Coon

Physical Science
Weeks 3 & 4

Chapter 15 Classification of Matter

SECTION 1 Composition of Matter

Mr. Coon's Physical Science

Monday April 13th

What You'll Learn

- what substances and mixtures are
- how to identify elements and compounds
- the difference between solutions, colloids, and suspensions

Before You Read

Matter is all around you. You breathe matter, sit on it, and drink it every day. What words would you use to describe different kinds of matter?

_____

_____

_____

Mark the Text

Underline Look for different descriptions of matter as you read each paragraph. Underline these descriptions. Read the underlined descriptions again after you've finished reading the section.

Read to Learn

Pure Substances

Have you ever seen a print that looked like a real painting? Did you have to touch it to find out? The smooth or rough surface told you whether it was a painting or a print. Each material has its own properties. The properties of materials can be used to classify them into categories.

Each material is made of a pure substance or of a mix of substances. A **substance** is a type of matter that is always made of the same material or materials. A substance can be either an element or a compound. Some substances you might recognize are helium, aluminum, water, and salt.

What are elements?

All substances are made of atoms. A substance is an **element** if all the atoms in the substance are the same. The graphite in your pencil is an element. The copper coating on most pennies is an element, too. In graphite, all atoms are carbon atoms. In copper, all atoms are copper atoms. The metal under the copper coating of a penny is another element, zinc. There are about 90 elements found on Earth. More than 20 other elements have been made in laboratories. Most of the 20 human-made elements are unstable. They exist for only a short time in laboratories. You may recognize the elements that are shown in the figure on the next page.

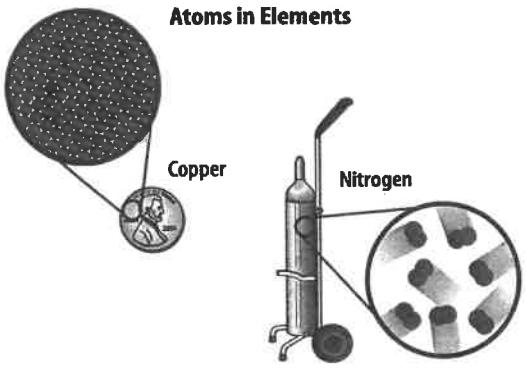
Reading Check

1. **Explain** Why is graphite considered an element?

_____

_____

_____



What are compounds?

A **compound** is a pure substance in which two or more elements are combined in a fixed proportion. A common compound is water. Water is made up of the elements hydrogen and oxygen. Each individual particle of water contains two hydrogen atoms and one oxygen atom. A molecule is the smallest particle of a compound. Chalk is another compound. It contains calcium, carbon, and oxygen. Each particle of chalk contains one calcium atom, one carbon atom, and three oxygen atoms.

Do compounds look like their elements? Can you imagine putting a silvery metal and a greenish-yellow poisonous gas on your food? Table salt is a compound made from elements that fits this description. Another name for table salt is sodium chloride. This common compound is made up of sodium, a silvery metal, and chlorine, a greenish-yellow poisonous gas. Many compounds look different from the elements in them.

What are molecules?

A particle that consists of two or more atoms bonded together is a molecule. As an example, oxygen in the air is a molecule made of two atoms of oxygen. A molecule is the basic unit of a molecular compound. Molecules are all around you. The simple sugars that you eat and the proteins in your body are molecules. The wool and cotton fibers in the clothes you wear all are molecules. They are formed from atoms that are bonded together.

Mixtures

Is pizza one of your favorite foods? Do you like soft drinks? If so, you like two foods that are mixtures. A mixture is a material made up of two or more substances that can be separated physically. There are many different kinds of mixtures.

Picture This

2. **Determine** What are the elements in each object shown in the figure?

_____

_____

_____

Think it Over

3. **Infer** Could a molecule contain only one atom? Explain your answer.

_____

_____

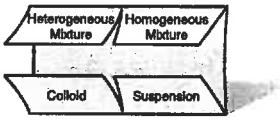
_____

Reading Check

4. **Explain** How can you tell that a pizza is a heterogeneous mixture?

FOLDABLES

A Classify Make the following Foldable to help you classify heterogeneous and homogeneous mixtures, colloids, and suspensions.



Reading Check

5. **Explain** Why is soda in an unopened bottle a homogeneous mixture?

What are heterogeneous mixtures?

Mixtures are different from compounds in several ways. One difference is that mixtures do not always contain the same proportions of the substances that make them up. For example, a pizza chef might put more cheese on one pizza than on another. In a pizza, you can see the different ingredients. A **heterogeneous** (he tuh ruh JEE nee us) **mixture** is one in which different materials can be identified easily. Granite, concrete, and pizza are some heterogeneous mixtures.

Recognizing Heterogeneous Mixtures You may be wearing a heterogeneous mixture. Some fabrics are labeled as permanent-press. These fabrics resist wrinkles. Permanent-press fabric contains fibers of two materials. The materials are polyester and cotton. The amounts of polyester and cotton can change from one piece of fabric to another. Look at the labels on some of your clothes. Do they contain different amounts of polyester and cotton?

You probably cannot tell that permanent-press fabric is a heterogeneous mixture by looking at it. It looks like it is made up of only one material. However, you might be able to see the mixture with a microscope. Under a microscope, the polyester fibers probably would look different from the cotton fibers.

Many substances around you are heterogeneous mixtures. Some have materials that are easy to see, such as those in pizza. Others have materials that are not easy to tell apart, such as the fibers in permanent-press fabrics. In fact, some parts of heterogeneous mixtures can be mixtures themselves. The cheese in pizza is a mixture, but you cannot see the materials. Cheese contains many compounds, such as milk, proteins, butterfat, and, sometimes, food coloring.

What are homogeneous mixtures?

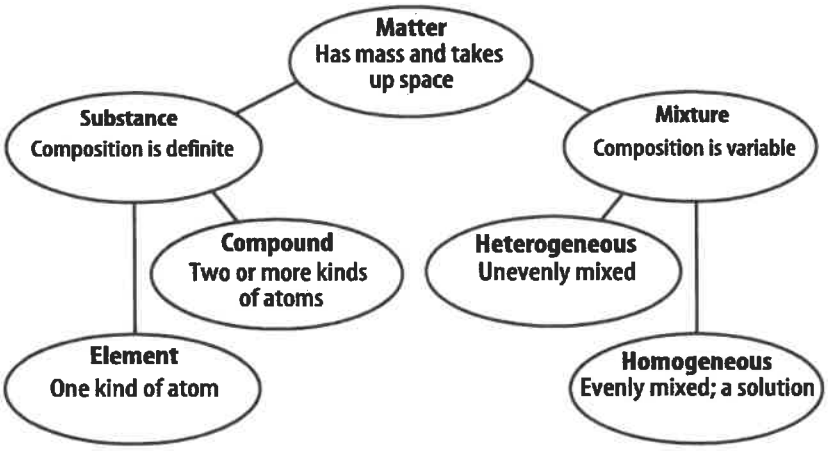
Soft drinks are mixtures. They contain water, sugar, flavorings, coloring, and carbon-dioxide gas.

Soft drinks in sealed bottles are homogeneous mixtures. A **homogeneous** (hoh moh JEE nee us) **mixture** contains two or more substances blended evenly throughout. You cannot see the different substances in a homogeneous mixture.

When a soft drink is poured into a glass, the carbon-dioxide gas forms bubbles. You then can see that the gas is separate from the other ingredients. When this happens, the soda becomes a heterogeneous mixture. However, after the carbon dioxide has bubbled out, the drink is flat. It is a homogeneous mixture of water, sugar, coloring, and flavoring.

What is a solution?

Vinegar is another homogeneous mixture. It looks clear, but it contains particles of acetic acid mixed with water. Homogenous mixtures, such as bottled soft drinks and vinegar, are called solutions. A **solution** is a homogeneous mixture of particles so small that they cannot be seen with a microscope and will never settle to the bottom of their container. Solutions stay evenly mixed. The diagram below shows the difference between substances and mixtures.



What are colloids?

Milk is an example of a mixture called a colloid. A **colloid** (KAH loyd) is a type of mixture with particles that are larger than those in solutions but not heavy enough to settle to the bottom of their container. Remember how a pizza is still a pizza even if the proportion of its ingredients are changed? Milk is similar to a pizza in that way. Milk contains water, fat, and proteins, but like any mixture, these substances can be in different proportions. What makes milk a colloid is that these ingredients form large particles, but they are not heavy enough to settle.

Paint is an example of a liquid colloid. Gases and solids can also be colloids. For example, fog and smoke are colloids. Fog is made up of liquid water particles suspended in air. Smoke contains solids suspended in air.

Do colloids and solutions look the same?

One way to tell the difference between a colloid and a solution is by how each looks. Fog looks white because its particles are large enough to scatter light. Sometimes it is not easy to tell that a liquid is a colloid. For example, some shampoos and gelatins are colloids called gels that look almost clear.

Picture This

6. **Identify** In the diagram, highlight the words that explain the difference between a substance and a mixture.

Think it Over

7. **Give an Example** Name a colloid that you can see through.

How do you identify colloids?

You can tell if a liquid is a colloid by shining a beam of light through it. You cannot see a light beam as it passes through a solution. But you easily can see a light beam in a colloid because its large particles scatter light. Small particles in solutions do not scatter light. Have you ever noticed how, at night, the fog scatters the light from a car's headlights? The **Tyndall effect** is the scattering of light by particles in a colloid.

Reading Check

8. Define What is the scattering of light by particles in a colloid called?

What are suspensions?

Some mixtures are neither solutions nor colloids. One example is muddy pond water. If pond water stands long enough, some mud particles will fall to the bottom. The water becomes clearer. Pond water is a suspension. A **suspension** is a heterogeneous mixture containing a liquid in which you can see particles settle. Look at the table below to compare the properties of different types of mixtures.

Where do suspensions occur in nature?

A river is an example of how particles in a suspension settle. Rivers move quickly when they go through narrow channels. They pick up soil and debris as they go. The soil and debris are suspended in the water. As long as the water in the river moves fast enough, the suspended soil does not settle. When the river slows, the particles fall out of the suspension and settle on the bottom of the river. This also happens when a river flows into a large body of water, such as an ocean. After many years, a delta forms made up of mud and debris.

Comparing Solutions, Colloids, and Suspensions

Description	Solutions	Colloids	Suspensions
Settle upon standing?	no	no	yes
Separate using filter paper?	no	no	yes
Particle size	0.1–1 nm	1–100 nm	>100 nm
Scatter light?	no	yes	yes

Applying Math

9. Comparison Which type of mixture has the largest particles? Explain how you know.

After You Read

Mini Glossary

colloid: a type of mixture with particles that are larger than those in solutions, but not heavy enough to settle to the bottom of their container

compound: a substance with two or more elements that are combined in a fixed proportion

element: a substance in which all the atoms are the same

heterogeneous mixture: a mixture in which different materials can be identified easily

homogeneous mixture: a mixture that contains two or more substances blended evenly throughout

solution: a homogeneous mixture of particles so small that they cannot be seen with a microscope and that will never settle to the bottom of their container

substance: a type of matter that is always made of the same material or materials

suspension: a heterogeneous mixture containing a liquid in which you can see particles settle

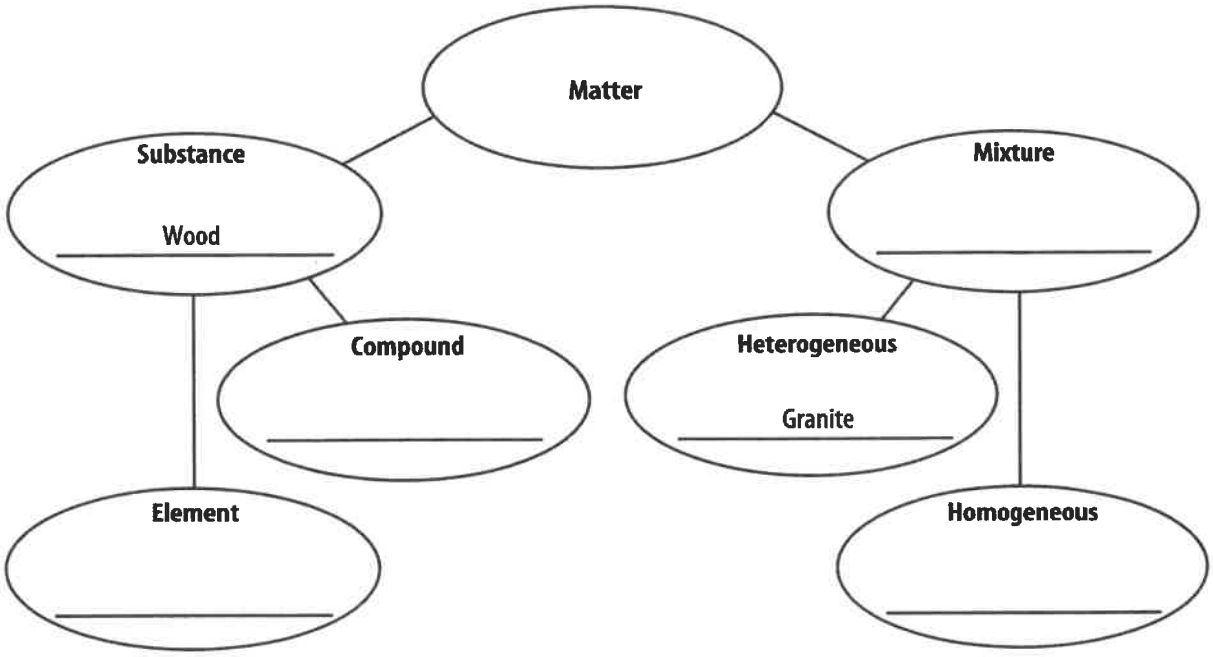
Tyndall effect: the scattering of light by particles in a colloid

1. Review the terms and their definitions in the Mini Glossary. The oxygen that you breathe is made up of tiny particles that are actually two atoms of oxygen bonded together. Would you say that oxygen is an element or a compound? Explain.

_____

_____

2. Fill in the blanks with an example of each type of matter.



End of Section

Name _____ **Date** _____

Classification of Matter

Mr. Coon's Physical Science
Tuesday April 14th

Before You Read

Before you read the chapter, use the "What I know" column to list three things you know about how different substances are classified. Then list three questions you have about matter in the "What I want to find out" column.

K What I know	W What I want to find out	L What I learned

Construct the Foldable as directed at the beginning of this chapter.

Science Journal

Describe the changes that take place as paint dries, particularly which changes are physical and which ones are chemical.

Name _____ **Date** _____

Classification of Matter

Section 1 Composition of Matter

Predict *Read the title of Section 1. List three things that might be discussed in this section.*

1. _____
2. _____
3. _____

Review Vocabulary

property

Circle the phrase that comes closest to the meaning of the word* property *as it is used in your book.

a piece of land — a quality or attribute

something that is owned — a stage prop

New Vocabulary

Use the terms on the left to fill in the blanks in the sentences.

colloid

A _____ is an _____ if all the atoms in the substance are the same.

compound

A _____ is a substance in which two or more elements are combined in a fixed proportion.

element

A _____ contains two or more substances blended evenly throughout.

heterogeneous mixture

A _____ is a mixture in which different materials can easily be distinguished.

homogeneous mixture

A _____ is a homogeneous mixture of particles too small to see with a microscope and too small to settle.

solution

The _____ is observed when light passes through a _____, which is a mixture with particles visible under a microscope but not heavy enough to settle.

substance

A _____ is a heterogeneous mixture containing a liquid in which you can see particles settle.

suspension

Tyndall effect

Name _____ **Date** _____

Section 1 Composition of Matter (continued)

Main Idea | **Details**

Substances

I found this information on page _____.

Classify *each substance as an* element *or a* compound.

calcium	chalk	hydrogen	salt	water
carbon	chlorine	mercury	sodium	zinc
carbon dioxide	copper	oxygen	sugar	

Elements	Compounds

Mixtures

I found this information on page _____.

Organize *information about* mixtures *in the outline below.*

I. Mixtures

A. Heterogeneous mixtures

1. _____
2. _____
3. _____
4. Examples: _____

B. Homogeneous mixtures

1. _____
2. _____
3. _____
4. Examples: _____

C. Colloids

1. _____
2. _____
3. _____
4. _____
5. Examples: _____

Name _____ **Date** _____

Section 1 Composition of Matter (continued)

Main Idea — **Details**

Mixtures

I found this information on page _____.

Sequence *the types of mixtures according to particle size.*

colloids solutions suspensions

Largest particles

Smallest particles

_____

_____

_____

Compare and contrast colloids, solutions, *and* suspensions. *Write the characteristics of each in the table.*

	colloids	solutions	suspensions
particles			
appearance			

Predict *what an observer who looks directly into a light source through a colloid will see.*

_____

_____

_____

SYNTHESIZE IT

Classify each substance as a solution, a colloid, or a suspension. Write each name in one of the boxes below.

herbed salad dressing paint pulpy orange juice tea
milk perfume smoke vinegar

colloids	suspensions	solutions

Chapter 15 Section 1 Quiz — Composition of Matter

Name: _____ Period: _____

Mr. Coon's Physical Science Class

Wednesday, April 15th

1. A substance is _____.
   - **A.** ◯ always an element
   - **B.** ◯ always a compound
   - **C.** ◯ either an element or a compound
   - **D.** ◯ a mixture of compounds

---

2. A(n)_____ is a substance in which all the atoms in it are alike.
   - **A.** ◯ compound
   - **B.** ◯ mixture
   - **C.** ◯ element
   - **D.** ◯ solution

---

3. Which of the following is a compound?
   - **A.** ◯ air
   - **B.** ◯ blood
   - **C.** ◯ water
   - **D.** ◯ brass

---

4. A(n) _____ is a substance in which atoms of two or more elements are combined in a fixed proportion.
   - **A.** ◯ synthetic element
   - **B.** ◯ compound
   - **C.** ◯ mixture
   - **D.** ◯ solution

---

5. The silvery liquid used in thermometers, called mercury, is a(n) _____.

A. ○ compound

B. ○ element

C. ○ mixture

D. ○ solution

---

6. Which of the following is a substance?

A. ○ milk

B. ○ water

C. ○ vinegar

D. ○ cheese

---

7. Which of the following is a homogeneous mixture?

A. ○ salad dressing

B. ○ pond water

C. ○ soft drink

D. ○ gelatin

---

8. Which of the following is a solution?

A. ○ salt water

B. ○ milk

C. ○ muddy water

D. ○ chlorine

---

9. A _____ is a heterogeneous mixture that never settles.

A. ○ solution

B. ○ suspension

C. ○ compound

D. ○ colloid

10. A mixture in which particles are so small they cannot be seen with microscope is a _____.

A. ○ heterogeneous mixture

B. ○ solution

C. ○ suspension

D. ○ element

---

11. A(n) _____ is a material made up of two or more substances that can be separated by physical means.

A. ○ element

B. ○ compound

C. ○ molecule

D. ○ mixture

---

12. The proportions of substances in a mixture _____.

A. ○ are always the same for each substance

B. ○ are always equal for each substance in the mixture

C. ○ can vary among the substances

D. ○ never can be determined accurately

---

13. Which of the following is a homogeneous mixture?

A. ○ dry soup mix

B. ○ salt water

C. ○ granite

D. ○ concrete

---

14. If using a microscope allows you to see substances in a mixture, that mixture is _____.

A. ○ heterogeneous

B. ○ homogeneous

C. ○ a solution

D. ○ microgeneous

---

15. Which of the following is a colloid?

A. ○ smoke

B. ○ oxygen

C. ○ vinegar

D. ○ water

STOP This is the end of the test. When you have completed all the questions and reviewed your answers, either: (Best option-->) upload in focus or (Second Choice -->) email or hand in hard copy.

chapter 15

Classification of Matter

Name: _____

Period: _____

section 2 Properties of Matter

Mr. Coon's Physical Science Class

Thursday, April 16th

What You'll Learn

- to identify substances using physical properties
- differences between physical and chemical changes
- how to identify chemical changes
- the law of conservation of mass

Before You Read

When you see someone, how do you identify that person as a friend or a stranger? How do you identify a friend on the phone? What are some things about people that help you recognize them? On the lines below, list some things you use to identify people.

_____

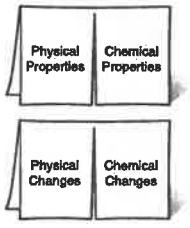
_____

Study Coach

Make Flash Cards For each heading in this section, make a flash card. The flash card should contain the main point of the paragraphs below the heading. When you finish the section, review the flash cards.

FOLDABLES™

Compare and Contrast Make the following Foldables to help you understand how physical and chemical properties are different, and how physical and chemical changes are different.



Read to Learn

Physical Properties

You can stretch a rubber band, but you can't stretch a piece of string very much. You can bend a piece of wire, but you can't bend a matchstick easily. The rubber band and the wire change shape, but the substances that they are made of do not change.

The ability to stretch or bend is a physical property. A **physical property** is a feature or characteristic that describes an object or substance. Some examples of physical properties are color, shape, size, density, melting point, and boiling point.

How do physical properties describe appearance?

How would you describe a tennis ball? You could describe some of its physical properties, such as shape and color. You could say it is a solid, not a liquid or a gas. For example, you might describe a tennis ball as a brightly colored, hollow sphere. You could also measure some physical properties of the ball. You could measure its diameter with a tape measure. You could measure its mass with a balance. You could measure how high it will bounce.

To describe a soft drink in a cup, you could start by saying it is a brown liquid. You could measure the volume and the temperature of the soft drink. Each of these characteristics is a physical property of that soft drink.

How do physical properties describe behavior?

Some physical properties describe the behavior of a material or substance. You recall that a magnet attracts objects that contain iron, such as a safety pin. Attraction to a magnet is a physical property of iron. Every substance has physical properties that make it useful for certain tasks.

Some metals, such as copper, are useful because they bend easily and can be pulled into wires. Other metals, such as gold, are useful because they easily can be pounded into sheets as thin as 0.1 micrometers. This property of gold makes it useful for decorating picture frames and other things. Flattened gold is called gold leaf.

Think again about the soft drink. If you knock over the cup, the drink will spill. If you knock over a jar of honey, however, it does not flow as quickly. The ability to flow is a physical property of liquids.

Reading Check

1. **Explain** Why does honey flow more slowly than water?

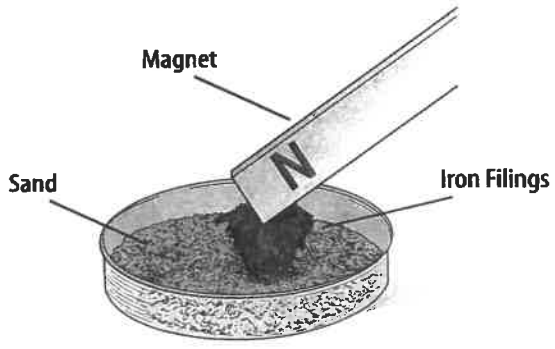
_____

_____

How are physical properties used to separate materials?

You can use the physical properties of size and hardness to separate some substances. Removing the seeds from a watermelon is easy. The seeds are small and hard, and the flesh of the large watermelon is soft and juicy.

Using Magnetism The dish in the figure below contains sand mixed with iron filings. You probably would not be able to sift out the iron filings. They are about the same size as the sand particles. However, if you pass a magnet through the mixture, it will attract only the iron filings. A magnet does not attract sand. This is an example of using the physical property of magnetism to separate substances in a mixture.



Picture This

2. **Observe** Why would it be difficult to sift the iron filings from the sand?

_____

_____

Physical Changes

When you break a stick of chewing gum, you change its size and shape. You do not change the identity of the materials that make up the gum. A physical change does not change identity.

Why doesn't the identity change?

When a substance freezes, boils, evaporates, or condenses, it undergoes a physical change. A **physical change** is a change in size, shape, or state of matter. Heat might be added or removed during a physical change. Changes in energy do not change the identity of the substance being heated or cooled. All substances have distinct properties that are constant, or never change. The properties of density, specific heat, boiling point, and melting point are constant for substances. These properties can be used to identify unknown substances in a mixture.

Iron is a substance that changes states when it absorbs or releases energy. At high temperatures, iron melts. However, iron has the same physical properties that identify it as iron, whether it is in the liquid or solid state.

Reading Check

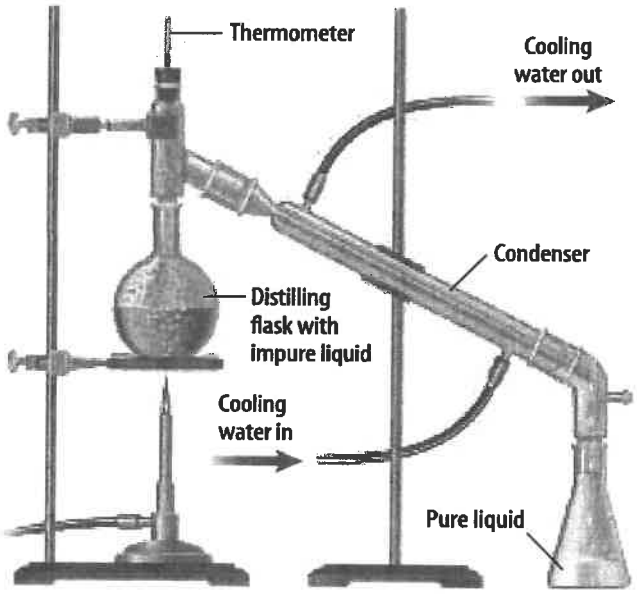
3. **Define** What effect does an energy change have on the identity of a substance?

What is distillation?

Distillation is the process of separating substances in a mixture by evaporating a liquid and condensing its vapor. A laboratory distillation process is shown below.

To distill a liquid, it is heated until it vaporizes. Then, the vapors are cooled until they condense. All solid material is left behind. Distillation is used to make drinking water out of salt water.

Liquids with different boiling points can be separated by distilling. The mixture is heated slowly until it begins to boil. Vapors of the liquid with the lowest boiling point form first. They are condensed and collected. As temperature increases, the second liquid boils. Its vapors are condensed and collected. Distillation is used often in industry. Natural oils such as mint are distilled.



Picture This

4. **Observe** Where would you expect to find the solid material left behind in the distillation process?

Chemical Properties and Changes

A **chemical property** is a characteristic of a substance that indicates whether it can undergo a change that results in a new substance. A warning on a can of liquid paint thinner or lighter fluid states that the liquid is flammable (FLA muh buhl). If a substance is flammable, it can burn. When a substance burns, it produces new substances during a chemical change. Therefore, whether or not a substance is flammable is a chemical property. Knowing which substances are flammable helps you to use them safely.

Another chemical property is how compounds react to light. Some medicines are kept in dark bottles because the compounds will change chemically in the light.

Detecting Chemical Change

Your senses tell you when a chemical change has happened. Leave a pot of chili cooking on the stove too long and you will smell it burning. The smell tells you a new substance formed.

How does the identity of a substance change?

You smell a rotten egg or see rust on a bike. These are signs that chemical changes have taken place. A **chemical change** is a change of one substance to another. When you drop antacid tablets in a glass of water, they foam up. After a lightning strike the air smells different. These are signs that new substances have been produced. Heat, light, and sound are often signs of a rapid energy release and of a chemical change.

The only proof that a chemical change has taken place is that a new substance is formed. For example, when hydrogen and oxygen combine in a rocket engine, their chemical changes produce heat, light, and sound. But there are no such clues when iron combines with oxygen to form rust. Rust forms slowly. The only clue that iron has changed to a new substance is the presence of rust. Burning and rusting are chemical changes because new substances are formed.

How can a chemical change be used to separate substances?

You can separate substances using a chemical change. One example is cleaning silver. Silver chemically reacts with sulfur compounds in the air to form silver sulfide, or tarnish. A different chemical reaction changes the tarnish back to silver using warm water, baking soda, and aluminum foil.

Think it Over

5. **Infer** How can knowing a chemical property such as flammability help you to use a product safely?

Reading Check

6. **Explain** What is the only proof that a chemical change has taken place?

Weathering—Chemical or Physical Change?

The forces of nature continuously shape Earth's surface. Rocks split, rivers carve deep canyons, sand dunes shift, and interesting formations develop in caves. These changes are known as weathering. Weathering changes are both physical and chemical changes.

What is physical weathering?

As a stream cuts through rock to form a canyon, small particles of rock are carried downstream. The large rocks and the particles of rock have the same properties. Their properties are not changed, so this weathering is physical.

What is chemical weathering?

Limestone is made up mostly of a chemical called calcium carbonate. Calcium carbonate does not dissolve easily in water. But if the water is even slightly acidic, calcium carbonate reacts. A new substance, calcium hydrogen carbonate, is formed. This substance dissolves in water. This change in limestone is a chemical change. The calcium carbonate changes to calcium hydrogen carbonate in the chemical reaction. Rainwater can dissolve limestone because of this reaction. This chemical change leads to weathering. Chemical changes like this one create caves and the rock formations that are found in them.

Think it Over

7. **Apply** How are shifting sand dunes an example of physical weathering?

The Conservation of Mass

Wood is combustible, which means it can burn. As you have learned, this is a chemical property of wood. Think about a log burning in a fireplace. After you burn a piece of wood, there is nothing left but a small pile of ashes. During the fire, the wood gives off heat, light, and smoke. These changes in the wood are all signs of a chemical reaction.

Where did all the matter in the log go as it burned? At first, you might think that matter was lost as the log burned, since the pile of ashes is so small. The ashes have a smaller mass than the wood you started with. But imagine that you could collect all the smoke and gases that escaped from the log while it burned. If you added this all up, you would find that no mass was actually lost.

Mass is not lost during burning. In the same way, mass is not gained or lost in any chemical change. In other words, matter is not created or destroyed in a chemical change. The **law of conservation of mass** states that the mass of all the substances before a chemical change equals the mass of substances after a chemical change.

Reading Check

8. **Explain** what the law of conservation of mass means.

After You Read

Mini Glossary

chemical change: change of one substance to another

chemical property: characteristic of a substance that indicates whether it can undergo a certain chemical change

distillation: the process of separating substances in a mixture by evaporating a liquid and condensing its vapor

law of conservation of mass: the mass of all substances that are present before a chemical change equals the mass of all the substances that remain after the change

physical change: a change in size, shape, or state of matter

physical property: a feature or characteristic that describes an object or substance

1. Review the terms and their definitions in the Mini Glossary. What is the main difference between a physical change and a chemical change?

_____

_____

2. Complete the table below by giving an example of the property or change.

Physical property	Example:
Chemical property	Example:
Physical change	Example:
Chemical change	Example:
Separation using physical change	Example:
Separation using chemical change	Example:

3. Study Coach Imagine explaining physical and chemical changes to a group of elementary school students. Describe some items around your house to use as examples of physical and chemical changes.

_____

_____

End of Section

Name _____ **Date** _____

Classification of Matter

Section 2 Properties of Matter

Mr. Coon's Physical Science

Mr. Coon's Physical Science Class

Friday, April 17th

Skim *Section 2 of your book. Write three questions that come to mind from reading the headings and the illustration captions.*

1. _____
2. _____
3. _____

Review Vocabulary

boiling point

Use the phrase **boiling point** *in a sentence.*

_____

_____

New Vocabulary

Read the definitions below, then write the key term for each one in the left column.

_____	a characteristic that can be observed without changing the substance
_____	a change in size, shape, or state of matter
_____	a change of one substance to another
_____	a characteristic that indicates whether a substance can change to another substance
_____	the separaration of substances in a mixture using evaporation
_____	the mass of all substances before a chemical change equals the mass of all substances after the change

Academic Vocabulary

identify

Use a dictionary to define the word **identify**.

_____

Name _____ Date _____

Section 2 Properties of Matter (continued)

Main Idea | **Details**

Physical Properties

I found this information on page _____.

Distinguish *between the materials listed below. Describe a unique physical property for each one that is not true for the other materials in this group.*

Material	Unique physical property
rubber	
applesauce	
marble	
copper	

Physical Change

I found this information on page _____.

Describe *how freezing could be used to remove sugar from a mixture of sugar and water.*

_____

_____

_____

_____

_____

Chemical Properties and Changes, Detecting Chemical Change

I found this information on page _____.

Identify *four properties of a substance that will never change.*

_____, _____, _____, _____

Organize *five kinds of physical changes and five kinds of chemical changes.*

Chemical	Physical
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Name _____ Date _____

Section 2 Properties of Matter (continued)

Main Idea

Details

Weathering—Chemical or Physical Change?

I found this information on page _____.

Identify *chemical and physical changes that occur as a car ages.*

Physical Changes	Chemical Changes

The Conservation of Mass

I found this information on page _____.

Describe *how the law of conservation of mass could be useful for investigating chemical changes.*

_____

_____

_____

_____

_____

_____

CONNECT IT Describe some ways that industry and agriculture use physical properties to separate substances.

_____

_____

_____

_____

_____

_____

_____

Name _____ Date _____

Classification of Matter Chapter Wrap-Up

Review the ideas that you listed in the table at the beginning of the chapter. Cross out any incorrect information in the first column. Then complete the table by filling in the third column. How do your ideas about what you know now compare with those you provided at the beginning of the chapter?

K What I know	W What I want to find out	L What I learned

Review

Use this checklist to help you study.

- ☐ Review the information you included in your Foldable.
- ☐ Study your *Science Notebook* on this chapter.
- ☐ Study the definitions of vocabulary words.
- ☐ Review daily homework assignments.
- ☐ Re-read the chapter and review the charts, graphs, and illustrations.
- ☐ Review the Self Check at the end of each section.
- ☐ Look over the Chapter Review at the end of the chapter.

SUMMARIZE IT

After reading this chapter, list three things you have learned about matter and how substances are classified.

_____

_____

_____

_____

Chapter 15 Section 2 Quiz — Properties of Matter

Name: _____ Period: ____ Mr. Coon's Physical Science

1. A characteristic of a material that can be observed without changing the identity of the material is a _____?

A. ○ physical change

B. ○ physical property

C. ○ chemical property

D. ○ chemical change

Monday, April 20th

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2. Which of the following is a physical property?

A. ○ ability to rust

B. ○ magnetic attraction

C. ○ flammability

D. ○ changes when exposed to light

---

3. The ability of a metal to be drawn out into thin wires is a _____.

A. ○ physical change

B. ○ physical property

C. ○ chemical property

D. ○ chemical change

---

4. A change in size, shape, or state of matter is a _____.

A. ○ physical property

B. ○ chemical property

C. ○ physical change

D. ○ chemical change

---

5. Which of the following is a physical change?

A. ○ lighter fluid burning

B. ○ iron turning white when heated

C. ○ eggs rotting

D. ○ bikes rusting

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6. A _____ is a characteristic of a substance that indicates whether it can undergo a certain chemical change.

A. ○ physical property

B. ○ physical change

C. ○ chemical property

D. ○ chemical change indicator

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7. A change of one substance to another is a _____.

A. ○ chemical change

B. ○ physical change

C. ○ physical reaction

D. ○ chemical property

---

8. The law of conservation of mass states that _____.

A. ○ matter can be created and destroyed but does not change forms

B. ○ the mass of all substances present before a chemical change equals the mass of all the substances remaining after the change

C. ○ in a chemical reaction, efforts should be made to preserve rare elements without changing them

D. ○ in a chemical reaction, the final mass of the products is always greater than the starting mass of the reactants

---

9. Which of the following is an example of physical weathering?

A. ○ change of calcium carbonate in limestone to calcium hydrogen carbonate.

B. ○ acid rain corroding a statue

C. ○ formation of stalactites in a cave.

D. ○ formation of a canyon by a flowing stream.

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10. Which of the following is a chemical change?

A. ○ burning of a log

B. ○ crushing an aspirin tablet

C. ○ evaporation of water off a lake

D. ○ boiling water

STOP This is the end of the test. When you have completed all the questions and reviewed your answers, either: (Best option-->) upload in focus or (Second Choice -->) email or hand in hard copy.

Kp, Ammi ëqNfwcga_j Qagd ac Aj_cq

Name: **Date:** **Class:**

Chapter 15 Lab Chapter 15 *Classification of Matter* Mr. Coon's Physical Science

DIRECTIONS Tuesday, April 21st

Choose the best answer choice for each of the following questions.

Substance	Flame Color
Barium	Yellow-green
Lithium	Crimson
Potassium	Violet
Strontium	Red
Copper	Blue-green

1. According to the chart, a substance that burns with a blue-green flame probably contains _________.

a. barium

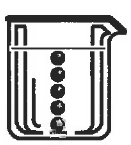
b. lithium

c. potassium

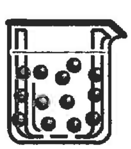
d. copper

2. José's science teacher told him that every part of a salt and water solution is identical. José wanted to collect samples to verify this statement. Which picture shows the sample that verifies this statement?

f. 

g. 

h. 

j. 

3. Mixtures can be either heterogenous or homogenous. Which of the following is characteristic of a homogenous mixture?

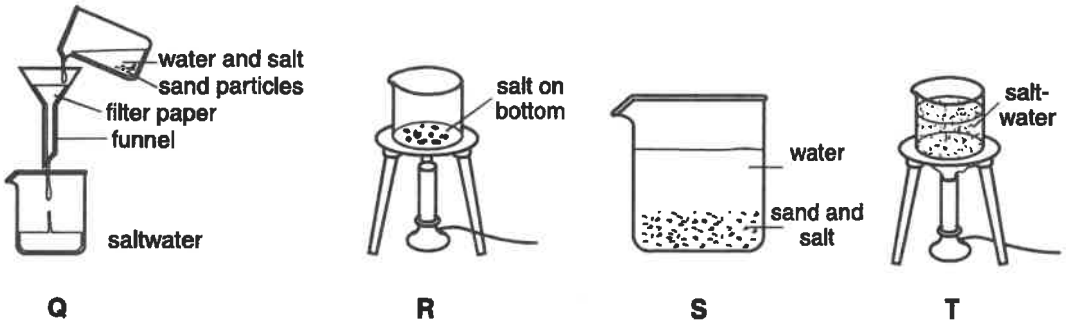
a. a mixture in which two or more substances are still distinguished

b. a mixture in which large particles are suspended

c. a mixture in which large particles are not suspended and eventually settle

d. a mixture in which two or more substances are evenly distributed

GO ON



Q R S T

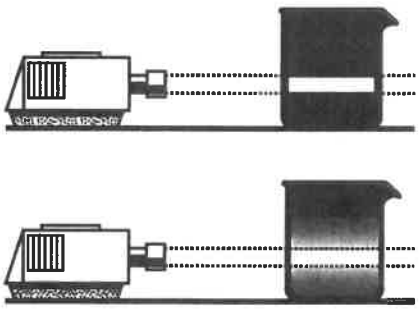
4. These pictures show the different steps in an experiment designed to separate a mixture of salt and sand. Which of these shows the steps in order, from first to last?

   f. Q, S, R, T

   g. R, T, Q, S

   h. S, Q, T, R

   j. T, R, S, Q



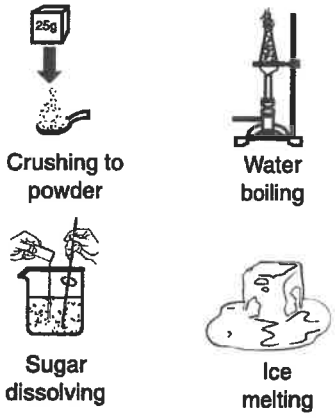
5. Which of these questions would most likely be answered by this experimental setup?

   a. How do the particles in a suspension and a solution compare in their ability to scatter light?

   b. How does light energy affect the rate at which particles dissolve in a suspension and in a solution?

   c. Does light change the evaporation rate of a suspension or a solution?

   d. How does light energy affect the temperature of a suspension and a solution?



6. What do these processes have in common?

   f. They are all examples of chemical changes.

   g. They are all examples of physical changes.

   h. They are all examples of reactions that require the addition of heat energy.

   j. They are all examples of unsafe laboratory techniques.

STOP

DIRECTIONS

Read each question. Then, on your answer sheet, mark the answer choice that you think is best.

1 **A beam of light from a flashlight is passed through four beakers containing four different substances. Which of these substances would scatter light the least?**

A saltwater

B milk

C muddy water

D paint

2 **Processes such as dissolving, melting, freezing, and evaporating can affect the appearance of a substance, but the identity of the substance remains the same. These processes are called**

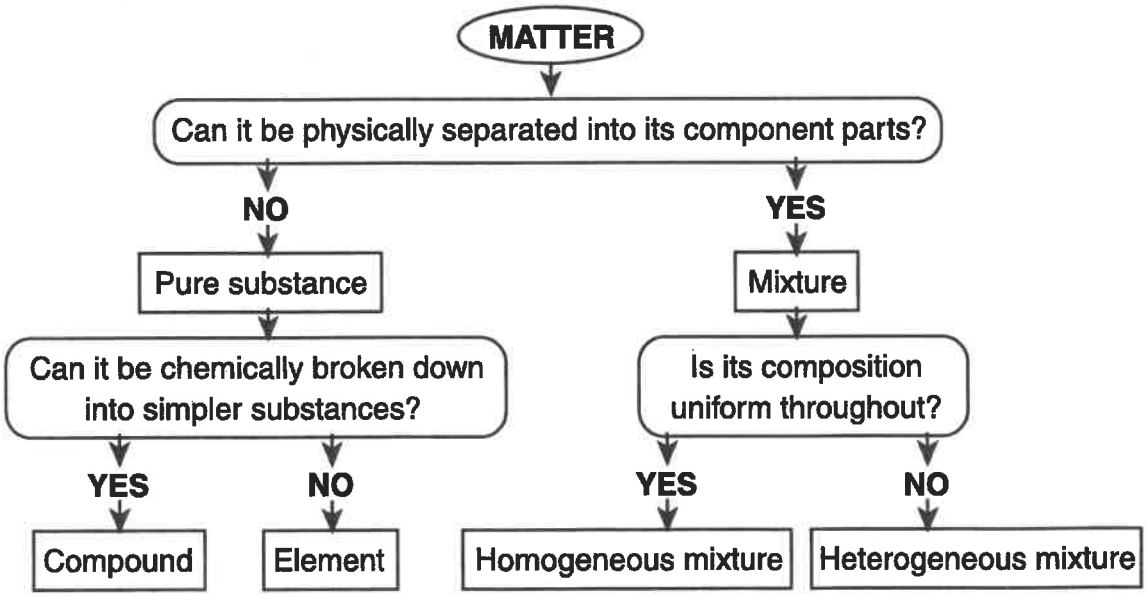
F chemical changes

G chemical properties

H physical changes

J physical properties

Directions: Use the information in the diagram to answer Number 3 below.



3 **According to the diagram, which of these statements is true?**

A Compounds cannot be broken down into simpler substances.

B Elements can be broken down into simpler substances.

C Heterogeneous mixtures have a uniform composition throughout.

D Homogeneous mixtures have a uniform composition throughout.

GO ON

4 **Most metallic elements, such as copper and iron, have high melting points. This is a useful property because**

F it keeps cars made of metal from becoming hot on summer days

G it enables people to use pots and pans made of metal to cook food

H it prevents machine parts made of metal from rusting

J it makes metals easier to melt so they can be poured into molds to make precision tools

5 **Which of the following does <u>not</u> make a solid dissolve faster in a liquid?**

A stirring the mixture

B heating the mixture

C using a smaller volume of liquid

D breaking the solid into smaller pieces

6 **Felipe took a sample of water from a creek in a glass beaker and placed the glass beaker on his desk. An hour later, he noticed that dirt had settled on the bottom of the beaker, leaving the rest of the water clear. What was the most likely cause of this?**

F Dirt does not dissolve easily in water taken from a creek.

G Felipe should have taken a larger sample of creek water.

H Felipe did not leave the creek water on his desk long enough to allow the dirt to dissolve.

J Felipe's sample of creek water was a suspension that settled when allowed to stand.

Directions: Read Number 7 below. Then, on your answer sheet, write your answer in complete sentences.

7 **The law of conservation of mass states that the mass of all the substances present before a chemical change equals the mass of all the substances remaining after the change. Design an experiment to verify this law.**

Name: _____ Period: ____

Understanding Matter Mini Lab
How are physical and chemical changes distinguished? Mr. Coon's Physical Science

Wednesday, April 22nd

Question 1: Is evaporation of water a physical change or a chemical change? Explain your answer.

Answer 1:

Question 2: List three clues that indicate that a chemical change has taken place.

Answer 2:

Question 3: Give an example of a chemical change that you encounter every day.

Answer 3:

Question 4: Explain how a burning candle demonstrates both physical and chemical changes.

Answer 4:

Question 5: Of the events you observed compare the substances that underwent chemical change. What were the similarities and differences in these changes?

Answer 5:

Question 6: Of the events you observed compare the substances that underwent physical change. What were the similarities and differences in these changes?

Answer 6:

Mr. Coon's Physical Science Name: _____ Period: ____

Thursday, April 23rd
No Friday Assignment

1. A mixture in which particles are so small they cannot be seen with a microscope is a _____.

A. ○ solution

B. ○ heterogeneous mixture

C. ○ suspension

D. ○ element

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2. The proportions of substances in a mixture _____.

A. ○ are always equal for each substance in the mixture

B. ○ can vary among the substances

C. ○ never can be determined accurately

D. ○ are always the same for each substance

---

3. A change in size, shape, or state of matter is a _____.

A. ○ chemical property

B. ○ physical change

C. ○ physical property

D. ○ chemical change

---

4. Which of the following is a colloid?

A. ○ oxygen

B. ○ vinegar

C. ○ water

D. ○ smoke

---

5. Which of the following is a substance?

A. ○ water

B. ○ cheese

C. ○ milk

D. ○ vinegar

---

6. Which of the following is a physical change?

A. ○ eggs rotting

B. ○ bikes rusting

C. ○ lighter fluid burning

D. ○ iron turning white when heated

---

7. A substance is _____.

A. ○ either an element or a compound

B. ○ always an element

C. ○ a mixture of compounds

D. ○ always a compound

---

8. Which of the following is a chemical change?

A. ○ burning of a log

B. ○ evaporation of water off a lake

C. ○ crushing an aspirin tablet

D. ○ boiling water

---

9. A _____ is a characteristic of a substance that indicates whether it can undergo a certain chemical change.

A. ○ chemical change indicator

B. ○ physical change

C. ○ physical property

D. ○ chemical property

10. Which of the following is a physical property?

A. ○ flammability

B. ○ magnetic attraction

C. ○ changes when exposed to light

D. ○ ability to rust

---

11. Which of the following is a homogeneous mixture?

A. ○ soft drinks

B. ○ dry soup mix

C. ○ granite

D. ○ concrete

---

12. A(n) _____ is a substance in which atoms of two or more elements are combined in a fixed proportion.

A. ○ solution

B. ○ compound

C. ○ synthetic element

D. ○ mixture

---

13. A _____ is a heterogeneous mixture that never settles.

A. ○ compound

B. ○ suspension

C. ○ solution

D. ○ colloid

14. Which of the following is a solution?

A. ○ muddy water

B. ○ milk

C. ○ salt water

D. ○ chlorine

15. Which of the following is a compound?

A. ○ blood

B. ○ air

C. ○ water

D. ○ brass

This is the end of the test. When you have completed all the questions and reviewed your answers, either: (Best option-->) upload in focus or (Second Choice -->) email or hand in hard copy.