Name _____ Date _____ Period _____

Mrs. Brown's Reading: Matter and Its States- ***You will use this reading to help complete your foldable so do not discard! Read the passages and answer the embedded questions. Then complete your foldable!***

Part 1: What is Matter?

Matter is everything around you. As we have learned matter is anything that has a **mass** and **volume**. Even though matter can be found all over the universe, you usually find it in just a few forms. As of 2015, scientists have identified **fifteen states of matter**. They may discover one more by the time you get old. You should know about **solids, liquids, gases, and plasmas**. The first four have been understood for a long time.

Questions:

1. What is matter? Give 4 examples of things that are matter?

3. What are the four major states of matter?

Part 2: States of Matter

There are four main states of matter. Solids, liquids, gases, and plasmas are all different states of matter. Each of these states is also known as a phase. Elements and compounds can move from one phase to another phase when special **physical forces** are present. One example of those forces is **kinetic energy**.
Chemical kinetic energy of a substance is measured as **temperature**. The phase or state of matter can change when the temperature changes. Generally, as the temperature rises, matter moves to a more active state, as the particles in the matter move faster.

1. Solids

So what is a solid? Solids are usually hard because their molecules have been packed together. The closer your molecules are, the harder you are. Solids also can hold their own shape. We say then that the **shape is definite**, which means that it doesn't change in different surroundings. A rock will always look like a rock unless something happens to it. The same goes for a diamond. Even when you grind up a solid into a powder, you will see little tiny pieces of that solid under a microscope. The volume of a **solid is also definite**.

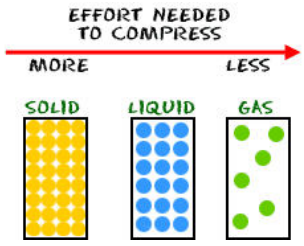
In the same way that a solid holds its shape, the atoms inside of a solid are not allowed to move around too much. This is one of the **physical** characteristics of solids. Atoms and molecules in liquids and gases are bouncing and floating around, free to move where they want. The molecules in a solid are stuck and simply vibrate in place (because at the atomic level everything is always moving, even if only a little bit).

Questions:

1. Why are solids hard?

2. How do the atoms inside a solid behave? (describe the "particles")

2. Liquids



The second state of matter we will discuss is a liquid. What is a liquid? Water is a liquid. Your blood is a liquid. Liquids are an in-between state of matter. They can be found in between the solid and gas states.

One characteristic of a liquid is that it will fill up the shape of a container. If you pour some water in a cup, it will fill up the bottom of the cup first and then fill the rest. The water will also take the shape of the cup. This means that the **shape is indefinite**, which means it will change if the surroundings change.

Another trait of liquids is that they are difficult to compress. When you compress something, you take a certain amount and force it into a smaller space. Solids are very difficult to compress and gases are very easy. Liquids are in the middle but tend to be difficult. This also means that a liquid has a **definite volume**.

Question

1. Give an example from your life to show liquids take the shape of their container.

3. Gases

Gas is everywhere. In the Earth's, atmosphere (that's a big layer of gas that surrounds the Earth) air is a gas and therefore is matter. Gases are **random** groups of atoms. Gases are really **spread out** and the **atoms and molecules are full of energy**. They are bouncing around constantly. Gases can fill a container of any size or shape. Think about a balloon. No matter what shape you make the balloon it will be evenly filled with the gas atoms. The atoms and molecules are spread equally throughout the entire balloon. Gases have an **indefinite shape and volume**.

You might hear the term **vapor**. Vapor and gas mean the same thing. The word vapor is used to describe gases that are usually found as liquids. Good examples are water (H_2O) or mercury (Hg). Compounds like carbon dioxide are usually gases at room temperature so scientists will rarely talk about carbon dioxide vapor.

Questions:

1. How do the atoms in a gas act? (describe the "particles")

2. What is the difference between a gas and a vapor?

4. Plasmas

Plasmas are a lot like gases, but the atoms are different, because they are made up of free electrons and ions of an element such as neon (Ne). You don't find naturally occurring plasmas too often when you walk around. They aren't things that happen regularly on Earth.

If you have ever heard of the Northern Lights or ball lightning, you might know that those are types of plasmas. It takes a very special environment to keep plasmas going. They are different and unique from the other states of matter. Plasma is different from a gas, because it is made up of groups of **positively and negatively charged particles**. In neon gas, the electrons are all bound to the nucleus. In neon plasma, the electrons are free to move around the system.

While natural plasmas aren't found around you that often, man-made plasmas are everywhere. Think about fluorescent light bulbs. They are not like regular light bulbs. Inside the long tube is a gas. **Electricity** flows through the tube when the light is turned on. The electricity acts as an energy source and charges up the gas. This charging and exciting of the atoms creates glowing plasma inside the bulb. The electricity helps to strip the gas molecules of their electrons.
Another example of plasma is a neon sign. Just like a fluorescent lights, neon signs are glass tubes filled with gas.

You also see plasma when you look at **stars**. Stars are big balls of gases at really high temperatures. The high temperatures charge up the atoms and create plasma. Stars are a good example of how the temperature of plasmas can be very different. Fluorescent lights are cold compared to really hot stars. However, they are still both forms of plasma, even with the different **physical** characteristics.

Final Question

Describe an interesting fact for each of the four states of matter that you just read about. Write at least 1 sentence for each state of matter.

1.

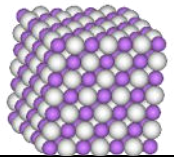
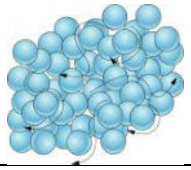
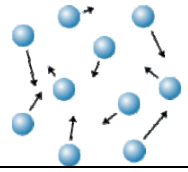
2.

3.

4.

Image: SOLID	**Mrs. Brown's** **States of Matter Cut and Glue Foldable** **By:_____** **Date: _____** **Period:_____** **Use your Reading to arrange the properties of the four common states of matter**	Image: LIQUID
Image: GAS		Image: PLASMA

SHAPE: VOLUME:	PARTICLE ARRANGEMENT: PARTICLE MOTION:	PARTICLE ARRANGEMENT: PARTICLE MOTION:
SHAPE: VOLUME:	PARTICLE ARRANGEMENT: PARTICLE MOTION:	PARTICLE ARRANGEMENT: PARTICLE MOTION:
SHAPE: VOLUME:		

Definite Shape	Definite Volume	Particles spread out		Indefinite Shape
	Indefinite Shape	Indefinite Volume	Particles moderately energetic & slide past each other	Particles vibrate in place due to low energy
Definite Volume	Particles closely packed		Particles spread out; Makes up Stars, Fire, and Lightening	Particles Loosely packed
Indefinite Volume	Particles **very** energetic (fast) and **charged**	Particles energetic and move quickly	Indefinite Shape	

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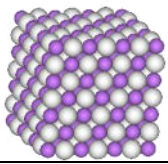
Definite Shape	Definite Volume	Particles spread out		Indefinite Shape
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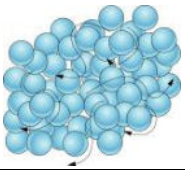
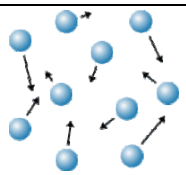
Definite Volume	Particles closely packed		Particles spread out; Makes up Stars, Fire, and Lightening	Particles Loosely packed
Indefinite Volume	Particles **very** energetic (fast) and **charged**	Particles energetic and move quickly	Indefinite Shape	

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