

Vocabulary and Section Summary

Four States of Matter

VOCABULARY

In your own words, write a definition of the following terms in the space provided.

1. states of matter

2. solid

3. liquid

4. gas

5. plasma

SECTION SUMMARY

Read the following section summary.

- Particles of matter are in constant motion. The states of matter depend on the motion of particles.
- A solid has a definite shape and volume. A liquid has a definite volume but not a definite shape.
- A gas does not have a definite volume or shape. Plasma, a fourth state of matter, does not have a definite shape or volume, and its particles are broken apart.

Vocabulary and Section Summary

Changes of State

VOCABULARY

In your own words, write a definition of the following terms in the space provided.

1. change of state

2. melting

3. evaporation

4. boiling

5. condensation

6. sublimation

Vocabulary and Section Summary A *continued*

SECTION SUMMARY

Read the following section summary.

- A change of state is the conversion of a substance from one physical form to another.
- A change of state requires a loss or gain of energy by a substance's particles.
- Melting is the change from a solid to a liquid, and freezing is the change from a liquid to a solid.
- Both boiling and evaporation result in a liquid changing to a gas.
- Condensation is the change of a gas to a liquid. It is the reverse of evaporation.
- Sublimation changes a solid directly to a gas.
- The temperature of a substance does not change during a change of state.

Skills Worksheet

Chapter Review

USING VOCABULARY

- _____ 1. **Academic Vocabulary** Which of the following words means “a set of steps or events”?
- a. reaction
 - b. process
 - c. principle
 - d. role

For each pair of terms, explain how the meanings of the terms differ.

2. *solid* and *liquid*

3. *evaporation* and *boiling*

4. *condensation* and *sublimation*

UNDERSTANDING CONCEPTS

Multiple Choice

- _____ 5. Which of the following statements best describes the particles of a liquid?
- a. The particles are far apart and moving fast.
 - b. The particles are close together but moving past each other.
 - c. The particles are far apart and moving slowly.
 - d. The particles are closely packed and vibrating in place.
- _____ 6. Dew collecting on a spider web in the early morning is an example of
- a. condensation.
 - b. evaporation.
 - c. sublimation.
 - d. melting.

Chapter Review *continued*

- _____ **7.** During which change of state do atoms or molecules become more ordered?
a. boiling
b. condensation
c. melting
d. sublimation
- _____ **8.** As the particles of a solid undergo sublimation, they
a. lose energy.
b. move closer to one another.
c. change temperature.
d. move farther apart from one another.

Short Answer

- 9. Listing** Rank solids, liquids, and gases in order of particle speed from the highest speed to the lowest speed.

- 10. Classifying** At atmospheric pressure, what is the characteristic boiling point of water, in degrees Celsius?

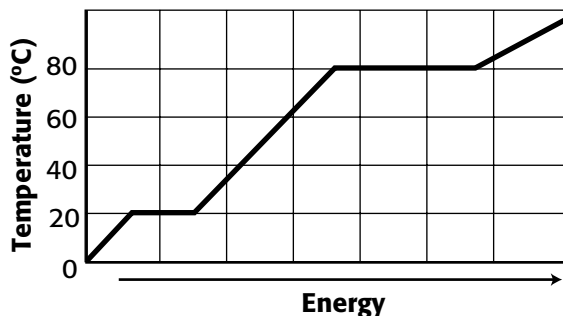
- 11. Analyzing** Explain why liquid water takes the shape of its container but an ice cube does not.

- 12. Concluding** Water's states of matter include steam, liquid water, and ice. What about water is the same in these states? What can you conclude about what changes and what does not change during a change of state?

Chapter Review *continued*

INTERPRETING GRAPHICS

Use the graph below to answer the next two questions.



13. Identifying What is the boiling point of the substance? What is the melting point?

14. Concluding How does the substance change while energy is being added to the liquid at 20°C?

WRITING SKILLS

15. Creative Writing Imagine that you are a gas particle and that the material you are in condenses and then freezes. From your point of view as a particle, write a clear step-by-step description of what happens as you go through each change of state.

Chapter Review *continued*

19. Applying Concepts After taking a shower, you notice that small droplets of water cover the bathroom mirror. Explain how these drops form. Be sure to describe where the water comes from and the changes it undergoes.

20. Making Inferences At sea level, water boils at 100°C and methane boils at -161°C. Which of these substances has a stronger force of attraction between its particles? Explain your reasoning.

21. Analyzing Ideas By using an electric current, you can split liquid water to form two new substances, hydrogen and oxygen gases. Is this a change of state? Explain your answer.

22. Evaluating Hypotheses Imagine that a gas is bubbling up from a sample of water. Laurel forms the hypothesis that the water is boiling. How could she test that hypothesis?

Chapter Review *continued*

MATH SKILLS

23. Analyzing Data Kate placed 100 mL of water in five different pans, placed the pans on a windowsill for a week, and measured how much water evaporated from each pan. Draw a graph of her data, which is shown below. Place surface area on the x -axis and volume evaporated on the y -axis. Is the graph linear or nonlinear? What does this information tell you?

| | | | | | |
|--------------------------------------|----|----|----|----|----|
| Pan number | 1 | 2 | 3 | 4 | 5 |
| Surface area (cm²) | 44 | 82 | 20 | 30 | 65 |
| Volume evaporated (mL) | 42 | 79 | 19 | 29 | 62 |

CHALLENGE

24. Analyzing Methods To protect their crops during freezing temperatures, orange growers spray water onto the trees and allow it to freeze. In terms of energy lost and energy gained, explain why this practice protects the oranges from damage.
