Name _____ Class _____ Date _____

CHAPTER 3 Properties of Matter

SECTION 1

What Is Matter?

California Science Standards

8.8.b

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What are the properties of matter?
- What is volume?
- What is mass?
- How is weight different from mass?

What Is Matter and Some of Its Properties?

You are made of matter. **Matter** is anything that has mass and takes up space. A toaster, a glass of water, and the air around you are all made of matter.

Matter can be described by its properties. Several properties of matter are volume, mass, and weight. The liter (L) is a scientific unit of volume. The kilogram (kg) is the SI unit for mass, and the newton (N) is the SI unit of weight. ☑

STUDY TIP

Organize Information In your notebook, make a table with three columns. Title them Property of Matter, Definition, and Unit of Measure. As you read this section, fill in the columns.

READING CHECK

1. Identify Give a unit of measure for each of the following:

volume _____

mass _____

weight _____

What Is Volume?

All matter takes up space. The amount of space that an object takes up, or occupies, is known as the object's **volume**.

Imagine a car driven into a swimming pool filled to the top. Some water would splash out. This would happen because the car and the water have volume. Two objects can't occupy the same volume at the same time. ☑

READING CHECK

2. Define What is volume?

_____

_____

_____

UNITS OF VOLUME

The SI unit of volume is the cubic meter (m^3). The figure below shows how big a cubic meter is.

This girl is sitting in a 1 m^3 box and holding a meter stick.

Math Focus

3. Convert The volume of a half-gallon carton of milk is 1.9 L. How many milliliters is this?

_____

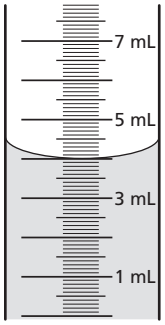
The liter is used more often than the cubic meter as the scientific unit for measuring volume. Small volumes of liquid are often given in milliliters (mL). Remember that 1 L equals 1,000 mL. Any volume of liquid can be described in liters or milliliters. For example, the volume of a small can of soda is measured as 0.355 L or 355 mL.

MEASURING LIQUID VOLUME

At home, you may use a measuring cup to determine a liquid's volume. In class, graduated cylinders are used to measure liquid volume accurately.

When you measure an amount of liquid, you must be careful. If you look closely, you will see that the surface of water is curved in a glass container. The curve of the surface of a liquid is called a **meniscus**. ☑

The meniscus may curve only a small amount and may look flat in a large glass container. The amount of a liquid in a container is measured from the lowest point of the meniscus. When you look at the figure below, you can see a meniscus.



To measure volume correctly, read the scale at the lowest point of the meniscus. The volume is read as 4.0 mL.

READING CHECK

4. Describe What is a meniscus?

_____

_____

_____

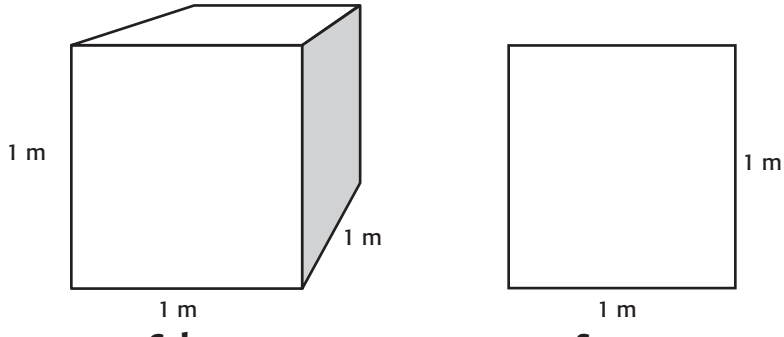
TAKE A LOOK

5. Draw On the figure draw a meniscus that would show a volume of 6.0 mL.

VOLUME OF A REGULARLY SHAPED SOLID OBJECT

The volume of any regularly shaped solid object is measured in cubic units. The word *cubic* means that the object is not flat. The volume of an object is calculated by multiplying three measurements: length, width, and height.

Cubic measurements are different from square measurements, which are used for area. The area of an object is flat. It is calculated by multiplying only two measurements: length and width. The figure below shows the difference between volume and area. ☑



The cube has volume. Each face of the cube has area. The square has only area.

READING CHECK

6. Identify What do cubic measurements measure?

_____

7. Identify What do square measurements measure?

_____

Critical Thinking

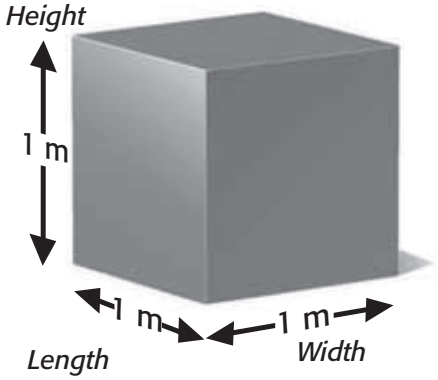
8. Find What is the area of each face of the cube shown in the figure? Remember that area is length times width.

_____

FINDING THE VOLUME OF A REGULARLY SHAPED OBJECT

There is a formula for calculating the volume of a regularly shaped object, such as a cube.

$$V = 1\text{ m} \times 1\text{ m} \times 1\text{ m} = 1\text{m}^3$$



A cube whose length, width, and height are each 1 m has a volume of one cubic meter (1 m^3).

To find the volume (V) of a regularly shaped object, multiply the area (A) and height (h), as shown in the following formula:

$$V = A \times h$$

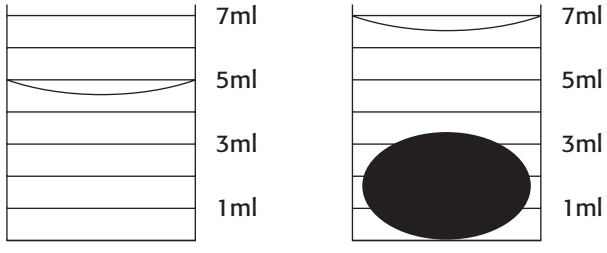
For example, find the volume of a box that has an area of 400 cm2 and a height of 10 cm.

$$V = A \times h$$
$$V = 400\text{ cm}^2 \times 10\text{ cm} = 4{,}000\text{ cm}^3$$

VOLUME OF AN IRREGULARLY SHAPED OBJECT

One important way to measure the volume of an irregularly shaped object is to put it into a known volume of water. The increase in total volume is equal to the volume of the object.

Remember that objects cannot occupy the same space at the same time. The figure below shows how much water is displaced, or moved, after an object is dropped into it. ☑



The irregularly shaped solid makes the total volume 2 mL larger. So, its volume is 2 mL.

READING CHECK

9. Describe You are given a toy metal car and asked to find its volume. Describe how you would do this.

_____

_____

_____

_____

_____

_____

What Is Mass?

Another property of matter is mass. **Mass** is a measure of the amount of matter that makes up an object. For example, both you and a penny are made of matter. You are made up of more matter than the penny, so you have a greater mass. ☑

The mass of an object does not change when the location of the object changes. The mass of any object changes only when the amount of matter that makes up the object changes.

READING CHECK

10. Describe What does the mass of an object measure?

_____

_____

DIFFERENCE BETWEEN MASS AND WEIGHT

You may think that mass and weight are the same thing, but they are very different. **Weight** is the measure of the force of gravity on an object. Earth has a force of gravity that keeps all objects from floating into space. When you step on a scale, you are seeing the force with which Earth pulls on you. This is known as your weight. ☑

READING CHECK

11. Identify When you step on a scale, what is being measured?

_____

An object's weight can change, depending on where the object is located. On the other hand, the mass of the object stays the same. For example, a penny weighs less on the moon than here on Earth. This is because the moon exerts a smaller force of gravity than Earth does. However, the mass of the penny, or the amount of matter it has, stays the same. Only the force changes.

The table below shows how mass and weight differ.

	Mass	**Weight**
How it is measured	with a balance	with a scale
What is measured	amount of matter	force of gravity
SI measurement units	kilograms	newtons
Effect of moving it (for example, to the moon)		

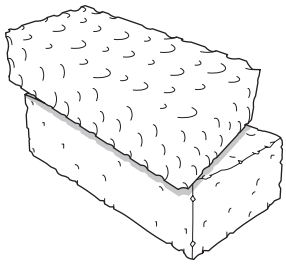
Discuss Form a small group. Discuss what it would be like to have a soccer game on the moon. Think about the weight of the ball and how large the field might be.

TAKE A LOOK

12. Complete Write either "none" or "change" in each of the two empty boxes in the table.

MEASURING MASS AND WEIGHT

The brick and the sponge in the figure below have the same volume. However, because the brick has more mass, Earth pulls on the brick more than it does on the sponge. So, the brick weighs more than the sponge.



The brick and the sponge take up the same amount of space. The the brick contains more matter, so its mass—and thus its weight—is greater.

The SI unit for mass is the kilogram (kg). Smaller masses are often measured in grams (g) or milligrams (mg). These units can be used to give the mass of any object. ☑

Weight is a measure of gravitational force. The SI unit of weight is the newton (N). One newton is equal to the weight on Earth of an object with a mass of about 100 g. ☑

READING CHECK

13. Identify Name three mass units.

_____

_____

READING CHECK

14. Identify What is the SI unit for force and its symbol?

_____

How Much Would You Weigh on Another Planet?

Have you ever wondered what it would be like visiting another planet or the moon? Would the ground feel the same? Would you feel heavier or lighter?

The table below shows what your weight would be on some other objects in our solar system.

Object in our solar system	Weight (lbs)	Weight (N)
Moon (Earth's)	20	89
Mars	45	200
Venus	110	480
Earth	120	530
Saturn	140	620
Jupiter	320	1,400

Name _____ Class _____ Date _____

Section 1 Review

8.8.b

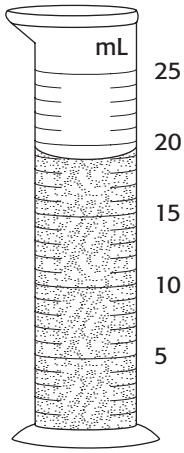
SECTION VOCABULARY

mass a measure of the amount of matter in an object	**volume** a measure of the size of a body or region in three-dimensional space
matter anything that has mass and takes up space	**weight** a measure of the gravitational force exerted on an object; its value can change with the location of the object in the universe
meniscus a curve at a liquid's surface by which one measures the volume of a liquid	

1. Describe Why is an apple an example of matter?

2. Explain What is the difference between mass and weight?

3. Identify In the figure below, what is the volume of water in the graduated cylinder?



4. Determine A rock is placed into a graduated cylinder containing 80 mL of water. What is the volume of the rock if the water level rises to the 120 mL mark?

5. Calculate One airline limits the size of carry-on luggage to a volume of 40,000 cm^3. A passenger has a carry-on that has an area of 1,960 cm^2 and is 23 cm high. Is the passenger's luggage OK to carry onto the airplane? Show your work.

Name _____ Class _____ Date _____

CHAPTER 3 Properties of Matter

SECTION 2

Physical Properties

California Science Standards

8.7.c, 8.8.a, 8.8.b, 8.8.d

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What are the physical properties of matter?
- What is density?
- What is a physical change of matter?
- What makes objects float or sink?

What Are the Physical Properties of Matter?

We use one or more of our senses to identify an object. The properties we are sensing are the physical properties of the object. A **physical property** of matter can be detected and measured without making a new substance. If a new substance is made, a chemical property has been measured. Here we will consider only physical properties. ☑

There are many physical properties that can help you identify an object. Examples of physical properties include color, odor, texture, and shape. How would you identify a fruit as an apple? You would probably first look at its color and shape. Its odor, and certainly its taste, would help confirm that the fruit was an apple.

The physical properties of an object may also include its strength, flexibility, ability to conduct electricity, and magnetism. Some other important physical properties of matter are listed in the table below.

STUDY TIP

Increase Vocabulary Read this section silently. Underline all the words that are new to you.

READING CHECK

1. Describe What are physical properties?

_____

_____

_____

Critical Thinking

2. Apply Concepts You are given two balls that are made from the same rubber. They are also the same size and color. One is hollow and one is solid. Give three physical properties that can be used to identify the ball that is solid.

_____

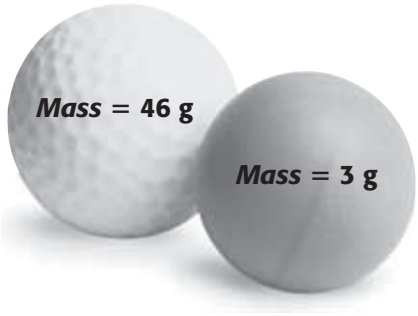
_____

_____

Physical property	Description
Thermal conductivity	how heat moves through a substance
Ductility	the ability of a substance to be pulled into a wire shape
State	the physical form of matter (solid, liquid, or gas)
Malleability	the ability of a substance to be rolled into a shape
Solubility	the ability of a substance to dissolve
Density	how compact a substance is
Compressibility	the ability of a substance to be squeezed or pressed together

DENSITY

Density is a physical property of matter that describes how its mass and volume are related. **Density** is a measure of the amount of matter in a given volume. For example, a golf ball and table-tennis ball have similar volumes, so they occupy about the same amount of space. However, since the golf ball has more mass, it has a greater density than the table-tennis ball does. ☑



A golf ball is denser than a table-tennis ball because the golf ball contains more matter in a similar volume.

To find an object's density (D), you measure its mass (m) and volume (V) and then use the following formula:

$$D = \frac{m}{V}$$

The units of density are the results of a mass unit (kg or g) being divided by a volume unit (L, mL, or cm^3). For example, one density unit for solids is grams per cubic centimeter (g/cm^3), and one density unit for liquids is grams per milliliter (g/mL).

A substance's density does not depend on how much of the substance there is. Generally, in the same room at the same time, a lot of something or a little of it will have the same density. For example, 1 kg of solid iron will have the same density as 1 g of solid iron.

How Is Density Determined?

You can solve a density problem by taking the following steps:

1. Write the density equation, $D = m \div V$.
2. Replace m and V with the measurements given in the problem, and then solve for D.

For example, what is the density of mercury if 270 g of mercury has a volume of 20 mL?

$$D = m \div V$$
$$D = 270 \text{ g} \div 20 \text{ mL} = 13.5 \text{ g/mL}$$

READING CHECK

3. Describe What is density a measure of?

_____

_____

Math Focus

4. Determine How much more matter is in a golf ball than in a table-tennis ball?

_____

CALIFORNIA STANDARDS CHECK

8.8.b Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.

5. Calculate A nugget of gold that has a mass of 28 g (1 oz) has a volume of 1.45 cm^3. What is its density? Show your work.

USING DENSITY TO IDENTIFY SUBSTANCES

Density is a useful physical property. At the same temperature and pressure, the density of a substance is always the same. So, density can be used to help identify an unknown substance. ☑

The densities of some common substances are given in the table below.

READING CHECK

6. Describe Under what conditions is the density of a substance always the same?

_____

_____

Densities of Common Substances at 20°C and 1 atm

Substance	Density (g/cm^3)	Substance	Density (g/cm^3)
Helium (gas)	0.000166	Zinc (solid)	7.13
Oxygen (gas)	0.00133	Silver (solid)	10.5
Water (liquid)	1.00	Lead (solid)	11.4
Pyrite (solid)	5.02	Mercury (liquid)	13.5

TAKE A LOOK

7. Identify You are given an unknown solid with a density of about 7 g/cm^3. Which solid is it?

_____

DENSITY OF SOLIDS

Would you rather carry around 1 kg of lead or 1 kg of feathers? They have the same mass, but they are very different. Lead is much denser than feathers. A 1 kg mass of lead has about the same volume as a stick of butter. A 1 kg mass of feathers would take up about the same space as a pillow. The difference in volume makes the lead easier to carry.

DENSITY, FLOATING, AND SINKING

READING CHECK

8. Describe When will an object sink in water?

_____

_____

If you know the density of a substance, you can tell if it will float or sink. For example, if the density of an object is less than the density of water, the object will float in water. Cork, many types of wood, and some plastics are less dense than water. That is why they float in it.

If the density of an object is greater than the density of water, it will sink in water. Rock and many types of metal are denser than water, so they sink. ☑

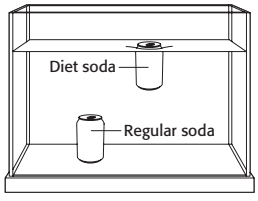
The figure below shows a can of diet soda and a can of regular soda in a tank of water. You can see that their densities are different.

Critical Thinking

9. Apply Concepts Which can of soda in the drawing is less dense than water? How do you know?

_____

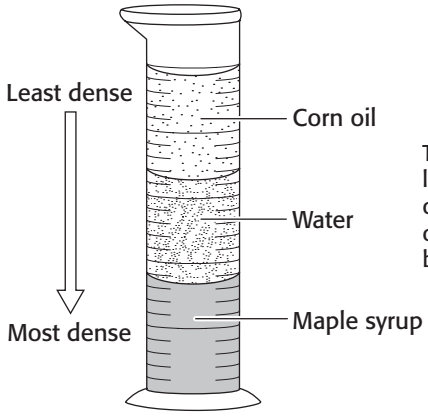
_____



In a tank of water, a can of diet soda floats, and a can of regular soda sinks.

Take a look at the following figure. It shows different kinds of liquids in a graduated cylinder. What do you think causes them to look that way? Each of the liquids (maple syrup, water, and corn oil) has a different density. When these three liquids are carefully poured into the cylinder, they form three different layers.

This happens because their densities are different. The liquid that is most dense is in the bottom layer, and the liquid that is least dense is on the top. ☑



This graduated cylinder contains three liquids that form three layers because of their densities. The layers are in order of increasing density from top to bottom.

READING CHECK

10. Identify Several liquids are poured into a container. They do not mix or dissolve in one another. What must be true of the liquid in the top layer?

_____

_____

What Is a Physical Change?

Any change that affects the physical properties of a substance is a **physical change**. Imagine that a piece of silver is pounded into a heart-shaped charm. This is a physical change because only the shape of the silver has changed. The piece of silver is still silver. Take a look at the figure below to see some other examples of physical changes. ☑

READING CHECK

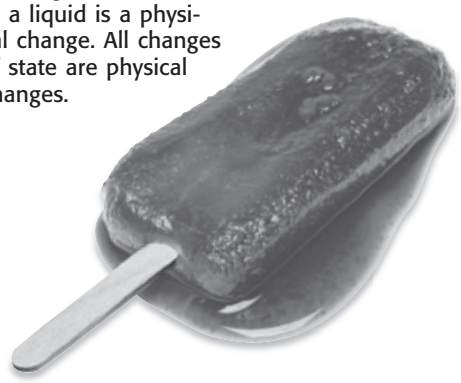
11. Describe What is a physical change?

_____

_____

_____

A change from a solid to a liquid is a physical change. All changes of state are physical changes.



This aluminum can has gone through the physical change of being crushed. The identity of the can has not changed.

TAKE A LOOK

12. Identify Name the physical change that happened to the popsicle.

_____

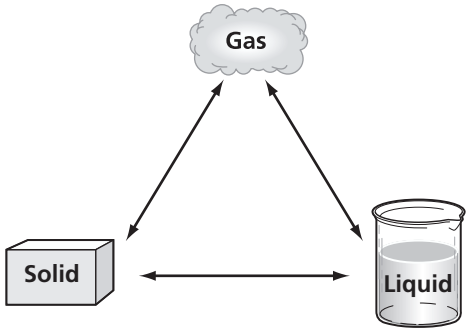
EXAMPLES OF PHYSICAL CHANGES

When a substance changes from a solid to a liquid, it is said to have changed state. Solid, liquid, and gas are the three states of matter. Any change in state is a physical change. ☑

READING CHECK

13. Identify When a liquid changes into a gas, what kind of physical change occurs?

_____



When you freeze water to make ice, you cause a physical change. Heating water in a teapot makes steam. This is also a physical change. Sugar seems to disappear or dissolve in water. However, if the water evaporates, the sugar reappears, so dissolving is a physical change.

REVERSIBILITY OF PHYSICAL CHANGES

In the figure above, the arrows each have two heads. This means that each change can be reversed. A solid can change into a liquid and then back into a solid. ☑

READING CHECK

14. Identify What change or changes of state can happen to a gas? Looking at the figure may help you with the answer.

_____

_____

Physical changes are often easy to undo. Suppose a solid cube of gold is melted and then poured into a bear-shaped mold. When it cools, the gold becomes solid again, and a bear-shaped charm is formed. The gold goes from solid to liquid to solid again, but it never stops being gold. These are physical changes because only the state and shape of the substance changes.

MATTER AND PHYSICAL CHANGES

READING CHECK

15. Identify What happens to the identity of a substance when it makes a physical change?

_____

Physical changes do not change the identity of matter. Melting, changing from liquid to gas, changing from liquid to solid, and changing shape are all examples of physical change. Physical changes can often be reversed easily, and the identity of the substance itself never changes. ☑

Name _____ Class _____ Date _____

Section 2 Review

8.7.c, 8.8.a, 8.8.b, 8.8.d

SECTION VOCABULARY

density the ratio of the mass of a substance to the volume of the substance **physical change** a change of matter from one form to another without a change in chemical properties	**physical property** a characteristic of a substance that does not involve a chemical change, such as density, color, or hardness

1. Describe In words, explain how to calculate the density of a substance.

_____

Use this table to answer questions 2 and 3.

Substance	Density (g/cm^3)
Wood (oak)	0.85
Water	1.00
Ice cube	0.93
Aluminum	2.7
Lead	11.3
Gold	19.3
Ethanol	0.94
Methanol	0.79

2. Identify Will any of the other substances in the table float in methanol? Why?

_____

3. Identify Which substance would have a mass of 135 g when it has a volume of 50 cm^3? Show your work.

$$D = \frac{m}{V}$$

_____

_____

_____

4. Identify Two balls have the same mass, but one has a larger volume than the other. Which ball has the larger density?

_____

5. Explain Most substances become more dense when they freeze. However, when water freezes, it becomes less dense. What must happen for this to be true? Hint: The mass stays the same.

_____

Name _____ Class _____ Date _____

CHAPTER 3 Properties of Matter

SECTION 3

Chemical Properties

California Science Standards

8.5.a, 8.5.c, 8.5.d

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

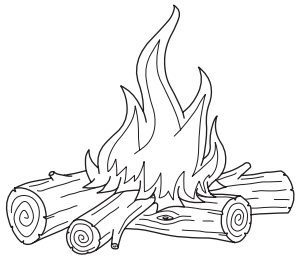
- What are chemical properties of matter?
- What is a chemical change?
- What is the effect of a chemical change?

What Are the Chemical Properties of Matter?

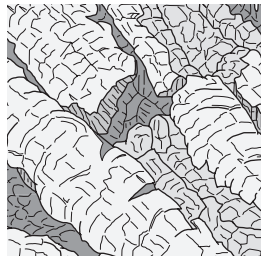
Physical properties are not the only properties that describe matter. **Chemical properties** describe the ability of matter to change into new matter. One chemical property of matter is reactivity. *Reactivity* is the ability of a substance to change into a new substance.

One kind of reactivity is flammability. *Flammability* is the ability of a substance to burn. For example, wood has the chemical property of flammability. You may have seen the result of wood burning in a fireplace or in a campfire. ☑

When wood burns, it becomes several different substances. Ash and smoke are just two of these new substances. The properties of the new substances are different from the original properties of the wood. Ash and smoke cannot burn. Unlike wood, they have the chemical property of nonflammability.

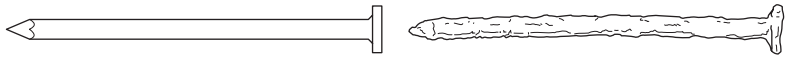


Wood burning in a fire



Ashes after the wood has burned

Rusting is another chemical property. Only iron can rust. Iron rusts when it combines with oxygen to form a new substance called iron oxide.



Iron nail with no rust

Iron nail with rust

STUDY TIP

Compare Make a table with two columns: Chemical property and Physical property. List the chemical and physical properties that are discussed in this section.

READING CHECK

1. Fill In Chemical properties of matter describe matter based on its ability to

_____

CALIFORNIA STANDARDS CHECK

8.5.a Students know reactant atoms and molecules interact to form products with different chemical properties.

Word Help: interact
to act upon one another

2. Compare In a chemical reaction, how do the chemical properties of the products compare with the chemical properties of the reactants?

_____

_____

COMPARING PHYSICAL AND CHEMICAL PROPERTIES

How can you tell the difference between a physical property and a chemical property? A physical property can be seen or identified because it does not change the identity of a substance. A physical change occurs when silver is pounded or gold is melted to make jewelry. After the change, the silver is still silver and the gold is still gold.

The chemical properties of a substance can't be seen unless you change the identity of the substance. For example, you may not know whether a liquid is flammable until you try to light it. If it burns, it has the chemical property of flammability. However, burning has changed the liquid into new substances.

A substance always has chemical properties. A piece of wood is flammable even when it is not burning. Iron can form rust even though it has not rusted.

Critical Thinking

3. Compare Describe what happens to a substance when a physical property and a chemical property of the substance are observed.

CHARACTERISTIC PROPERTIES

The properties that are most useful in identifying a substance are called *characteristic properties*. These properties are constant. This means that they do not change. The characteristic properties of a substance can be physical, chemical, or both.

A piece of iron has characteristic properties that help identify it as iron. A good example of this is density. Iron always has the same density when measured at the same temperature and pressure. Iron also rusts.

Scientists can identify a substance by studying its physical and chemical properties. The table below shows some characteristic properties of several liquids.

Property	Rubbing alcohol	Kerosene	Gasoline
Density (g/cm^3)	0.8	0.8	0.8
Ability to dissolve, or mix with water	yes	no	no
Flash point (°C) (The higher the flash point, the more flammable the liquid.)	12	40	–40

Critical Thinking

4. Apply Concepts A scientist measures three properties of a liquid. Its density is 0.8 g/cm^3, it does not mix with water, and its flash point is –40°C. Using the table to the right, find the identity of the substance. Explain your answer.

What Happens During a Chemical Change?

When a substance changes into one or more new substances that have new and different properties, a **chemical change** has happened. Chemical changes are not the same as chemical properties. The chemical properties of a substance describe which chemical change can happen to the substance. For example, flammability is a chemical property. Burning is the chemical change that shows this property. ☑

READING CHECK

5. Describe What is a chemical change?

_____

_____

A chemical change is the process that causes a substance to change into a new substance. You can learn about a substance's chemical properties by observing what chemical changes happen to that substance.

Chemical changes occur more often than you think. For example, a chemical change happens every time you use a battery. Chemical changes also take place within your body when the food you eat is digested. The figure below describes other chemical changes.

Soured milk smells bad because bacteria have formed smelly new substances in it.

The **Statue of Liberty** is made of copper, which is orange-brown. But this copper is green because of its interactions with moist air. These interactions are chemical changes that form copper compounds. Over time, the compounds turn the statue green.

TAKE A LOOK

6. Identify What property of milk told the girl that the milk had soured?

_____

A fun way to see what happens during a chemical change is to bake a cake. A cake recipe combines different substances. Eggs, cake mix, oil, and water are mixed to form a batter. When the batter is baked, you end up with a substance that is very different from the original batter.

The heat of the oven and the mixture of ingredients cause a chemical change. The result is a cake. The cake has properties that are different from the properties of the raw ingredients alone.

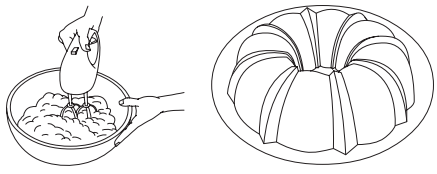
Critical Thinking

7. Apply Concepts How do you know that baking a cake causes a chemical change?

_____

_____

_____



Cake mix batter becomes a cake.

SIGNS OF CHEMICAL CHANGES

A change in color, odor, or texture may show that a chemical change has happened. Many chemical changes produce or absorb heat.

An increase in temperature happens when a chemical change releases, or gives off, heat. Wood burning is a good example of a chemical change that gives off heat.

Some chemical changes cause a substance to absorb, or gain, heat. Sugar is broken down into carbon and water when it is heated. ☑

READING CHECK

8. Identify What are four changes that indicate that a chemical change has occurred?

_____

_____

_____

_____

MATTER AND CHEMICAL CHANGES

When matter has a chemical change, the identity of the matter changes. Chemical changes can be reversed only by other chemical changes. For example, water can be made by heating a mixture of hydrogen and oxygen. Hydrogen and oxygen are produced when an electric current is passed through water. The electric current supplies the energy needed to pull the hydrogen away from the oxygen.

PHYSICAL VERSUS CHEMICAL CHANGES

Sometimes it is hard to decide whether a physical change or a chemical change has happened to an object. Ask yourself whether something new formed as a result of the change?

Physical changes do not change the matter that makes up an object. Ice melts into water and water freezes into ice. The water does not change in the process. The only changes that happened were to its physical properties.

Chemical changes change the matter that makes up a substance. A chemical change would change water into another substance. ☑

READING CHECK

9. Describe How can you tell that a physical rather than a chemical change has occurred?

_____

_____

REVERSING CHANGES

Many physical changes, like freezing, melting, and boiling, can be reversed easily. Remember that the substance does not become another substance.

This is very different from a chemical change. During a chemical change, the substance does become another substance. Many chemical changes cannot be reversed easily. For example, ashes and smoke cannot be unburned to make wood.

Name _____ Class _____ Date _____

Section 3 Review

8.5.a, 8.5.c, 8.5.d

SECTION VOCABULARY

chemical change a change that occurs when one or more substances change into entirely new substances with new chemical properties	**chemical property** a property of matter that describes a substance's ability to participate in chemical reactions

1. Describe How is a chemical property different from a chemical change?

_____

_____

2. Explain Why is reactivity not a physical property?

_____

_____

3. Identify What can be absorbed or produced as the result of a chemical reaction?

_____

4. Complete Fill in the type of change for each description in the table below.

Type of change	Description of change
	rusting
	boiling
	freezing
	burning

5. Identify What are four things that indicate that a chemical change probably happened?

_____

_____

6. Identify and Explain Originally, the Statue of Liberty was copper colored. After many years, it turned green. What kind of change happened? Explain your answer.

_____

_____

7. Identify A burning candle is observed. Heat is felt above the flame, black smoke is seen rising from the wick, and wax melts. What caused each change?

_____

_____