Name_____ Date_____

Matter: All That "Stuff"

Just look around you and you will see "stuff" – tables, pencils, food, books, animals, etc. Everything you see around you is made of matter. There are more different kinds of things out there than we could ever list, but they are all built of the same chemical building blocks. Even very complicated types of matter like volcanoes or human bodies are made of combinations of elements.

Elements are substances that cannot be separated into simpler substances by a chemical change. You may have seen a periodic table, which shows in chart format **over 100** elements that are known. For example, helium is an element. Helium has the symbol He and is used to fill balloons. The element sodium has the symbol Na and is part of what makes up the salt you put on your food. Au is the symbol for gold, which can be made into jewelry.

Aluminum is also an element. A piece of aluminum foil is made up of many atoms of aluminum. **An atom is the smallest particle of an element that has the same chemical properties as the element**. All of the atoms that make up a piece of aluminum foil are identical, but they are not the same as the atoms that make up a different element. For example, titanium (which is used to make baseball bats) is an element that is made up of titanium atoms. Aluminum atoms and titanium atoms are not the same and the elements do not have the same properties.

Atoms are very tiny. They are much too small to be seen with our eyes or even with a regular microscope. It is now known that atoms contain three smaller parts: **protons, neutrons, and electrons**. Most of the mass of an atom is in its center or **nucleus**. The nucleus of an atom contains both protons and neutrons. Protons are **positively** charged particles. The number of protons is what determines the type of atom. Neutrons are also in the nucleus and are **neutral** particles. Orbiting around the nucleus, similar to how moons orbit a planet, are electrons. Electrons are very small, **negatively** charged particles. The rest of the atom is made up of empty space.

A quick review: Elements are made up of many of the same kinds of atom. Atoms are the smallest particles that still have the chemical properties of the element. Therefore, if you had a chunk of the element silver sitting in front of you, what you see is many silver atoms. The individual silver atoms are much too small to see.

What happens when more than one element combine in a chemical reaction? The result is a **compound**. A very familiar example of a compound is water. Water is made of the elements hydrogen and oxygen. The chemical formula for water is H_2O, which means there are two hydrogen atoms for every oxygen atom. Another example of a compound is sodium chloride. Sodium chloride is made of the elements sodium and chlorine. Sodium chloride is more commonly known as table salt.

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Matter: All That "Stuff" Questions

1. True or False. Matter is all around us.

2. _____ are substances that cannot be separated into simpler substances by a chemical change.

3. Give an example of an element.

4. The three parts of an atom are protons, _____, and _____.

5. The center of an atom is the _____ and it contains the protons and _____.

6. The small particles that orbit the nucleus are called _____.

7. List the charges for the particles below:
   Protons have a __ charge.
   Electrons have a __ charge.

8. When you combine more than two or more elements in a chemical reaction, the result is a _____.

9. Give an example of a compound.

10. What two elements make up water?

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Matter: All That "Stuff" Answers

1. **True** or False. Matter is all around us.

2. **Elements** are substances that cannot be separated into simpler substances by a chemical change.

3. Give an example of an element.
   Helium, sodium, gold, silver…(see a periodic table)

4. The three parts of an atom are protons, **neutrons**, and **electrons**.

5. The center of an atom is the **nucleus** and it contains the protons and **neutrons**.

6. The small particles that orbit the nucleus are called **electrons**.

7. List the charges for the particles below:
   Protons have a **+** charge.
   Electrons have a **-** charge.

8. When you combine more than two or more elements in a chemical reaction, the result is a **compound**.

9. Give an example of a compound.
   Water, sodium chloride…

10. What two elements make up water?
    Water and oxygen