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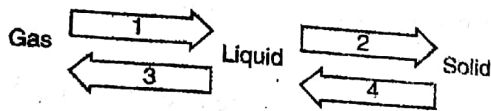
## Lesson 1 Quiz

# What Are Solids, Liquids, and Gases?

1 At what temperatures is water a gas?

- (A) below  $0^{\circ}\text{C}$
- (B) above  $100^{\circ}\text{C}$
- (C) between  $0^{\circ}\text{C}$  and  $100^{\circ}\text{C}$
- (D) between  $0^{\circ}\text{C}$  and  $120^{\circ}\text{C}$

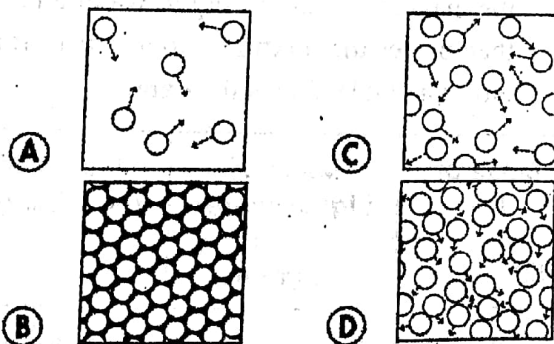
2 Study the following diagram.



What word belongs on arrow 2?

- (A) condensation
- (B) evaporation
- (C) freezing
- (D) melting

3 Jakob studied drawings of the particles in the same substance. The drawings show the substance in different states and temperatures. Which shows the substance at the **highest** temperature?



4 The table shows the melting points and boiling points for different substances.

Substance	Melting point ( $^{\circ}\text{C}$ )	Boiling point ( $^{\circ}\text{C}$ )
aluminum	660	2519
chlorine	-101	-34
copper	1085	2562
gold	1064	2856
mercury	-39	357
oxygen	-219	-183
silver	962	2162
tungsten	3422	5555

Suppose these substances were placed in a freezer set to  $-50^{\circ}\text{C}$ . Which substance would become a liquid?

- (A) chlorine
- (B) mercury
- (C) oxygen
- (D) tungsten

5 Matter may be a gas, solid, or liquid. It can change from one state to another. Which change **most often** causes matter to change state?

- (A) change in mass
- (B) change in color
- (C) change in volume
- (D) change in temperature

Name \_\_\_\_\_

Date \_\_\_\_\_

# How Does Water Change?

## Lesson 2 Quiz

- 1 Some water is in a closed container. How do the properties of the water change if the container is placed in a freezer?

(A) Mass and volume decrease.  
(B) Mass and volume increase.  
(C) Mass increases and volume stays the same.  
(D) Mass stays the same and volume increases.

- 2 A closed jar contains 150 grams of ice in 300 grams of liquid water. After sitting for a while, half of the ice has melted. Which description of the mass is now correct?

(A) The mass of the ice is 0 grams, and the mass of the liquid water is 375 grams.  
(B) The mass of the ice is 75 grams, and the mass of the liquid water is 375 grams.  
(C) The mass of the ice is 75 grams, and the mass of the liquid water is 300 grams.  
(D) The mass of the ice is 150 grams, and the mass of the liquid water is 300 grams.

- 3 What happens to the mass and the volume of an ice cube as it melts?

(A) Mass and volume decrease.  
(B) Mass and volume increase.  
(C) Mass decreases and volume stays the same.  
(D) Mass stays the same and volume decreases.

- 4 An experiment includes these steps:

Step 1: Place 500 grams of water in a container.

Step 2: Freeze the water.

Step 3: Measure the mass.

Step 4: Allow the water to melt.

Step 5: Measure the mass.

What will happen to the mass during the experiment?

(A) It will not change in either Step 3 or Step 5.  
(B) It will decrease in Step 3 and increase in Step 5.  
(C) It will increase in Step 3 and decrease in Step 5.  
(D) It will increase in Step 3 and increase in Step 5.

- 5 During an experiment, a student measures the mass of ice and of liquid water and then places the mixture into a freezer for a day. The table shows the data.

Mass of Ice	Mass of Liquid Water	Mass After the Change
50 grams	75 grams	?

What will the student **most likely** have at the end of the experiment?

(A) 100 grams of ice  
(B) 125 grams of ice  
(C) 125 grams of liquid water  
(D) 150 grams of liquid water

Name \_\_\_\_\_

Date \_\_\_\_\_

## Lesson 3 Quiz

## How Does Matter Change?

- 1 A beaker of water is placed on a hot plate. The picture on the left shows the beaker when bubbles first start forming in the water. The picture on the right shows the beaker 5 minutes later.



Time = 0 min



Time = 5 min

What happened during the 5 minutes?

- (A) Water was changed into energy during a chemical change.
- (B) Water was changed into a different state during a physical change.
- (C) Water was changed into a different material during a physical change.
- (D) Water was changed into a different material during a chemical change.
- 2 How does cutting a whole pumpkin pie into eight slices affect its mass?
- (A) Cutting the pie increases its mass.
- (B) Cutting the pie decreases its mass.
- (C) Cutting the pie does not change its mass.
- (D) Cutting the pie makes its mass equal to its volume.

- 3 Students in a class made a list of activities that involve a chemical change. Which of these changes should be included on the list?

- (A) ringing a bell
- (B) making ice cubes
- (C) picking up rocks
- (D) making pancakes

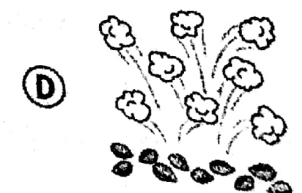
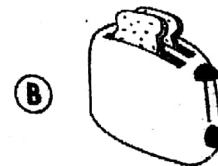
- 4 The table lists some examples of chemical changes and physical changes.

Chemical changes	Physical changes
burning leaves	tearing paper
toasting a bagel	sharpening a pencil
baking a loaf of bread	pouring milk into a glass
crumpling aluminum foil into a ball	freezing water into ice cubes

Which example is in the wrong column?

- (A) sharpening a pencil
- (B) baking a loaf of bread
- (C) pouring milk into a glass
- (D) crumpling aluminum foil into a ball

- 5 Which of the following represents a physical change?



Name \_\_\_\_\_ Date \_\_\_\_\_

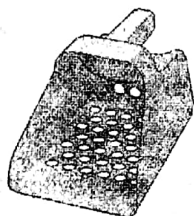
Lesson 4 Quiz

## What Are Mixtures and Solutions?

- 1 Adding food coloring to water creates a solution. Which of these is true of **all** solutions?

(A) They all include water.  
(B) The parts are evenly mixed.  
(C) They are all liquids or gases.  
(D) The substances are permanently combined.

- 2 The figure shows a tool that is used to separate certain types of mixtures.



This type of tool is **best** used to separate what type of mixture?

(A) a mixture that is a solution  
(B) a mixture that is partly magnetic  
(C) a mixture of particles that have different sizes  
(D) a mixture of particles that are all about the same size

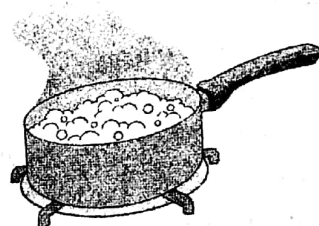
- 3 A company collects cans for recycling. Some cans are made of aluminum, and others are made of steel. Which of the following is the **best** way to separate the mixture of the two types of cans?

(A) by size  
(B) by shape  
(C) by magnetism  
(D) by evaporation

- 4 A mixture contains 1 gram of salt and 2 grams of sugar dissolved in 100 grams of water. Which other mixture would **most likely** have the same properties?

(A) 3 grams of salt, 2 grams of sugar, and 100 grams of water  
(B) 3 grams of salt, 6 grams of sugar, and 400 grams of water  
(C) 4 grams of salt, 6 grams of sugar, and 300 grams of water  
(D) 4 grams of salt, 8 grams of sugar, and 400 grams of water

- 5 The pot contains a mixture.



The method shown in the picture can be used to separate what type of mixture?

(A) a solution, such as salt water  
(B) a mixture of particles with different densities  
(C) a mixture of particles of different sizes, such as seashells and sand  
(D) a mixture of steel, which is magnetic, and aluminum, which is not magnetic

Name \_\_\_\_\_

Date \_\_\_\_\_

Unit 18  
Lesson 5 Quiz

# What Affects the Speed of Dissolving?

- 1 Destiny is making a nutrient solution to use in her garden. She places the powder in a watering can. Then she adds the water. Which would dissolve the powder fastest?

(A) shaking the can vigorously  
(B) stirring the solution slowly  
(C) tilting the can carefully from side to side  
(D) setting the can down and leaving it alone

- 2 DeShawn has to dissolve salt crystals in water. What would be the **best** thing to do to help the crystals dissolve quickly?

(A) heat the salt crystals  
(B) crush the salt crystals  
(C) cool the water in the tank  
(D) use the largest salt crystals

- 3 Reggie has a sample of raw sugar made up of large particles and a sample of white sugar made up of much smaller particles. He dissolved 1 tsp of each sample in 1 cup of water. Which dissolved faster?

(A) Both dissolved at the same rate.  
(B) The white sugar dissolved slowly, and the raw sugar dissolved quickly.  
(C) The white sugar dissolved quickly, and the raw sugar dissolved slowly.  
(D) The white sugar dissolved quickly, and the raw sugar did not dissolve.

- 4 Salim added 1 g of salt to each of four beakers filled with water. He stirred the water at different speeds and recorded how long it took for the salt to dissolve.

Stirring	Time (sec)
No stirring	25
Slow stirring	18
Medium stirring	10
Fast stirring	6

Which conclusion should Salim draw?

(A) Salt will not dissolve in water unless the water is stirred.  
(B) Stirring water increases the rate at which a salt dissolves.  
(C) Stirring water decreases the rate at which a salt dissolves.  
(D) Stirring has no effect on the rate at which a salt dissolves.

- 5 Four students each added salt crystals to water and measured the time it took for all the crystals to dissolve. The following table shows their results.

Student	Temperature (°C)	Time (sec)
Marcus	10	65
Tyra	25	40
Luis	50	25
Athena	75	15

Athena repeated the investigation using water heated to 40 °C. Which is the time **most likely** measured by Athena?

(A) 10 sec  
(B) 20 sec  
(C) 30 sec  
(D) 50 sec

Name \_\_\_\_\_

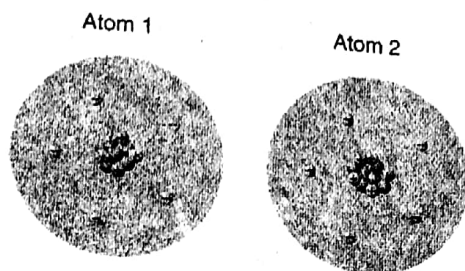
Date \_\_\_\_\_

Unit 13

## Lesson 6 Quiz

# What Is Atomic Theory?

- 1 Samir drew two atoms as shown in the following illustration.



Which statement is **true**?

- (A) They are atoms of two different elements.
- (B) They are both atoms of the same element.
- (C) Atom 1 has a positive charge, and Atom 2 has a negative charge.
- (D) Atom 2 has a positive charge, and Atom 1 has a negative charge.
- 2 Atoms are made up of smaller particles called subatomic particles. Which is a subatomic particle that has no charge?
- (A) electron (C) nucleus
- (B) neutron (D) proton
- 3 Every atom has a center called the nucleus. The nucleus has a positive charge. Which particles are found in the nucleus?
- (A) neutrons only
- (B) protons only
- (C) electrons and protons
- (D) neutrons and protons

- 4 The following table describes four different atoms.

	Number of electrons	Number of neutrons	Number of protons
Atom 1	8	8	8
Atom 2	8	10	8
Atom 3	10	8	7
Atom 4	10	9	8

Which is **true**?

- (A) Each atom is a different element.
- (B) Only atoms 3 and 4 are the same element.
- (C) Atom 3 is a different element from all the others.
- (D) Atom 4 is a different element from all the others.
- 5 A scientist is examining two atoms. One has a nucleus with five protons and five neutrons surrounded by five electrons. The other has a nucleus with five protons and six neutrons surrounded by five electrons. What can the scientist conclude about these two atoms?
- (A) They have different charges.
- (B) They are the same element.
- (C) They are not made of matter.
- (D) They cannot form compounds.

# Matter

## Vocabulary

- 1 What is the term for the amount of space something takes up?
- (A) matter (C) volume  
(B) density (D) temperature

- 2 Which is the **best** description of what happens during a chemical reaction?
- (A) A substance goes through a chemical change.  
(B) The physical properties of a substance are changed.  
(C) A new substance is formed during a chemical change.  
(D) The type of matter in the substance remains unchanged.

- 3 Which term means "a combination of two or more substances that keep their identities"?

(A) matter (C) solution  
(B) mixture (D) compound

- 4 What term is used to identify a mixture that has the same composition throughout?

(A) liquid (C) solution  
(B) element (D) compound

- 5 Which term names the type of matter made of just one kind of atom?

(A) solid (C) molecule  
(B) element (D) compound

Date \_\_\_\_\_

Unit Test

- 6 Which term names a substance formed by two or more types of atoms that are chemically combined?

(A) matter (C) solution  
(B) mixture (D) molecule

- 7 Which term names the smallest unit of a pure substance that has the properties of that substance?

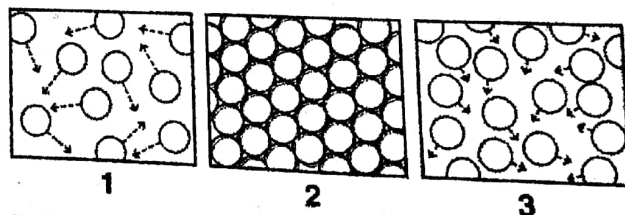
(A) atom (C) element  
(B) matter (D) molecule

- 8 Which term or phrase **best** describes what happens when a tomato rots?

(A) physical change  
(B) chemical change  
(C) conservation of mass  
(D) formation of a compound

## Science Concepts

- 9 The states of matter differ in many ways, including shape and volume. The following three figures show the particles in a solid, a liquid, and a gas.



Which of the following **correctly** identifies the state of matter?

(A) 3: gas (C) 1: liquid  
(B) 2: solid (D) 2: liquid

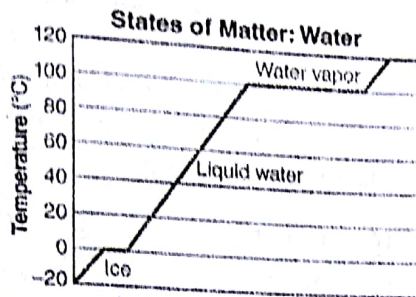


Name \_\_\_\_\_

Date \_\_\_\_\_

Unit 13

- 10 The graph shows the changes in state of water at sea level.



Based on the graph, which of the following is **true**?

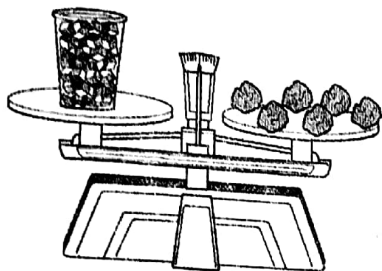
- (A) Liquid water boils at temperatures between 0 °C and 100 °C.
- (B) Solid water melts, forming liquid water, at temperatures below 0 °C.
- (C) Liquid water freezes, forming solid water, at temperatures greater than 0 °C.
- (D) Water vapor condenses into liquid water when temperatures drop below 100 °C.
- 11 There are different characteristics for each of the states of matter. Which statement describes a **difference** between liquids and solids?
- (A) Temperature can change a solid to a liquid, but it cannot change a liquid to a solid.
- (B) Solids have a definite volume and liquids do not have a definite volume.
- (C) The particles in a solid are much closer together than the particles in a liquid.
- (D) Solids take on the shape of their containers and liquids maintain their own shapes.
- 12 A cup holds 125 grams of liquid water and 100 grams of ice. What is a reasonable mass for the water in the cup **after** the ice melts?
- (A) 175 grams
- (B) 215 grams
- (C) 225 grams
- (D) 230 grams
- 13 How does water change as it evaporates?
- (A) Its mass and volume decrease.
- (B) Its mass and volume increase.
- (C) Its mass remains unchanged. Its volume increases.
- (D) Its mass increases. Its volume remains unchanged.
- 14 Riley and Jill are studying what happens to matter when it changes state. They found this list of statements. Which of these statements is **true**?
- (A) When matter changes state, its mass changes.
- (B) When matter changes state, its mass remains the same.
- (C) When matter changes state, its boiling point might also change.
- (D) When matter changes state, the space between particles in the matter stays the same.



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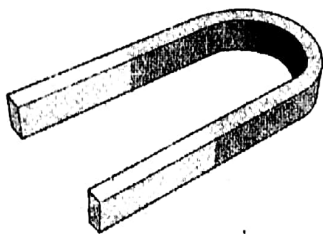
Date \_\_\_\_\_

- 15 Peter places six balls of modeling clay on one side of a balance. He places a plastic cup on the other side. It takes 41 plastic cubes to balance the modeling clay. He then removes the clay, shapes it into a dinosaur, and puts it back on the balance.



How many cubes will he **most likely** need to put into the cup to balance the dinosaur?

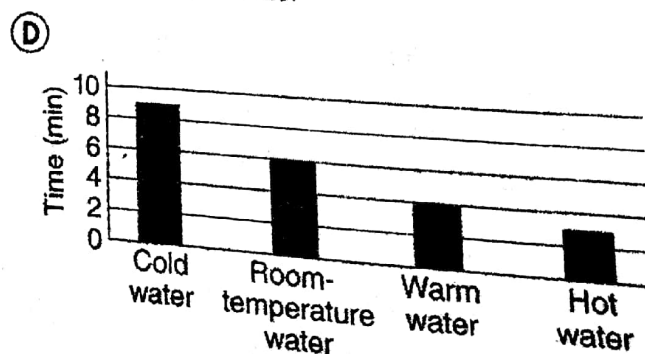
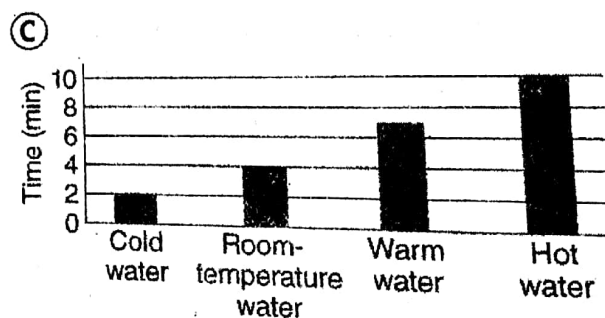
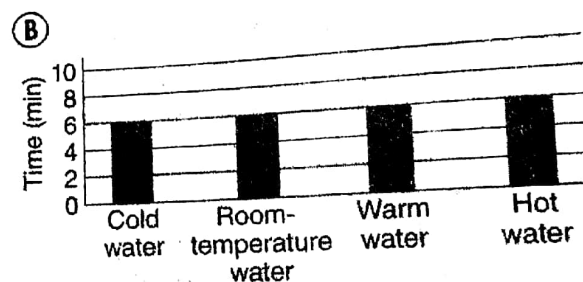
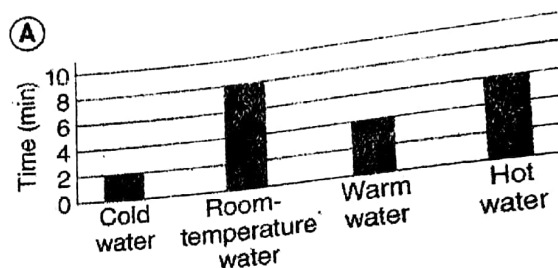
- (A) 35 cubes (C) 41 cubes  
(B) 38 cubes (D) 47 cubes
- 16 The following illustration shows a tool that can be used to separate elements of certain mixtures.



This tool can separate what type of mixture?

- (A) a solution of two solids  
(B) a mixture of particles with different densities  
(C) a mixture of particles of different sizes  
(D) a mixture of magnetic and nonmagnetic items

- 17 Kym has set up an experiment with four beakers, each filled with 100 mL of water at four different temperatures. She plans to time how long it takes for 1 tsp of sugar to dissolve at each temperature. To determine if there is a trend, she will add the sugar to each beaker of water without stirring, wait for it to dissolve, and then plot her results on a graph. Which of the following graphs would **most likely** show the results of Kym's experiment?



- 18 Sergio wanted to find out if changing the temperature of a solution changed how quickly salt dissolved in it. First, he tested a control solution at room temperature, or 25 °C, and measured how fast salt dissolved in the solution. Next, he cooled solution A to 10 °C, heated solution B to 40 °C, and added salt to each. How quickly did the salt dissolve in solutions A and B compared to the control solution?

(A) faster for both Solution A and Solution B  
(B) faster for Solution A and more slowly for Solution B  
(C) more slowly for Solution A and faster for Solution B  
(D) more slowly for both Solution A and Solution B

- 19 Claire is studying how quickly sugar dissolves in warm and cold water. First, she dissolves a 4 g sample of raw sugar, as shown in the following figure, in both warm and cold water. Then, she dissolves a 4 g sample of white sugar, as shown in the following figure, in both warm and cold water.



Raw sugar



White sugar

In which of the following solutions would the sugar dissolve the **slowest**?

(A) raw sugar, cold water  
(B) raw sugar, warm water  
(C) white sugar, cold water  
(D) white sugar, warm water

- 20 Four students are dissolving sugar in water to perform an experiment. Each student dissolved 1 tsp of sugar in 1 cup of hot water and stirred the water a different number of times. The students recorded how long it took for the sugar to dissolve in each cup. The results are shown in the following table.

Stirring	Time (sec)
zero stirs	28
two stirs	17
four stirs	11
six stirs	7

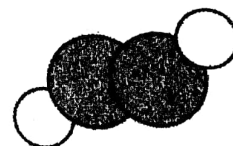
Which of the following happened as the number of stirs increased?

- (A) The speed of dissolving increased.  
(B) The speed of dissolving decreased.  
(C) The amount of sugar dissolved increased.  
(D) The amount of sugar dissolved decreased.
- 21 A scientist draws a model of water and a model of hydrogen peroxide, as shown in the following illustration.

Water



Hydrogen peroxide



Which statement is **true**?

- (A) Water is a molecule, and hydrogen peroxide is an atom.  
(B) Water is an atom, and hydrogen peroxide is a molecule.  
(C) The two chemicals have different kinds of elements in their molecules.  
(D) The two chemicals have different numbers of atoms in their molecules.