

GRADE 5
Science

Administered May 2022

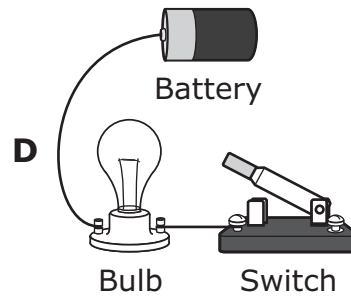
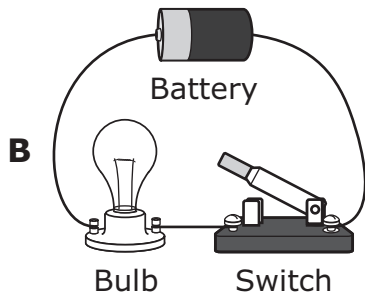
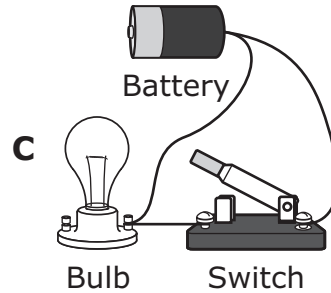
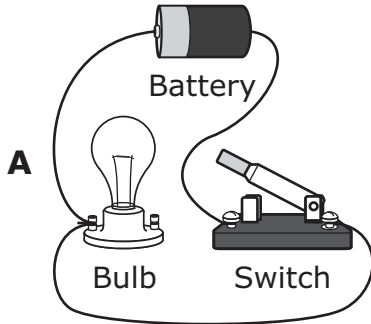
RELEASED

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.

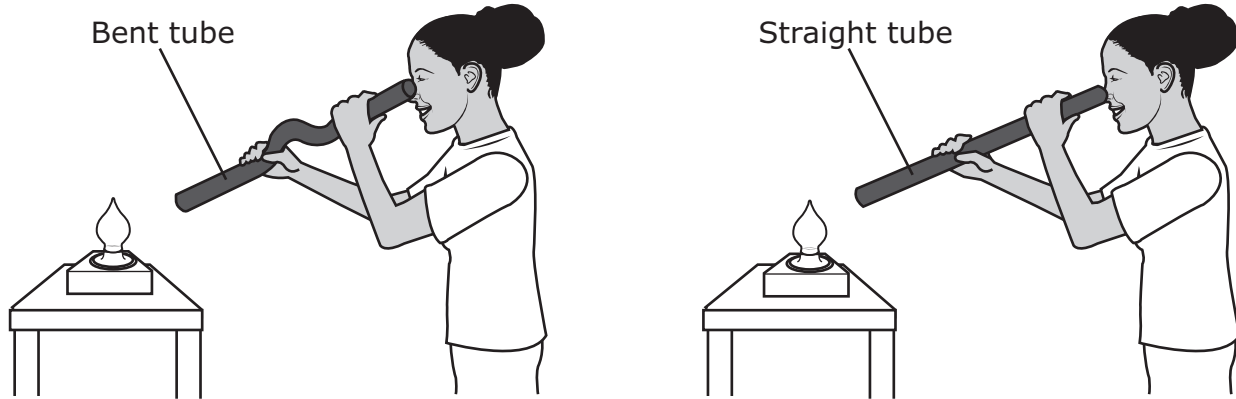
- 1 Which circuit shown will produce light when the switch is closed?



-
- 2 Which statement best explains why the sun appears to move across the sky during the day?

- F** The Earth is closest to the sun in the winter.
- G** The Earth is revolving around the sun.
- H** The Earth is tilted at 23.5 degrees.
- J** The Earth is rotating on its axis.

- 3** A student is looking directly at a lit nightlight through two different cardboard tubes as shown.



Through which tube, if any, will the light be seen and why?

- A** The bent tube only because the light bounces off the sides of the tube and travels through the tube to the student's eye
- B** The straight tube only because the light travels in a straight line directly to the student's eye
- C** Both tubes because light travels equally well along straight and curved paths
- D** Neither tube because both tubes absorb all of the light

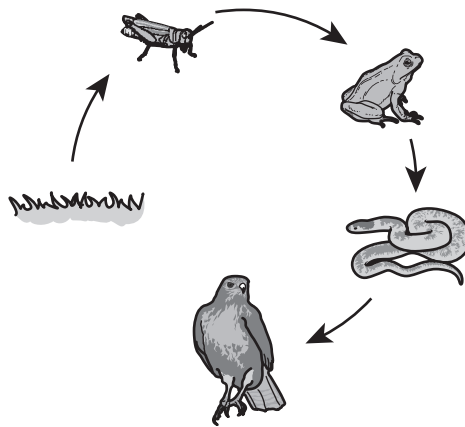
- 4 A student places objects in a bucket of water to determine if they will float.

Object
Toothpick
Plastic paper clip
Penny
Cork
Metal spoon
Vegetable oil

Which set of items is less dense than water?

- F** Plastic paper clip, penny, and cork
- G** Toothpick, metal spoon, and plastic paper clip
- H** Metal spoon, vegetable oil, and penny
- J** Toothpick, cork, and vegetable oil

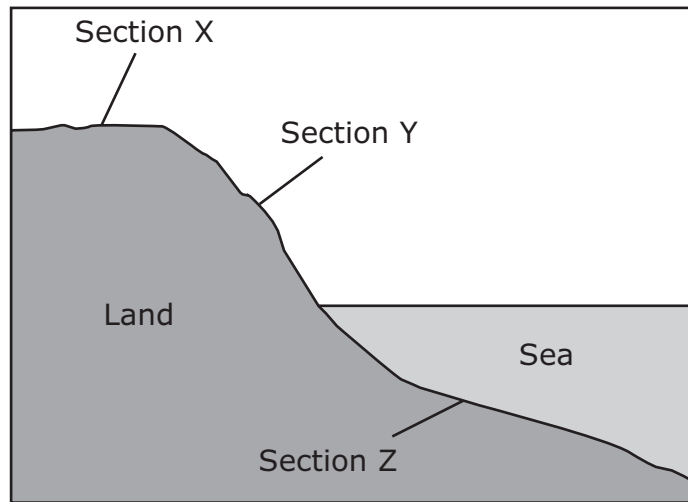
5 A food chain is shown.



Which role do the grasses have in the food chain?

- A** They decompose small organisms to produce energy.
- B** They prevent the food chain from containing too many carnivores.
- C** They capture the energy from the sun and are food for consumers.
- D** They break down dead organisms into simpler substances.

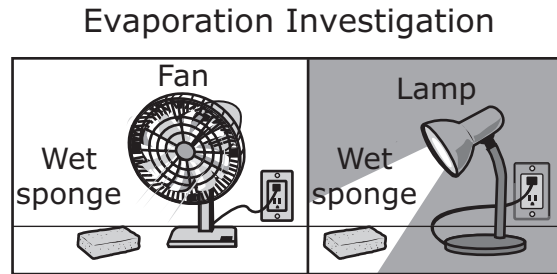
6 A diagram of different sections of land is shown.



Which action is most likely happening in Section Y in the diagram?

- F** Wind and rain compacting rock into larger pieces
- G** Water carrying rocky material to a new location
- H** Chemicals in water gluing sediments to each other
- J** Pressure causing layers of sediment to form over time

- 7 A student uses the setup shown to investigate ways to speed up evaporation.



Which forms of energy are being compared in the student's investigation?

- A** Light energy and electrical energy
- B** Mechanical energy and electrical energy
- C** Light energy and thermal energy
- D** Mechanical energy and thermal energy

- 8** A gardener plants seeds in the garden. After the flower stage, the fruits and vegetables grow. A table of how many days are needed for some plants to be ready for harvest is shown.

Plant	Days to Sprout	Days until Ready for Harvest
Green beans	6	50–70
Watermelon	4–5	80–100
Cucumber	2–5	55–65
Pumpkin	3–4	85–120

Which statement is supported by the data shown in the table?

- F** Pumpkins take the most time to sprout and to be ready for harvesting.
- G** Green bean seeds sprout faster because they are smaller than other seeds.
- H** Cucumbers are ready for harvest in less time than watermelons.
- J** Watermelon seeds take longer to sprout because watermelon plants produce large fruits.

-
- 9** Students make a solar system model on the playground. The school building represents the sun. They label round objects for each planet.

Which planet should they place at the greatest distance from the school building?

- A** Jupiter
- B** Neptune
- C** Mercury
- D** Saturn

- 10** Students observe a gerbil in a cage. They write their observations as shown.

- It twitches its whiskers.
- It burrows in the bedding.
- It drinks water from a metal tube.
- It walks on four legs.

Which of these observations is most likely a learned behavior?

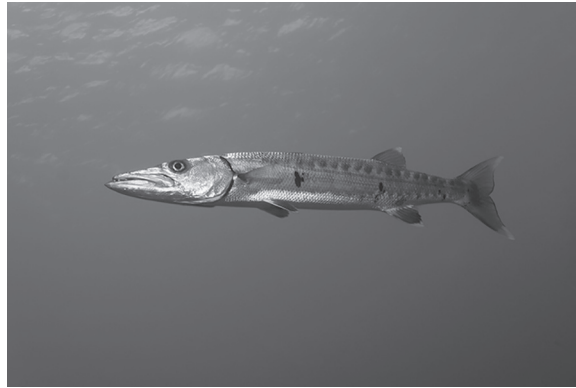
- F** Twitching its whiskers
- G** Burrowing in the bedding
- H** Drinking water from a metal tube
- J** Walking on four legs

-
- 11** A student plans to make a chart that describes each process in the water cycle. Which sentence should the student use to describe the process of condensation?

- A** Water flows downhill.
- B** Liquid water turns into water vapor.
- C** Polar ice turns into liquid water.
- D** Water vapor collects to form droplets.

- 12** Students study barracudas. They gather some observations of barracudas. A barracuda is shown.

Barracuda

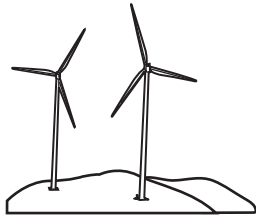


Which observation describes barracudas interacting with the living elements of their ecosystem?

- F** Barracudas can travel quickly using surface ocean currents.
- G** Barracudas live around hard structures such as oil rigs and jetties.
- H** Barracudas are predators of other fish.
- J** Barracudas tend to live in warm waters.

13 Examples of objects that use different types of energy to perform their functions are shown.

Example 1



Wind turbines spinning

Example 2



Campfire burning

Example 3



Hammer hitting a nail

Example 4



Wrecking ball breaking down a building

Which examples use mechanical energy to perform their functions?

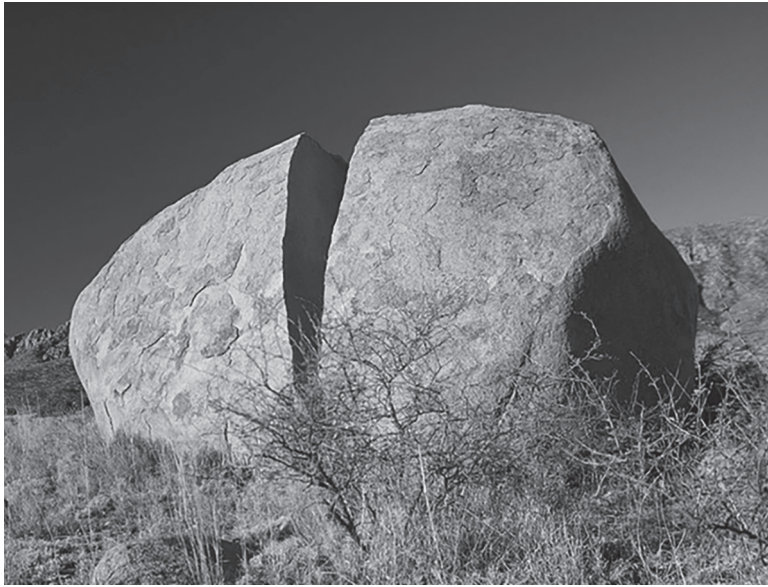
A Examples 1, 2, and 4

C Examples 1 and 2 only

B Examples 1, 3, and 4

D Examples 3 and 4 only

14 A picture of a rock is shown.

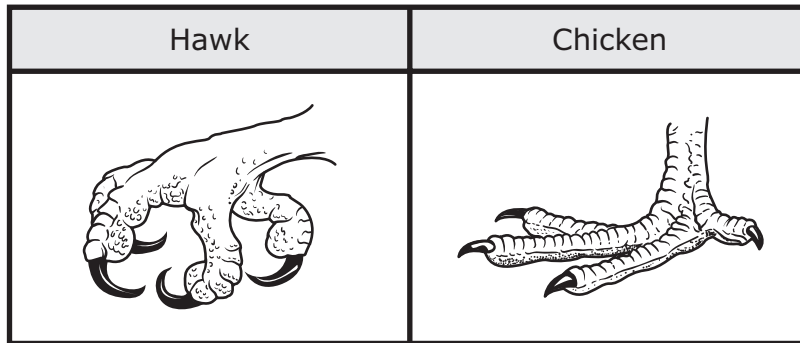


George F. Mobley/National Geographic Creative

Which process most likely caused the crack in the rock?

- F** Water freezing and thawing in the rock
- G** Wind blowing particles against the rock
- H** Water moving and dropping the rock
- J** Glaciers scraping over the surface of the rock

15 The foot of a hawk and the foot of a chicken are shown.



The difference between the shapes of their feet is most likely associated with the —

- A** predators that hunt them
- B** climate in which they live
- C** way they get their food
- D** distance they can fly

16 A student is classifying objects. Answering which question will provide the best evidence that an object is a metal?

- F** What is its mass?
 - G** What is its physical state?
 - H** Does it conduct thermal energy?
 - J** How quickly does it dissolve in water?
-

17 Two box turtles live in an area in a zoo's reptile house. Zoo visitors made a list of observations of the turtles. The list is shown.

1. Sliding into a small pond
2. Eating a strawberry
3. Digging a hole in the sandy soil
4. Climbing onto a flat rock
5. Holding an earthworm in its mouth
6. Walking across the area

Which observations best describe how box turtles interact with living parts of their environment?

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

18 A student pours 14 grams of sugar into a jar filled with 500 milliliters of water. The student thoroughly stirs the sugar and water to make a solution.

Which change most likely occurs to the sugar when it is added to the water?

- F** The sugar breaks down to form a new substance in the solution.
- G** The sugar changes water into a new substance in the solution.
- H** The sugar floats on the surface of the water in the solution.
- J** The sugar completely dissolves in the solution.

19 The student is observing part of a plant with a microscope.



Which statement describes a behavior of light in the microscope?

- A** Light travels through the microscope lens without changing direction.
- B** Moving in straight lines causes light to increase in brightness.
- C** Light refracts through the lens of the microscope.
- D** Moving in straight lines keeps light from reflecting.

- 20** A student lists resources that can be used to produce electricity. The list is shown.

- Wind
- Coal
- Natural gas
- Water power
- Petroleum

Which of the resources are renewable resources?

- F** Wind, water power
- G** Wind, coal, and natural gas
- H** Coal, water power, and petroleum
- J** Coal, natural gas, water power, and petroleum

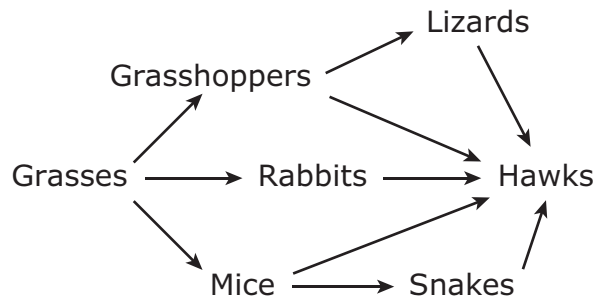
- 21** Butterflies have very long, tubelike tongues. Hummingbirds have very long tongues.



Which statement best describes why butterflies and hummingbirds both have long tongues?

- A** Butterflies and hummingbirds both migrate.
- B** Butterflies and hummingbirds are attracted to brightly colored flowers.
- C** Butterflies and hummingbirds eat the same food.
- D** Butterflies and hummingbirds have the same predators.

22 A food web of a grassland ecosystem is shown.



Which organisms rely on the same food source?

F Snakes and hawks

H Mice and snakes

G Rabbits and lizards

J Grasshoppers and lizards

23 Students conduct an investigation with breakfast cereal. The first four steps of the students' investigation are in the table shown.

Breakfast Cereal Investigation

- | |
|--|
| <ol style="list-style-type: none">1. Grind 50 grams of cereal into a fine powder.2. Stir the cereal powder into 500 milliliters of warm water.3. Hold a magnet against the side of the beaker at the 250-milliliter mark.4. Stir the mixture for three minutes. |
|--|

The students are trying to determine the presence of which substance in the cereal?

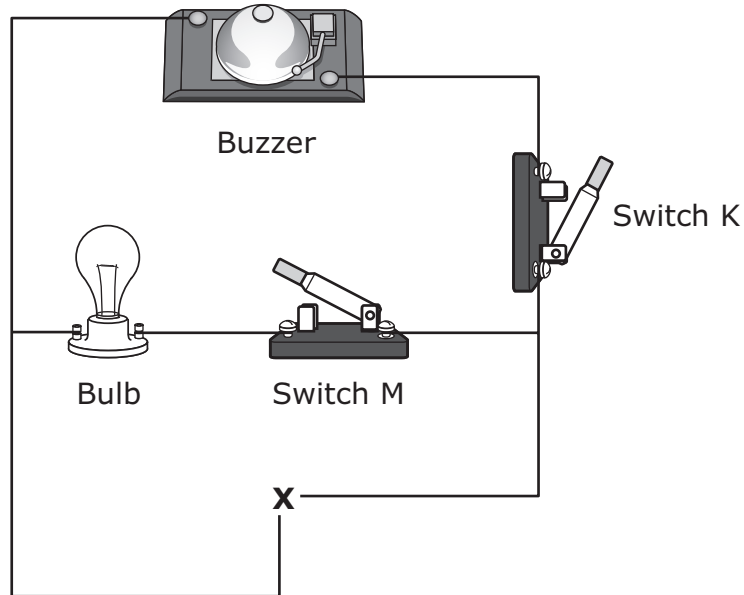
A Sugar

C Salt

B Iron

D Wheat

- 24** A group of students is building the circuit represented in the diagram.



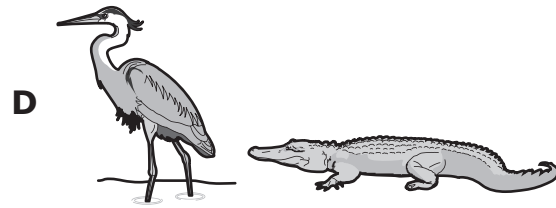
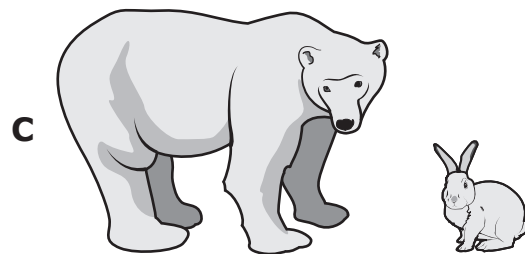
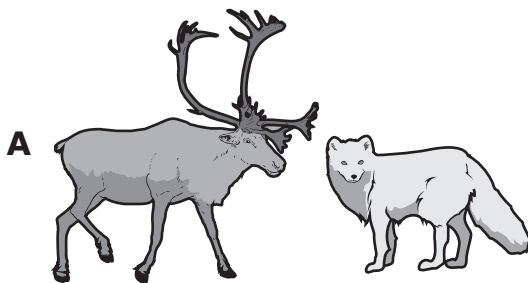
What object can be used at Position X for the buzzer to sound when Switch K is closed?

- F** A power source **H** Another bulb
G An insulated wire **J** Another switch

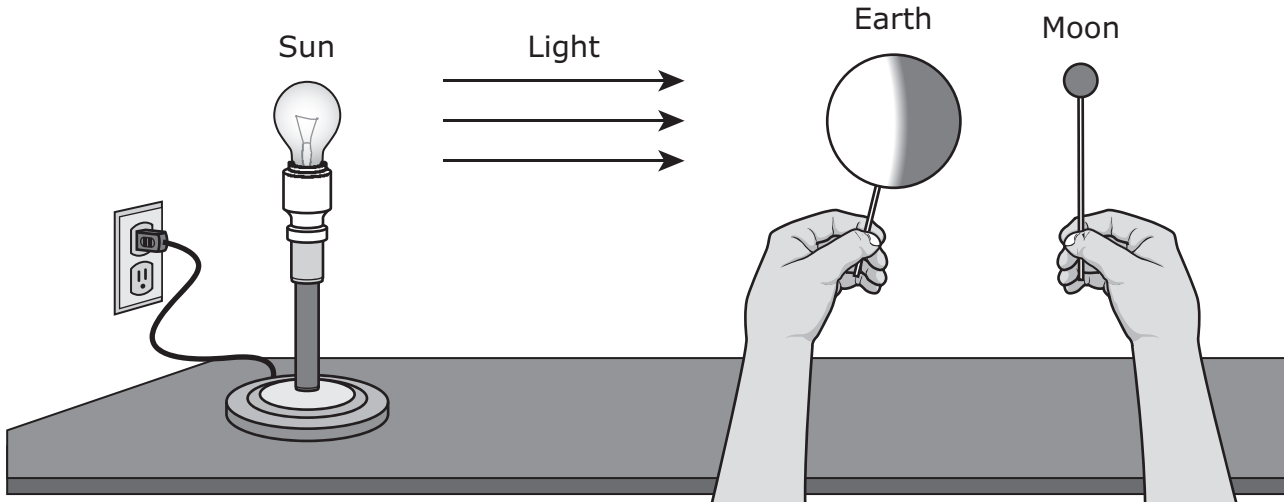
25 Some characteristics of the tundra are described.

- Long winters with temperatures at -34°C
- Less than 25 centimeters of precipitation each year
- Thin layer of topsoil covers the frozen ground
- Some types of plants found there are mosses, grasses, small shrubs, and trees

Based on this description, which pair of animals is LEAST likely to live in the tundra?



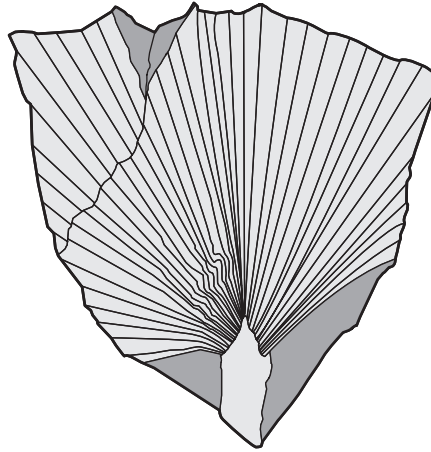
- 26** A student makes the model shown with objects representing the sun, Earth, and the moon to use in a class demonstration.



Which action should the student do with the objects to demonstrate a complete day-night cycle of Earth?

- F** Move the moon around Earth once
- G** Spin the sun in a circle once
- H** Move Earth around the sun once
- J** Spin Earth in a circle once

- 27** Scientists have uncovered palm plant fossils in Alaska, the northern-most state of the United States. Modern-day palm plants grow in tropical climates. A picture of a palm fossil that measures almost one meter across is shown.



This discovery suggests to scientists that this area in Alaska once was —

- A** covered with an ocean
 - B** warmer than it is now
 - C** populated by polar bears
 - D** changed by earthquakes
-
- 28** Which Texas land formation is correctly paired with the force that made the land formation?
- F** A canyon at Palo Duro Canyon State Park was formed by a river.
 - G** A sand dune at Monahans Sandhills State Park was formed by an earthquake.
 - H** A delta at the end of the Guadalupe River was formed by wind.
 - J** A rock formation with layers on Mustang Island was formed by ice.

- 29** A group of students at a park used a collecting net to capture several insects. The teacher transferred the insects to small terrariums that allowed the students to observe the insects before releasing them outside.

Each of the following characteristics is likely an inherited trait EXCEPT —

- A** a fly's missing antenna
- B** a butterfly's black-and-yellow stripes
- C** a dragonfly's two sets of wings
- D** a beetle's green spots

- 30** A group of students wants to build a desert garden at school. They need soil that allows water to drain away easily for the desert plants in this garden. The students test different soils to determine how much water passes through and how much water remains in each soil as shown in the table.

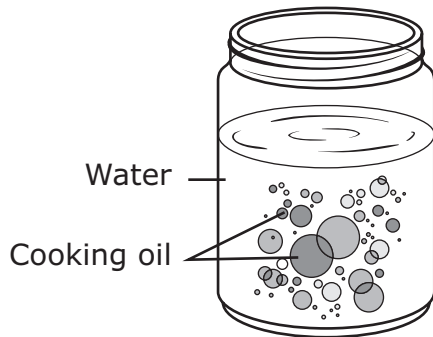
Student Investigation of Soils

Soil Type	Initial Volume of Water (mL)	Volume of Water That Went Through the Soil After 5 Minutes (mL)	Volume of Water Remaining in the Soil After 5 Minutes (mL)
Sand	200	175	25
Clay	200	115	85
Silt	200	150	50
Gravel	200	190	10

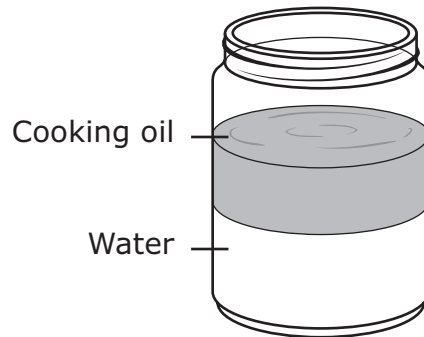
Based on the table, which types of soils are best to use to build the garden?

- F** Clay and sand
- G** Sand and gravel
- H** Gravel and silt
- J** Silt and clay

- 31** A student poured equal amounts of water and cooking oil into a jar. The student placed a lid on the jar and shook the mixture for five seconds and then let the jar sit for ten minutes. The results of this investigation are shown.



Immediately after shaking



Ten minutes after shaking

Which conclusion best compares a property of cooking oil and water shown in this investigation?

- A** Cooking oil is less dense than water.
- B** Water is less dense than cooking oil.
- C** Water dissolves in cooking oil.
- D** Cooking oil dissolves in water.

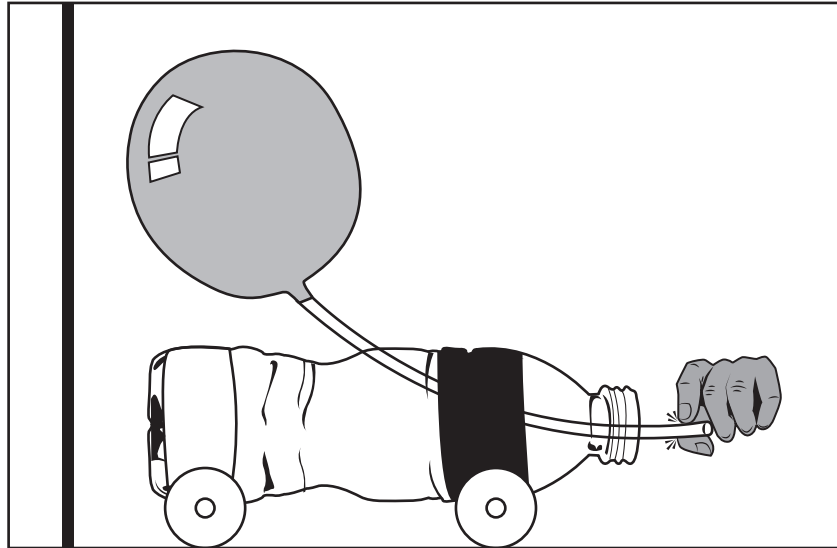
- 32** Many of America's large oil fields are found underground at the Permian Basin in West Texas. An area of the Permian Basin is shown.



How did these oil fields form?

- F** Dead plants and animals were buried for millions of years.
- G** Plants were eaten by consumers that left fossilized remains.
- H** Heat caused underground rocks to undergo chemical changes.
- J** Rocks at the surface of Earth melted and then solidified.

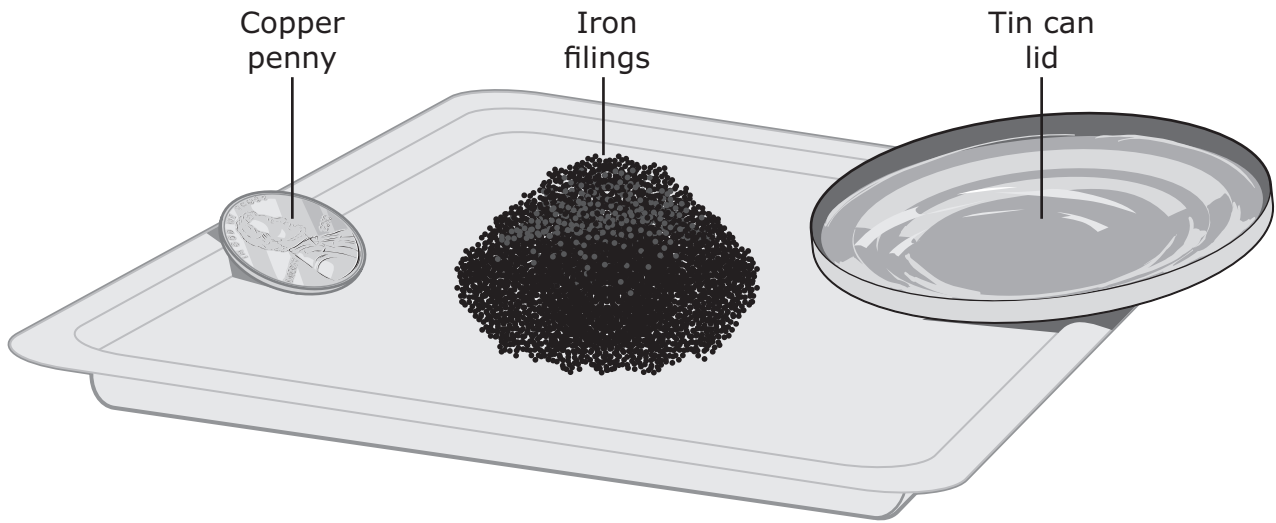
- 33** Students build a balloon-rocket car using a balloon, a straw, a water bottle, and some tape. When the straw is released by a student, the air from the balloon comes out. A diagram of the car is shown.



Which statement best describes the motion of the car when the straw is released?

- A** The car will move away from the wall in the same direction as the air that is leaving the balloon.
- B** The car will move toward the wall because of the force of the air from the straw.
- C** The car will move fast because the straw gets light as the air is released.
- D** The car will not move because the air escapes from the balloon.

34 Students observe some objects on a lab tray. The students will classify the objects based on physical properties common to all of the objects.



Based on their common properties, how should these objects be classified?

F

- Insulate thermal energy
- Bendable
- Attract to magnets

H

- Conduct electrical energy
- Bendable
- Soluble in water

G

- Soluble in water
- Attract to magnets
- Conduct thermal energy

J

- Conduct thermal energy
- Conduct electrical energy
- Not soluble in water

35 Crested floating heart is a non-native plant that now grows in Texas. This plant grows very fast and can spread over the entire surface of a pond or lake.

Which effect will most likely occur when crested floating heart covers a lake?

- A** Small fish will have fewer places to hide from predators.
 - B** Less sunlight will reach the plants that grow underwater.
 - C** Several new trees will grow along the lake shore.
 - D** Deer will have to find another source of water.
-

36 Students conduct experiments to investigate friction. Which experiment will best test the effect of friction on objects?

- F** Drop two balls from the same height at the same time
- G** Roll two marbles on the carpet from the same starting point at the same time and with the same amount of force
- H** Roll three marbles across three different surfaces from the same starting point at the same time and with the same amount of force
- J** Release two balls from the top of a ramp at the same time



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