NAME Key DATE CLASS

#9 Binder

Chapter 8

Use with Text Pages 214–221

STUDY GUIDE

• Matter and Temperature

Match the definition in Column II with the term in Column I. Write the letter of the correct definition in the blank on the left.

Column I	Column II
h 1. kinetic theory of matter	a. water vapor
J 2. plasma	b. state of matter with no definite shape but with definite volume
i 3. crystals	c. solid which is not made of crystals
f 4. solid	d. state of matter that has no definite shape and no definite volume
c 5. amorphous material	e. Matter expands when it gets hotter and contracts when it cools.
g 6. steam	f. state of matter with definite shape and definite volume
e 7. thermal expansion	g. water in the solid state
b 8. liquid	h. Tiny particles in motion make up all matter.
d 9. gas	i. particles arranged in repeating geometric patterns
g 10. ice	j. gaslike mixture of charged particles

Use the words in the box to fill in the blanks.

shape	vibrate	plasma	energy
spread	volume	contracts	crystals
heated	position	flow	separate

In solids, particles move back and forth, but do not change position.

Different kinds of solids have crystals of different shapes. Particles in a liquid have more energy than do solid particles. Liquid particles can vibrate over and around each other. Because of this kind of particle motion, liquids are able to flow (spread).

Because particles of a liquid are very close to one another, a liquid has a definite volume. The particles in a gas have more energy than do liquid particles. Gas particles can completely separate from one another. A gas does not have a definite shape or volume. The most common form of matter in the universe is plasma.

Matter expands when it is heated. Matter expands because particles spread (flow) apart in all directions. Matter contracts when it is cooled.

NAME DATE CLASS

Chapter 8

REINFORCEMENT

Use with Text Pages 214–221

• Matter and Temperature

Answer the following questions in the blanks provided. Use complete sentences where appropriate.

1. What are the three common states of matter?

   a. solids b. liquids c. gases

   What is the fourth state of matter? plasma

2. Complete the following chart describing the shape and volume for the three common states of matter.

State of Matter	Volume	Shape
solid	definite	definite
liquid	definite	indefinite
gas	indefinite	indefinite

   How does the fourth state of matter differ from the other three? Plasma has no definite vol. or shape, but it differs in that it consists of charged particles

3. Use the kinetic theory of matter to explain the behavior of the three common states of matter.

4. In general, when you heat a substance, it expands. This phenomenon is called thermal expansion. Use the kinetic theory to explain thermal expansion. Give an example of thermal expansion that you have observed.

NAME DATE CLASS

Chapter 8

STUDY GUIDE

Use with Text Pages 222–223

Fresh Water: Will There Be Enough?

#9 Binder

Complete the following sentences using words from pages 222–223 in your textbook. Then look for these words in the word search.

Fresh water 1. For living things, the most important liquid on Earth is _____. (2 words)

polluted 2. _____ water refers to water that contains such high levels of unwanted materials that it is unacceptable for use.

toxic 3. _____ chemicals from home use may end up in our water supply if they are not disposed of properly.

fertilizers 4. _____, herbicides, and pesticides used on farms may enter the groundwater.

thermal 5. The excess heat in water is called _____ pollution.

organisms 6. If water temperature is changed too much, some _____ that live in the water will die.

safer environment 7. One way to reduce water pollution is to use products that are _____ for the _____.

Scientists dispose 8. _____ are trying to develop better ways to contain and _____ of industrial wastes.

F	O	S	O	A	N	P	S	M	S	C	A	R
W	Y	R	T	A	W	H	S	T	R	F	L	E
B	U	E	R	E	T	A	W	H	S	E	R	F
A	J	Z	N	O	C	A	P	E	Z	N	P	A
R	I	I	W	V	A	S	I	R	A	V	O	S
C	C	L	U	R	I	V	E	M	W	I	L	R
B	I	I	S	M	S	I	N	A	G	R	O	E
I	T	T	X	D	E	T	U	L	L	O	P	H
G	A	R	O	O	S	I	E	N	U	N	T	T
S	L	E	E	T	T	T	H	W	M	M	I	N
O	F	F	D	I	S	P	O	S	E	E	O	L
D	A	M	B	R	F	P	J	U	Q	N	R	A
L	P	S	C	I	E	N	T	I	S	T	S	T

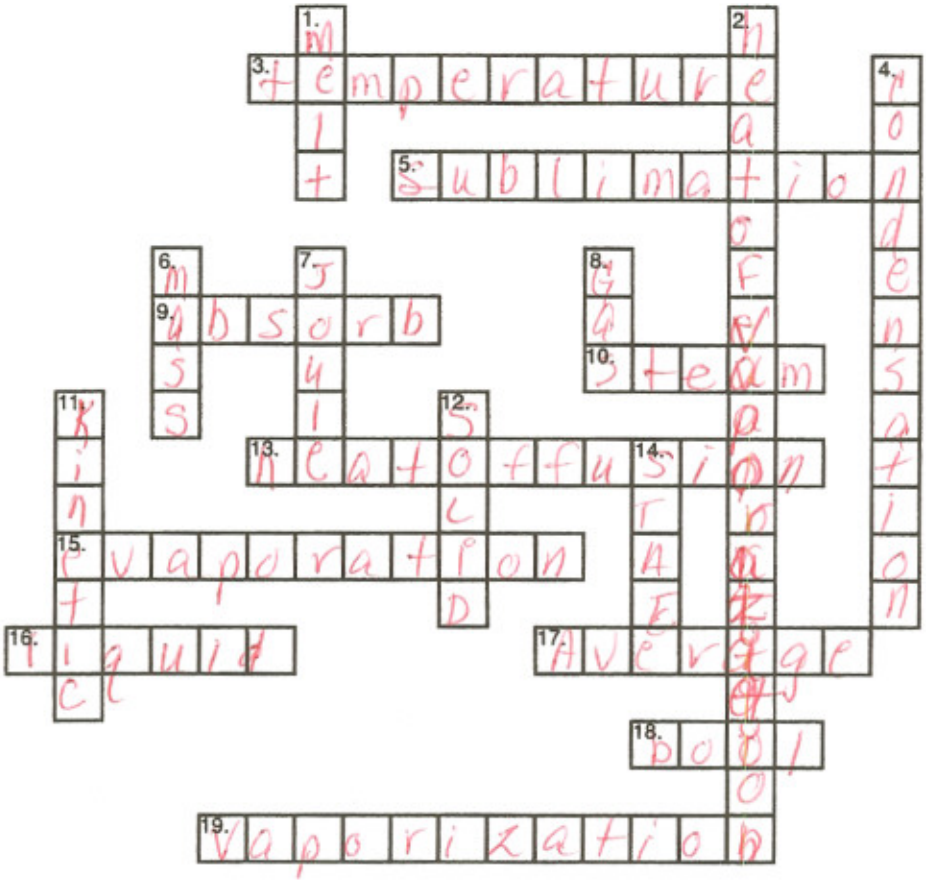
NAME DATE CLASS

Chapter 8

STUDY GUIDE

Use with Text Pages 224–227

• Changes in State



Across

3. The state of a material depends on this.
5. change of a solid directly to a gas
9. When ice melts, the particles of solid water _____ energy.
10. gaseous water
13. energy needed to change a material from solid to liquid (3 words)
15. change of a liquid to gas below the boiling point
16. has definite volume but no definite shape
17. The kinetic energy of a substance is the _____ kinetic energy of its particles.
18. to change from a liquid to a gas at temperatures above those normal to the liquid state
19. process that occurs during boiling

Down

1. to change from solid to liquid
2. energy needed to change a material from liquid to gas (3 words)
4. occurs when a gas cools and changes to a liquid
6. Liquids have a definite volume and _____ .
7. a unit of heat
8. no definite shape, no definite volume
11. theory used to explain changes of state
12. has a definite volume and shape
14. determined by motion and spacing of particles

NAME DATE CLASS

Chapter 8

STUDY GUIDE

Use with Text Pages 228–233

• Behavior of Gases

10

Use the words in the box to fill in the blanks.

force	constantly	size	absolute	liquids
increase	volume	boiling	decrease	pressure
kinetic	particles	kilopascals	larger	decrease
pressure	Charles's	Boyle's	temperature	increased

Gases in Earth's atmosphere exert pressure on everything. According to the kinetic theory, the particles of a gas are constantly moving. Every time gas particles hit something and bounce off, they exert a tiny force. Pressure is this amount of force exerted per unit of area. Air pressure at sea level is 101.3 kilopascals.

The amount of force exerted by a gas depends on the size of its container. Boyle's law states that if a sample of gas is kept at constant temperature, decreasing the volume will increase the pressure the gas exerts. If you increase the volume, the pressure will decrease. According to the kinetic theory, if you do not change the amount of gas or its temperature but decrease the size of the container, the particles will strike the walls more often and the pressure will rise. When the size of the container is larger, the pressure is smaller because the particles hit the walls less often.

According to Charle's law, if a sample of gas is kept at constant pressure, the volume increases if the temperature is increased. Charles's measurements suggested that the volume of a gas would become zero at a temperature of –273 °C. The temperature –273 °C is called absolute zero. All gases become liquids when cooled to their boiling points.

NAME DATE CLASS

Chapter 8

STUDY GUIDE

Use with Text Pages 234–239

• Uses of Fluids

11

Match the definitions in Column II with the terms in Column I. Write the letter of the correct definition in the blank on the left.

Column I	Column II
b 1. fluid	a. the ability of a fluid to exert an upward force on an object immersed in it
e 2. Archimedes' principle	b. a gas or a liquid
d 3. pressure	c. Pressure applied to a fluid is transmitted unchanged throughout the fluid.
f 4. hydraulic lift	d. force per unit area
g 5. Bernoulli's principle	e. The buoyant force on an object in a fluid is equal to the weight of the fluid displaced by the object.
a 6. buoyancy	f. operates on Pascal's principle
c 7. Pascal's principle	g. As the velocity of a fluid increases, the pressure exerted by the fluid decreases.

Use the words in the list to fill in the blanks.

Bernoulli's	Archimedes'	less	faster	farther	floats
hydraulic	piston	buoyant force	pressure	areas	
sinks	liquid	connected	Pascal's	upward	

The amount of buoyant force determines whether an object will sink or float in a fluid. If the buoyant force is less than an object's weight, the object sinks. If the buoyant force equals an object's weight, the object floats. Archimedes principle can be used to explain the buoyant force on an object submerged in a fluid.

Machines such as hydraulic lifts that multiply forces use Pascal's principle. In a hydraulic lift, a liquid is placed in two connected cylinders. Each cylinder has a piston that can move up and down. Also, the cylinders have different cross sectional areas. In this device, the pressure on each piston will be the same. However, the force will be greater on the piston with larger area. Bernoulli's principle explains why a pitched baseball curves and how airplanes fly. Air travels farther over the top of the wing than over the bottom. Thus, the air travels faster over the top of the wing than over the bottom. Pressure above the wing is less than pressure below it. There is net upward force on the wing.

NAME DATE CLASS

Chapter 8

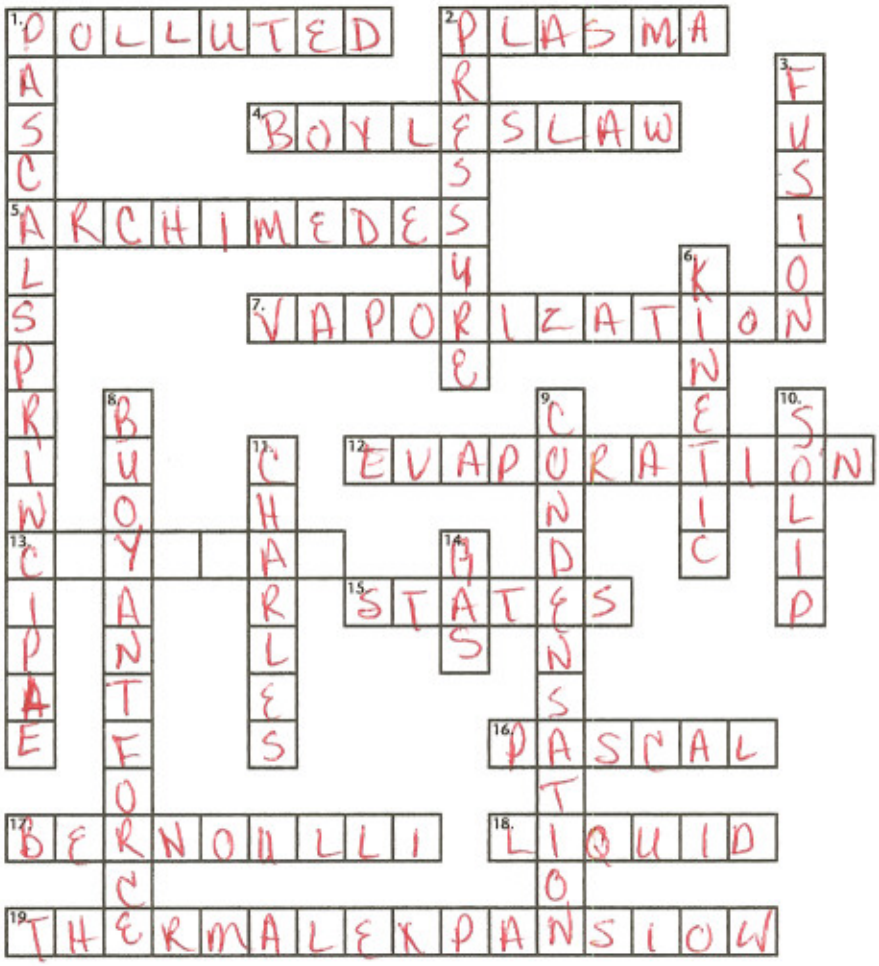
CHAPTER REVIEW

B.P. 9

• Solids, Liquids, and Gases

Part A. Vocabulary Review

Solve the following crossword puzzle using the clues provided.



Across

1. Water that contains such high levels of unwanted materials that it is unacceptable for drinking is ____.
2. gaslike mixture of positively and negatively charged particles
4. law which states that if the volume of a container of gas is decreased, the pressure of the gas will increase provided the temperature does not change (2 words)
5. The buoyant force on an object in a fluid is equal to the weight of the fluid displaced by the object: ____ principle.
7. The amount of energy needed to change a material from a liquid to a gas is the heat of ____.
12. changing of a liquid to a gas gradually at temperatures below the boiling point
13. repeating geometric arrangement of the particles in a solid
15. Solid, liquid, gas, and plasma are the ____ of matter.
16. SI unit of pressure
17. person who stated that pressure exerted by a fluid decreases as the velocity of the fluid increases
18. state of water at 25°C
19. refers to matter expanding as it gets hotter and contracting when it cools (2 words)

NAME DATE CLASS

Chapter 8 Review (continued)

B.P.9

Down

1. Pressure applied to a fluid is transmitted unchanged throughout the fluid (2 words).
2. amount of force exerted per unit area
3. Amount of energy it takes to change a material from a solid to a liquid is the heat of ____.
6. The idea that matter is made up of tiny particles that are in constant motion is the ____ theory of matter.
8. determines whether an object will sink or float in a fluid (2 words)
9. changing of a gas to a liquid
10. physical state of ice
11. The volume of a gas increases with increasing temperature provided the pressure does not change:____ law.
14. state of water vapor

Part B. Concept Review

Match each theory, principle, or law in Column II with its description in Column I. Write the letter of the correct term in the blank at the left.

Column I	Column II
D 1. All matter is made of small particles that are in motion.	a. Boyle's law
A 2. If the volume of a container of gas is decreased, the pressure on the gas will increase if the temperature does not change.	b. Bernoulli's principle
E 3. The volume of a gas increases with increasing temperature provided the pressure does not change.	c. Pascal's principle
F 4. The buoyant force on an object in a fluid is equal to the weight of the fluid the object displaces.	d. kinetic theory of matter
C 5. Pressure applied to a fluid is transmitted unchanged throughout the fluid.	e. Charles's law
B 6. As the velocity of a fluid increases, the pressure exerted by the fluid decreases.	f. Archimedes' principle

Answer the following questions on the lines provided.

7. Identify three ways you use fresh water each day. Brushing, flushing, showering, bathing, laundrying, drinking
8. Identify three substances that are polluting fresh water supplies. raw sewage, fertilizers, pesticides, herbicides, toxic chemicals
9. What can you do to reduce water pollution? Use environmentally friendly products
10. How are scientists dealing with water pollution? Developing better ways of containing & disposing industrial & farming by-products

NAME DATE CLASS

Chapter 8

REINFORCEMENT

Use with Text Pages 222–223

• Fresh Water: Will There Be Enough?

Write definitions for the following terms in the space provided.

1. fresh water _____

2. polluted water _____

3. thermal pollution _____

Answer the following questions on the lines provided.

4. In what ways can groundwater be polluted by farms? _____

5. What can you do daily in your own life to save water and reduce water pollution?

6. Using Table 8-1 in your textbook, explain why self-service car washes are permitted to stay open when city officials forbid home car washing because of a drought? _____

NAME DATE CLASS

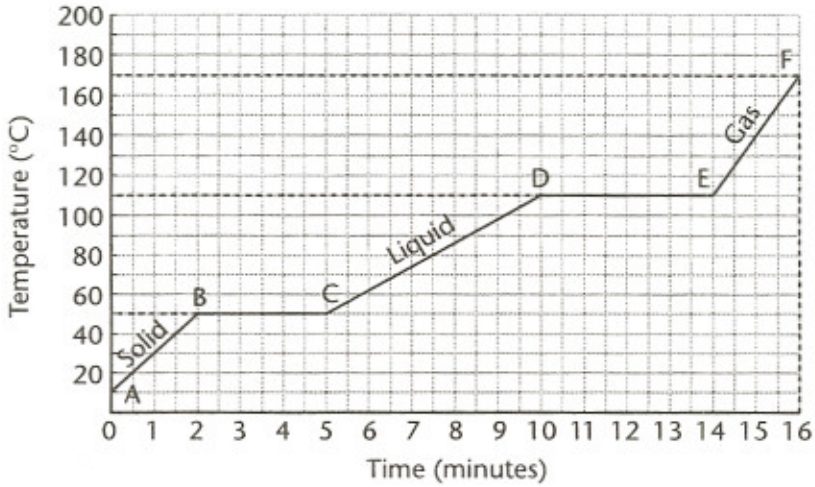
Chapter 8

REINFORCEMENT

Use with Text Pages 224–227

• Changes in State

Look carefully at the graph. It was drawn from the data collected when a substance was heated at a constant rate. To heat at a constant rate means to add heat evenly as time passes. Use the graph to complete the paragraphs that follow.



At the start of observations, Point A, the substance exists in the solid state. The temperature at this point is 10°C. As energy is absorbed, the temperature of the substance rises at a constant rate for two minutes. At Point B, the temperature is 50°C, and the solid begins to melt. The temperature remains constant until the change from solid to liquid is complete. It has taken three minutes to add enough energy to melt the solid completely. From Point C to Point D, the substance is in the liquid state. Its temperature rises at a constant rate to 110°C. The temperature remains constant while the liquid changes to a gas. At Point E, the substance exists as a gas. Its temperature rises evenly as energy is added.

When the gaseous substance is allowed to cool, it releases energy. The cooling curve will be the reverse of the warming curve. Energy will be released as the substance changes from a gas to a liquid and also from a liquid to a solid. The amount of energy released during condensation will be the same as the amount absorbed during vaporization.

NAME DATE CLASS

Chapter 8

REINFORCEMENT

Use with Text Pages 234–240

• Uses of Fluids

Determine whether the italicized term makes each statement true or false. If the statement is true, write the word "true" in the blank. If the statement is incorrect, write in the blank the term that makes the statement true.

gas 1. A fluid is a liquid or a *solid*.

an upward 2. Buoyancy is the ability of a fluid to exert *a downward* force on an object immersed in it.

less than 3. If the buoyant force on an object is *greater than* the weight of the object, the object will sink.

true 4. The buoyant force on an object in a fluid is *equal to* the weight of the fluid displaced by the object.

Pascal's 5. *Archimedes'* principle states that pressure applied to a fluid is transmitted unchanged throughout the fluid.

decreases 6. As the velocity of a fluid increases, the pressure exerted by the fluid *increases*.

true 7. The Venturi effect describes how fluids flow *faster* when forced to flow through narrow spaces.

Answer the following questions on the lines provided.

8. A hydraulic machine can be used to lift extremely heavy objects. Why is the fluid in the hydraulic machine a liquid rather than a gas? A liquid cannot be further compressed, thus it transfers pressure effectively throughout the system. Gases are highly compressable + thus not suitable for this use,

9. A block of wood is floating in water. The weight of the part of the block above water is one-third of the total weight of the block. What is the weight of the water displaced by the block of wood? Explain your answer in terms of Archimedes' principle. The weight of water is equal to the weight of the portion of the wood block that's submerged. According to Archimedes principal, the buoyant force of an object in a fluid is equal to the weight of fluid displaced.

10. A passenger jet in the air increases its speed. Does the downward force of air on the top of the wings increase or decrease? Does the net lifting force of the air on the wings increase or decrease? Explain your answer. The downward force decreases. The lifting force increases. Bernoulli's principle states that as the velocity of a fluid increases, the pressure exerted by the fluid decreases

NAME DATE CLASS

Chapter 8

REINFORCEMENT

Use with Text Pages 228–233

• Behavior of Gases

Write the definitions for the following terms in the spaces provided.

1. Boyle's law states that if you decrease the volume of a container of gas, the pressure of the gas will increase, provided the temp. doesn't increase
2. Charles's law states that the volume of a gas increases with increasing temperature, provided the pressure doesn't change.
3. pressure Pressure is force exerted per unit area
4. absolute zero is the theoretical temp. at which a gas would have a volume of zero. This temp. is -273 °C or 0K

Explain what will happen in each of the following cases.

5. If the temperature remains constant, what will happen to the pressure of a gas if you decrease the volume of the container that holds the gas? pressure will increase
6. If the volume of a container of gas remains constant, what will happen to the pressure of a gas if you increase temperature? The pressure will increase.

Answer the following questions regarding temperature.

7. On the Kelvin scale, what is the freezing point of water? 273 K
8. On the Kelvin scale, what is the boiling point of water? 373 K
9. On the Celsius scale, what are the freezing and boiling points of water?
   freezing point = 0°C, boiling point = 100°C