



Laboratory Activity

States of Matter

Three common states of matter are solid, liquid, and gas. A fourth state of matter, the plasma state, exists only at extremely high temperatures. Differences among the physical states depend on the attractions between the atoms or molecules and on the rate of movement of the atoms or molecules. Pressure and temperature control these two factors.

Strategy

You will observe the characteristics of a solid.

You will change a gas to a liquid.

You will compare the characteristics of a solid, a liquid, and a gas.

Materials

marker

beaker (1,000-mL)

ice cubes (frozen from 500 mL of water)

ice cube tray

plastic drinking glass (cold or add an ice cube)

water

Procedure

1. Mark the level of the top of the ice cubes while they are still in the tray. Remove the ice cubes and place them in the beaker. Record the characteristics of ice in Table 1.
2. Let the ice cubes melt. Record the characteristics of the resulting water in Table 1.
3. Pour the water back into the tray. Mark the level of the top of the water on the tray.
4. Place the cold glass in a warm area. After a few minutes, record your observations of the surface of the glass in Table 1.
5. Place an ice cube in the beaker of water. Observe whether or not it floats. Record your observations in Table 1.

Data and Observations

Table 1

Material	State of matter	Takes shape of container (yes or no)	Other characteristics
Ice cubes			floats: yes or no
Water			higher or lower in tray than ice
Material	Observations		
Glass			
Beaker with ice			

Laboratory Activity 1 (continued)

Questions and Conclusions

1. What is solid water called?

Liquid water?

Water as a gas?

2. Did the ice cube sink or float in the water? Explain.

3. Which occupies more volume, an equal amount of water or ice? Explain.

4. Where did the water on the glass come from?

What are the characteristics of water as a gas?

5. What change caused the water vapor to change to a liquid?

6. If you changed liquid water to water vapor in a pressure cooker, what volume would the water vapor occupy?

7. Compare the characteristics of water as a solid, a liquid, and a gas.

Strategy Check

_____ Can you observe the characteristics of a solid?

_____ Can you observe a gas change to a liquid?

_____ Can you compare the characteristics of a solid, a liquid, and a gas?

**Directed Reading for
Content Mastery****Key Terms
States of Matter****Meeting Individual Needs**

Directions: Write the letter of the term that correctly completes each sentence in the space at the left.

- _____ 1. When a liquid is _____ it is turning into a solid.
- _____ 2. You experience _____ when you float in a swimming pool.
- _____ 3. The amount of force applied to an area is called _____.
- _____ 4. The measure of the average kinetic energy of the particles of a substance is the _____.
- _____ 5. _____ explains why a balloon bulges on one end when you pinch the other end.
- _____ 6. _____ objects have definite shape and volume.
- _____ 7. To determine an object's buoyant force, use _____.
- _____ 8. _____ relates an object's mass and volume and determines whether an object will sink or float.
- _____ 9. Matter that has definite volume but takes the shape of its container is _____.
- _____ 10. Thermal energy that flows from higher temperature to lower temperature is _____.
- _____ 11. _____ quickly forms on a cold glass on a hot day.
- _____ 12. A _____ has no definite shape or volume.
- _____ 13. If it takes up space and has mass, it is _____.
- _____ 14. Boiling and evaporation are both forms of _____.
- _____ 15. A solid object is _____ when it is transforming into a liquid.
- a. pressure
b. buoyant force
c. liquid
d. freezing
e. Archimedes' principle
f. condensation
g. density
h. gas
i. heat
j. matter
k. melting
l. Pascal's principle
m. solid
n. temperature
o. vaporization