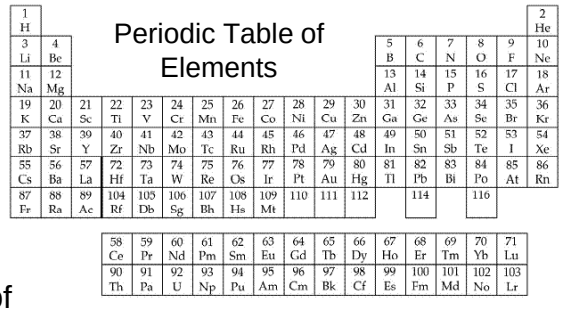
Elements, Atoms and Molecules:

Name _____

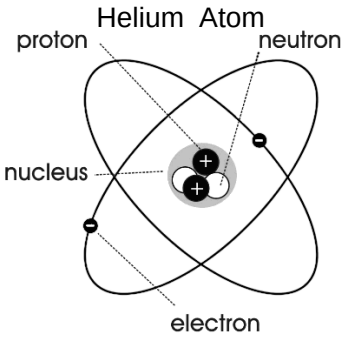
Instructions: Read through the information below and then complete the "Fill-Ins" at the bottom of page.

Elements are the basic building blocks of all known matter in the universe. Elements represent the purest and simplest form of any type of matter. ***All of the known elements in their basic form are found on the Periodic Table of Elements.***

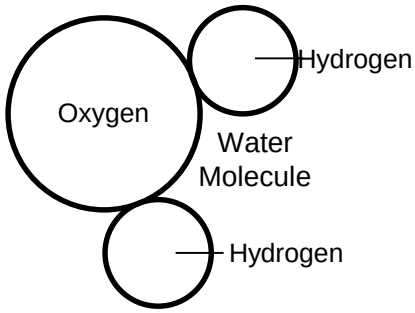
Elements on the *Periodic Table* are arranged by characteristics such as atomic number, electron arrangement, and chemical properties. ***Rows on the Periodic Table are referred to as "periods" and columns are called "families".***



The smallest piece of matter is referred to as an atom. A single atom represents the smallest unit of any type of matter. For example, 1 atom of Gold, 1 atom of Hydrogen, or 1 atom of Carbon would all be examples of the smallest unit of that type of matter. Keep in mind that atoms are extremely small and it takes millions of atoms to actually make up any sizeable amount of any type of matter. ***In fact there are over 20 million atoms of carbon in a period made with a pencil.*** Even though atoms are extremely small, scientists have identified several particles that make up individual atoms. The outermost part of the atom contains tiny particles called "*electrons*". These ***electrons have a negative charge and orbit*** the center of the atom called the "***nucleus". Inside the nucleus there are two other particles, "protons"*** which have a positive charge ***and "neutrons"*** which have a neutral charge. All together these particles are the basic parts of all atoms that are represented on the Periodic Table. Although the current Periodic Table contains only 115 different elements, there are many more types of matter in the universe. "**Compounds**" are a type of matter made of different atoms that are chemically combined to form a new substance different from the individual atoms that make them. There are over 10 million known compounds that can be created with the current elements on the Periodic Table. Each of these have unique and different properties from each other.



Just like atoms are the smallest piece of an element, a "***molecule***" is the smallest piece of a compound. Water is a compound made with 2 atoms of hydrogen and 1 atom of oxygen, water's chemical formula is H_2O. Scientists are always developing new compounds for different uses. New molecules have been developed for treatments to help fight diseases while other molecules help farmers grow crops with better resistance to insects.



Read the following statements and complete the "Fill-Ins" with information from this page.

1- All known elements are listed on the _____ of Elements.

2- _____ of elements are represented by columns on the Periodic Table.

3- The smallest piece of any type of matter is called an _____.

4- Over _____ million carbon atoms are in a period made with a pencil.

5- _____ charged electrons orbit the nucleus of an atom.

6- The nucleus of an atom contains _____ and _____.

7- Different atoms can combine to from _____.

8- The smallest piece of a compound is called a _____.

Counting Atoms: Practice

Name _____

Instructions: Read through the information below and then complete the problems.

Elements are the building blocks of compounds. Compounds are represented by using chemical formulas that show what type and how many of each atom they contain. In a chemical formula, the number in front of an element symbol is called the "*Coefficient*". The *coefficient* gives the number of molecules, while the small number behind and below an element symbol is called the "*Subscript*". The *subscript* gives the number of specific atoms within a molecule. If there is no subscript it means there is only 1 of that atom in the molecule

Coefficient → $2KNO_3$ ← *Subscript*

In the chemical formula for Potassium Nitrate **$2KNO_3$**, there are 2 K (Potassium) atoms, 2 N (Nitrogen) atoms, and 6 O (Oxygen) atoms.

Using the example below as your guide, count the atoms in the following chemical formulas.

Example- H_2SO_4 = *2 H, 1 S, 4 O*

1- H_2SO_4 = _____

2- $CaCl_2$ = _____

3- Fe_2O_3 = _____

4- $NaCl$ = _____

5- $2H_2O_2$ = _____

6- $4C_2H_6$ = _____

7- $2K_2SO_3$ = _____

8- $3KNO_3$ = _____

9- NH_4Br = _____

10- $2H_2O$ = _____

11- $3H_3PO_4$ = _____

12- $2SiO_2$ = _____

Elements, Atoms and Molecules:

MASTER KEY

Instructions: Read through the information below and then complete the "Fill-Ins" at the bottom of page.

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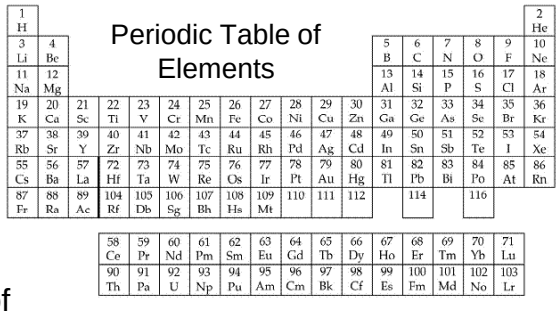

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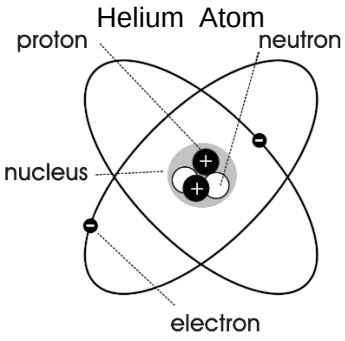

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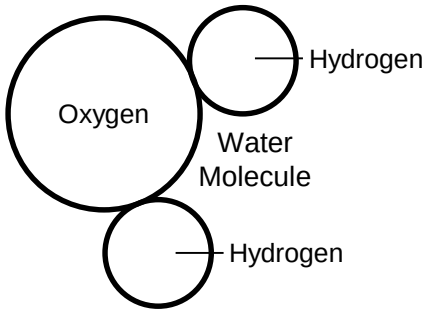

Read the following statements and complete the "Fill-Ins" with information from this page.

1- All known elements are listed on the __Periodic Table__ of Elements.

2- __Families__ of elements are represented by columns on the Periodic Table.

3- The smallest piece of any type of matter is called an ___Atom___.

4- Over __20_ million carbon atoms are in a period made with a pencil.

5- __Negatively_ charged electrons orbit the nucleus of an atom.

6- The nucleus of an atom contains __Protons __ and __Neutrons___.

7- Different atoms can combine to from __Compounds__.

8- The smallest piece of a compound is called a ___Molecule___.

Counting Atoms: Practice

MASTER KEY

Instructions: Read through the information below and then complete the problems.

Elements are the building blocks of compounds. Compounds are represented by using chemical formulas that show what type and how many of each atom they contain. In a chemical formula, the number in front of an element symbol is called the "*Coefficient*". The *coefficient* gives the number of molecules, while the small number behind and below an element symbol is called the "*Subscript*". The *subscript* gives the number of specific atoms within a molecule. If there is no subscript it means there is only 1 of that atom in the molecule

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1- H_2SO_4 = 2 H,1 S,4 O

2- $CaCl_2$ = 1Ca, 2 Cl

3- Fe_2O_3 = 2 Fe, 3 O

4- $NaCl$ = 1 Na, 1 Cl

5- $2H_2O_2$ = 4 H, 4 O

6- $4C_2H_6$ = 8 C, 24 H

7- $2K_2SO_3$ = 4 K, 2 S, 6 O

8- $3KNO_3$ = 3 K, 3 N, 9 O

9- NH_4Br = 1 N, 4 H, 1 Br

10- $2H_2O$ = 4 H, 2 O

11- $3H_3PO_4$ = 9 H, 3 P, 12 O

12- $2SiO_2$ = 2 Si, 4 O