Name _____ Date _____ Period _____

Reading: Matter and Its States

Part 1: What is Matter?

Matter is everything around you. Matter is anything that has a **mass** and **takes up space**. Even though matter can be found all over the universe, you usually find it in just a few forms. As of 1995, scientists have identified five **states of matter**. They may discover one more by the time you get old.

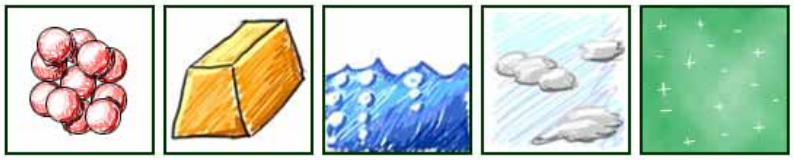
You should know about solids, liquids, gases, plasmas, and a new one called Bose-Einstein condensates. The first four have been around a long time. The scientists who worked with the Bose- Einstein condensates received a Nobel Prize for their work in 1995.

Questions:

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

3. What are the five states of matter?

Part 2: States of Matter



There are five main states of matter. Solids, liquids, gases, plasmas, and Bose-Einstein condensates 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 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.

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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. 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.

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.

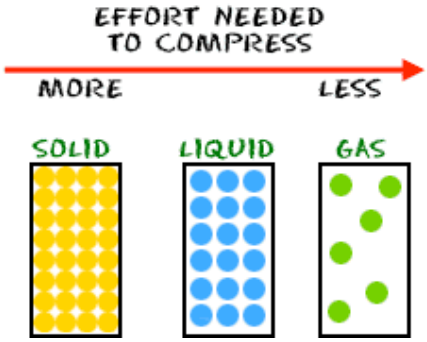
Questions:

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.



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 set **volume**.

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

3. Gases
Gas is everywhere. There is something called the atmosphere. That's a big layer of gas that surrounds the Earth. 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. That is one of their physical characteristics. 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.

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 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?

Final Question
Describe each of the three states of matter that you just read about. Write at least 1 sentence for each state of matter.

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