

**GRADE 5**  
**Science**

**Administered April 2014**

**RELEASED**



# SCIENCE

**DIRECTIONS**

Read each question carefully. For a multiple-choice question, determine the best answer to the question from the four answer choices provided. For a griddable question, determine the best answer to the question. Then fill in the answer on your answer document.

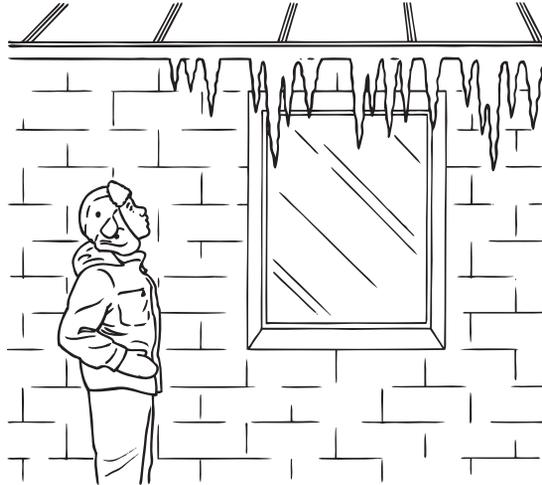
- 1 Some students used a globe to model the rotation of Earth. They shaded in Texas on the globe, as shown below. They rotated the globe and observed that Texas was in exactly the same place after each rotation.



The students could rotate the globe quickly or slowly. If the globe could rotate only at the rate that Earth actually rotates, about how long would each complete rotation take?

- A 30 days
- B 60 minutes
- C 24 hours
- D 365 days

2 A student observes ice forming on the edge of a school building.



At what temperature did the water outside the school building most likely begin to change to ice?

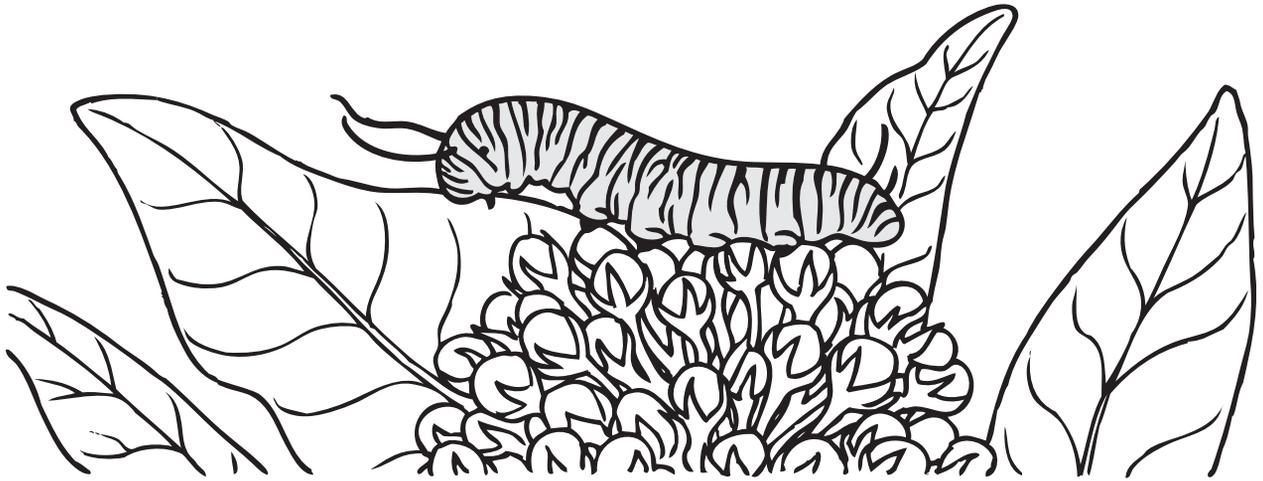
**F** 100°C

**G** 32°C

**H** 25°C

**J** 0°C

- 3 The caterpillars of monarch butterflies eat milkweed leaves. Milkweed leaves contain sap that is toxic to many animals but not to monarch butterfly caterpillars. This sap makes the monarch butterfly caterpillars toxic to predators and protects them from being eaten.



Which of these is an inherited trait of monarch butterfly caterpillars?

- A The size of the milkweed leaves that the caterpillars eat
- B The ability of the caterpillars to eat toxic leaves without being harmed
- C The number of milkweed leaves the caterpillars eat each day
- D The number of leaves on the milkweed plants that the caterpillars visit each summer

4 The picture below shows a child standing in a swimming pool.



Why does the lower part of the child appear so much different in size from the upper part?

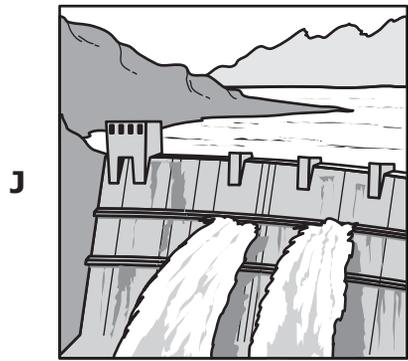
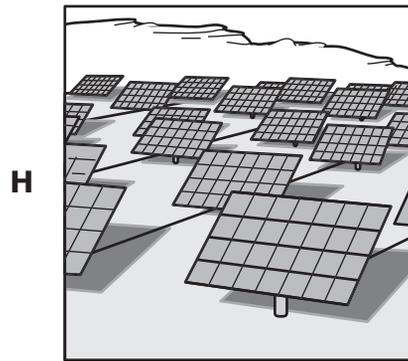
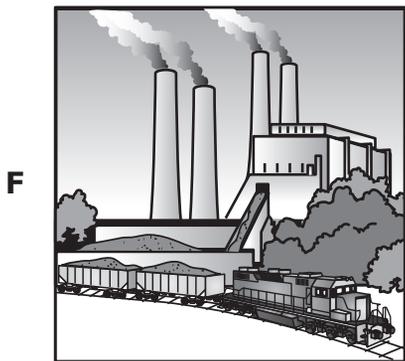
- F** The light rays that travel through water and then into air are refracted.
- G** The light rays that travel through water and then into air are enlarged.
- H** The light rays that travel through air and then into water are reflected.
- J** The light rays that travel through air and then into water are reduced.

5 Animals and plants use substances that cycle through the environment. Which substance is needed by plants to survive and is released into the environment by animals?

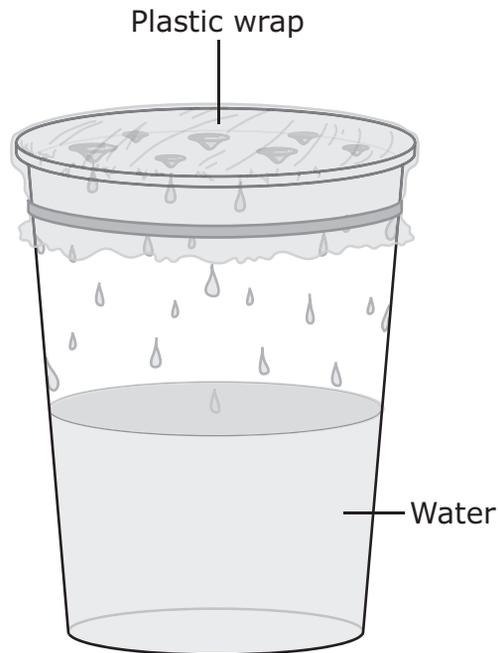
- A Oxygen
- B Sugar
- C Salt
- D Carbon dioxide

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6 Which of the methods of generating electricity shown below does **NOT** use alternative energy resources?



- 7 A student makes a model of the water cycle by using a cup, some water, and plastic wrap. After the student places the model near a sunny window, moisture forms on the inside of the plastic wrap.

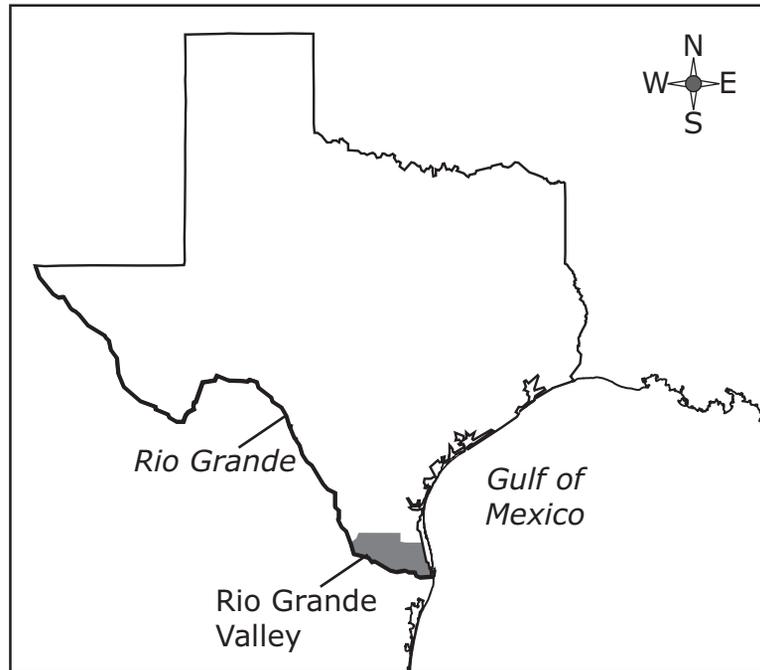


What change is the student most likely observing in this model?

- A Freezing
- B Condensation
- C The warming of air
- D The formation of clouds

- 8 The Rio Grande Valley is located at the southern tip of Texas at the end of a long river known as the Rio Grande.

Location of the Rio Grande Valley



How did the delta at the end of the Rio Grande form?

- F Sand and mud from the Gulf of Mexico were washed ashore by tsunamis.
- G The river cut through the solid bedrock of the valley.
- H The river deposited large amounts of sediment from land erosion.
- J Hurricanes pushed soil and debris from the Gulf of Mexico onto the land.

9 Which table shows the correct role of each organism in the food chain below?

Algae → shrimp → arctic cod → ringed seals → polar bears

**A**

Organism	Role
Algae	Producers
Shrimp	Consumers
Arctic cod	Consumers
Ringed seals	Consumers
Polar bears	Consumers

**C**

Organism	Role
Algae	Producers
Shrimp	Producers
Arctic cod	Consumers
Ringed seals	Consumers
Polar bears	Consumers

**B**

Organism	Role
Algae	Decomposers
Shrimp	Producers
Arctic cod	Producers
Ringed seals	Producers
Polar bears	Consumers

**D**

Organism	Role
Algae	Producers
Shrimp	Decomposers
Arctic cod	Decomposers
Ringed seals	Decomposers
Polar bears	Consumers

- 10** A student observes that the craters on the moon are different sizes. The student designs an experiment to study the formation of craters. The materials for the experiment are marbles and a pan of flour. The student makes a hypothesis that the size of the craters made on the surface of the flour will depend on the height from which the marble is dropped. Some of the steps in the student's experiment are described below.

1. Fill a round pan with flour
2. Smooth out the flour in the pan
3. \_\_\_\_\_
4. For each trial, measure the size of the crater formed and then smooth out the flour again

Which of these is most likely Step 3 in the student's experiment?

- F** Drop the same marble from different heights into the pan of flour
- G** Drop marbles of different masses from the same height into the pan of flour
- H** Drop marbles of different sizes from different heights into the pan of flour
- J** Drop a single marble one time into the pan of flour

**11** A teacher is setting up the terrarium shown below in a science classroom.



Which of these organisms is best suited for the terrarium?

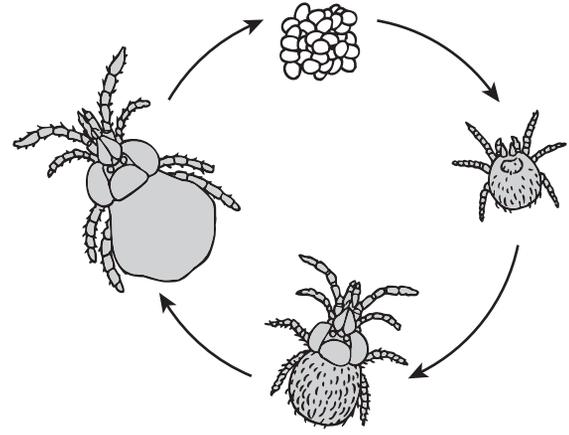
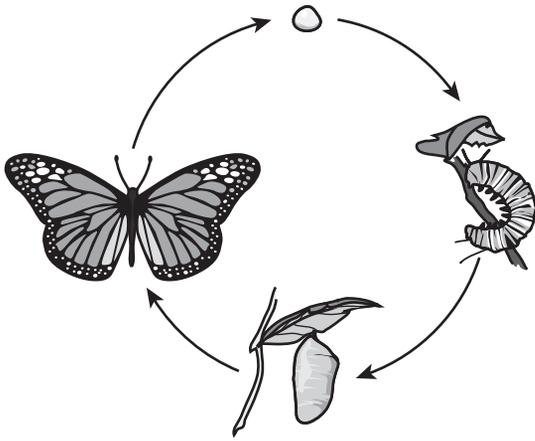
- A** Blue jay
- B** Lobster
- C** Snail
- D** Water lily

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**12** Several students investigate the characteristics of soil. The students observe samples of common soils. In one sample they observe that water drains through the soil easily. When they rub the soil between their fingers, it feels rough and scratchy, and its particles feel hard. The soil the students observed is most likely —

- F** clay
- G** silt
- H** loam
- J** sand

**13** The life cycles of a butterfly and a chigger are shown below.



How is the life cycle of chiggers different from the life cycle of butterflies?

- A** Chigger larvae have legs.
- B** Chiggers have a nymph phase.
- C** Chiggers go through metamorphosis.
- D** Chigger larvae hatch from eggs.

- 14** A student measures the mass of several substances and records the results in the table below.

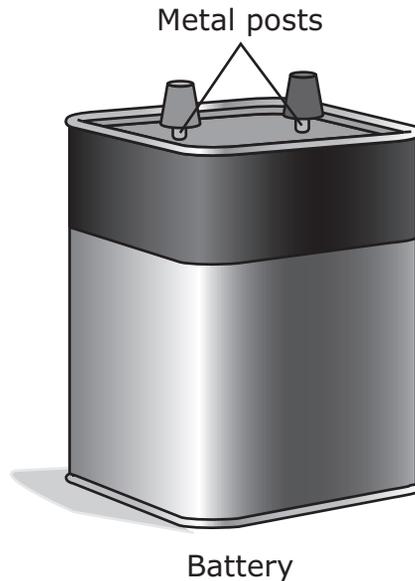
Substances for  
Investigation

Substance	Mass (g)
Water	125
Toothpicks	5
Table salt	30
Sugar cubes	20
Alcohol	98
Cooking oil	75
Marbles	40
Plastic cubes	35

What is the difference in grams between the total mass of the liquid substances and the total mass of the solid substances used in the investigation?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

**15** The diagram shows the metal posts that are usually found on a battery.



The battery can be connected to a bell and a switch to produce sound. Which statement best explains why there are two metal posts on the battery?

- A** The battery needs only one metal post to connect to the bell, but the other metal post is present in case the first post fails to work.
- B** The battery needs to form a complete circuit that starts with one metal post and ends with the other metal post.
- C** One metal post makes a complete circuit with the switch, and the other metal post makes a complete circuit with the bell.
- D** One metal post makes the bell start to ring, and the other metal post makes the bell ring louder.

- 16** The ocotillo is a desert plant with long, straight branches. Its leaves are small and appear for only a short time after a rain. Most of the time, the branches of the ocotillo do not have leaves. Maple trees grow in areas where water is more abundant than in the desert. Maple leaves can be very large and are present for most months of the year.



Ocotillo leaves



Maple leaves

Ocotillo plants are better adapted for surviving in the desert than maple trees because the characteristics of ocotillo leaves —

- F** allow more sunlight to reach the soil
- G** prevent the plant from producing flowers
- H** encourage the release of carbon dioxide from the stems
- J** reduce the amount of water lost through evaporation

- 17** When a powdered drink mix was added to water, the liquid turned orange. A student decided the taste was too strong, so he poured out half of the liquid and added more water. Which of the following most likely occurred when more water was added?
- A** The physical state changed.
  - B** The orange color became lighter.
  - C** The liquid had a sweeter taste.
  - D** None of the above

**18** Each school year for 30 years, the amount of rain that fell at a school was measured and recorded. Tracking rainfall over a long period provides the most information about which characteristic of an area?

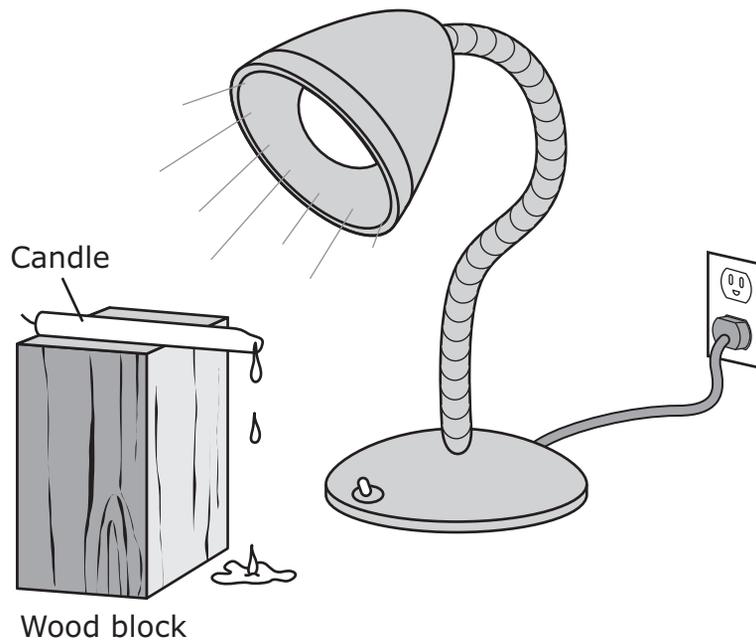
**F** Climate

**G** Temperature of one day

**H** Weather

**J** Type of soil

- 19** A class is learning about states of matter. The teacher shows the students how to set up the investigation shown in the diagram.



What kinds of energy are needed in this investigation to change the state of matter of the candle?

- A** Light, mechanical, and thermal
- B** Electrical and thermal
- C** Mechanical, light, and electrical
- D** Thermal and mechanical

**20** All of these are related to the formation of oil or natural gas **EXCEPT** —

- F** decomposed animals
- G** decayed plants
- H** sedimentary rocks
- J** active volcanoes

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**21** A prickly pear cactus is shown below.



The roots of the prickly pear cactus spread out in a wide underground network. How does this type of root system benefit a prickly pear cactus?

- A** By producing fruit and storing water
- B** By capturing sunlight and getting rid of waste materials
- C** By absorbing water and supporting the plant in loose, sandy soil
- D** By releasing nutrients into the sandy soil and taking in oxygen

- 22** Some students paint the inside of several boxes. They paint each box a different color. They observe that the inside of the box painted white looks brighter than the others. What is the most likely reason this box looks brighter?
- F** More light is reflected off white paint.
  - G** More light is refracted by white paint.
  - H** More light passes through white paint.
  - J** More light is absorbed by white paint.

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- 23** A teacher wears protective gloves to lift a metal pan filled with boiling water from a hot plate. Why are the protective gloves necessary?
- A** The metal pan creates thermal energy.
  - B** The metal pan insulates thermal energy.
  - C** The metal pan conducts thermal energy.
  - D** The metal pan reduces thermal energy.

- 24** A student hiking in a rocky area on a mountain notices that wide, deep cracks have formed in some of the large rocks. Some of the cracks are so large that the rocks have broken apart. Which process most likely caused these rocks to crack and break?
- F** Erosion by wind
  - G** Water freezing and thawing
  - H** Erosion by fast-moving water
  - J** Sediments being deposited

- 25** Prairie dogs eat plants and dig underground tunnels. Prairie dog tunnels help break up hard prairie soils, and the animals' waste adds nutrients to the soil. In the past, large groups of prairie dogs lived in many parts of the U.S. Great Plains, but people have destroyed most of these colonies.

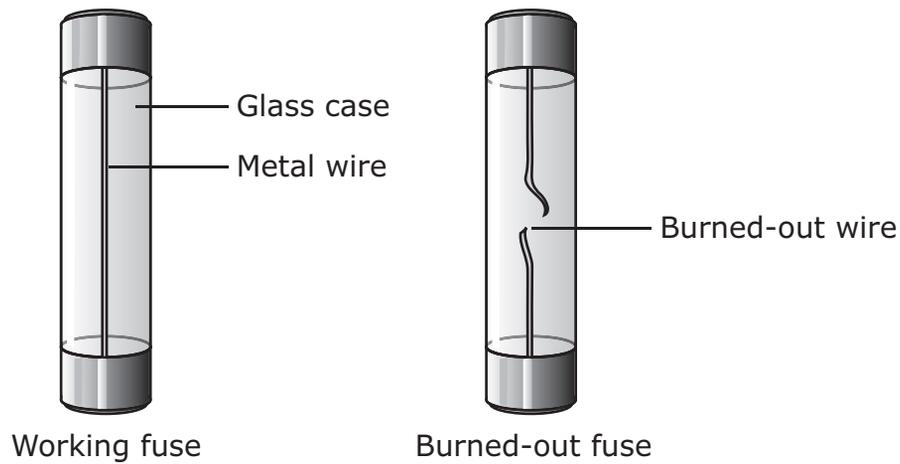


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Which of these will most likely happen when prairie dogs are removed from an area?

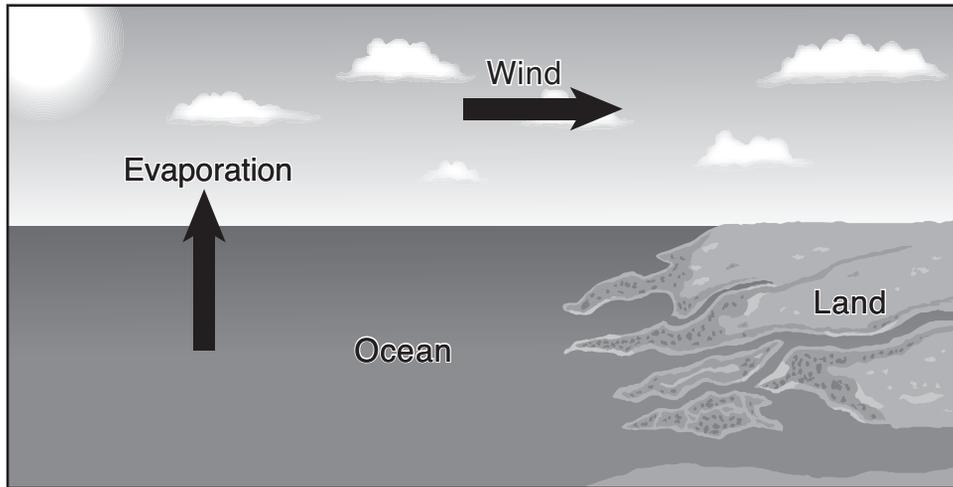
- A** The population of predators that eat prairie dogs will decrease.
- B** The population of plants that prairie dogs eat will decrease.
- C** The nutrients in the soil will increase.
- D** The number of underground tunnels will increase.

- 26** Most cars have lights, power locks, radios, and other equipment that use electricity. Electric circuits power this equipment. Each circuit has a fuse that completes it. The picture below shows one type of fuse a car may have.



Which of these describes one thing that could happen if the wire in a car fuse burns out?

- F** The car's lights will burn brighter.
- G** The car's radio will not work.
- H** The car's turn signal will blink too slowly.
- J** The car's power windows will open faster.



**27** The diagram above shows the process of evaporation over the ocean. What is the most likely effect of this process on the land areas nearby?

- A** Increased drought conditions
- B** Decreased erosion of the shoreline
- C** Increased precipitation
- D** Decreased solar energy

**28** In a food chain, energy does **NOT** flow directly from —

- F** producer to decomposer
- G** producer to consumer
- H** consumer to decomposer
- J** consumer to producer

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**29** A student made a mixture using equal amounts of salt and pepper. The salt grains were the same size as the pepper grains. What should the student do to most easily separate the pepper from the salt?

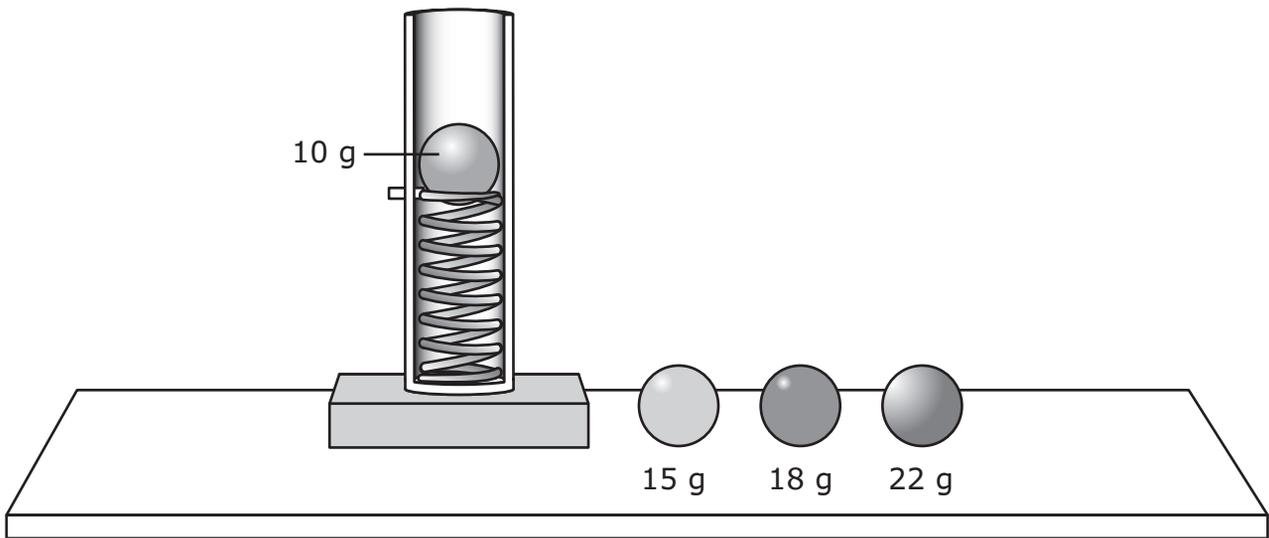
- A** Use a pair of tweezers to remove each grain of pepper
- B** Run a small magnet through the mixture to attract the pepper
- C** Put the mixture in water and filter the pepper out of the water
- D** Use a strainer with a fine wire screen to remove the pepper

**30** Which of these is a learned behavior of a dog?

- F** Begging for food
- G** Drinking water
- H** Panting on a hot day
- J** Chewing on a bone

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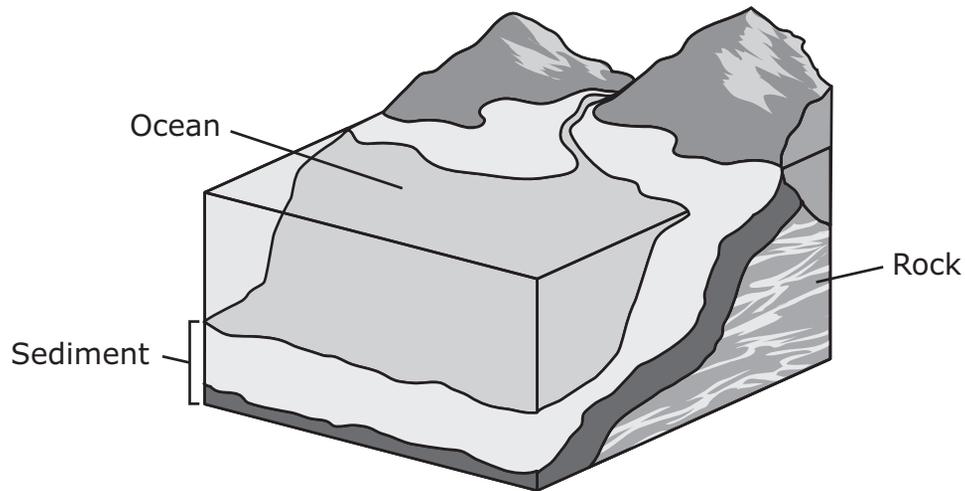
**31** A student designs an experiment to test the force of a spring using a spring launcher and four spheres with the same diameter but with different masses.



What other piece of equipment would be most useful for this experiment?

- A** A graduated cylinder to measure the volume of each sphere before the sphere is launched
- B** A beaker to collect the spheres after they are launched
- C** A stopwatch to measure how long it takes to load each sphere on the spring
- D** A meterstick to measure the height each sphere reaches after the sphere is launched

**32** The model below shows layers of sediment on the floor of an ocean.



Which of the following best explains how these layers can become rock over many years?

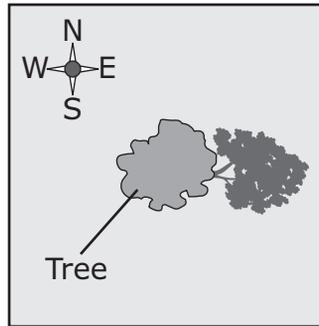
- F** Sand in the sediment melts and turns into rock.
- G** The weight of the water compacts the sediment into rock.
- H** Changing water temperatures turn sand in the sediment into rock.
- J** Pollution caused by humans turns the sediment into rock.

- 33** Objects that blow into a swimming pool or that are dropped into the pool by swimmers need to be removed. These objects include foam cups, keys, and coins. Which of the following explains a useful method for removing some of these objects?
- A** The keys and coins are less dense than water, so they can be easily picked up off the bottom of the pool by divers.
  - B** The foam cups have the same density as water, so they can be crumbled up for removal by the pool filter.
  - C** The foam cups are less dense than water, so they can be removed from the surface with a pool cleaning net.
  - D** The keys and coins have the same density as water, so they can be washed away when the pool is drained.

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- 34** Most kangaroos have large, heavy tails, while spider monkeys have long, thin tails. Kangaroo tails are useful when the kangaroos are hopping and also when they are crawling around on the ground to feed. Spider monkey tails are useful when the spider monkeys are moving through trees. Both of these animals use their tails primarily for —
- F** grabbing and holding their food
  - G** supporting and balancing their body
  - H** attracting the attention of other animals
  - J** carrying their young

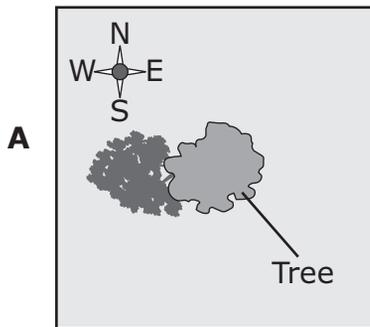
- 35** Shadows cast by objects change throughout the day. The picture below shows the shadow cast by a tree at 3:00 P.M.

View from Above

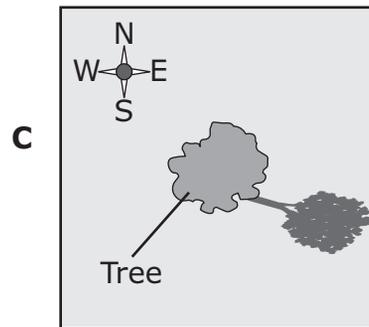


Which picture shows how the tree's shadow most likely looked at 9:00 A.M.?

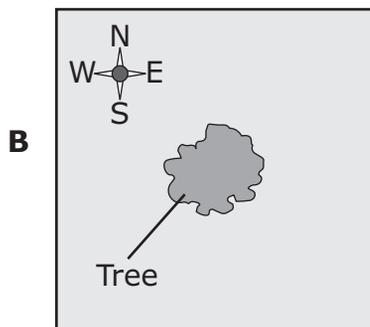
View from Above



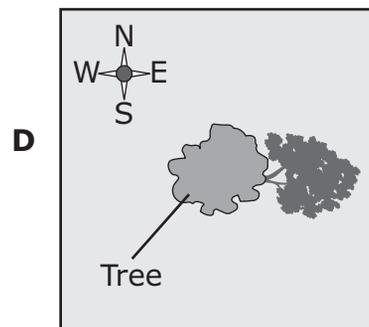
View from Above



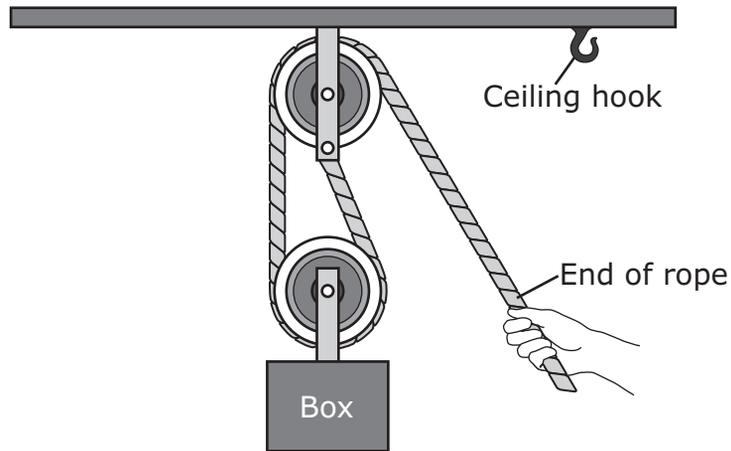
View from Above



View from Above



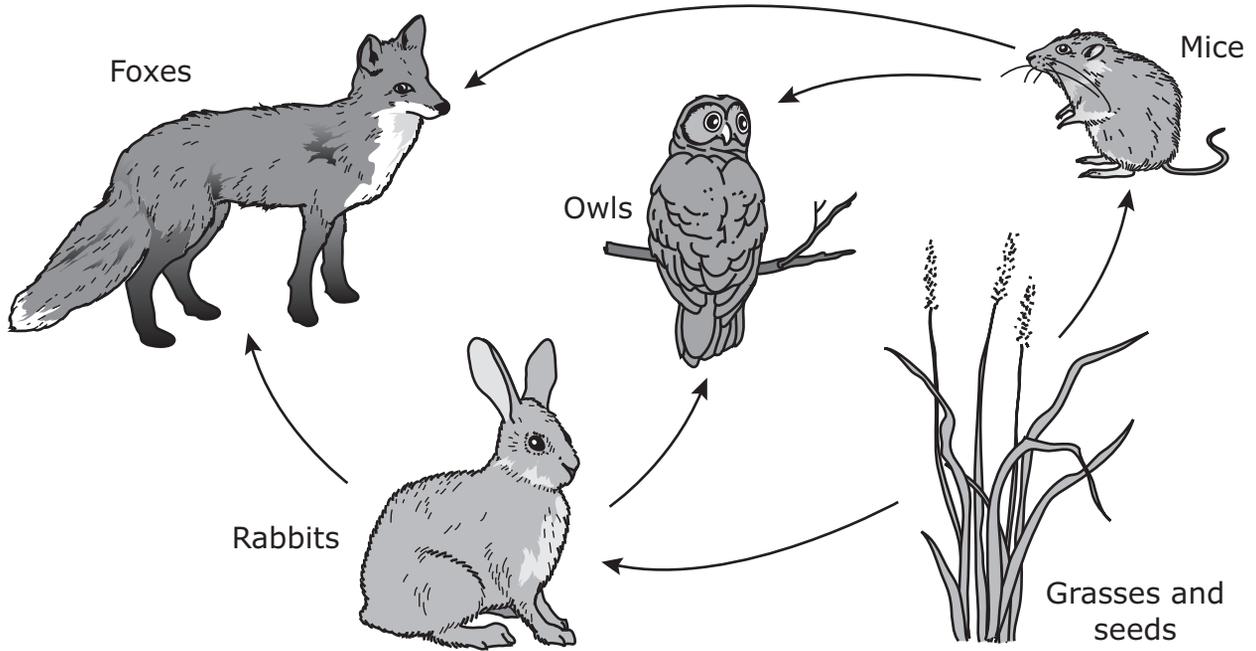
**36** The picture below shows a pulley system that can be used to lift a box.



Which of these should a person do to lift the box?

- F** Tie the end of the rope to the box
- G** Tie the end of the rope to the ceiling hook
- H** Pull the end of the rope downward
- J** Allow the end of the rope to move upward

37 The food web below is made up of organisms that live in a forest.



Which change would most likely occur if all the producers in this ecosystem were removed?

- A The mice would become the new producers.
- B All the animals would either die or move away.
- C The number of mice would increase.
- D All the animal populations would increase.

- 38** Which alternative energy source is generated beneath Earth's crust and can be used to heat buildings?
- F** Hydroelectric energy
  - G** Geothermal energy
  - H** Wind energy
  - J** Solar energy

39 A cook uses the ingredients listed below to prepare a meal.

Ingredients

- Sugar cubes
- Salt
- Cooking oil
- Carrots
- Butter

Which table correctly shows the physical properties of these ingredients when placed in hot water?

**A**

Ingredient	Physical Property
Sugar cubes	Solid that becomes a liquid and floats
Salt	Solid that becomes a liquid and sinks
Cooking oil	Liquid that floats
Carrots	Solid that does not dissolve
Butter	Solid that dissolves

**C**

Ingredient	Physical Property
Sugar cubes	Solid that does not dissolve
Salt	Solid that dissolves
Cooking oil	Liquid that sinks
Carrots	Solid that does not dissolve
Butter	Solid that becomes a liquid and floats

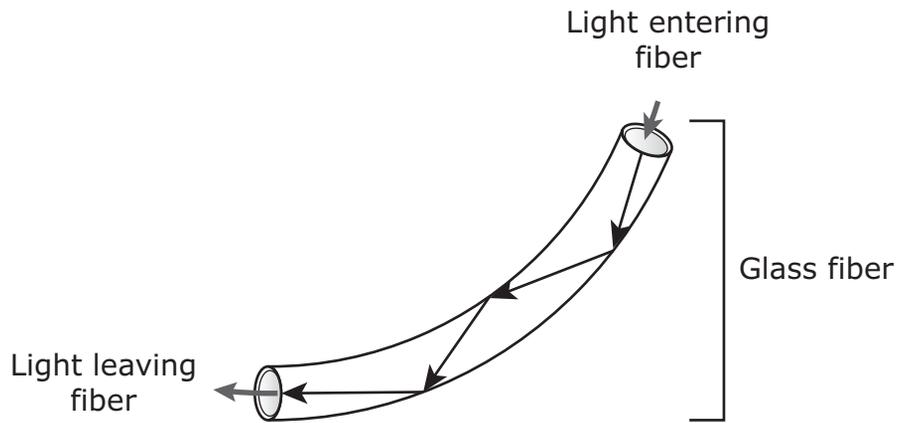
**B**

Ingredient	Physical Property
Sugar cubes	Solid that dissolves
Salt	Solid that dissolves
Cooking oil	Liquid that sinks
Carrots	Solid that dissolves
Butter	Solid that becomes a liquid and floats

**D**

Ingredient	Physical Property
Sugar cubes	Solid that dissolves
Salt	Solid that dissolves
Cooking oil	Liquid that floats
Carrots	Solid that does not dissolve
Butter	Solid that becomes a liquid and floats

- 40** The model shows a special glass fiber that is thinner than some metal wires. When light enters one end of the fiber, it moves through the fiber as shown.



After the light leaves the fiber, it travels —

- F** in a straight line
- G** back into the fiber
- H** around the fiber
- J** in a curve

**41** Some facts about birds called cattle egrets are listed below.

### Cattle Egrets

1. They have yellow bills and light-orange legs.
2. They make nests in trees away from predators.
3. They eat ticks off cattle while the cattle graze.
4. They are often found in the same fields as cattle.



© Nicolaas Trout/  
iStockphoto # 6958570

Which of these facts best describes how these birds depend on other animals to survive?

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

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**42** One of the brightest objects in the night sky is a planet that is closer to the sun than Earth is. What is the name of this planet?

- F** Mars
- G** Saturn
- H** Jupiter
- J** Venus

- 43** Wild Texas hogs, similar to the one shown below, are descended from hogs brought here from other countries.



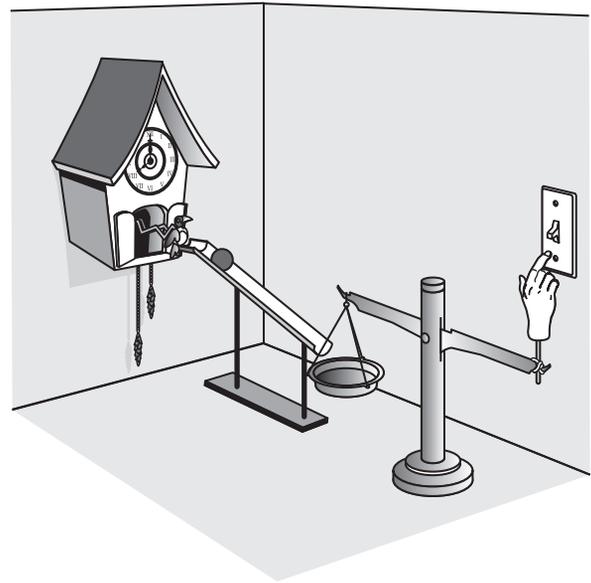
These wild hogs eat many different kinds of foods, including plants, fungi, and insects. Besides being very destructive to the habitats of other animals, how do wild hogs most likely harm other animals?

- A** By competing with other animals for food
- B** By moving slower than most other animals
- C** By causing other animals to reproduce more
- D** By eating foods that no other animals eat

- 44** Rube Goldberg was an artist who drew cartoons that showed a very complicated way to do a simple task. The picture below shows a cartoon like the ones Goldberg drew.

How to Turn On a Light Switch  
the Rube Goldberg Way

1. The bird in the clock hits the ball.
2. The ball rolls down the ramp.
3. The ball falls into the balance pan.
4. The balance pan moves down.
5. The hand moves up.
6. The switch turns on.



Which form of energy is used to turn on the switch?

- F** Light energy
- G** Thermal energy
- H** Electrical energy
- J** Mechanical energy

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



**STAAR  
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April 2014**