

Name

Date

Class

States of Matter

Water exists in three states—solid, liquid, and gas. Solid water is ice. The water molecules in ice vibrate but cannot change position relative to other water molecules. In liquid water, molecules are free to move around each other. However, the molecules remain close together. Gaseous water is called water vapor. Water molecules in vapor have so much energy that they escape the attractions of the other water molecules. Water vapor spreads out into the available space. In this activity, you will investigate the three states of water.

Possible Materials

- 500-mL beaker
 - crushed ice
 - hot plate
 - Celsius thermometer
 - graph paper
 - ring stand
 - thermometer clamp
-
-

Question

How does water behave as its temperature is increased?

Form a Hypothesis

Think about the experiences that you've had with the different states of water. Now, make a hypothesis to answer the question above. Write your hypothesis in your Science Journal.

Safety

The hot plate and beaker will be very hot. Do not touch them until after they have cooled.

Test Your Hypothesis

1. Think about the materials that you have been given. How will you test your hypothesis?
2. Make a list of the steps that you will follow. You'll probably want to put crushed ice into the beaker. How will you heat the beaker? How will you measure temperature? How

slowly do you need to heat the beaker in order to observe the temperature at which the state changes? Once you have designed your experiment, ask your teacher to approve your plan.

3. Carry out your experiment. Make careful temperature readings at regular time intervals as the water is heated. Note the time when the last piece of ice melts. Also note the time when the water first begins to boil. You might want to record your data in a table like the one on the next page.



Data and Observations

Time (minutes)																				
Temperature (°C)																				
Observations																				

Interpret Your Data

1. Look carefully at your data. At what temperature did the last bit of ice melt? At what temperature did the water first begin to boil?

2. Make a graph showing how the water temperature changed through time. Label the x-axis of your graph *Time (min)* and the y-axis *Temperature (Celsius)*.

Conclude and Apply

1. Examine the graph that you made. Write a description of how the water temperature changed through the experiment. What was the temperature when the ice was melting? How did the temperature change after the last bit of ice melted? How did the temperature behave when the water began to boil?

2. In this activity, you saw how water changes state. Give some other examples of matter changing state.

Going Further

Research to find out why water is a good substance to use to cool machinery. What is specific heat? Give a short speech to communicate what you learn.
