5th Grade Science Name:_____#____
Chapter 8 Study Guide Date: _____ Homeroom:_____

DIRECTIONS: Read Lesson 1. Fill in the blanks with the correct answer.

Lesson 1, Matter

What is matter made of?

1. Matter is anything that has _____ and _____.
2. An_____ is a material that cannot be broken down into anything simpler.
3. Elements can be classified as:

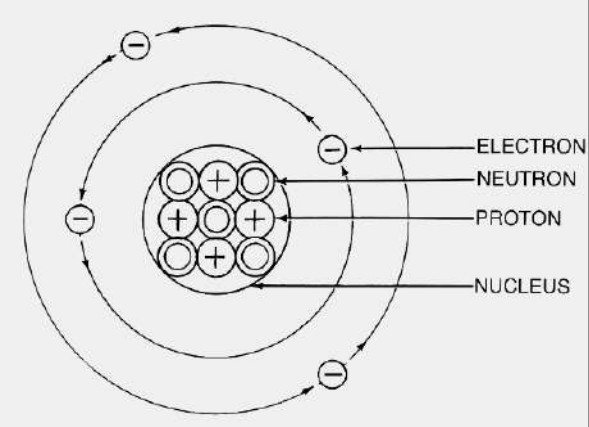
Classification	Properties
	Shiny, conduct heat and electricity, bend easily
	Dull, poor conductors of heat electricity, brittle
	Have some properties of metals and some properties of nonmetals

4. A(n) _____ is the smallest unit of an element that retains (keeps) the properties of that element.
5. Atoms are made of smaller particles:

_____,

_____,

_____



A <u>proton</u> has one unit of **positive** electric charge. The number of protons in an atom is called the **atomic number**. This is what determines which element it is. Protons are found in the **center** of the atom (nucleus).

A <u>neutron</u> is a particle with **no** electric charge—it is **neutral**. Neutrons are also found in the **center** of the atom (nucleus).

<u>Electrons</u> are smaller particles and have one unit of **negative charge** each. Electrons move within the space **outside** the nucleus.

Usually, the number of protons and electrons are **equal**, so atoms have no overall charge.

Protons and neutrons have about the same mass, which is called **atomic mass unit** (amu).

Add the mass of all the protons and neutrons in an atom to find the **atomic mass.**

What are compounds?

6. A _____ forms when two or more elements combine. Compounds have properties different from their individual elements.

7. _____ compounds have chemical names, and many have common names.

8. _____names use the names of the elements. The second element has its name changed slightly.
Examples:

Iron	**+**	**Oxygen**	**=**	**Iron Oxide (rust)**
2Fe		**30**		**Fe_20_3**

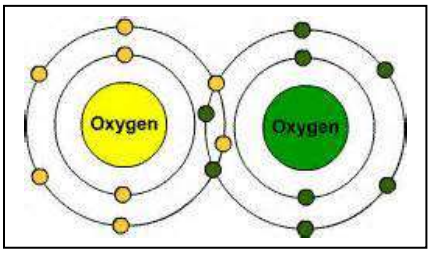
Sodium	**+**	**Chlorine**	**=**	**Sodium Chloride (table salt)**
Na		**Cl**		**NaCl**

9. Some compounds are made of_____, such as water. A _____forms when two or more atoms join together and share electrons.

Examples:

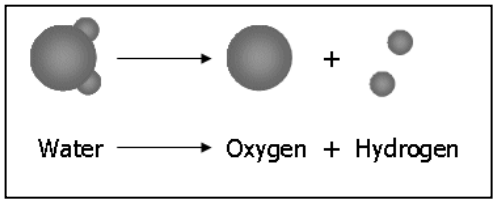
Oxygen we breathe is made from two atoms of oxygen.

O_2



Water is formed by one oxygen atom and two hydrogen atoms

H_2O



How are elements grouped?

10. The periodic table groups the elements according to their **properties**.

1) Whether they are _____

2) Whether they are _____, _____ or _____ at room temperature

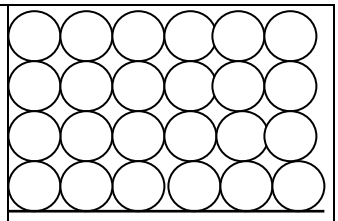
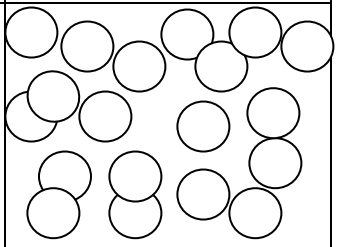
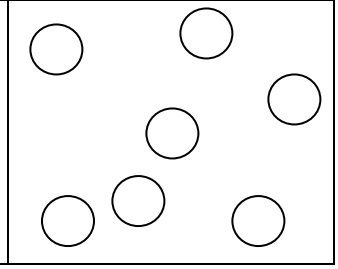
3) Whether they are _____, _____, or

_____

The symbols for most elements are made of one or two letters. The first letter is ALWAYS capital, the second letter is NEVER capital.

What forms can matter have?

11. Three states of matter: _____, _____, _____.

	• Particles have very little freedom to move; • particles vibrate in place; • definite shape with definite volume; • does not change shape unless something changes it by heat or being broken	
	• Particles move more freely than in a solid; • close together but can flow past each other; takes shape of container; • a definite volume but not a definite shape.	
	• Particles not close together; • no definite volume or shape; • at room temperature move around to fill their container; • if volume of container increases, gas expands to fill it. (balloons, balls)	

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DIRECTIONS: Read Lesson 2. Fill in the blanks with the correct answer.

Lesson 2, Physical and Chemical Properties

What are physical properties?

1. A _____ is something that can be observed about an object without changing the identity of the object.
2. Physical properties of matter: mass, volume, weight, density, buoyancy, color, hardness, odor, magnetism

Property	Description
_____	Amount of matter in an object; can be measured on an equal pan balance; mass is measured in kilograms or grams
_____	Measures how much space matter takes up; calculate the volume of a regularly shaped object by multiplying its length (L) by its width (W) by its height (H); L x W x H = V (in cubic centimeters, cm^3) Irregularly shaped objects can be placed in a graduated cylinder or beaker with a specific amount of water in it; when placed in the water the level rises; the change in the water level when an object is placed under water tells the object's volume; measured in mL (1 cm^3 = 1 mL)
_____	How strongly gravity pulls on an object; if an object has more mass it will have more weight; weight is measured in newtons ; 1 newton = 0.225 pounds (lbs) in the English system; measured with a scale
_____	Amount of mass for each cm^3 (or mL) of a substance; to find density, divide its mass by its volume; $\text{Density} = \frac{\text{mass}}{\text{volume}}$
_____	The resistance to sinking; object can float as a result of buoyancy; depends on density and shape; *Surface tension*: in water, every particle pulls toward the other particles, creating a "skin" on the surface; an object that is spread out may be able to rest on the "skin" and float

What are chemical properties?

3. A _____ describes the way a substance reacts with other substances. The old matter is changed into new matter. It **cannot** be changed back into its original state.

Evidence of a chemical change:

1) a gas is produced
2) a change in temperature
3) a change in color
4) a change in odor
5) a change in pH

How can physical properties be classified?

4. Physical properties can be classified as:

Extensive Properties	*Intensive Properties*
Depends on the amount of substance present: _____, _____, _____	Do NOT depend on the amount of substance present: _____, _____, _____

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DIRECTIONS: Read Lesson 3. Fill in the blanks with the correct answer.

Lesson 3, Conductors and Insulators

What are conductors and insulators?

1. Many physical properties can be determined by taking simple measurements or making observations.
   Some require testing and investigations to measure.
   One property that requires testing is _____, which is the ability of a material to transfer heat energy.

2. A material that easily conducts heat energy is called a _____.

   Materials that do not conduct heat well are called _____.

Conductors	*Insulators*
Heat up **quickly** and evenly	Do not **conduct** heat well
Gold, copper, silver, and **most metals**	Often absorb heat, but do not distribute it **evenly**
Solids are better than liquids	Many **nonmetals**, such as wood, plastic, and glass
Liquids are better than **gases**	Effectiveness is measured by the rate at which heat **passes through** them. The slower it moves through, the **better** an insulator it is.

How are conductors and insulators used?

3. Pans used for cooking need to be made of a conductive material, such as metal. The metal helps to _____ evenly to cook the food.

4. _____ is a material used to prevent heat from flowing into or out of a building. Insulation keeps buildings warm in the winter and cool in the summer. Cloth, plastic, fiberglass, air, and other insulators can all be used as insulation.

Types of Insulation	
Vacuum	Not a good conductor of heat; used in some thermoses to keep hot liquids hot
Concrete	Helps insulate _____; holes trap air
Air	Slows heat transfer through walls and roofs
Winter coats, sweaters, fleece jackets	_____ is trapped and warmed by your body to keep you warm
Layers of clothes	_____ is trapped and warmed by your body to keep you warm
Blankets and gloves	Traps _____ from the body and prevents it from flowing to the surrounding air

5. Insulators in nature:

Animal	***Insulator***	***How it Works***
Birds	Layer of soft, fluffy feathers called down	Traps _____ and keeps it close to the birds' bodies
Many Mammals	Hair and fur	Traps _____underneath hair to keep the animals warm
Ocean Mammals (whales and dolphins)	Blubber – layer of fat	Allows them to maintain body temperature in _____ water

Do conductors have other uses?

6. Materials that are good _____conductors, such as metals, are often good electrical conductors as well. They allow electrical charges to move easily. _____is often used in electrical wires because it is a good conductor.

7. Materials, such as rubber and plastic, are _____ because they do not allow electrical charges to flow. Electrical insulators are placed around metal wires to protect you from electrical shock.

8. It is important to know what materials are good electrical conductors because electricity can be **dangerous**. _____ is an electrical conductor.

   Power cords can be dangerous if the_____ is worn and bare wires are showing.

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DIRECTIONS: Read Lesson 4. Fill in the blanks with the correct answer.

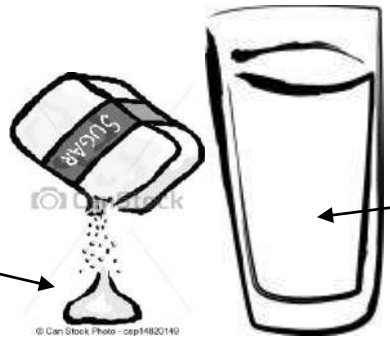
Lesson 4, Mixtures

What are mixtures?

1. A _____ is a physical combination of substances. Mixtures like snack mix that have different parts you can plainly see are called **heterogenous**.
2. Some heterogeneous mixtures do not look "chunky." They may look smooth or creamy. You can see the parts clearly when you look at them under a microscope. This is called a _____.
3. Over time parts of the suspension will settle to the bottom. **Shaking or stirring** the mixture, however, will .make it look smooth again.
4. A _____ is a mixture like a suspension, except that its parts do not settle. Examples of colloids: smoke, mayonnaise, foam

What are solutions?

5. A _____ is a mixture with parts that blend so that it looks the same everywhere, even under a microscope. The smaller amount that is dissolved in a solution is called the _____. The larger amount that dissolves the other substance in a is called the _____.



6. Solutions can be made with _____, _____, _____.
   _____ is an important solution of water vapor in air. When it condenses, it forms clouds.
   Seltzer (carbonated water) is a solution of carbon dioxide gas in liquid water.
7. An **alloy** is a solution of a metal and another solid (often another metal).
8. Many common household products are solutions: window cleaner, bleach, vinegar, beverages.
9. The maximum amount of a solute that can dissolve in a solvent is called the **solubility**. Solubility often depends on **temperature**. Many substances become more soluble at_____ temperatures.
10. _____ is often called the universal solvent because it can dissolve many things.

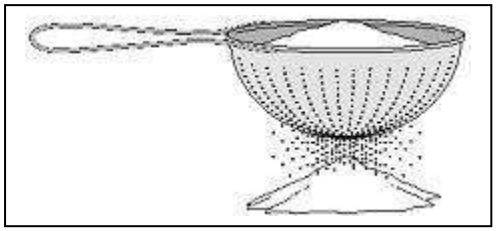
How can mixtures be separated?

11. The parts of mixtures can be separated using **physical methods,** which will not change their properties or identities.

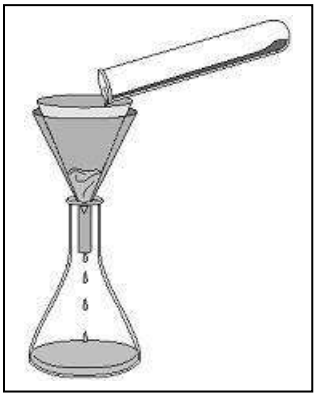
Ways Mixtures Can Be Separated

1) Magnetism

2) Sieve

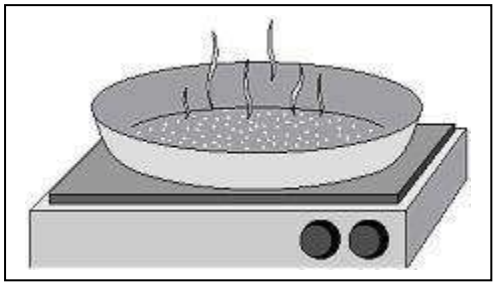


3) Filtration



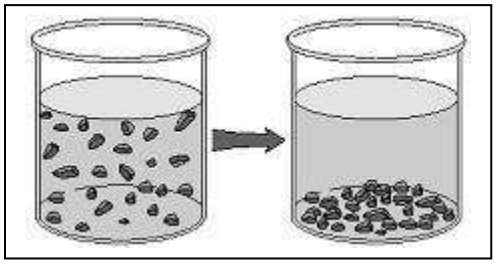
4) Flotation

5) Evaporation

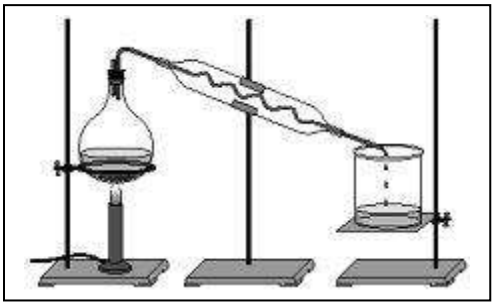


6) Pick out with Tongs

7) Settling



8) Distillation



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DIRECTIONS: Read Lesson 5. Fill in the blanks with the correct answer.

Lesson 5, Physical and Chemical Changes

What are physical changes?

1. A **physical change** alters the form of an object without changing what type of matter it is. Changes in _____ and _____ are examples of physical change.

Sharpening your pencil	Tearing a piece of paper
Crushing an aluminum can	Breaking glass
Blowing up a balloon	Folding paper into a particular shape

Ice melting and evaporating (change of state is a physical change)

A substance changing from a solid to a liquid to a gas does not change its chemical identity.

2. Combining **two substances** to form a _____ is another example of physical change.

3. Physical changes can be reversed using _____ methods.

Ice can melt and become a _____. The liquid can be _____ back into ice.
Raisins, pretzels, and nuts can be combined to form a snack mixture. Each item can be picked out of the mixture, the way they were originally.
Sugar can be dissolved in water to form a mixture. The water can be _____ and collected, leaving the sugar in the container.

What are chemical changes?

4. Chemical changes occur when atoms link together in new ways to create substances different from the original substances. This is also known as a _____

Chemists write equations for chemical changes similar to _____ equations.

Chemicals on the left side of a chemical equation are called	Chemicals on the right side of the equation are called
Reactants.	**Products.**

Baking Soda **+** Vinegar ⇨ water **+** carbon dioxide **+** sodium acetate

$NaHCO_3$ **+** $HC_2H_3O_2$ ⇨ H_2O **+** $C0_2$ **+** $NaC_2H_3O_2$

How many atoms are on each side of the arrow in the equation above?

_____ ⇨ _____

This is called the **law of conservation of mass**. The total number of each type of atom must be the same in the _____ and the_____.

5. Math equations make sense whether you read them right to left or left to right. Chemical equations are similar. Most chemical equations are _____, or they can be undone. The products break apart or combine to form the original reactants.
Water can be broken down into _____ and _____.

How can you spot a chemical change?

6. Chemical changes produce _____, which have _____properties than the previous ones. Often you can _____, _____, or _____. the formation of new substances as a chemical change occurs.

Signs of a chemical change:

1) Changes in color: _____ removes the color from clothing

2) Changes color with metals: corrosion of a metal can cause a color change called _____; when iron rusts (corrosion) it becomes a reddish color

3) Releases gas: _____ indicate that a chemical change has occurred

4) Forms a precipitate – a solid formed from a chemical reaction of some solutions; "soap scum" on a sink is a _____ formed from solutions of soap and water

5) Releases energy – a burning candle produces a hot flame; _____ come from the chemical change (combination of atoms) in the candle and the wick with oxygen from the air

7. Chemical reactions are taking place _____.

Some examples:

1) Plants use energy from the Sun to help them create _____ (their food).

2) Plants and animals use chemical reactions to release _____, which is used to fuel their cells.

3) Machines use _____ from chemical reactions.

4) Chemical reactions happen in nature to form compounds that created _____.

5) Artificial compounds are also formed with chemical reactions. _____ are formed with these changes.