Name _____

Minnesota Comprehensive Assessments-Series III

Science Item Sampler
Grade 8

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Minnesota Department of Education

18 Point

Science Test
General Directions

- This test contains two segments.
- You may write in this test book or use scratch paper.
- All answers must be marked in this test book.
- This test has four kinds of questions.
- Answer each multiple-choice question by circling your answer. The sample below shows how to do this.

Sample Question Answered in Test Book:

What should a farmer do to prevent too much fertilizer from being put on a field?

A. Apply fertilizer right before planting

B. Apply fertilizer and water at the same time

C. Measure the amount of minerals the soil needs

D. Measure the amount of water in the soil

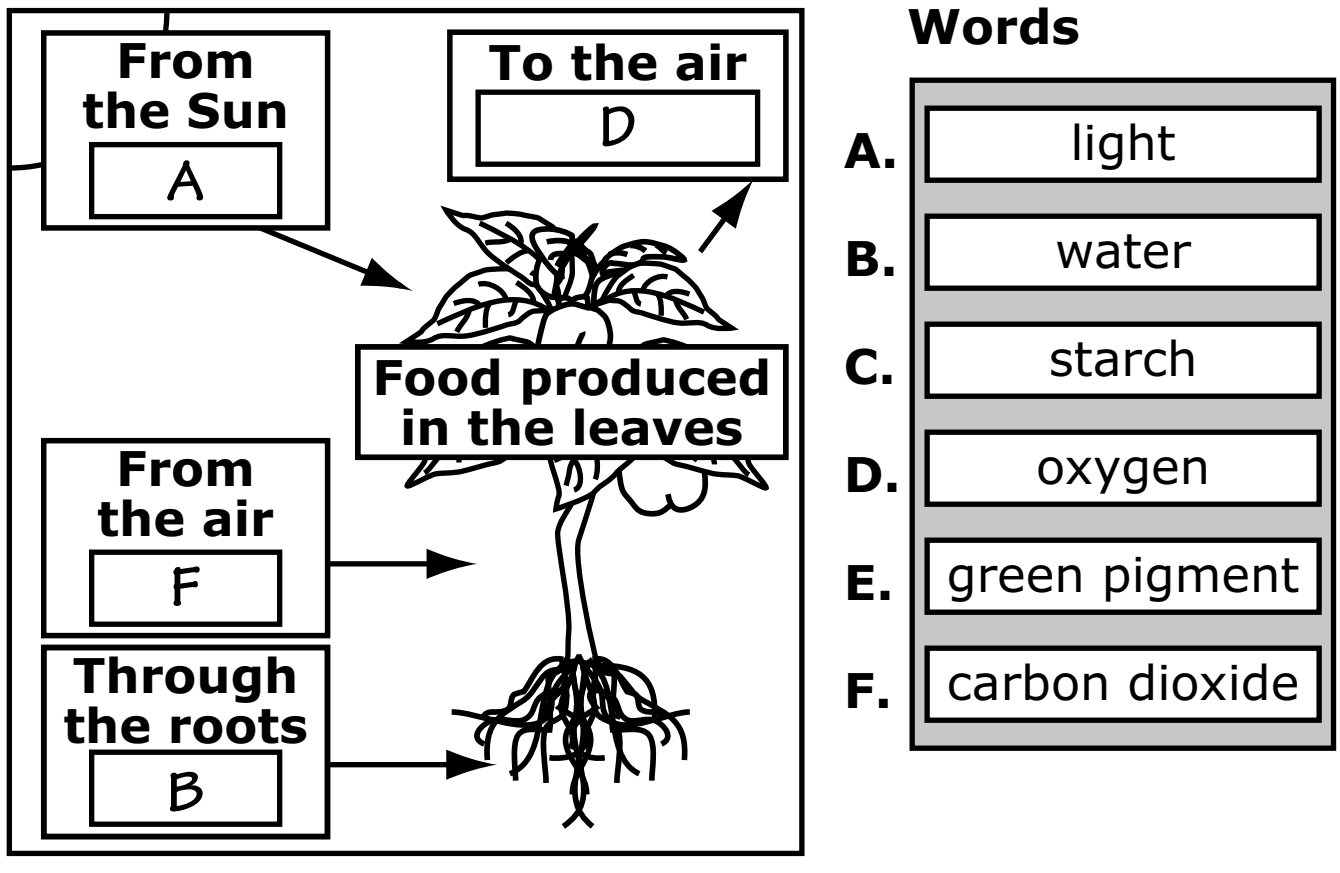
Go on to the next page.

- For some diagram questions, you will need to write the label letters (A, B, C, etc.) in the boxes. The sample below shows how to do this.

Sample Question Answered in Test Book:

This diagram shows the process of photosynthesis. Identify the parts of the photosynthesis process involved in this ecosystem.

Each word is labeled A, B, C, D, E, or F. Write the letter of the correct word in each empty box. Four of the words will be used.



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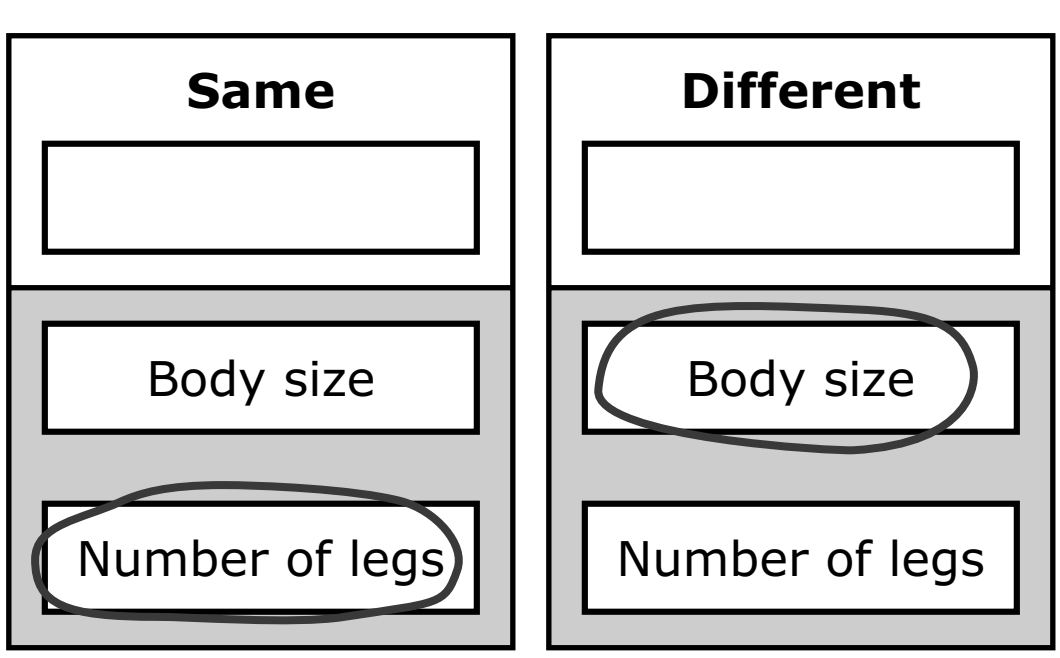
- For some diagram questions, you will need to circle the word you want to select as your answer. The samples below show how to do this.

Sample Question Answered in Test Book:

Two characteristics of pintail ducks are listed. Identify the characteristics that are the same and different in pintail ducks.

On the diagram, circle the word you want to select. You may only circle 1 word for Same and 1 word for Different.



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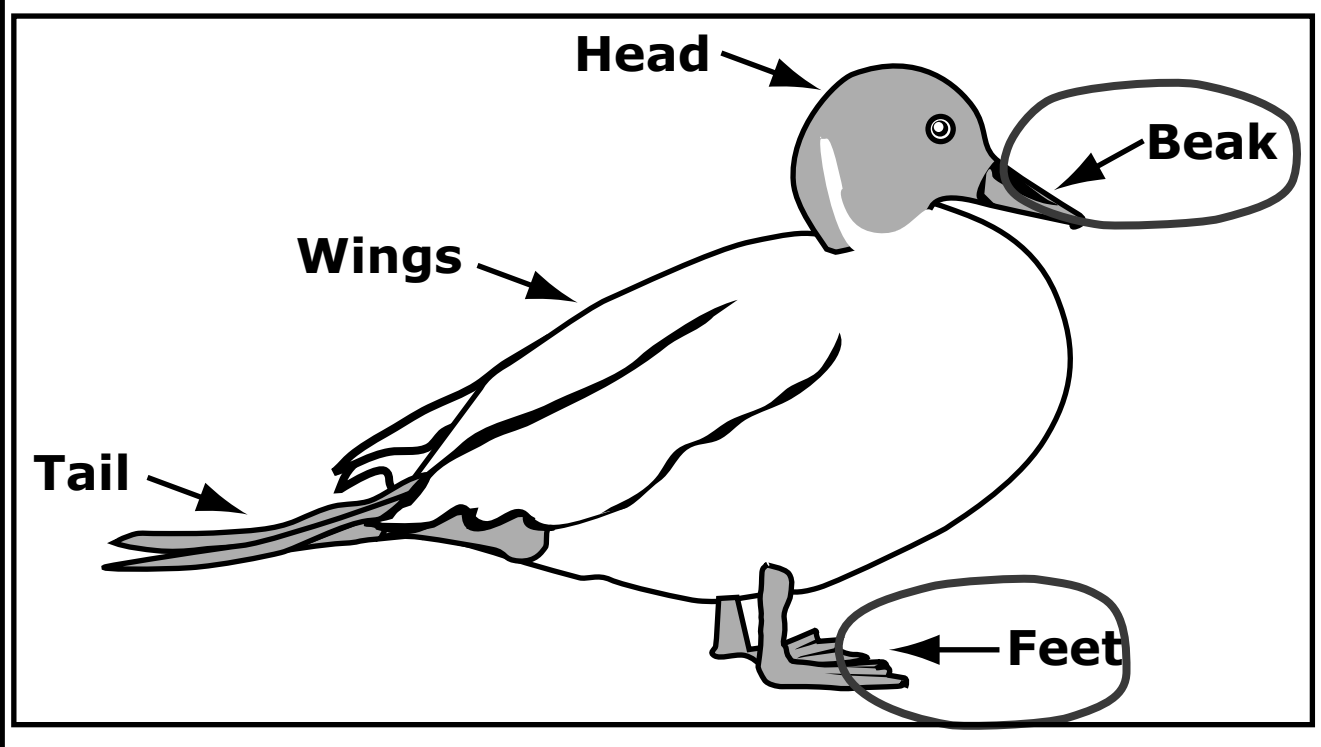
Sample Question Answered in Test Book:

Choose 2 different adaptations that make this duck more suited to feed on water plants than other kinds of birds.

On the diagram, circle the 2 adaptations. You may only circle 2 adaptations.



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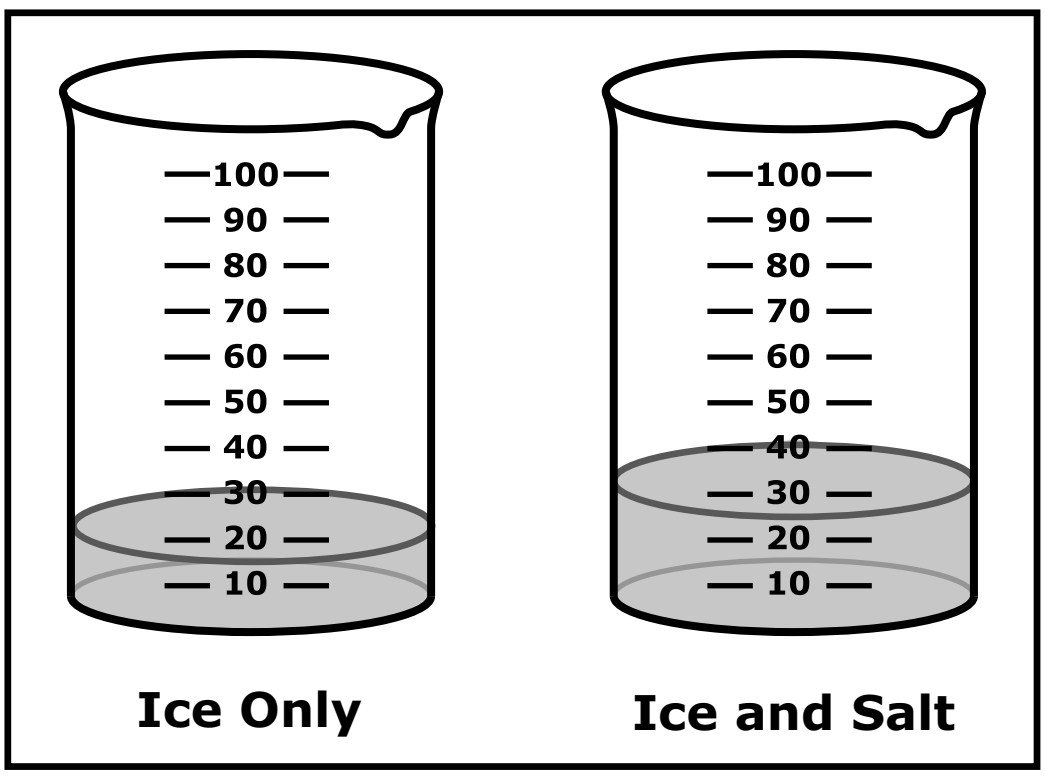
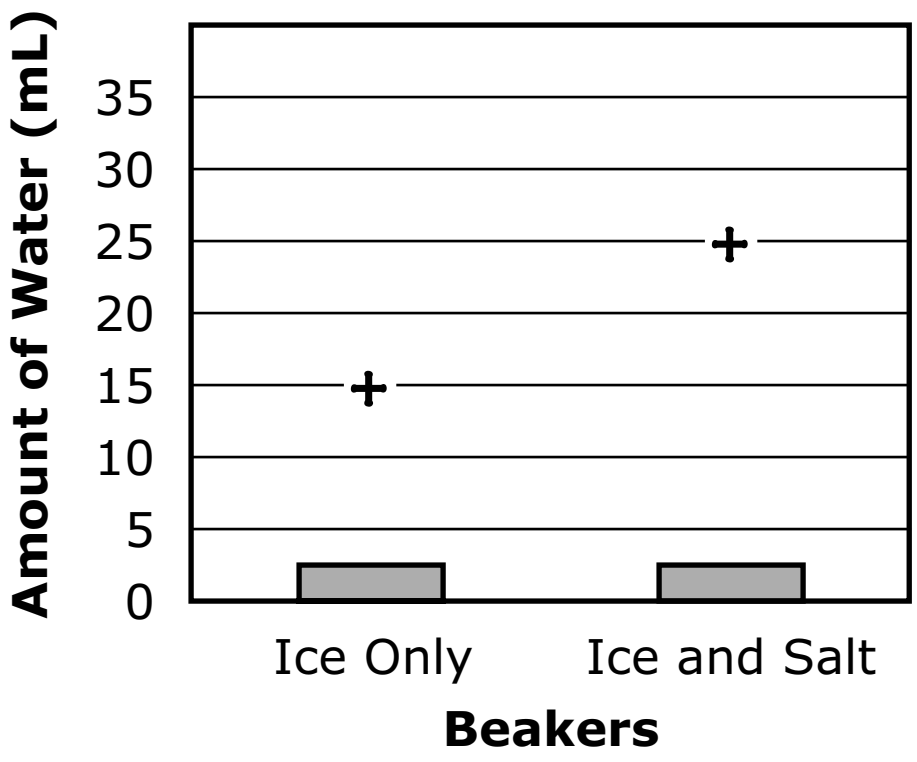
- For some graphing questions, you will need to write a "+" above each bar, where the top of the bar should be. The sample below shows how to do this.

Sample Question Answered in Test Book:

Read the water level in the beakers. Make a graph of this data.



Write a "+" above each bar where the top of the bar should be.



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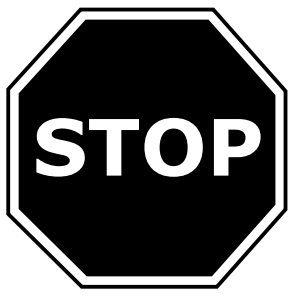
- When you finish a segment of the test, stop and check your answers. Then use the sticker given to you to seal it. Once you seal a segment, you cannot go back to it. Each segment must be sealed before you move on to the next segment.



10

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Segment 1

You will be told when to begin this segment.

1

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Science Test — Segment 1

How Does a Garden Grow

Go on to the next page.

1

This student is growing a garden. In her garden, she is growing many types of fruits and vegetables, including bell peppers.

Go on to the next page.

1. Which factor affecting the growth of pepper plants is a living factor?

A. The temperature of the air

B. The kinds of bacteria living in the soil

C. The amount of water the plants receive

D. The amount of sunlight the plants receive

Go on to the next page.

1

The student is planning an experiment to determine how the amount of light a pepper plant receives affects the amount of fruit it produces. To prepare for her experiment, she reviews photosynthesis and why it is important in making fruit. She draws a diagram of a pepper plant and all the parts of photosynthesis.

2. This diagram shows the process of photosynthesis. Identify the parts of the photosynthesis process involved in this ecosystem.

Each word is labeled A, B, C, D, E, or F. Write the letter of the correct word(s) in each empty box. You may only use each letter 1 time. 4 of the words will be used.

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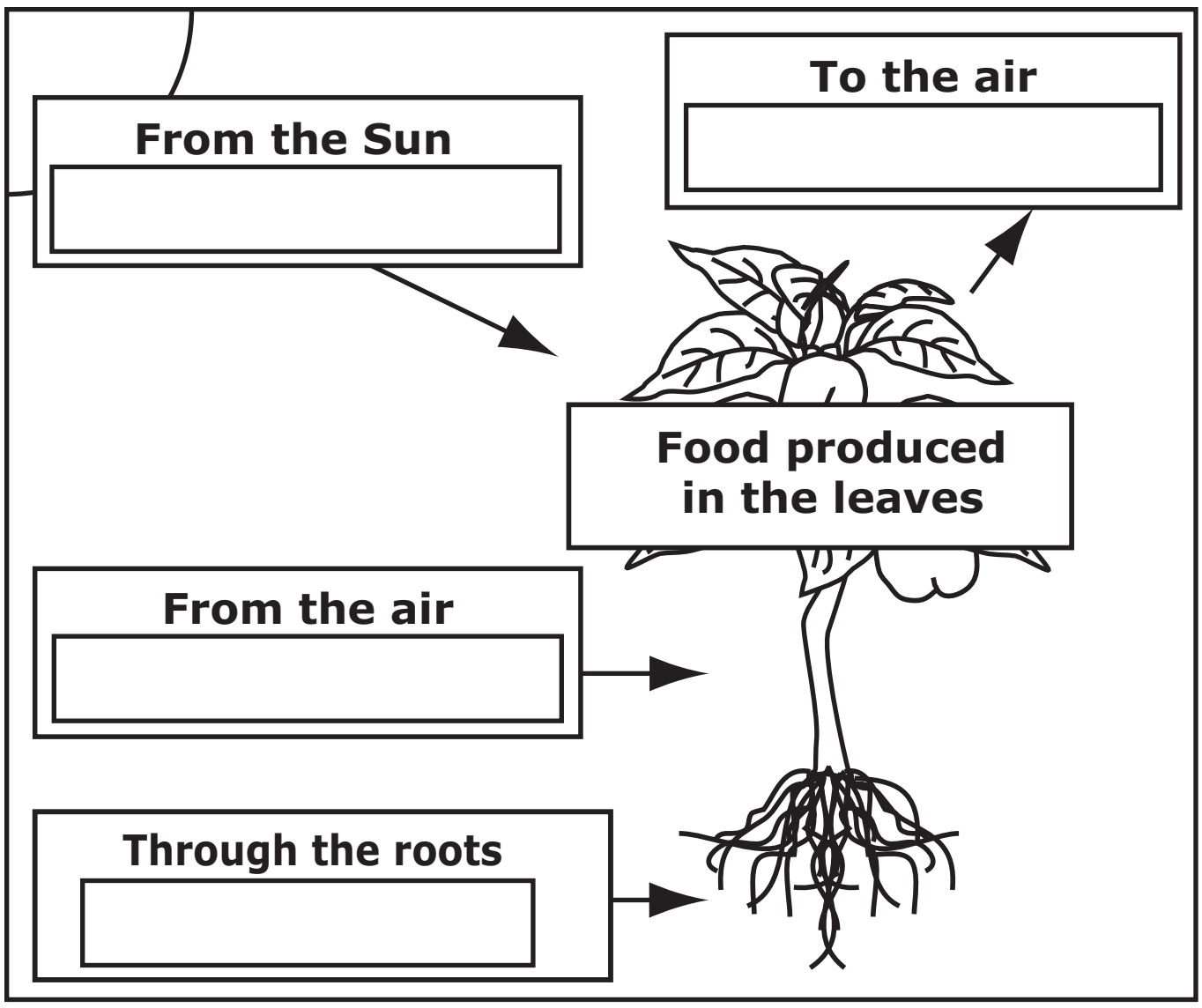

Words

A. light

B. water

C. starch

D. oxygen

E. green pigment

F. carbon dioxide

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1

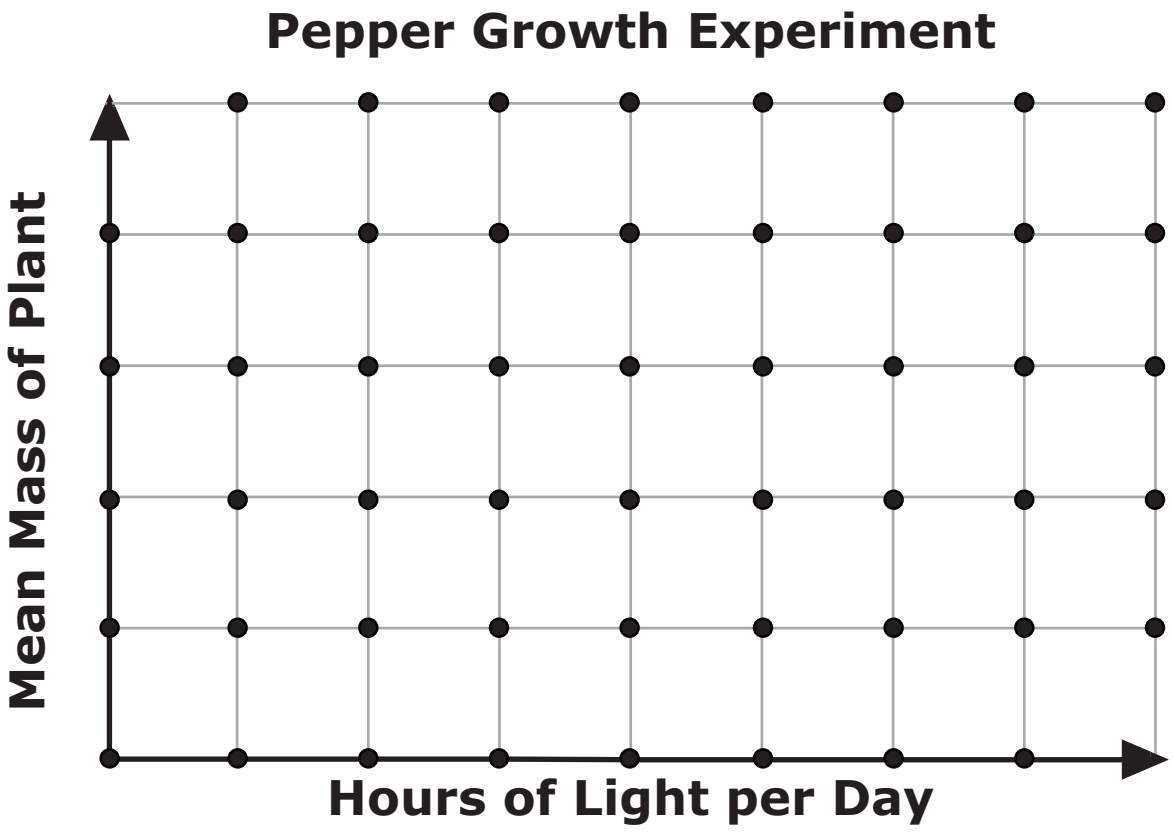
The student tests how the amount of light a pepper plant receives affects the mass of the plants. She sets up 9 pots, each with 1 pepper plant.

The plants are divided into 3 groups with 3 plants in each group. The first group receives 8 hours of light per day. The second group receives 12 hours of light per day. The third group receives 18 hours of light per day.

Go on to the next page.

3. After 10 weeks, the student measures the mass of each plant and averages the results for each group. She notices that the more light her pepper plants received, the more mass they had.

On the graph, draw a line to connect 2 points to show the trend for her results.



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1

4. Which variables in this investigation are controlled?

On the diagram, circle each of the variables you want to select.

The hours of light per day the plants receive

The number of pots in each group

The number of plants per pot

The type of plant

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Properties of Matter Investigation

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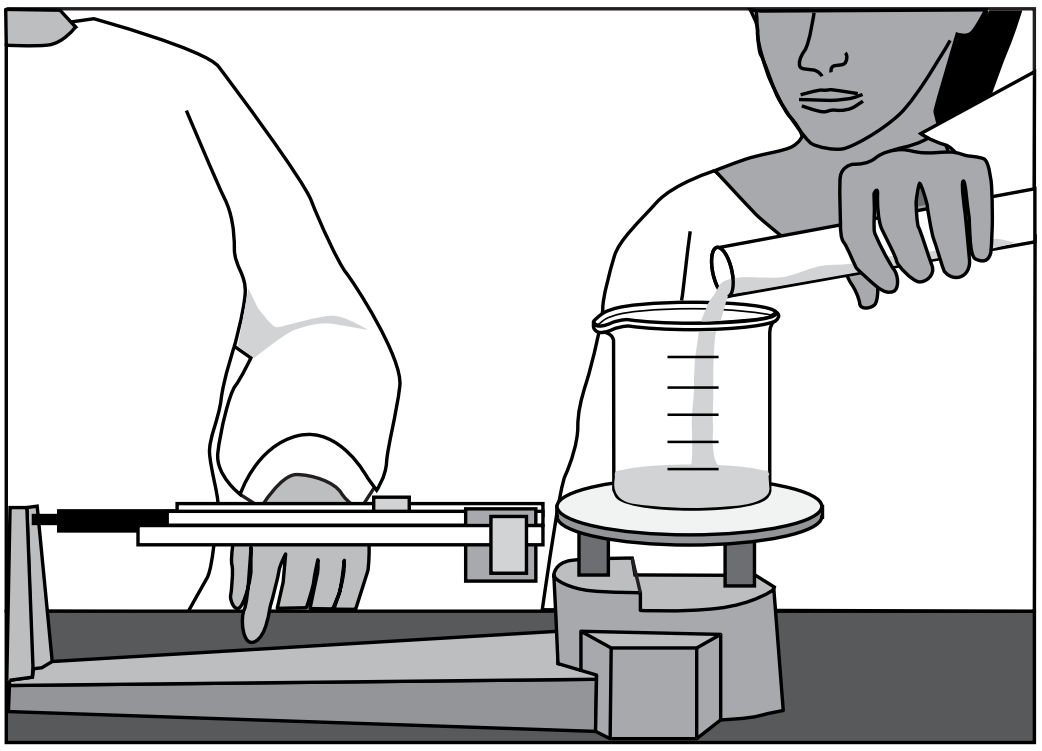
1

Two students are completing an investigation on the properties of matter. They start by measuring the mass of 50 milliliters of water.



5. Which properties of the water do **not** change when it is poured from the beaker into the graduated cylinder?

On the diagram, circle each of the properties you want to select.

Properties

- Mass
- Phase
- Shape
- Volume

ITEM SAMPLER MAY BE DUPLICATED.

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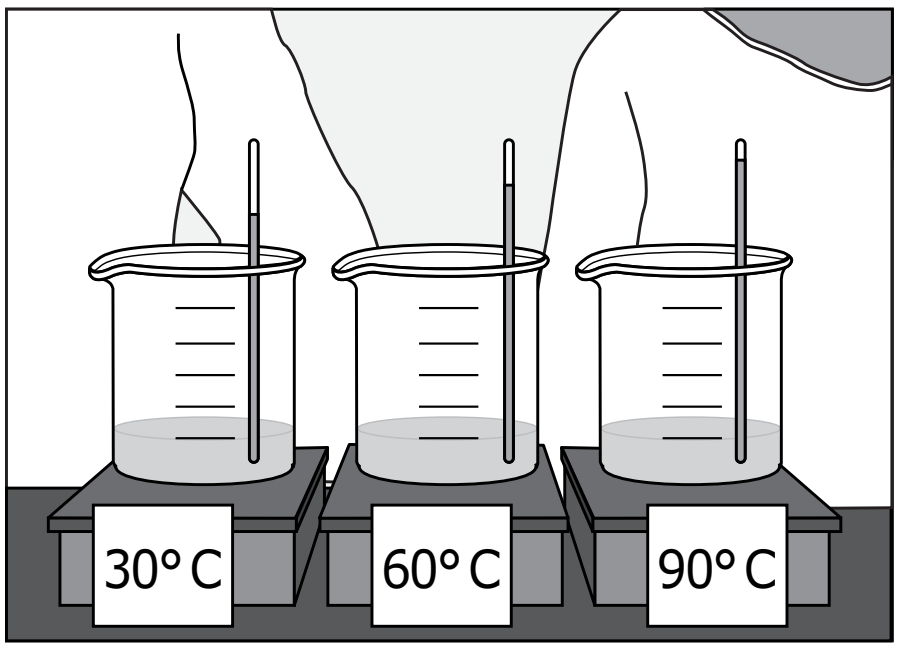
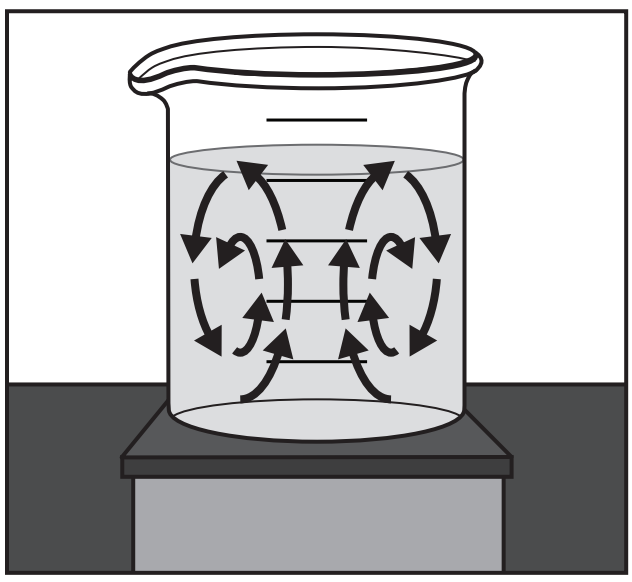
In order to compare the effect of temperature on the dissolving rate of sugar, the students prepare 3 beakers of water at different temperatures, one at 30°C, one at 60°C, and one at 90°C.



6. Which method of heat transfer is shown by the arrows?



A. Conduction

B. Convection

C. Precipitation

D. Radiation

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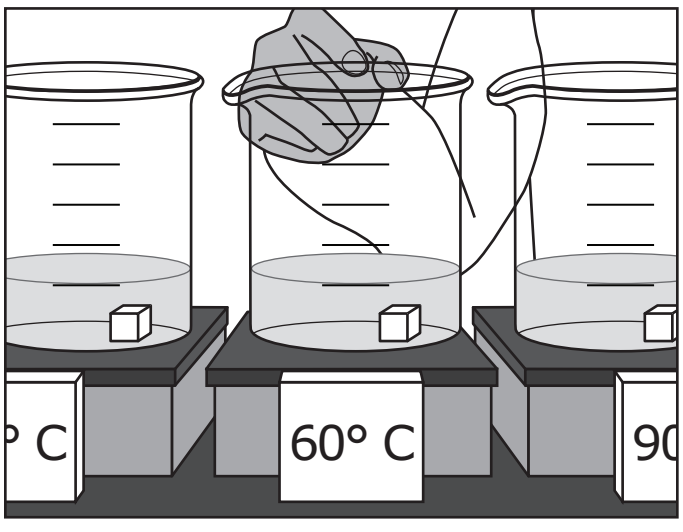
1

The students now add a sugar cube into each beaker of water, while stirring the water.



7. As the sugar crystals disappear, what is happening to the sugar molecules?

A. They combine with the water molecules.

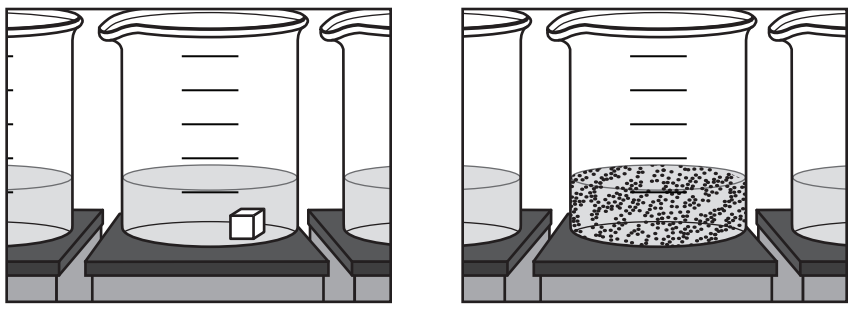
B. They enter the spaces between the water molecules.

C. They evaporate into the air.

D. They separate into smaller pieces called atoms.

Go on to the next page.

One of the beakers of sugar water is heated at a very slow rate, using a hotplate, until all of the water is gone. Notice there is a substance left in the beaker.



Before Heating **After Heating**

8. Which of the following statements best describes what happened to the water?

A. The water changed into a solid.

B. The water changed state from a liquid to a gas.

C. The water changed into hydrogen and oxygen.

D. The water changed state from a liquid to a solid.

9. The substance that is left in the beaker is sugar. Based on this fact, what type of change took place when the sugar dissolved in the water?

A. Chemical

B. Electrical

C. Mechanical

D. Physical

Go on to the next page.

1

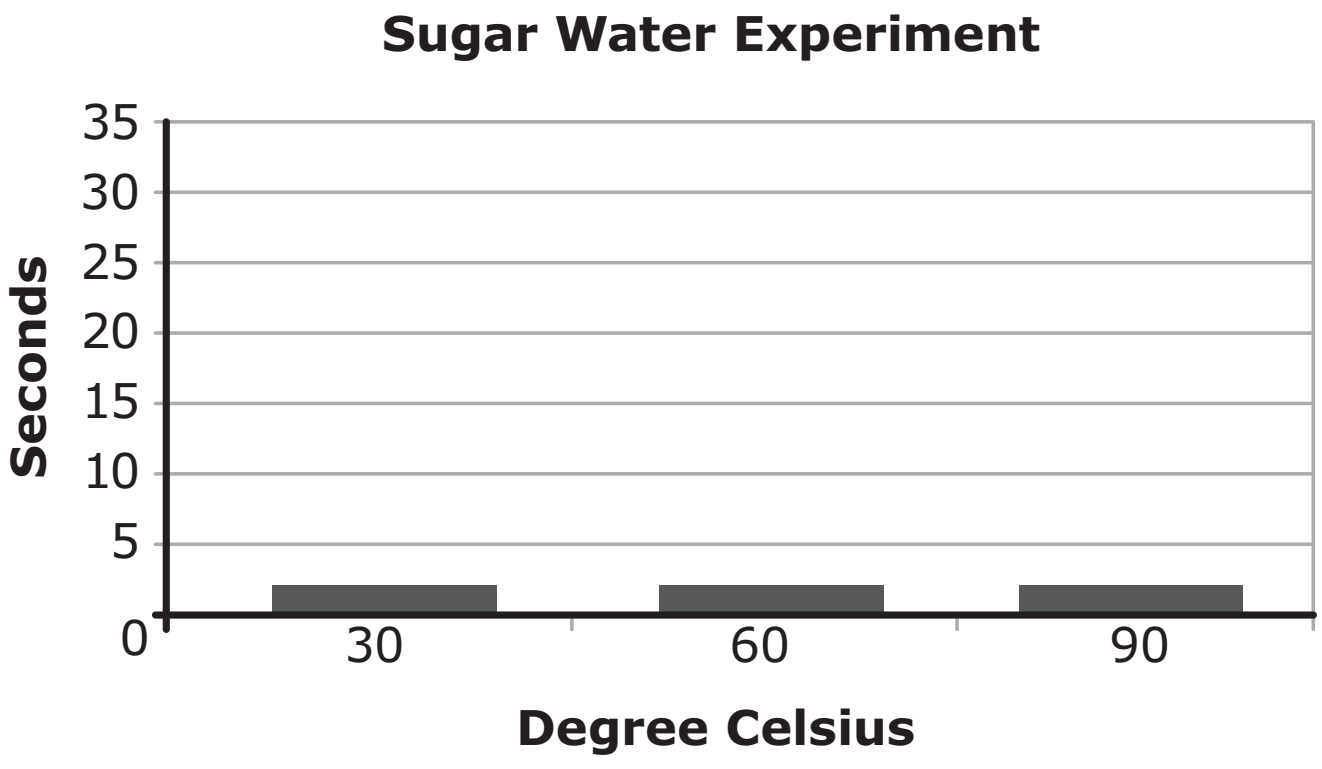
The data that was recorded from dissolving sugar is shown in the table below.

Sugar Water Experiment

Beaker 1	Beaker 2	Beaker 3
30°C	60°C	90°C
30 sec	15 sec	5 sec

10. The data show results of the experiment. Make a graph of this data.

Write a "+" above each bar where the top of the bar should be.



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11. The students slowly heat a fourth beaker to 100°C. Using the data they have collected the students want to predict how long it will take for the sugar to dissolve in this beaker.

Predict how long it will take the sugar to dissolve, based on the student's data.

Write your answer in the box. You may use up to 5 numbers.

sec

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Segment 2

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Science Test — Segment 2

Weather

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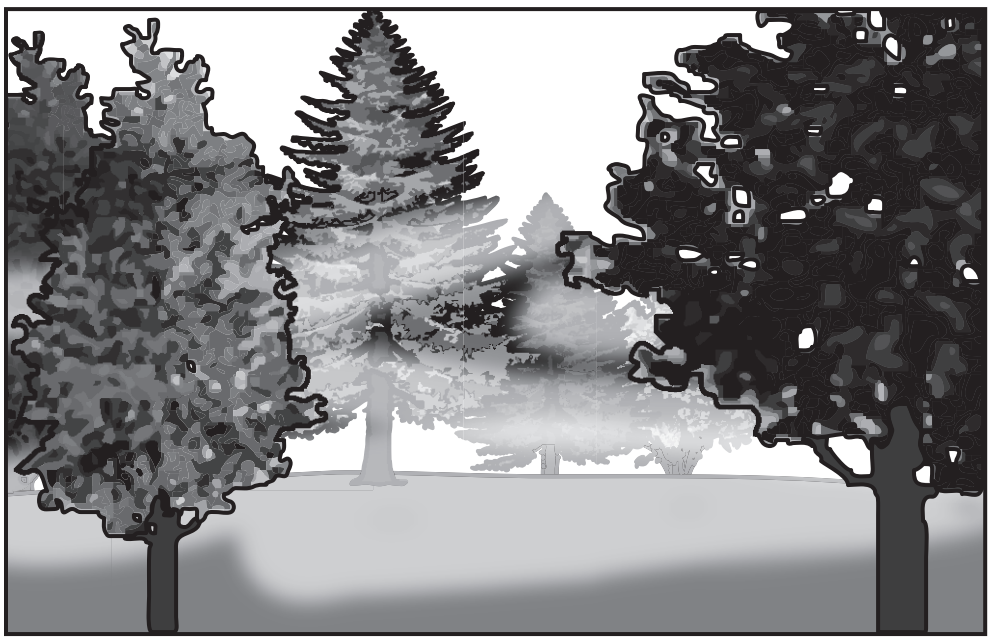
On the way to school, students saw fog in low-lying areas. Students also noticed that the air was very calm, and there was little wind.



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12. Later in the day the sun moves higher in the sky and the temperature increases. The fog cannot be seen. How does the air temperature increase during the day affect the water in the fog?

A. The increasing temperature keeps the water in the atmosphere.

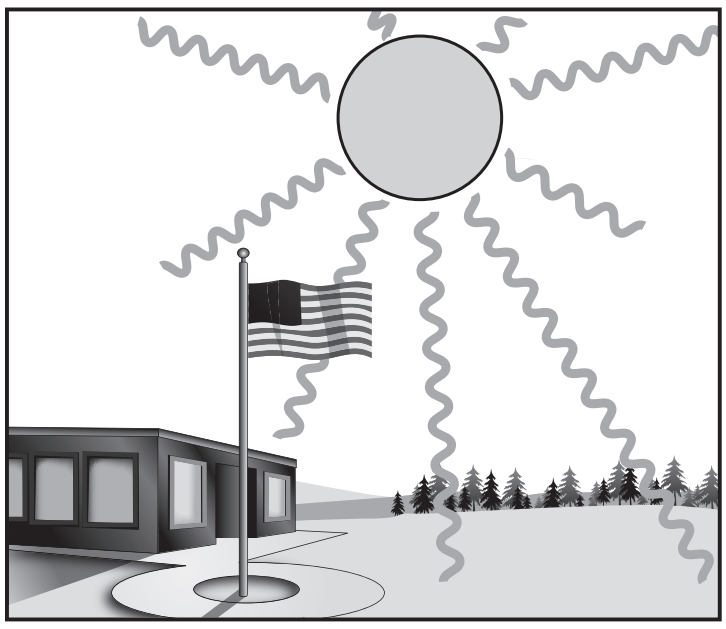
B. The increasing temperature moves the water to local lakes.

C. The increasing temperature forces the water underground.

D. The increasing temperature returns the water to the ocean.

Go on to the next page.

Later that morning, students saw the flag blowing in the wind.



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13. Which statement explains why winds are often weaker at night and get stronger during the day?

A. Wind results from changes in the water vapor content of the air.

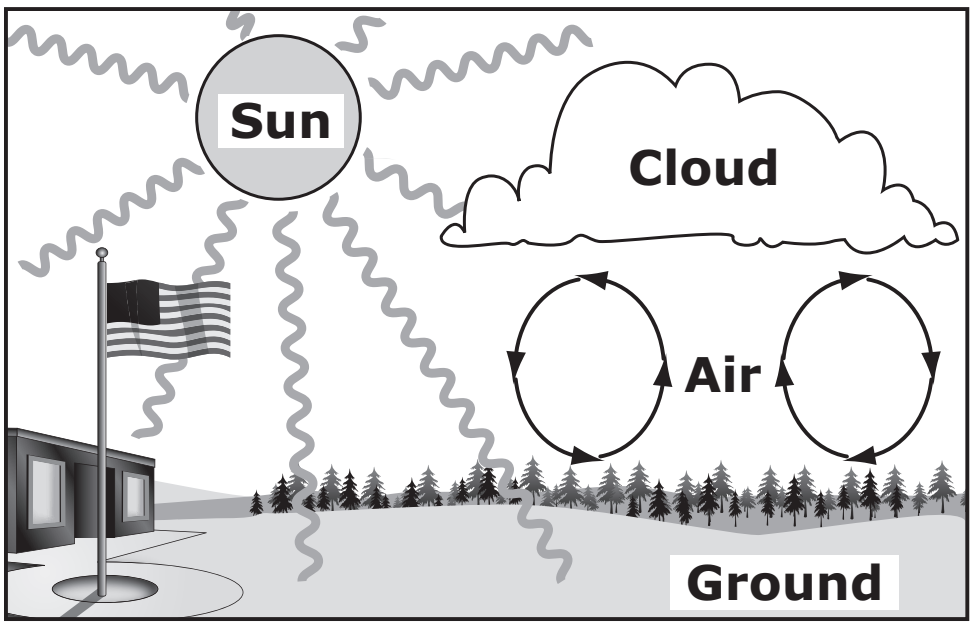
B. Wind results when rain or snow falls from clouds.

C. Wind results from unequal heating of the air.

D. Wind results where skies change from cloudy to clear.

Go on to the next page.

The energy that drives our weather is transferred through several processes.



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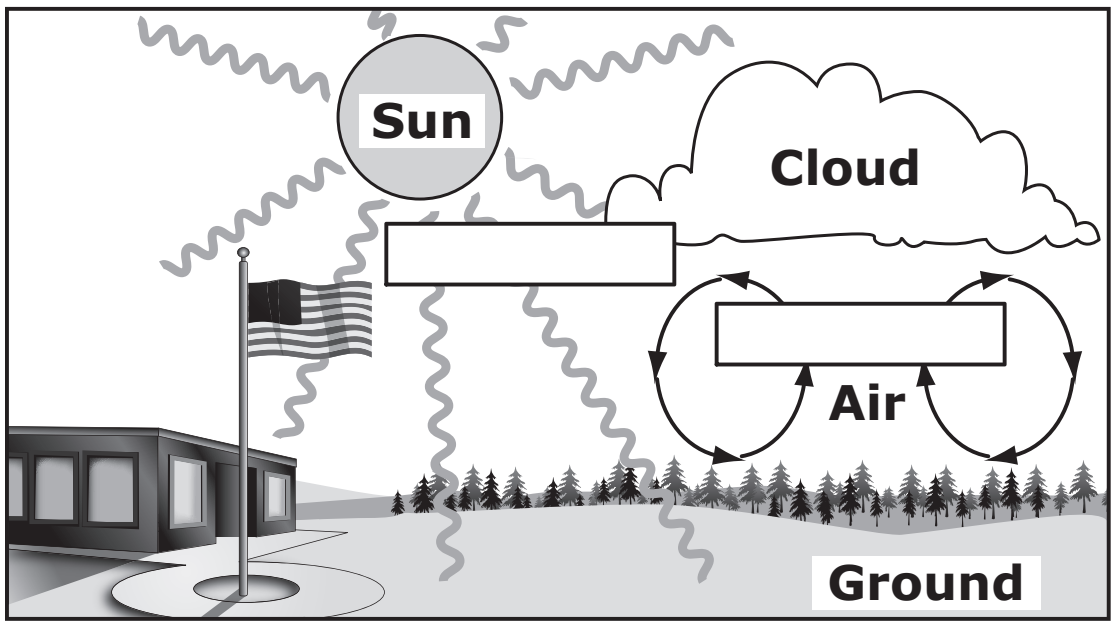
14. What is the principal external energy source which drives the weather on Earth?

Write your answer in the box. You may use up to 10 letters.

Go on to the next page.

15. Identify the processes of energy transport that affect Earth and its atmosphere.

Each process is labeled A, B, C, D, or E. Write the letter of the correct process in each empty box. You may only use each letter 1 time. 2 of the processes will be used.



Processes

A. Convection

B. Conduction

C. Precipitation

D. Condensation

E. Radiation

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Water Bottle Rockets

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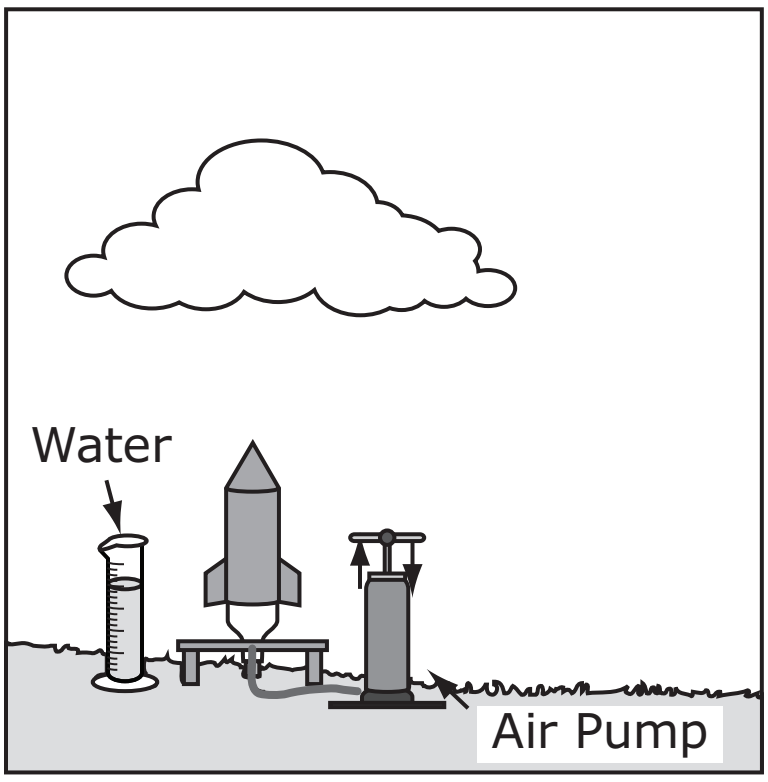
Water bottle rockets are made by adding water to a bottle and pumping air into it. The flight time and height depend on the shape and the size of the water bottle rocket and the amounts of water and air you pump into the bottle.

2



16. Which tool best measures the volume of water put into the water bottle rocket?

A. Timer

B. Metric ruler

C. Graduated cylinder

D. Celsius thermometer

Go on to the next page.

17. 650 milliliters of water is put into the water bottle. Convert 650 milliliters to liters.

You can use the calculator to help you answer this question.

Write your answer in the box. You may use up to 10 numbers.

650 milliliters = ☐ liters

2

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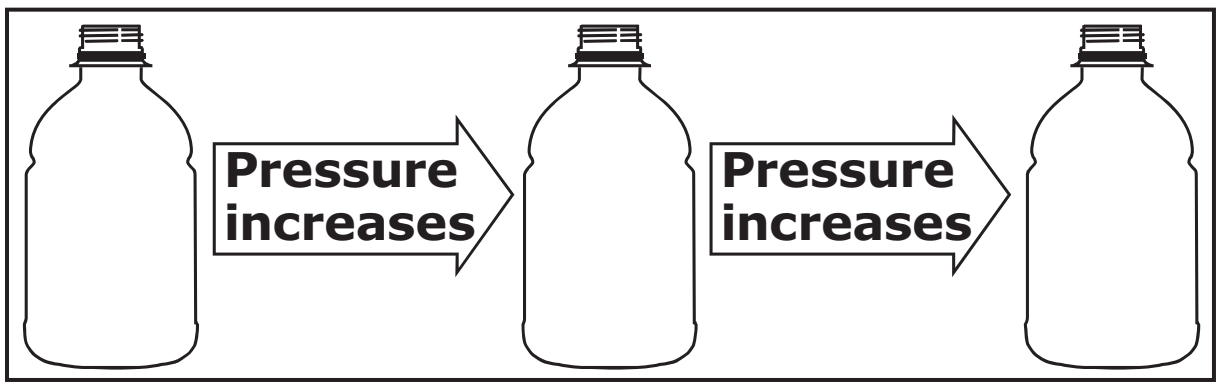
Go on to the next page.

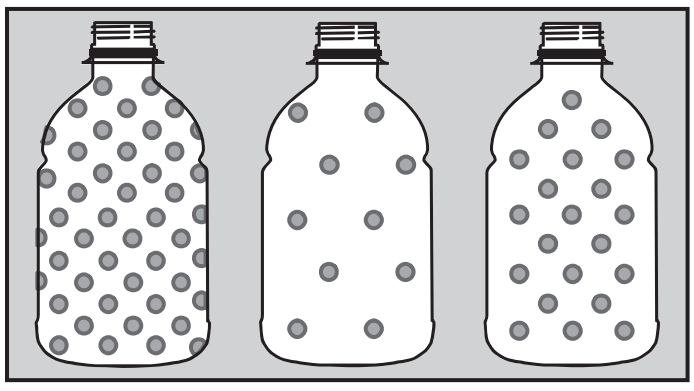
18. Complete the diagram to show how the space between air molecules changes as pressure increases in the bottle.

Each air molecule group is labeled A, B, or C. Write the letter of the air molecule group in the correct bottle. You may only use each letter 1 time.

Space Between Air Molecules



Air Molecule Groups



A. **B.** **C.**

Go on to the next page.

19. Some of the air that is pumped into the bottle dissolves in the water. What type of change happens when air dissolves in water?

A. Chemical

B. Color

C. Molecular

D. Physical

2

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