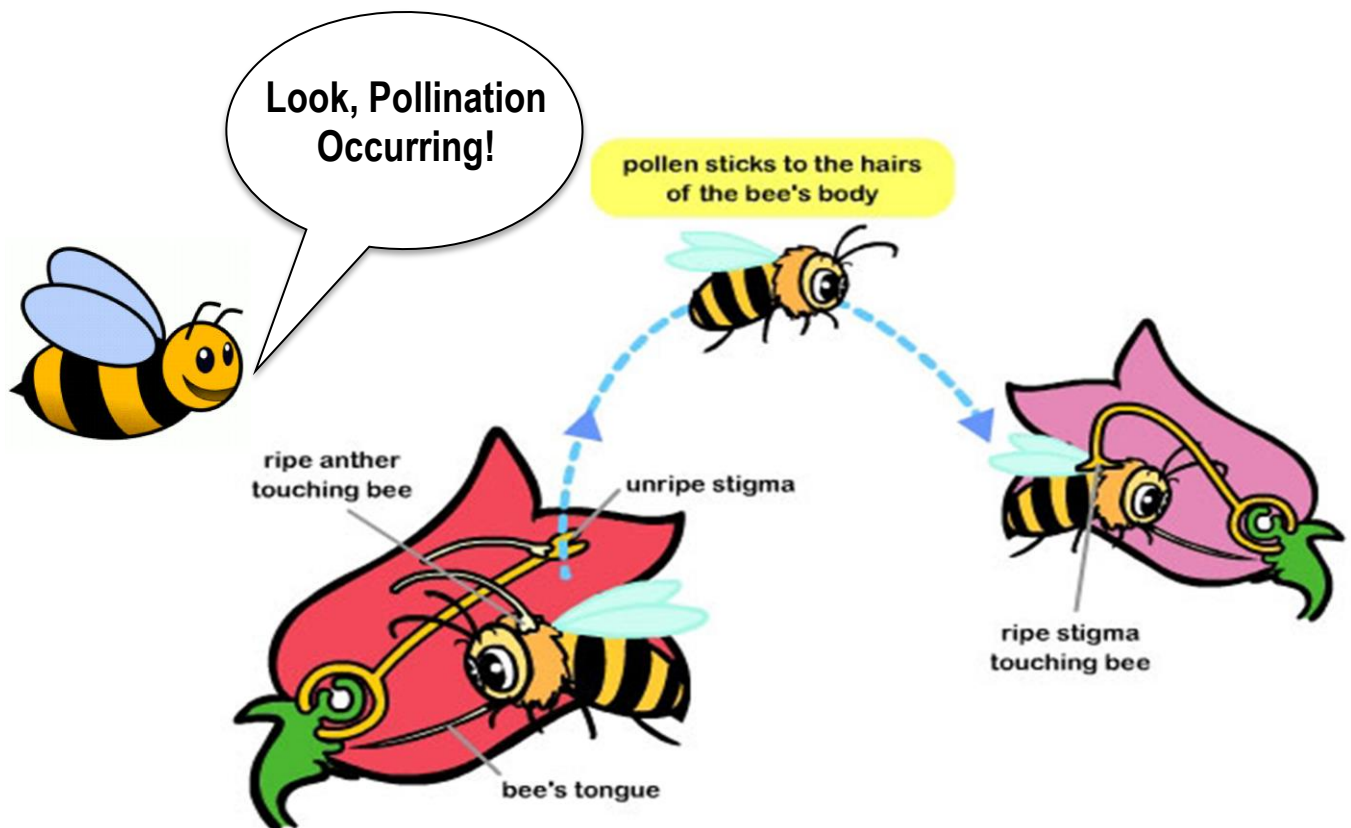


Grade 5 Science

Student Edition



SPRING BREAK PACKET

Student Name	
Class Mod	

April 18, 2017– April 21, 2017



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Note to Students and Parents

This Spring Break Packet has been created to provide practice for students to work through Selected Response and Brief Constructed Response items (SRs and BCRs). This packet will continue to engage students in the Next Generation Science Standards (NGSS) Performance Expectations (PEs).

These items reflect the concepts taught in their science classrooms: Earth and Space Science; Physical Science; and Science and Engineering Practices (SEPs).

The Spring Break Packet contains informational-text passages, SRs and BCRs, graphs, charts and a scoring rubric for BCRs. It is highly recommended that this rubric be used when responding to BCRs.

Please write your response to the SRs and BCRs on the space provided in this booklet. Students are encouraged to return a completed packet to their science teacher when they return from Spring Break.

NOTE: Students in Grade 5 were administered the new Maryland Integrated Science Assessment (MISA) in March 2017.

To learn more about the NGSS, visit: <http://www.nextgenscience.org>.

*Grading Scale	
Overall score	Grade
26 points	A
20 + points	A
17-21 points	B
14-16 points	C
11-13 points	D
10-0 points	E

****Each Selected Response question is worth 1 point. The Brief Constructed Response questions (numbers 5, 10, and 17) are worth a maximum of 3 points each.***

A New Glue ... from Inside Cow Bellies?

If you take a drive through the country, you might see a herd of cows munching on grass and shrubs. Unlike us, they can eat and digest tough, fibrous plants. They can do this, in part, because of bacteria that live in their bellies.

Those bacteria, like some that live in your own stomach, are very helpful. They feed on chewed-up food once it makes its way down into the cow's gut. This helps grind the plant chunks into even smaller pieces so the cows can get the most nutrients from their food.

Paul Weimer studies these bacteria. He's a microbiologist with the Agricultural Research Service in Madison, Wisconsin.

One day Dr. Weimer was watching some bacteria under a microscope. They were turning plant chunks into food for themselves and the cow in which they lived. He was impressed with how tightly the bacteria stuck to the plant material, and that gave him an interesting idea: "If the bacteria are so good at sticking to plant materials, wouldn't they be good at sticking to other similar things, like wood? Could they be used to make a wood glue?"

Do you know why these little bacteria are so good at attaching themselves to things?

Dr. Weimer explains, "They have an outer slime layer that allows them to cling to a surface. In my laboratory, they stick so tightly to plant material, or cellulose, I can't get them off without destroying them."

Other bacteria are good clingers too. Some can stick to our teeth and cause cavities if we don't brush them off. Eeeww!

It might sound really weird to you, but finding bacteria that can form a glue is a great discovery. It could help replace some of the smelly and expensive chemicals that are used right now to make wood products. That could help the environment.

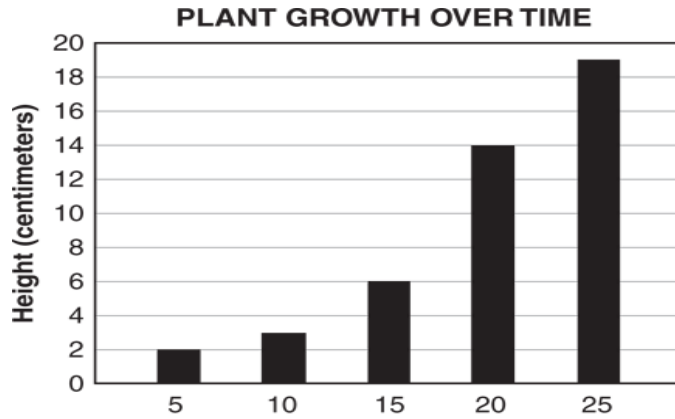
1. **Another microbiologist studied bacteria in the stomach of an ocean mammal. This scientist observed that bacteria in the ocean mammal did not attach to food particles.**

Which of these statements best explains the findings?

- A. Ocean water kills stomach bacteria.
- B. Bacteria only stick to plant materials.
- C. The scientist was studying a different type of bacteria.
- D. Bacteria in laboratories behave differently than bacteria in cow bellies.

Answer: _____

2. Students measured the change in height of a plant during a 25-day period. The graph below shows their data.



How many centimeters did the plant grow from Day 10 to Day 25?

- A. 3 centimeters
- B. 8 centimeters
- C. 16 centimeters
- D. 19 centimeters

Answer: _____

3. Maryland air quality is reported daily using the color codes from the data table below.

AIR QUALITY

Color Code	Condition	Suggested Action
Green	Good	None
Yellow	Moderate	Very sensitive people should limit outdoor exercise.
Orange	Unhealthy for sensitive people	People with trouble breathing should limit being outdoors for long periods.
Red	Unhealthy	Everyone should limit outdoor exercise.

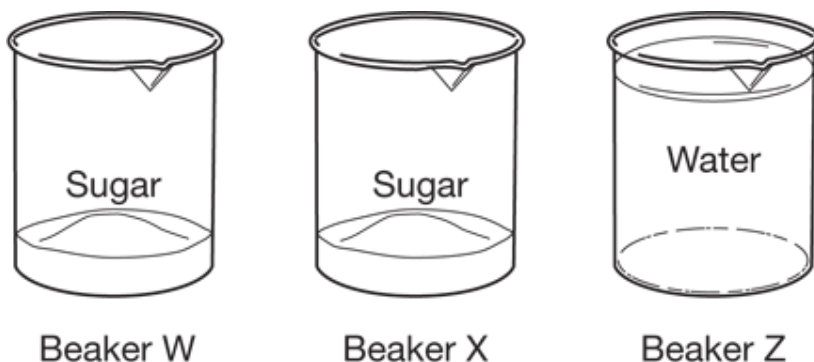
Which group of people would most likely be affected when the color code is yellow?

- A. adults who exercise regularly
- B. athletes in good physical shape
- C. teenagers who play soccer and football
- D. young children with breathing problems

Answer: _____

4. Use the information below to answer the following.

A teacher conducted an investigation that demonstrated changes in matter. Three beakers were used in the investigation. Each empty beaker had a mass of 400 grams. Beaker W and Beaker X each contained 25 grams of sugar. Beaker Z contained 500 milliliters of water at 60° Celsius.



The teacher poured the sugar from Beaker W into Beaker Z. The teacher stirred the sugar and water until the sugar was not visible.

Next, the teacher slowly heated the sugar in Beaker X on a hot plate. Within a few minutes, the sugar melted. The melted sugar turned brown and began to smoke. Finally, the melted sugar turned black and became a solid.

What property of the water most likely changed after the teacher added the sugar?

- A. color
- B. flavor
- C. hardness
- D. odor

Answer: _____

6. The sun appears to rise in the east and set in the west each day. During the day, the sun is so bright that other objects in space are rarely visible. At night, other objects in space, such as planets and stars, are often visible. The data table below contains information about the planets in our solar system.

PLANETS IN THE SOLAR SYSTEM

Planet	Distance from the Sun (millions of kilometers)	Time for Revolution (Earth units)	Diameter at Equator (kilometers)	Time for Rotation (Earth units)
Mercury	58	88 days	4,878	59 days
Venus	108	225 days	12,104	243 days
Earth	150	365 days	12,756	24 hours
Mars	228	687 days	6,794	25 hours
Jupiter	778	12 years	142,984	10 hours
Saturn	1,433	29 years	120,536	11 hours
Uranus	2,871	84 years	51,118	17 hours
Neptune	4,497	165 years	49,500	17 hours

Which of these actions is responsible for the sun appearing to rise and set?

- A. Earth rotating on its axis
- B. The sun rotating on its axis
- C. Earth revolving around the sun
- D. The sun revolving around Earth

Answer: _____

7. The Little Dipper is a group of stars. During the night, the Little Dipper appears to change positions in the sky.

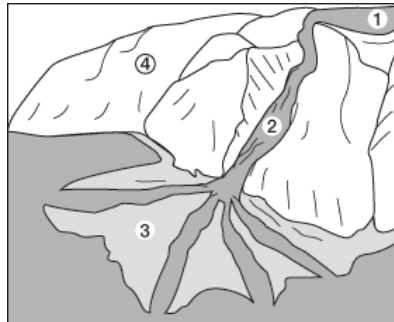


Which of these statements best explains why the Little Dipper appears to change positions in the night sky?

- A. Earth rotates on its axis.
- B. Earth revolves around the stars.
- C. The Little Dipper moves around the sun.
- D. The stars in the Little Dipper move in the sky.

Answer: _____

8. Erosion, transportation, and deposition change the surface of Earth.



Which number in the diagram represents a landform made by the deposition of eroded sediment?

- A. 1
- B. 2
- C. 3
- D. 4

Answer: _____

9. Use the information below to answer the following.

Many natural resources are found in Maryland and the surrounding area. Some of these natural resources are renewable and some are nonrenewable. People use both kinds of resources in daily activities. Using natural resources often produces waste products.

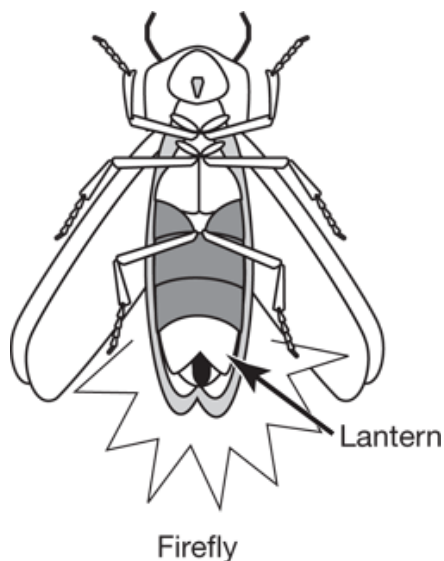
Which of these natural resources found in Maryland is nonrenewable?

- A. coal
- B. soil
- C. water
- D. wood

Answer: _____

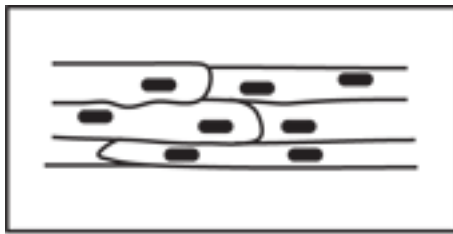
Use the information below to answer Number 10 on page 11.

Fireflies release light from specialized cells in a part of their body called the lantern. The light produced releases very little heat. The firefly signals attract other fireflies and also warn predators that they taste bad. Some female fireflies produce “false signals” to attract male fireflies. These “false signals” are a response to a male light signal. The attracted male firefly comes to the light of the female firefly. The female firefly then eats the male firefly.

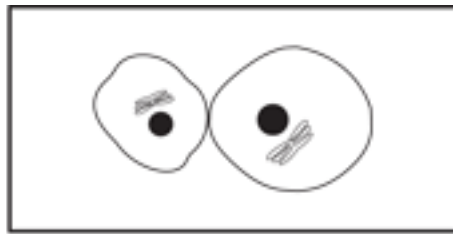


Use the information below to answer Number 11.

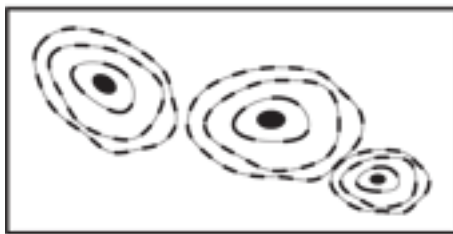
Several different types of cells are shown below.



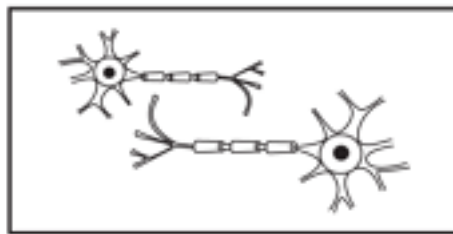
Muscle Cells



Skin Cells



Bone Cells



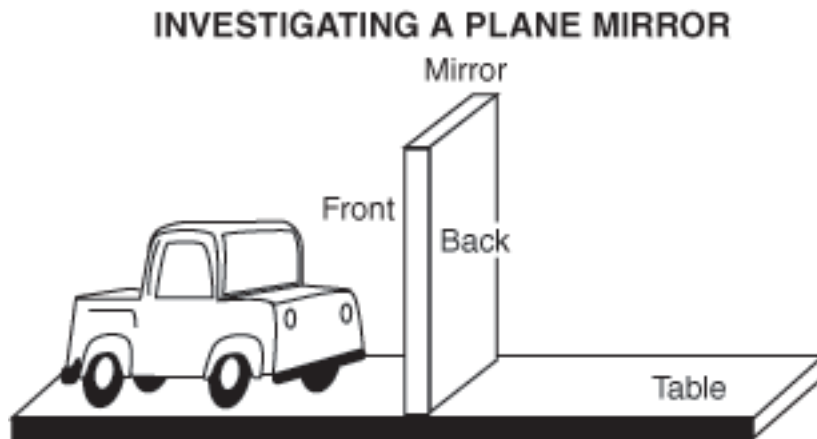
Nerve Cells

11. Which two types of cells are most similar in shape?

- A. skin cells and bone cells
- B. nerve cells and skin cells
- C. bone cells and nerve cells
- D. muscle cells and skin cells

Answer: _____

Use the diagram below to answer Number 12.



12. Several students placed a toy truck on a table in front of a plane mirror and viewed the image of the truck in the mirror. Next, the students moved the toy truck to different positions and observed the reflected images of the truck from each position.

The students placed the toy truck 20 centimeters in front of the mirror.

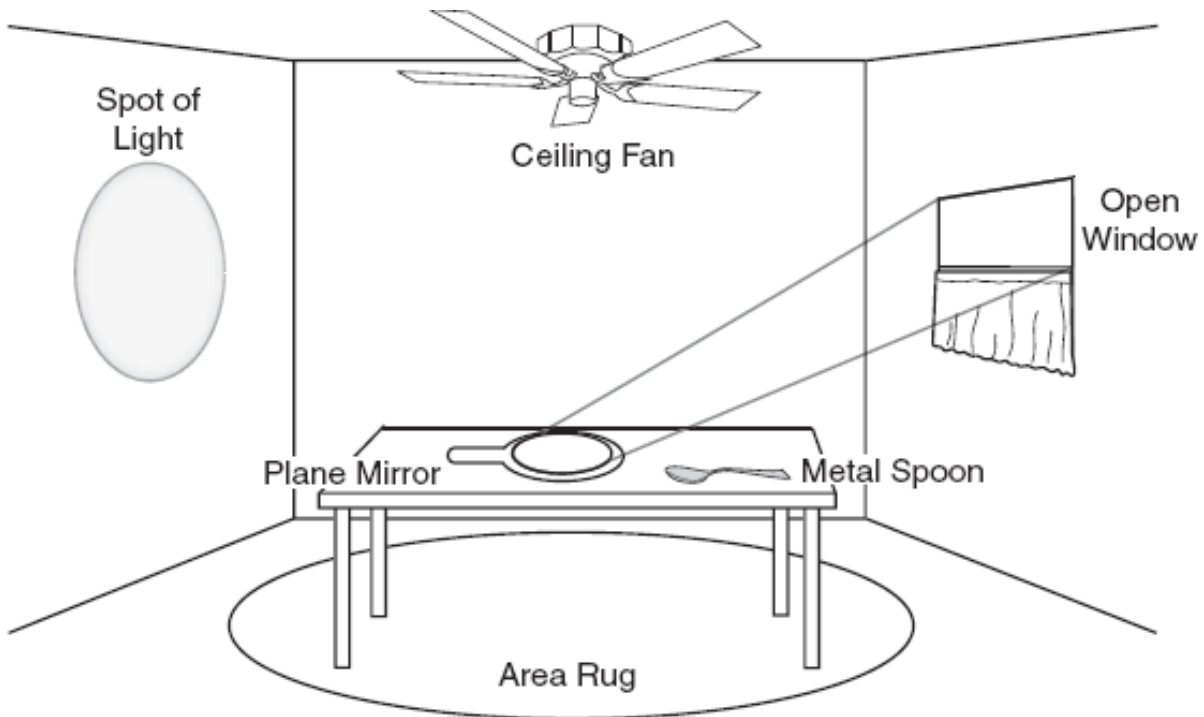
The image of the truck will appear to be

- A. 0 centimeters from the mirror
- B. 10 centimeters in front of the mirror
- C. 20 centimeters behind the mirror
- D. 40 centimeters behind the mirror

Answer: _____

13. Use the information below to answer the following.

Sunlight enters a room through an open window. The sunlight shines on the wood table, area rug on the floor, and the plane mirror and metal spoon on the table. A spot of light appears on the wall opposite the window.



An image of the ceiling fan appears in the plane mirror on the table.

How does the image of the fan in the mirror compare to the actual fan on the ceiling?

- A. larger
- B. smaller
- C. reversed
- D. upside down

Answer: _____

Use the passage below “Making Fresh Water from Salt Water” to answer Number 14.

Five students distilled equal masses of salt water in identical distillation devices. After several hours, the students measured a different amount of fresh water in each of the cups.

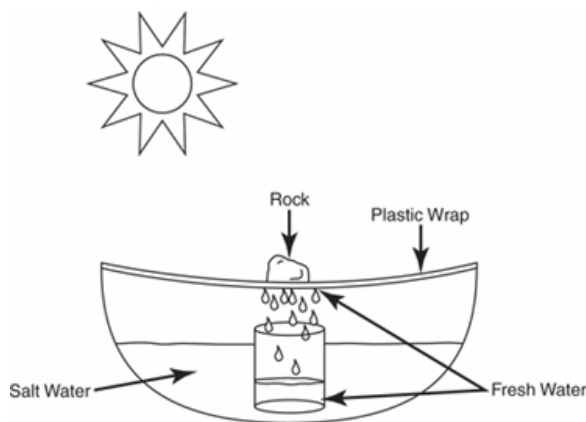
Although most water on Earth is salt water, humans can only live by drinking fresh water. Fresh water can be produced from salt water by separating the salt from the water. One method of separating salt from water is distillation. During distillation, salt water is heated until the liquid changes to a vapor, or gas. When the water turns to a vapor, the salt is left behind. When the vapor cools and changes to a liquid, it is fresh water.

The steps for making a simple distillation device are described below:

1. Pour salt water in a bowl.
2. Place an empty cup upright in the middle of the bowl of salt water.
3. Cover the bowl and cup with plastic wrap.
4. Place a small rock on the plastic wrap directly over the cup so the plastic wrap is pushed down slightly.
5. Place the bowl in a sunny location.

The distillation device is pictured below:

Sunlight causes water to evaporate. The vapor collects in droplets on the inside of the plastic wrap and rolls toward the lowest part of the plastic wrap, where the rock pushes it down. The droplets drip into the cup, filling it with fresh water. The salt stays in the bowl.



- 14. What is the best explanation for the different amounts of water in each of the cups?**
- A. Equal amounts of salt were present in the water.
 - B. Some of the distillation devices were in the shade.
 - C. Each student timed the distillation process differently.
 - D. Each student measured the temperature of the water incorrectly.

Answer: _____

15. **Students are learning about the natural resources in Maryland. One group of students researches information about renewable natural resources in the state. The other group researches information about nonrenewable natural resources in the state. The resources the students investigate include plants, animals, soil, minerals, water, coal, and oil.**

Which nonrenewable natural resource heats homes?

- A. sunlight
- B. aluminum
- C. natural gas
- D. ocean waves

Answer:_____

16. **Use the information below to answer the following.**

A Green Community

Many cities in the United States are developing “green communities.” A green community is intended to reduce the use of energy and consists of houses, apartments, and nearby businesses. Grocery stores, restaurants, and movie theaters are all within walking distance of the homes in the community. People travel shorter distances to their schools and jobs.

Many of the buildings in a green community are made of renewable and recycled materials. Solar energy keeps the buildings at a comfortable temperature. Natural landscape features, such as trees and plants, are carefully located to provide shade and to control temperatures. Community gardens allow residents to grow food and flowers.

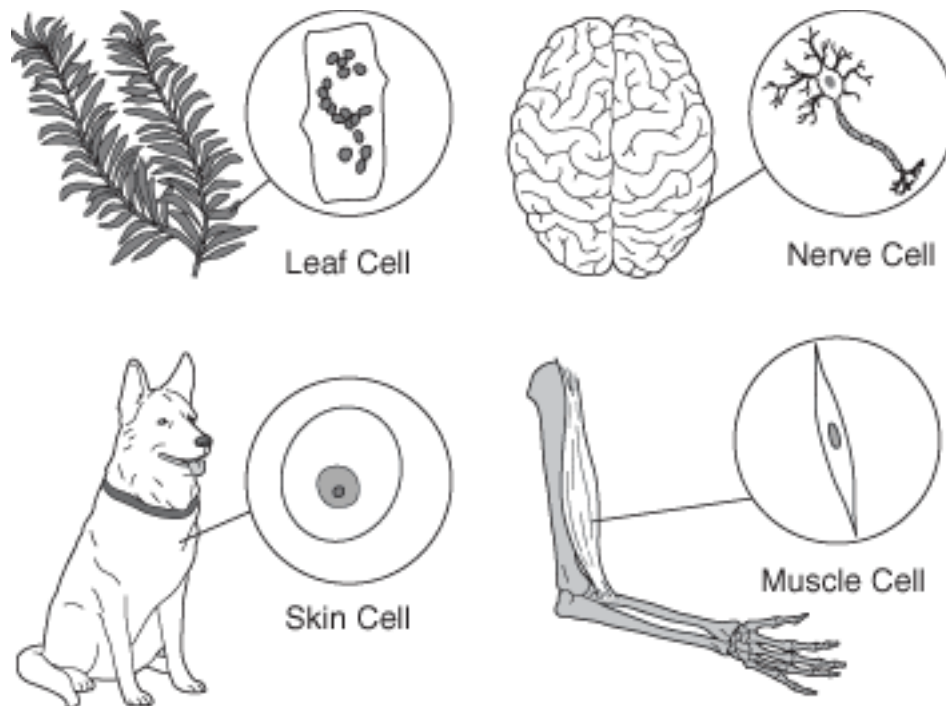
People in green communities are using a nonrenewable resource when they

- A. heat their homes with wood
- B. wash vegetables before cooking
- C. drive gasoline-powered automobiles
- D. grow flowers in the community garden

Answer:_____

17. **Most organisms are made of many different types of cells. Each type of cell has a special role within the organism.**

Multicellular organisms are made of groups of cells working together to do one job. These are called specialized cells. The diagrams show four types of specialized cells. Not all multicellular organisms need the same specialized cells.



18. Use the information below to answer the following.

A student is investigating changes in the states of matter. The student fills a graduated cylinder with 50 milliliters of packed snow. The graduated cylinder has a mass of 50 grams when empty and 95 grams when filled with the snow.

The packed snow changes to liquid water when the snow is put in a warm room.

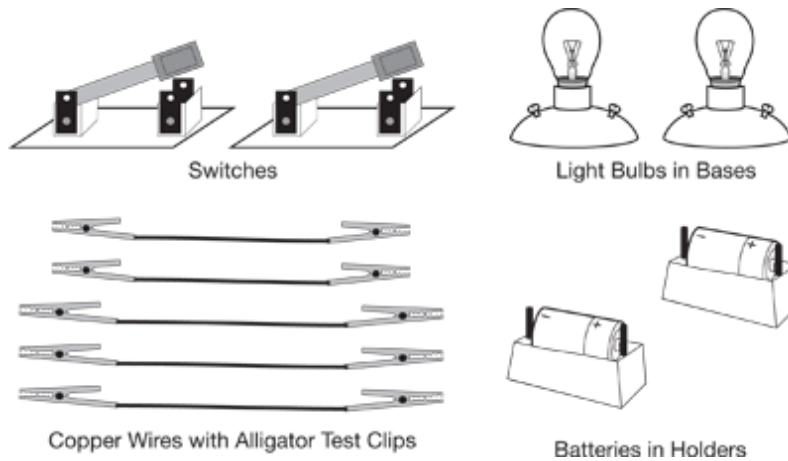
Which statement best describes this process?

- A. Cooling causes the snow to melt.
- B. Cooling causes the snow to freeze.
- C. Heating causes the snow to freeze.
- D. Heating causes the snow to melt.

Answer:_____

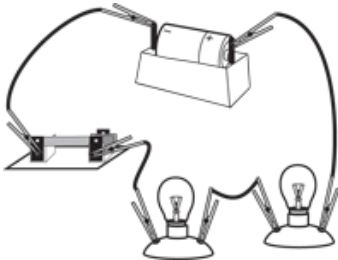
19. Use the information and diagram below to answer the following question.

Two students built different electrical circuits using the materials below.

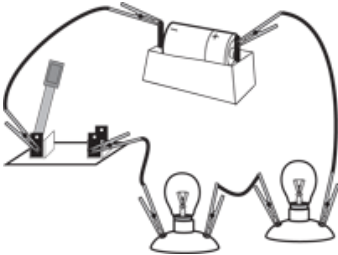


Which of the circuits shown below will make both light bulbs glow?

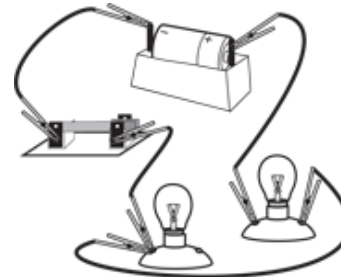
A.



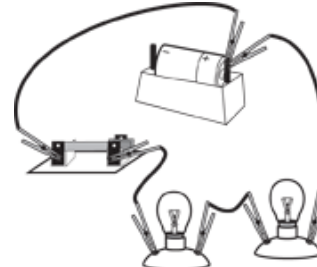
B.



C.



D.



Answer: _____

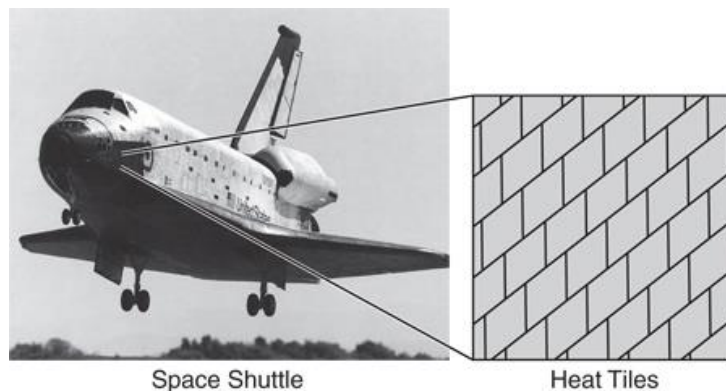
Space Shuttle Re-entry

The space shuttle program uses spaceships to carry humans from Earth to space and back again.

It takes a lot of fuel to produce the force needed to lift a space shuttle from Earth to space because the lift force must act against the force of gravity pulling down on the space shuttle. Much less fuel is needed to bring the space shuttle back to Earth. When the astronauts on a space shuttle complete a mission, they use the force of gravity acting on the space shuttle to pull it down from space to Earth's surface.

This landing process is not entirely without problems. Once the space shuttle moves from space into Earth's atmosphere, the space shuttle begins to hit air molecules. Although air is a gas, the space shuttle moves so quickly that it hits many air molecules with a great amount of force. Those hits result in friction with the air around the space shuttle. The friction slows the downward motion of the space shuttle and produces a large amount of heat.

Because of the heat produced, the space shuttle needs heat-resistant tiles so the inside of the space shuttle does not get too hot as it lands. The heat produced by the friction between the tiles and the atmosphere produces an orange glow as the shuttle moves toward Earth's surface.



20. Use the passage “Space Shuttle Re-entry” above to answer the following question.

Which measurement best represents the distance of the orbiting space shuttle from Earth?

- A. 300 liters
- B. 300 seconds
- C. 300 kilograms
- D. 300 kilometers

Answer: _____

BRIEF CONSTRUCTED RESPONSE SCIENCE RUBRIC

LEVEL 3

There is evidence in this response that the student has a *full and complete understanding* of the question or problem.

- The supporting scientific evidence is complete and demonstrates a full integration of scientific concepts, principles, and/or skills.
- The response reflects a complete synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology strengthens the response.
- An effective application of the concept to a practical problem or real-world situation reveals a complete understanding of the scientific principles. *

LEVEL 2

There is evidence in this response that the student has a *general understanding* of the question or problem.

- The supporting scientific evidence is generally complete with some integration of scientific concepts, principles, and/or skills.
- The response reflects some synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology is present in the response.
- An application of the concept to a practical problem or real-world situation reveals a general understanding of the scientific principles. *

LEVEL 1

There is evidence in this response that the student has *minimal understanding* of the question or problem.

- The supporting scientific evidence is minimal.
- The response provides little or no synthesis of information, such as data, cause-effect relationships, or other collected evidence.
- The accurate use of scientific terminology may not be present in the response.
- An application, if attempted, is minimal. *

LEVEL 0

There is evidence that the student has *no understanding* of the question or problem.

- The response is completely incorrect or irrelevant or there is no response.
-