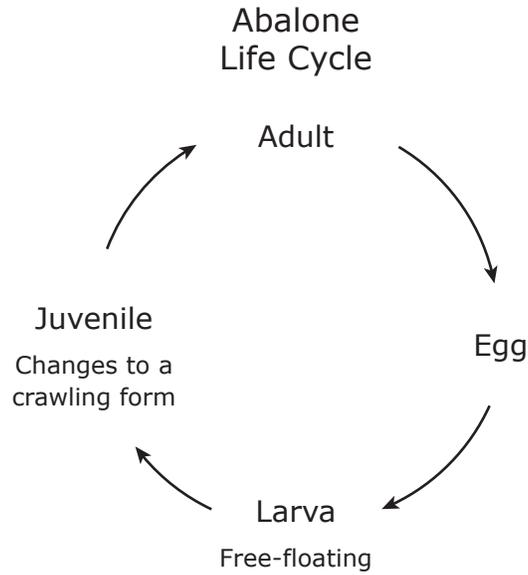
13 Students on a field trip observed a valley and wondered how it was formed. The three major characteristics of the valley were recorded.

| | |
|-----------------------|---|
| <input type="radio"/> | Characteristics of a Valley |
| | • Round-bottom floor |
| | • Nearly vertical sides |
| | • Small hills containing sediments of many sizes |
| <input type="radio"/> | |
| | |
| | |
| | |
| | |
| | |
| | |

This valley was most likely formed by —

- A** a rapid series of earthquakes
- B** volcanic activity
- C** a flood with rapidly moving water
- D** the movement of a glacier

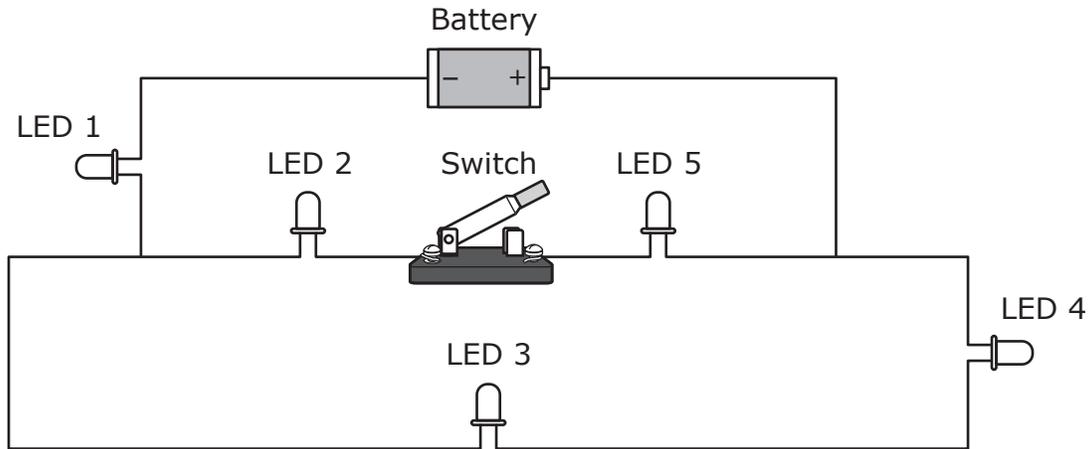
- 14** The abalone is a type of sea snail. Adult abalones slowly crawl over rocks near the shore, while larvae float in the water.



Which organisms have a life cycle that is most like that of abalones?

- F** Humans
- G** Frogs
- H** Birds
- J** Snakes

- 15** This circuit has five light-emitting diode, or LED, lights. It also has one battery and one switch.



Which LEDs produce light when the switch is in the position shown?

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

- 16 Students are investigating properties of objects. They observe four objects and record observations for each object in the table.

Properties of Four Objects

| Object Label | Is a Liquid? | Is Attracted to a Magnet? | Is Soluble in Water? |
|--------------|--------------|---------------------------|----------------------|
| K | Yes | No | No |
| L | No | Yes | No |
| M | No | No | Yes |
| N | No | No | No |

Based on the students' observations, which of these tables properly identifies the objects?

F

| Label | Object |
|-------|---------------|
| K | Oil |
| L | Iron needle |
| M | Pancake syrup |
| N | Rubber ball |

H

| Label | Object |
|-------|---------------|
| K | Pancake syrup |
| L | Safety pin |
| M | Cotton candy |
| N | Iron needle |

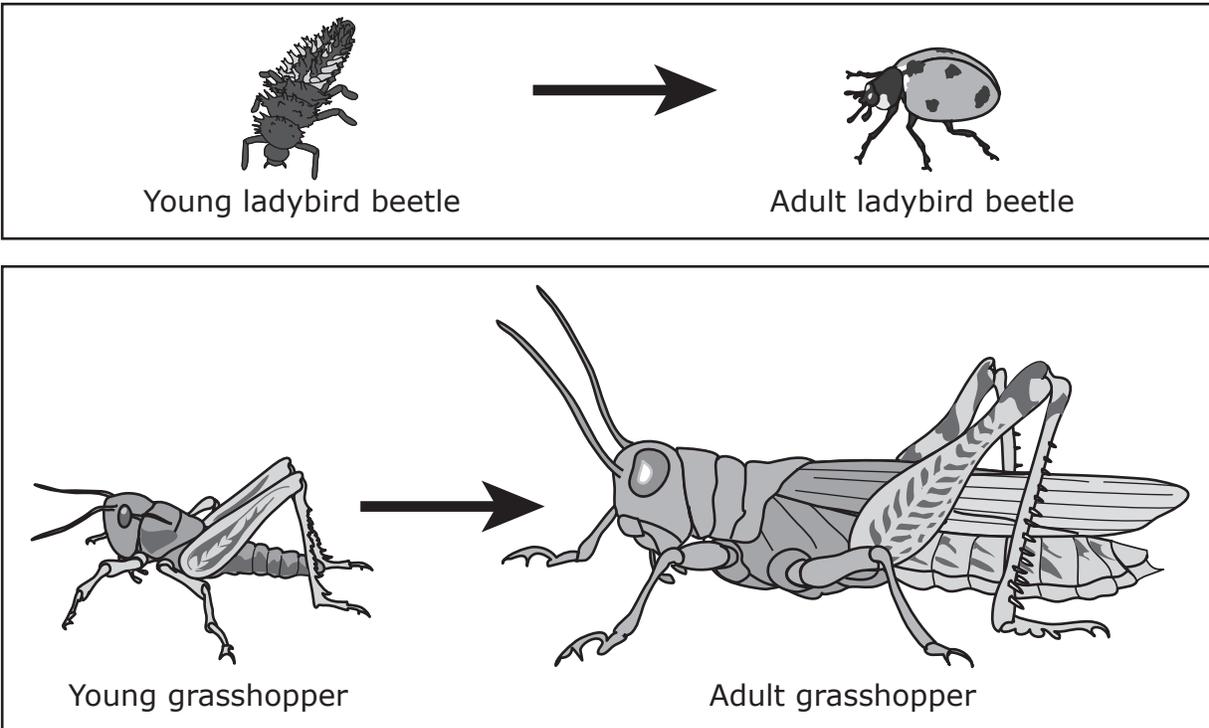
G

| Label | Object |
|-------|---------------|
| K | Pancake syrup |
| L | Sugar cube |
| M | Plastic dish |
| N | Cotton candy |

J

| Label | Object |
|-------|-------------|
| K | Oil |
| L | Safety pin |
| M | Sugar cube |
| N | Rubber ball |

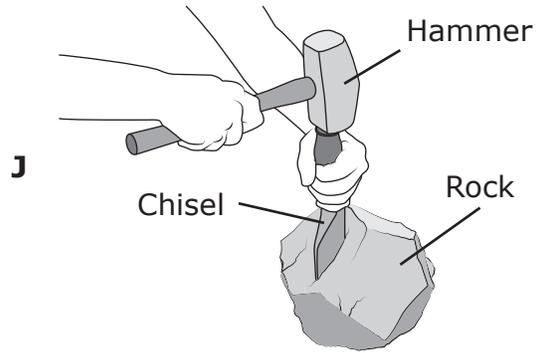
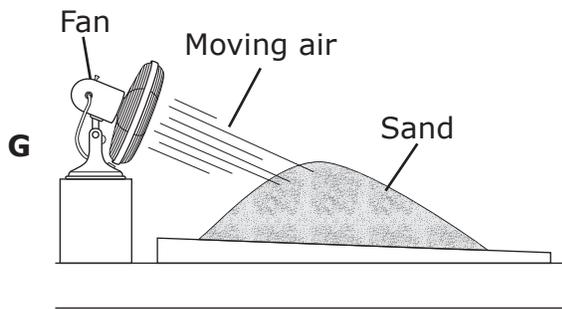
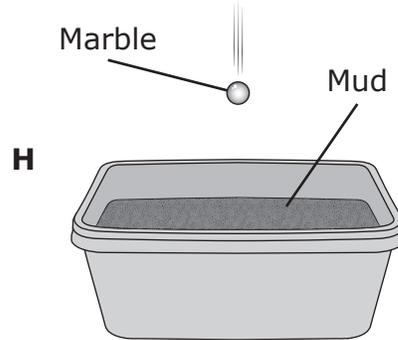
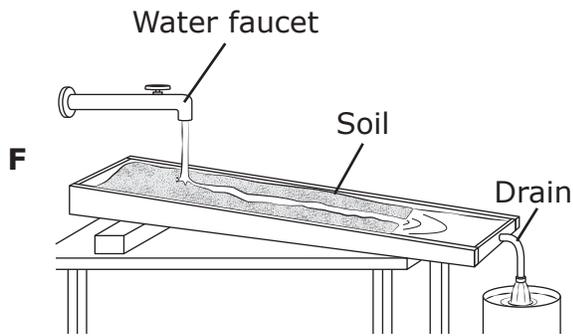
17 This diagram shows two stages in the life cycles of ladybird beetles and grasshoppers.



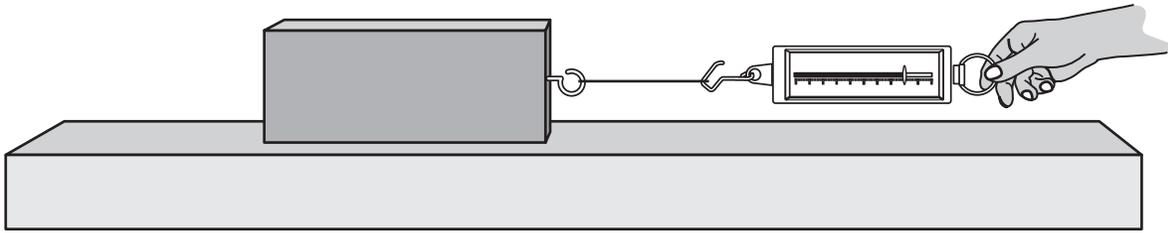
Based on the diagram, which statement best compares the life cycles of these two types of organisms?

- A Young ladybird beetles take many years to develop into adults.
Young grasshoppers develop into adults quickly.
- B Young grasshoppers live in a habitat that is different from that of adults.
Young ladybird beetles live in the same habitat as adults.
- C Young grasshoppers undergo incomplete metamorphosis to become adults.
Young ladybird beetles undergo complete metamorphosis to become adults.
- D Young ladybird beetles have a nymph stage before becoming adults.
Young grasshoppers are larvae before becoming adults.

18 The Grand Canyon is more than 400 km long and in some places almost 2 km deep. Which model best represents the main process that formed the Grand Canyon?



- 19** Students design an experiment to determine how much force is needed to move blocks of wood of different masses slowly across a lab table.



Which procedure should students include in their design?

- A** Conduct five trials, using a different scale to pull each block of wood
- B** Conduct five trials, pulling a different side of each block each time
- C** Conduct five trials, using a different table for each trial
- D** Conduct five trials, pulling each block of wood in the same way for each trial

- 20** The leaves of two types of plants that live in different environments are shown in the pictures.



Giant water lily leaves

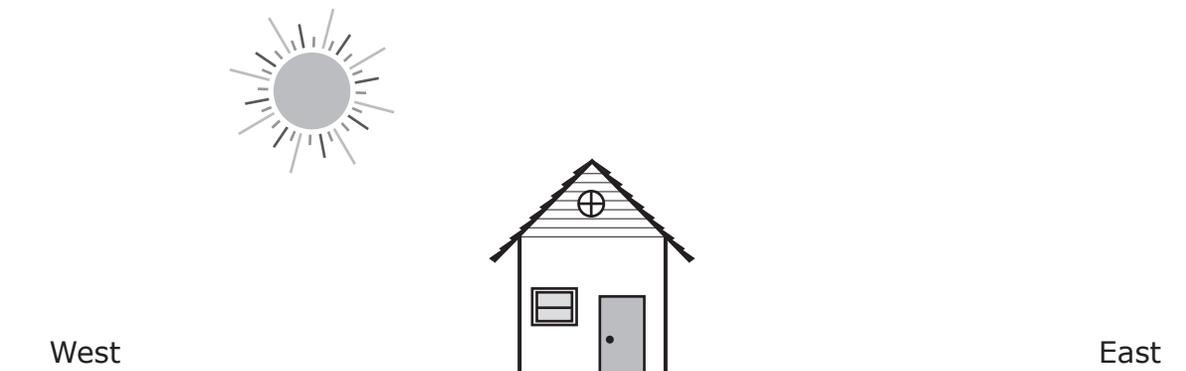


Mesquite leaves

The leaves of both plants have different structures. What differences in the structure of the leaves of these plants likely help them survive in their environments?

- F** The pan-like shape of the giant water lily leaves helps them catch rainwater. The slim shape of the mesquite leaves helps them avoid sunlight.
- G** The broad shape of the giant water lily leaves helps them stay on the water surface. The slim shape of the mesquite leaves helps them prevent water loss.
- H** The pan-like shape of the giant water lily leaves helps them attract small fish. The slim shape of the mesquite leaves helps them avoid herbivores.
- J** The broad shape of the giant water lily leaves helps them attract aquatic birds. The slim shape of the mesquite leaves helps them attract pollinators.

- 21** A teacher asks students to explain what they see in this picture. Four student explanations are shown in the box.



Student 1: The sun will set in less than 6 hours.
Student 2: The sun will reach the east horizon in less than 10 hours.
Student 3: The picture shows early morning.
Student 4: The picture shows the location of the sun at noon.

Which of the students gave a correct explanation?

- A** Student 1 only
- B** Students 2 and 4 only
- C** Student 2 only
- D** Students 1 and 3 only

- 22** A family takes a group picture in a park where bluebonnets are blooming. The family notices that some of the blooms are white and others are blue.

The color of the blooms is most likely determined by —

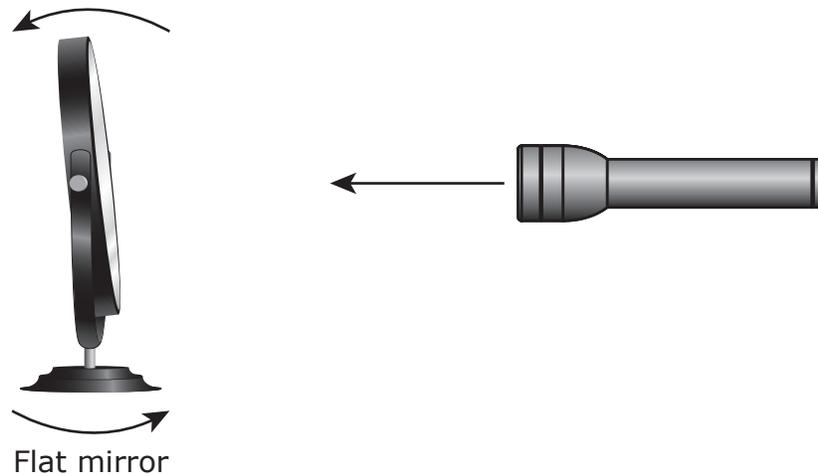
- F** air temperature
 - G** the age of the plant
 - H** the types of consumers that eat the plant
 - J** inheritance from parent plants
-

- 23** A beaker with 115 mL of solution has a temperature of 21°C. The solution contains 5 g of salt and 115 mL of water. Students added two ice cubes to the solution and stirred the solution with a stirring rod.

Which properties of the solution changed as the ice cubes melted?

- A** The color and physical state of the solution
- B** The temperature, mass, and volume of the solution
- C** The volume, temperature, and mass of the salt in the solution
- D** The physical state and temperature of the solution

- 24** A student conducts an investigation by shining a flashlight toward a flat mirror. The student changes the angle of the mirror and observes the path of the reflected light.



As the mirror changes direction, the light reaching the mirror can reach the ceiling because the light —

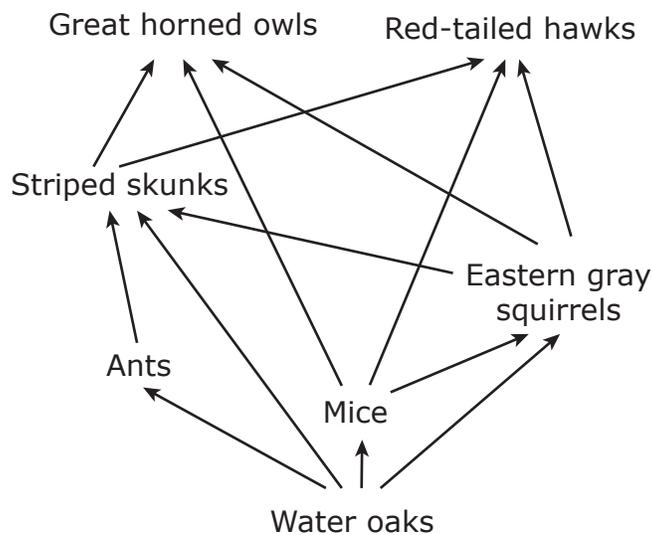
- F** travels in straight lines and reflects from the surface of the mirror
 - G** refracts in the glass of the mirror and is spread out all over the room
 - H** enters the mirror and changes direction when it is refracted by the back of the mirror
 - J** travels through air and does not change its direction in air
-
- 25** A science class has an aquarium in which fish and aquatic plants are growing. How is carbon dioxide directly involved in the survival of organisms in the aquarium?
- A** The fish must absorb carbon dioxide through their gills for energy.
 - B** Both the plants and the fish need carbon dioxide to make their own nutrients.
 - C** The plants need carbon dioxide to make sugar.
 - D** The plants release carbon dioxide into the water to control the water temperature.

- 26** A family was vacationing in the mountains in a cabin that had no electrical power. They needed boiling water in order to prepare dried soup mix.

With no electrical energy available, which method would most likely provide enough thermal energy to quickly heat the water to boiling?

- F** Using a microwave oven to heat water in a glass jar for 3 minutes
- G** Shaking the water in a closed, insulated plastic bottle for 3 minutes
- H** Shining a battery-powered flashlight on a metal container of water for 10 minutes
- J** Placing a metal pot of water over glowing charcoal in an outdoor grill for 10 minutes

-
- 27** A partial food web from the Texas Piney Woods is shown.



How many types of organisms in this food web obtain energy directly from producers?

- A** Two
- B** Three
- C** Four
- D** Five

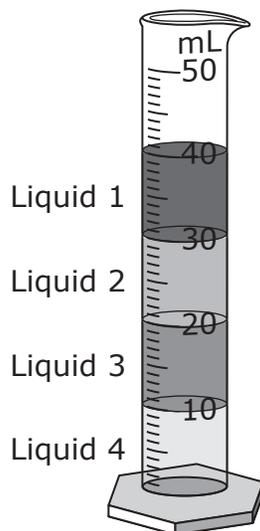
28 The picture below shows a cumulonimbus cloud forming over an ocean.



Which statement best explains how the sun and the ocean interact to form a cumulonimbus cloud?

- F** Heat from the sun warms the ocean, causing water to evaporate. The water vapor then condenses to form a cumulonimbus cloud.
- G** Heat from the sun causes clouds in the area to gather over the ocean and form one large cumulonimbus cloud.
- H** Light from the sun shines on the ocean, causing water vapor to condense. The water then evaporates to form a cumulonimbus cloud.
- J** Light from the sun causes ocean water to reflect water vapor into the air and gather over the ocean into a cumulonimbus cloud.

- 29** A student measured out 10 mL of four clear liquids and added one drop of a different-colored dye to each liquid. One of the liquids was water. The student then carefully poured each liquid into a graduated cylinder and let the mixture settle for 30 minutes. The student observed that the liquids had separated into layers, as shown in the diagram.

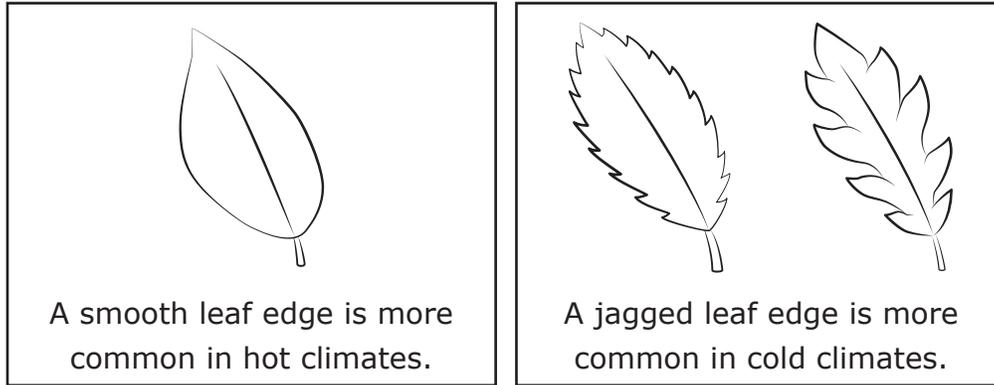


Which of these procedures would help the student identify the layer of water?

- A** Stir the liquids, let them settle, and then identify the bottom layer as water
- B** Drop a piece of ice into the graduated cylinder, let the ice settle, and then identify the layer just above the ice as water
- C** Add water to the graduated cylinder, let the mixture settle, and then identify the layer that increases in volume as water
- D** Carefully pour each layer into separate plastic containers, place the containers in a freezer, and then identify the liquid that takes the longest to freeze as water

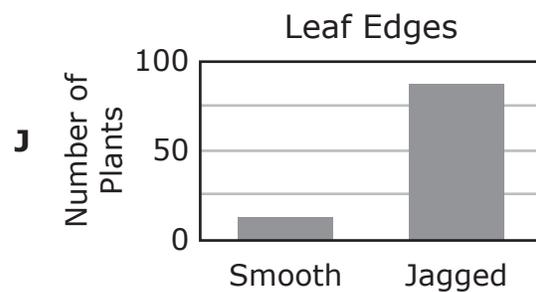
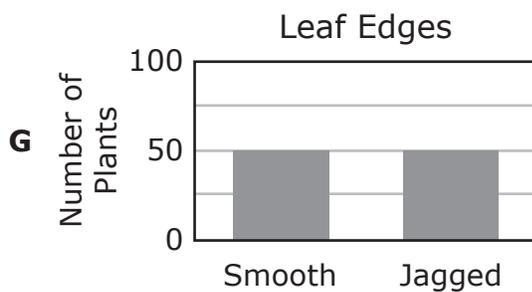
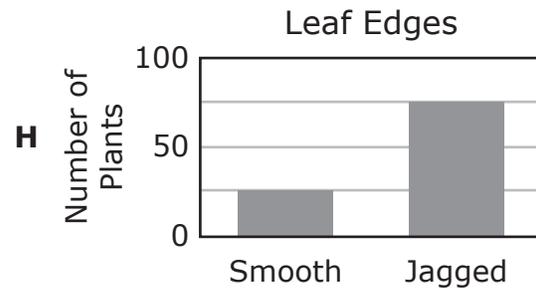
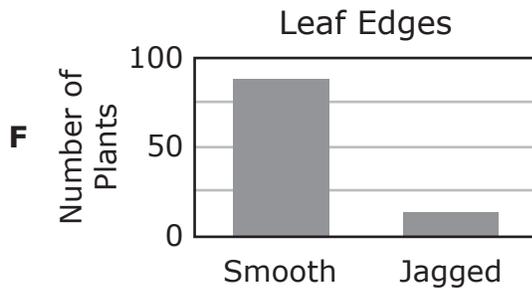
30 Woody plants have many different kinds of leaves. Some leaves have very smooth edges, while other leaves have jagged edges, as shown in the diagram. The characteristics of plant leaves vary with the climate in which the plant naturally grows. Some scientists discovered an area with many fossilized leaves of woody plants. The scientists used data from samples of 100 leaf fossils to compare the number with smooth-edged leaves and the number with jagged-edged leaves.

Leaf Characteristics

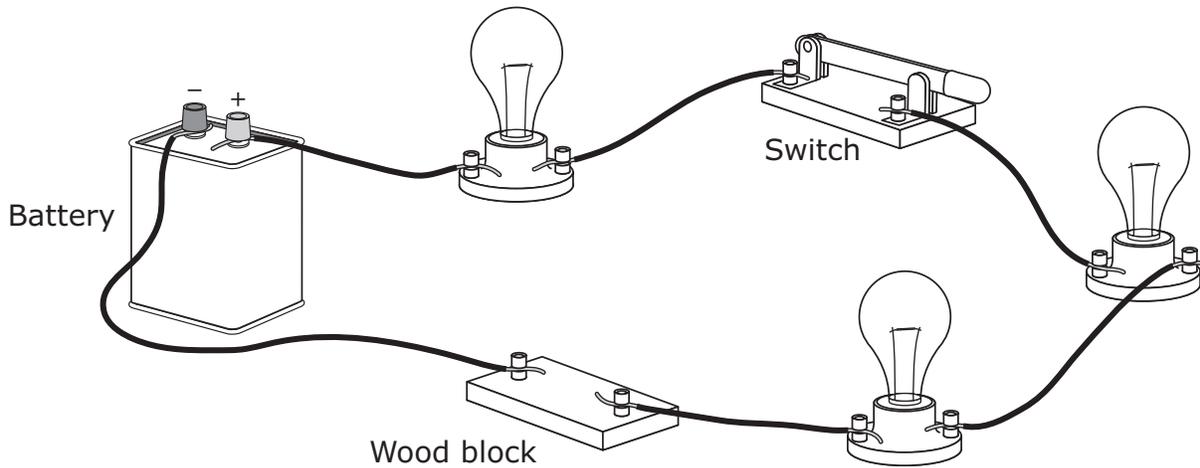


The scientists concluded that the plants had grown in a hot climate.

Which graph most likely represents the data from the investigation?



31 The circuit below does not work.



Which procedure would most likely allow the bulbs to light?

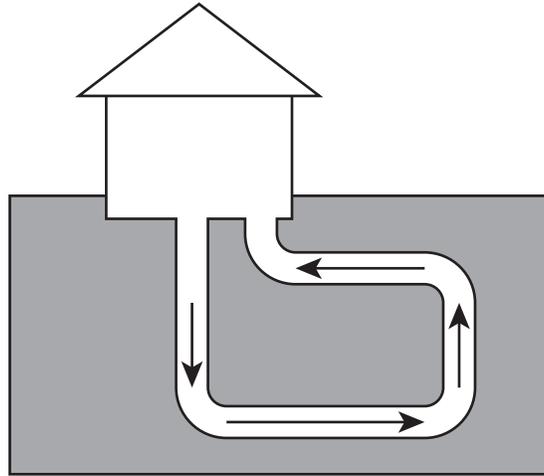
- A** Open the switch and then connect the two wires that are attached to the wood block
- B** Switch the positions of the two wires that are connected to the battery and then open the switch
- C** Move the switch closer in the circuit to the battery
- D** Connect the two wires that are attached to the wood block

32 Aquatic plants have adaptations that help them live in water. For example, the structures needed for making food are located on the tops of floating plant leaves.

This adaptation helps the plants —

- F** absorb sunlight
- G** stay anchored
- H** avoid predators
- J** capture fish

- 33** This simple diagram shows a system used to heat a house. Water is pumped from the house through a series of pipes underground, where the water is warmed. The warmed water returns to the house to supply heat on cold winter days.



Which type of alternative energy resource is used to supply heat to the house?

- A** Biofuel
- B** Hydroelectric
- C** Geothermal
- D** Solar

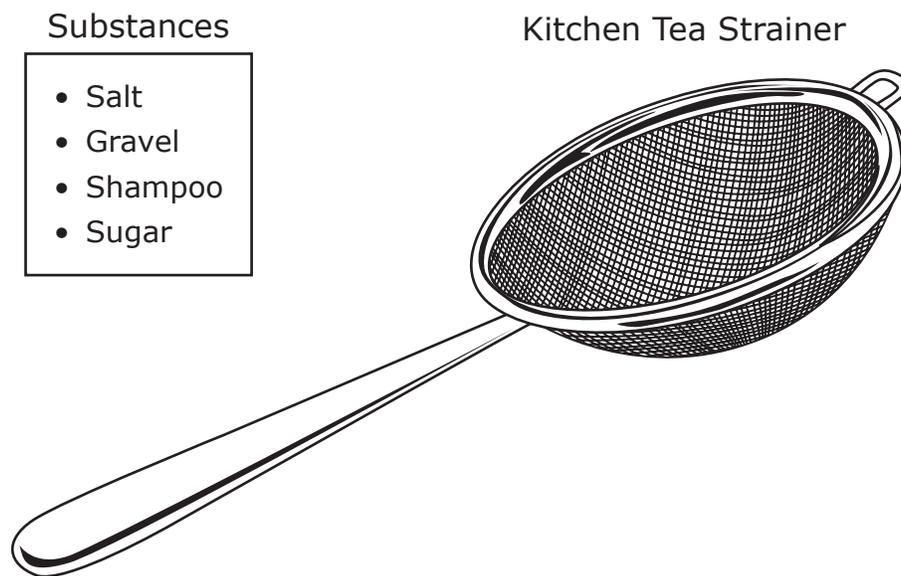
34 The table lists the characteristics of four types of animals.

| Type of Animal | Characteristics |
|----------------|--|
| Muskrat | Small mammal; body that is about 32 cm long; long, scaly tail; back feet that are partially webbed |
| Mallard | Migratory bird; flat, webbed feet; males and females have different colored feathers |
| Mink | Small mammal; about 61 cm long; thick fur; eats small mammals, birds, and fish |
| Western grebe | Migratory bird; black and white feathers; hunts by diving and spearing fish |

What features do the ecosystems in which these animals live most likely have in common?

- F** Dry, rocky mountains
- G** Forests of pine trees
- H** Tall, spiny cacti
- J** Lakes and rivers

- 35** A student stirs 15 grams of each substance listed below into 200 milliliters of water to form four different mixtures. The student then tries to separate the water from each mixture by pouring the mixture through a kitchen tea strainer.



Which mixture can the student separate most easily with the strainer?

- A** Salt and water
- B** Gravel and water
- C** Shampoo and water
- D** Sugar and water

-
- 36** Which statement best describes the processes of weathering and erosion?

- F** Weathering and erosion are directly responsible for the breakdown of any type of rock into smaller particles and the carrying away of the loose sediments.
- G** Weathering and erosion are directly responsible for depositing loose sediments on the bottom of the ocean, forming layers of sediment.
- H** Weathering and erosion are directly responsible for the amount of water in a river that transports sediments to the sea.
- J** Weathering and erosion are directly responsible for the transportation, deposition, and compaction of loose sediments on the seafloor.

**STAAR
GRADE 5
Science
May 2018**



806439