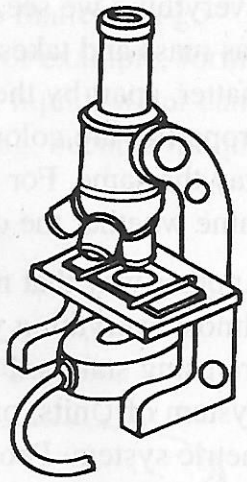
Name _____ Date _____

Matter

Matter is made up of basic units. Matter can be combined, separated, mixed, and altered. The smallest building block of matter that retains the properties of matter is the **atom**. A single crystal of salt or grain of rice is made up of millions of atoms. Atoms are too small to be seen except with very powerful microscopes.



An **element** is made up of only one kind of atom. Few of the things you see around you are pure elements. Wood, plastic, and steel are made of molecules that consist of many kinds of atoms. A substance made of two or more elements chemically combined is called a **compound**. When two or more atoms combine, they form a **molecule**. A molecule is the smallest particle of matter that consists of more than one atom.

Darken the letter of the answer that best completes each sentence.

1. The smallest building block of matter is _____.
- Ⓐ a molecule
- Ⓑ an element
- Ⓒ an atom
- Ⓓ a compound

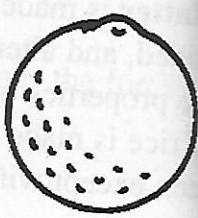
2. _____ is made up of only one kind of atom.
- Ⓐ A molecule
- Ⓑ An element
- Ⓒ An atom
- Ⓓ A compound

3. _____ is a substance made of two or more elements chemically combined.
- Ⓐ A molecule
- Ⓑ An element
- Ⓒ An atom
- Ⓓ A compound

4. When two or more atoms combine, they form _____.
- Ⓐ a molecule
- Ⓑ an element
- Ⓒ an atom
- Ⓓ a compound

Properties of Matter

Everything we see, touch, taste, and smell is matter. Matter is anything that has mass and takes up space. We can tell different substances, or objects of matter, apart by their characteristics, or **properties**. Some of these properties are color, taste, and odor. Some properties of a substance always stay the same. For example, the color, taste, and smell of an orange are the same whether the orange is small or large, whole or sliced.



Another way that matter can be described is by measurement. You use measurements in almost everything you do. When everyone agrees to use the same units of measurement, the are using standard units. Scientists from around the world have adopted the International System of Units, or SI, for a standard of measurement. This standard is sometimes called the metric system. People use these standard units to make all kinds of measurements every day. For example, cooking requires measuring volume, or the amount of space something takes up. When you measure the amount of matter in an object, you are measuring **mass**. People often confuse mass with **weight**, which is a measure of the force of gravity pulling on an object. Weight varies with the gravitational force on an object, but mass remains the same.

Answer these questions.

1. Describe what matter is. _____

2. Describe an orange according to its properties. _____

3. Why do we measure using standard units instead of measuring with any kind of units? _____

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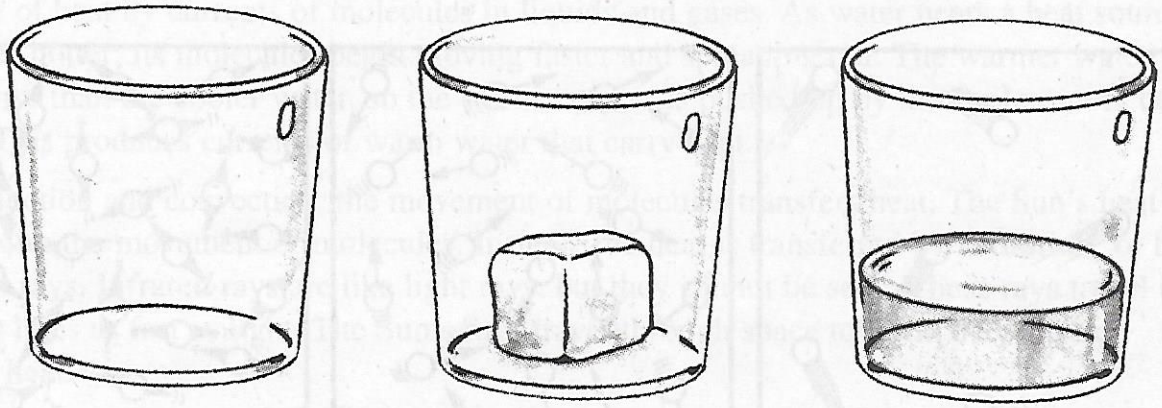
Phases of Matter

Matter can also be found in solid, liquid, and gas states, or **phases**. Some matter can go through all three phase changes as a result of heating or cooling. Water, for example, forms a solid at freezing temperatures, and when heated, melts into a liquid. As a liquid, water can change into a gas through evaporation and can once again, through cooling, become a liquid by condensation.

Answer the questions.

1. In the boxes below, show which is the solid, liquid, or gas by labeling each.



a. _____ **b.** _____ **c.** _____

2. Explain why condensation forms on a glass containing a cold drink.

_____

_____

_____

_____

3. Explain how evaporation occurs.

_____

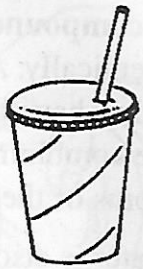
_____

_____

_____

Mixtures

In a **mixture**, the parts keep their properties, even though the parts are mixed together. A **solution** is a mixture in which the composition is the same throughout. A **suspension** is a solution in which one of the parts is a liquid. Suspensions are very common in everyday life.



When you are making a gelatin dessert mold, you are making another type of mixture. The gelatin in the dessert is a mixture called a colloid. In a **colloid**, the parts do not dissolve, but they are so small that they do not settle out. They remain suspended because they are constantly moving.

Answer the questions.

1. In _____ the parts keep their own properties.
- Ⓐ a suspension
- Ⓑ a solution
- Ⓒ a mixture
- Ⓓ a colloid

2. _____ are mixtures in which the composition is the same throughout.
- Ⓐ Suspensions
- Ⓑ Solutions
- Ⓒ Mixtures
- Ⓓ Colloids

3. _____ is a mixture in which one of the parts is a liquid.
- Ⓐ A suspension
- Ⓑ A solution
- Ⓒ A mixture
- Ⓓ A colloid

4. _____ is a mixture in which the particles do not settle out.
- Ⓐ A suspension
- Ⓑ A solution
- Ⓒ A mixture
- Ⓓ A colloid

5. Describe what the *solvent* and *solute* of a solution are. Use a reference book to help you

_____

_____

_____

_____

_____

_____

_____

_____

Name _____ Date _____

Compounds

A **compound** results when two or more elements combine chemically. As a result, you end up with something you didn't have before. Rust is a compound. Rust results from the combining of atoms of the element oxygen in air with atoms of the element iron.

Water is also a compound. Each molecule of the compound water is made up of two atoms of hydrogen and one atom of oxygen. Hydrogen and oxygen are gases, but when they combine as H_2O, they form the clear liquid water.

Another example of a compound is salt. Salt is made up of the elements sodium and chlorine. As an element, sodium is a solid that is dangerous to handle because it can burst into flames. Chlorine is a poisonous gas. But when sodium and chlorine are combined chemically in the ratio of one to one, they form salt (NaCl), a white crystal that is safe to handle and eat.

Answer the questions.

1. Explain the difference between a mixture and a compound.

_____

_____

_____

_____

2. Explain how the compound water is formed.

_____

_____

_____

_____