Unit 3 NAME

Class Work 10/31/13

3.1 Atoms, Elements and Compounds

SPARK

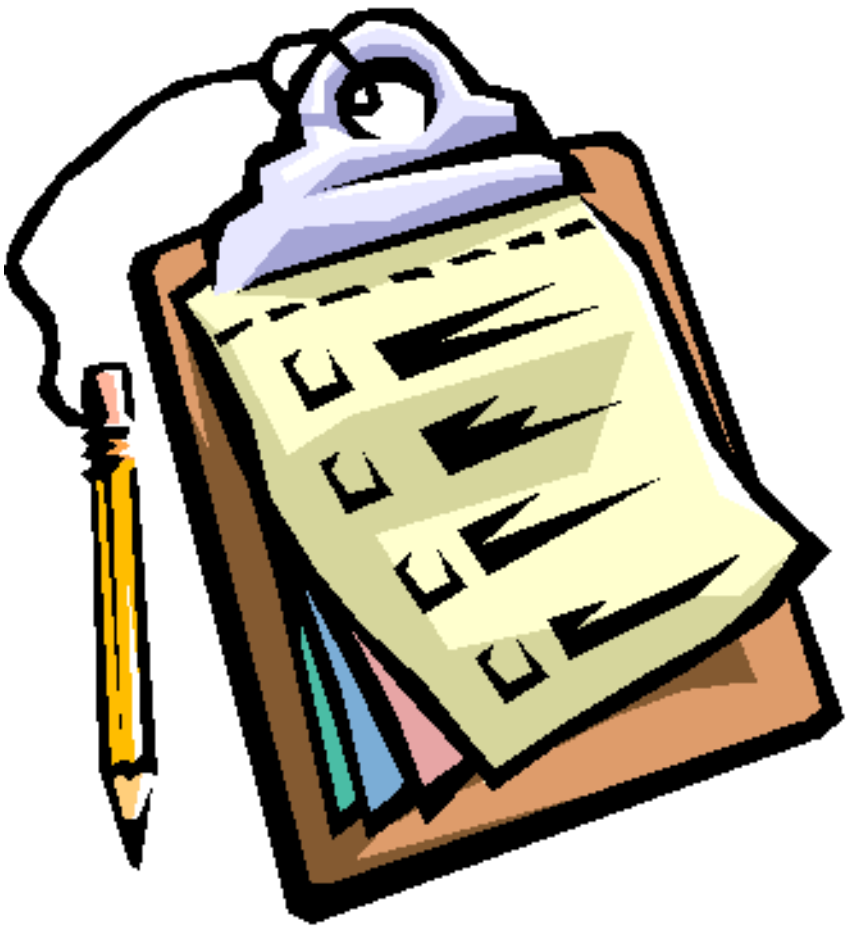
1. What do you already know about atoms???

Objectives

SWBAT use particle diagrams to differentiate among elements, compounds, and mixtures and interpret and write chemical formulas of compounds

Agenda:

- SPARK
- Objective
- Notes
- Practice
- Homework



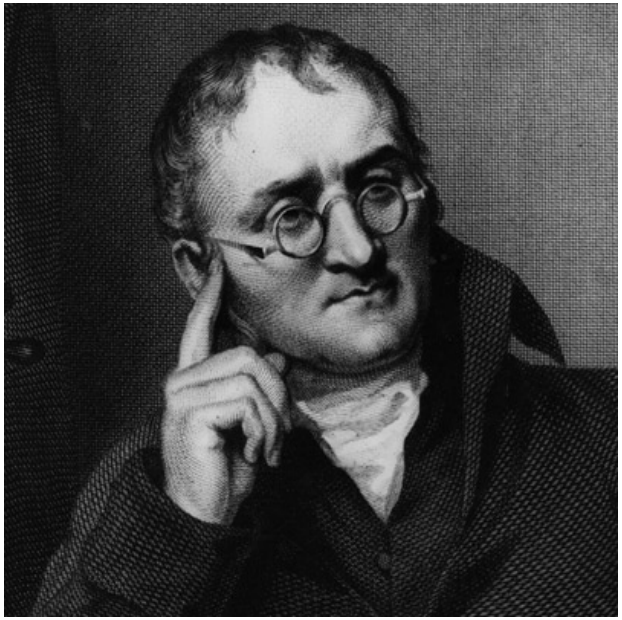
Democritus

- Democritus, a Greek philosopher, believed that everything was made of small indivisible and indestructible particles.

460 BC

Dalton

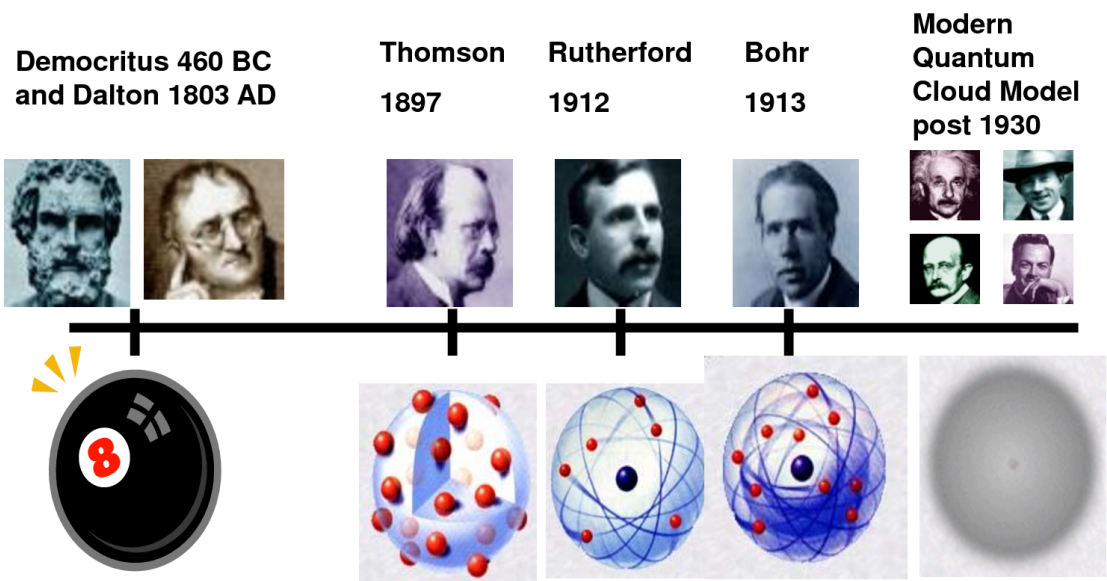
- Used experimental methods to transform Democritus' ideas about atoms into scientific theory



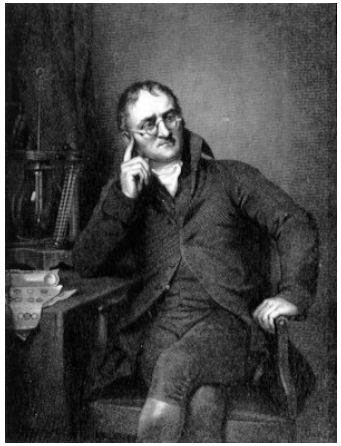
Atom*

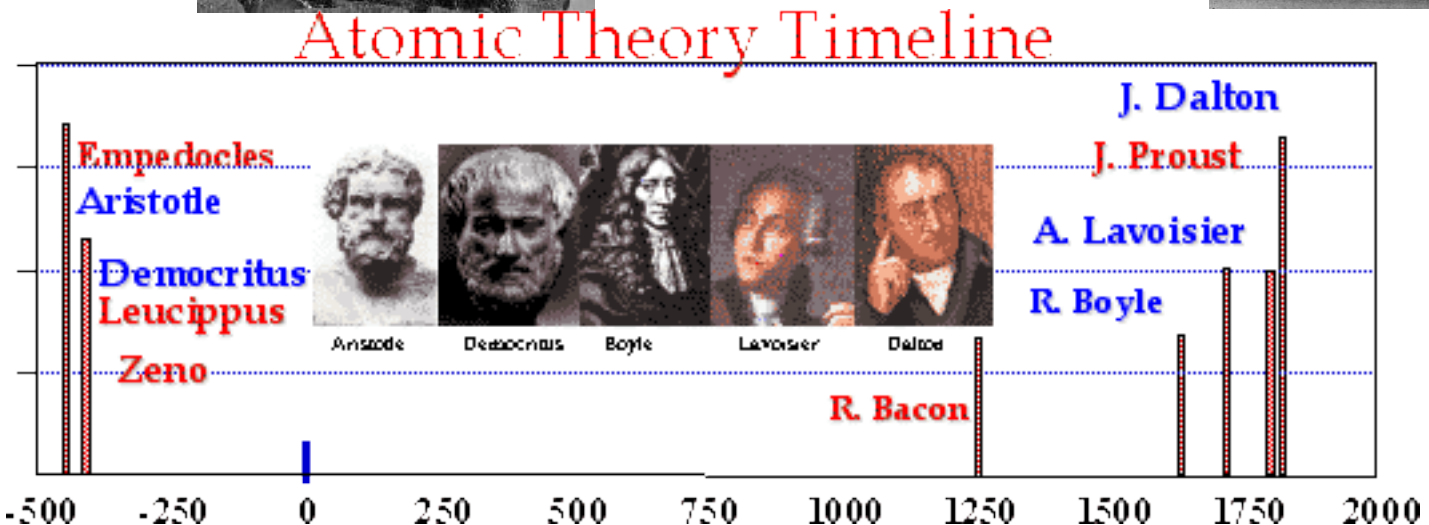
- Smallest building block of matter and smallest particle of an element that has the chemical properties of that element

History of the Atom Timeline



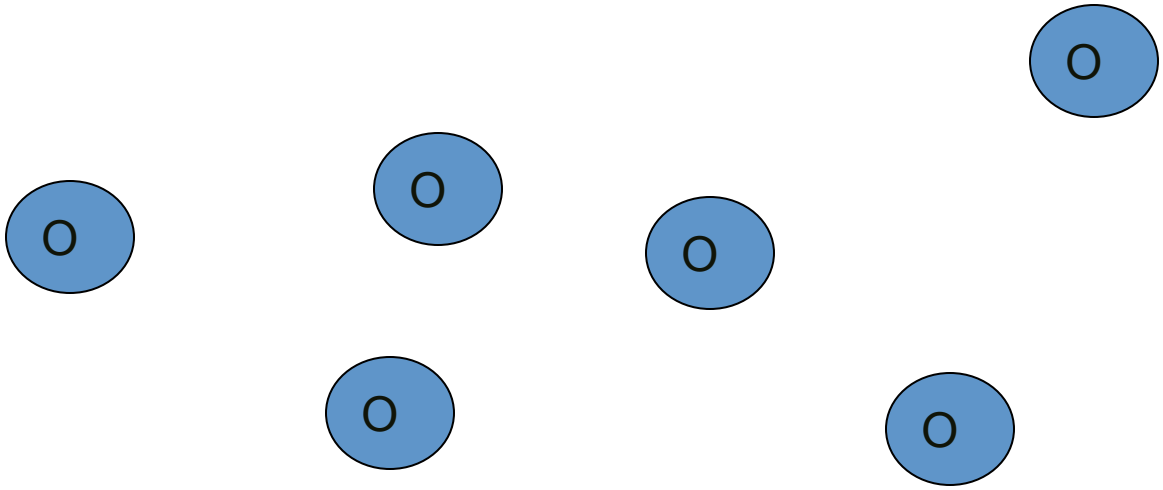
Many Key Players in Modern Atomic Theory





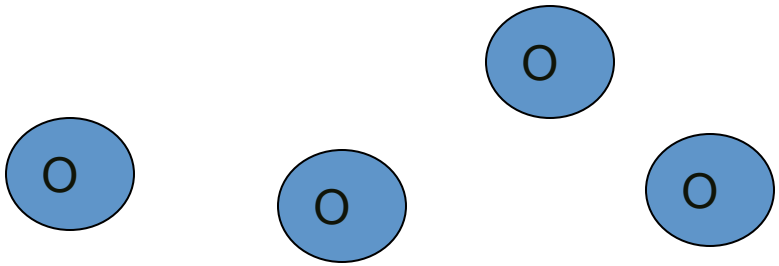
Dalton's Atomic Theory

1. All elements are composed of tiny indivisible particles called ATOMS.



Dalton's Atomic Theory

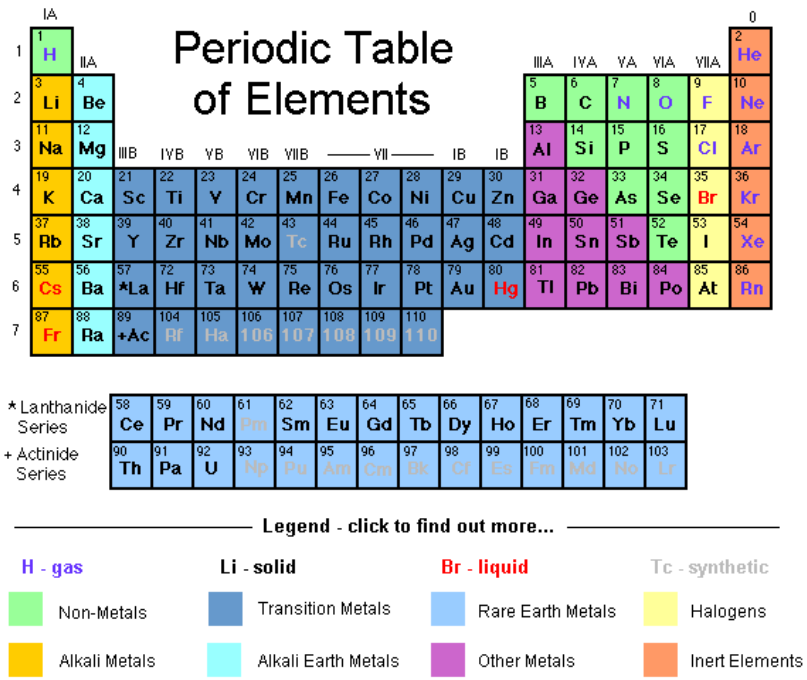
2. Atoms of the same element are identical.



3. Atoms of an element are different from every other elements (unique).

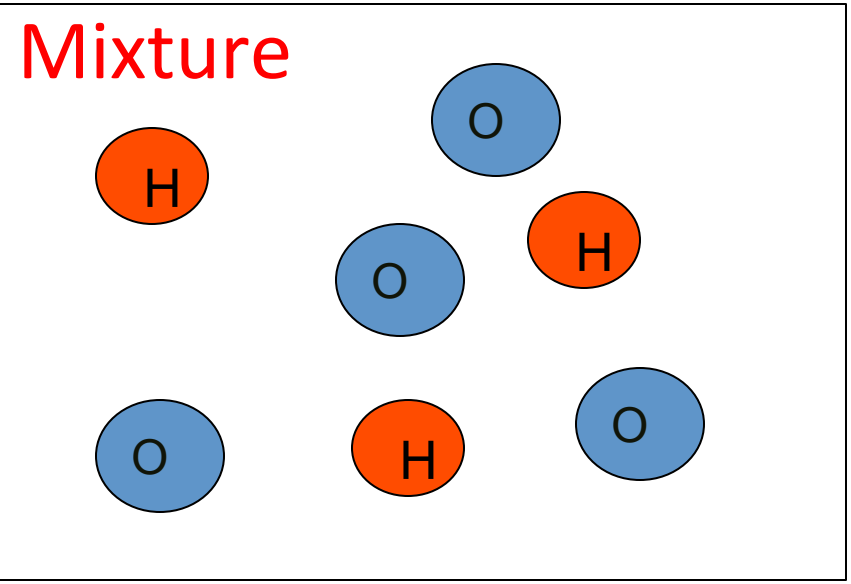
Element*

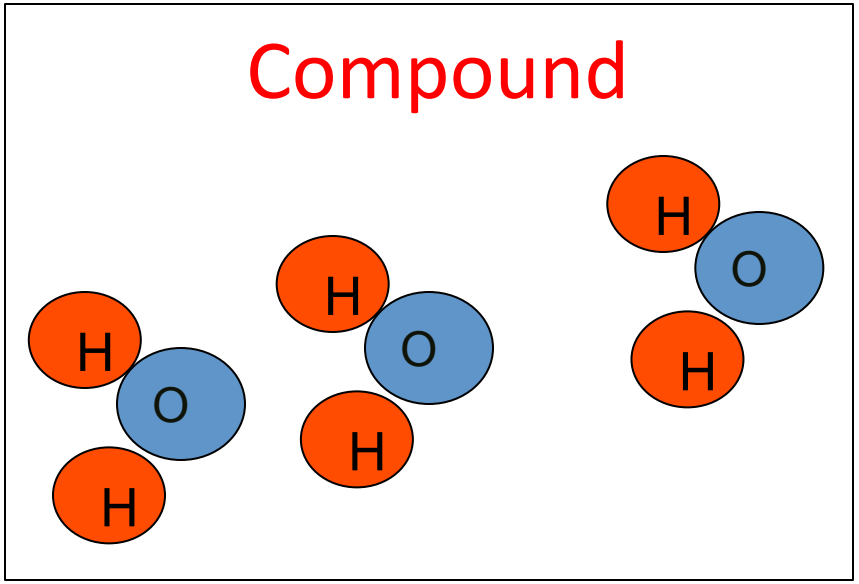
- Pure substance made of only one kind of atom that cannot be broken down by physical or chemical means



Dalton's Atomic Theory

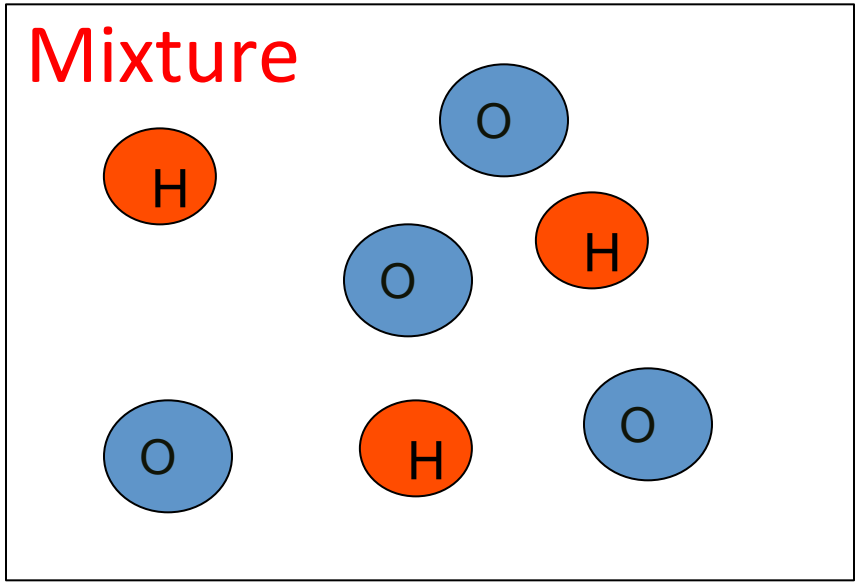
3. Atoms of different elements can physically mix together to form a <u>mixture</u>…

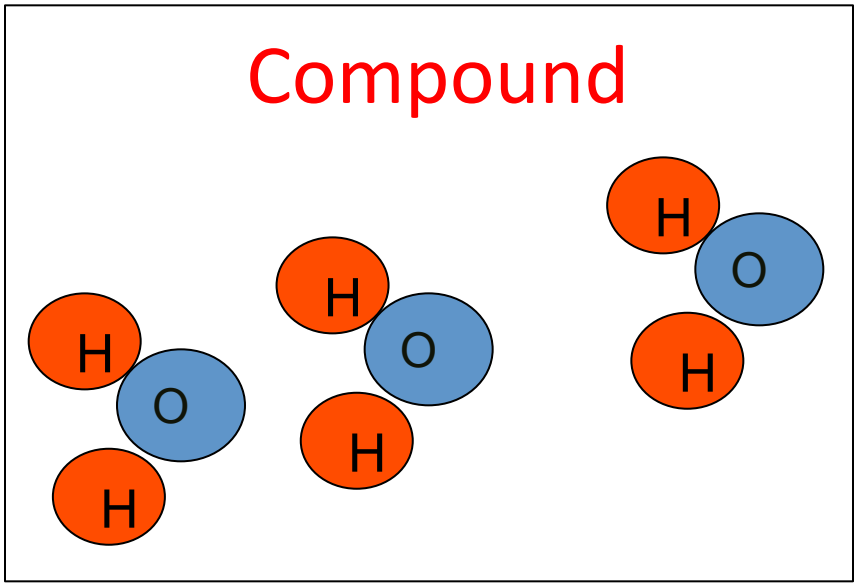




…or atoms of different elements can chemically combine in a fixed whole number ratio to form <u>compounds</u>

Dalton's Atomic Theory

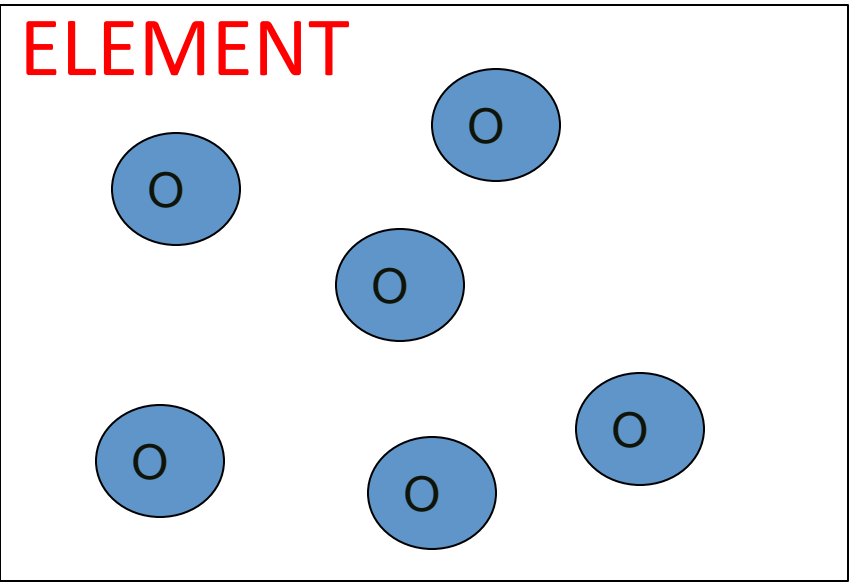


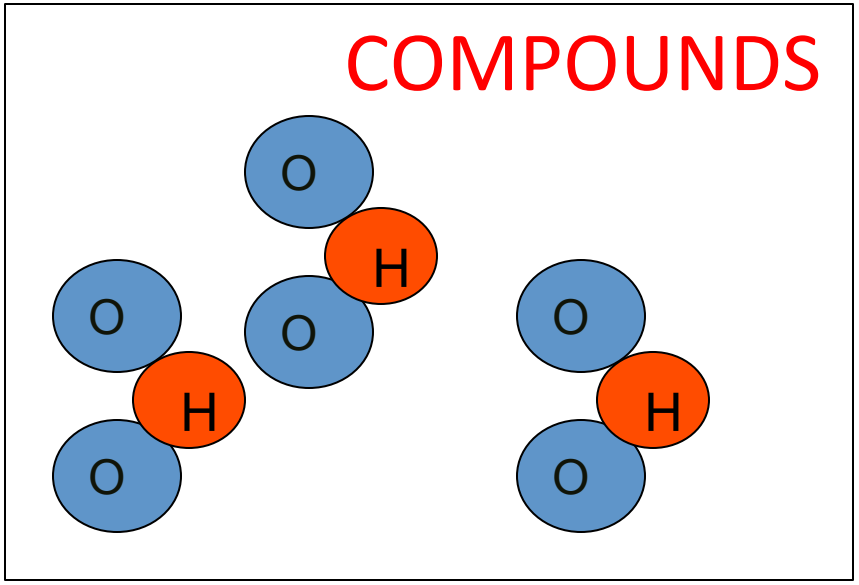


…or atoms of different elements can chemically combine in a fixed whole number ratio to form <u>compounds</u>

Dalton's Atomic Theory

Pure Substance*– Substance that cannot be separated by physical means (boiling, filtering, etc.)





Compounds vs. Mixtures

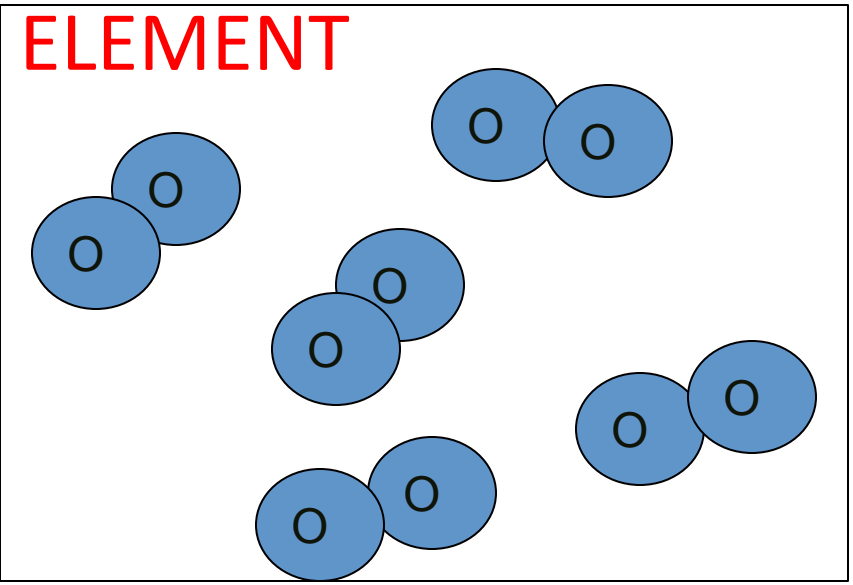
What is the difference between compounds and mixture?

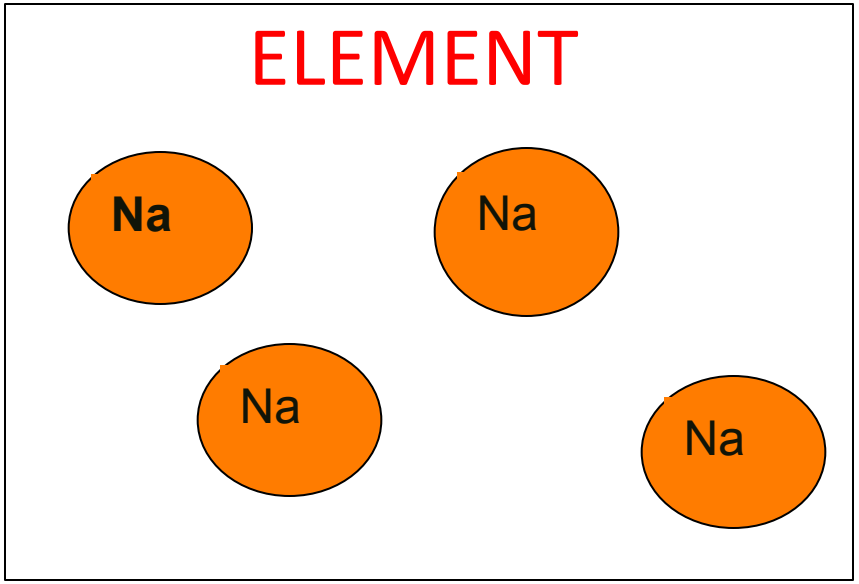
- Compounds*: substance made from the atoms of two or more elements that are chemically bonded

- Mixtures*: two or more pure substances that are physically combined

Dalton's Atomic Theory

NOTE: the same element bonded together is <u>still</u> just an element not a compound.

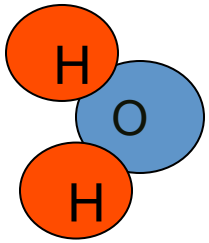




Dalton's Atomic Theory

Examples of Compounds:

H_2O



$Cu(NO_3)_2$

1 Copper, 2 Nitrogen, 6 oxygen

Hold up the number of fingers to indicate how many atoms of the element in RED exist in the compound

CO_2

CO_2

1 Carbon

2 Oxygen

Na_2SO_4

Na_2SO_4

2 Sodium

1 Sulfur

4 Oxygen

$Fe(NO_3)_2$

$Fe(NO_3)_2$

1 Iron

2 Nitrogen

6 Oxygen

$(NH_4)_3PO_4$

$(NH_4)_3PO_4$

3 Nitrogen

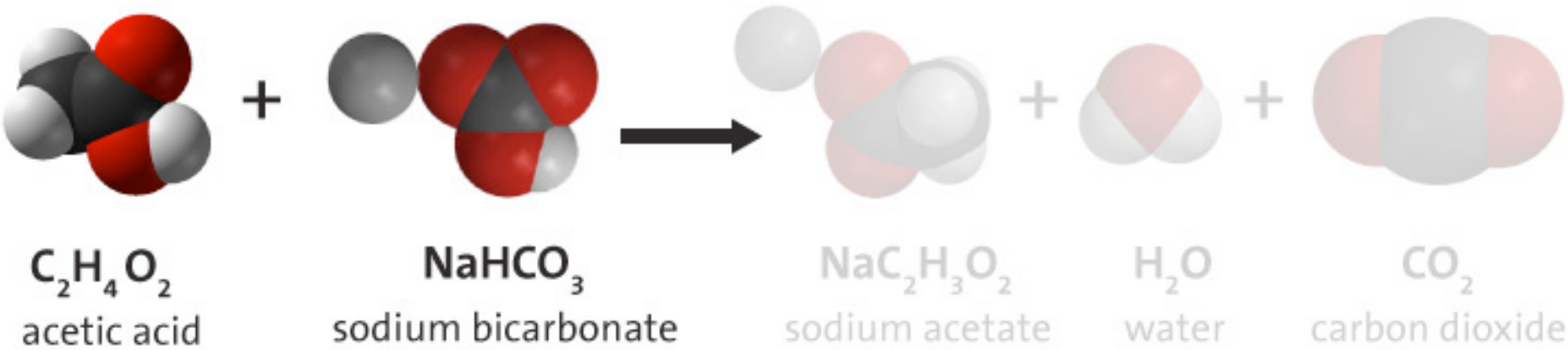
12 Hydrogen

1 Phosphorus

4 Oxygen

Dalton's Atomic Theory

5) In chemical reactions, atoms are combined, separated, or rearranged. Atoms cannot be created or destroyed.



Group Practice

#1: I am looking at atoms under a super strong microscope and I see magnesium and oxygen. How do you determine if it's a mixture or a compound?

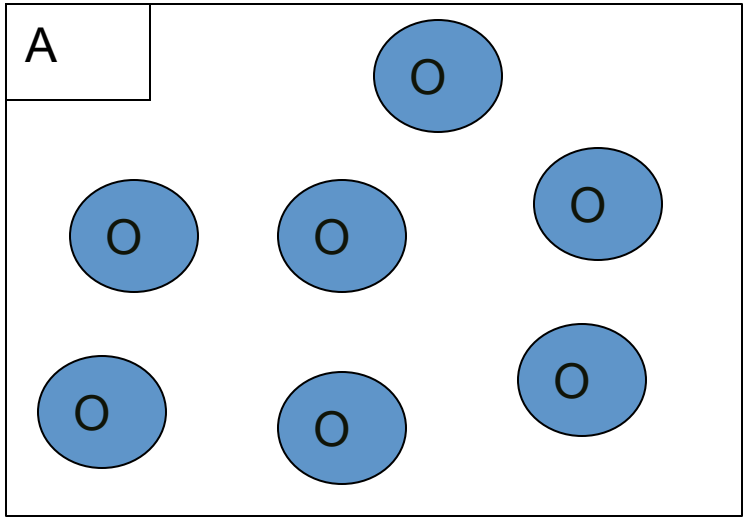
Group Practice

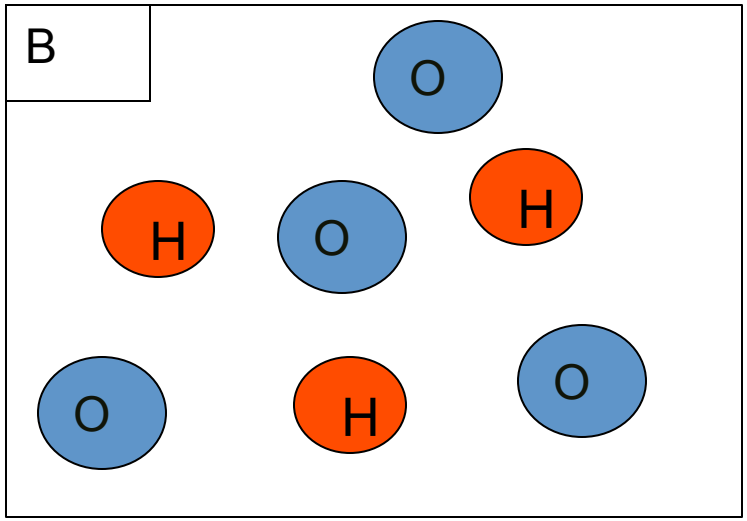
#2. Which two substances can *not* be broken down by chemical change?

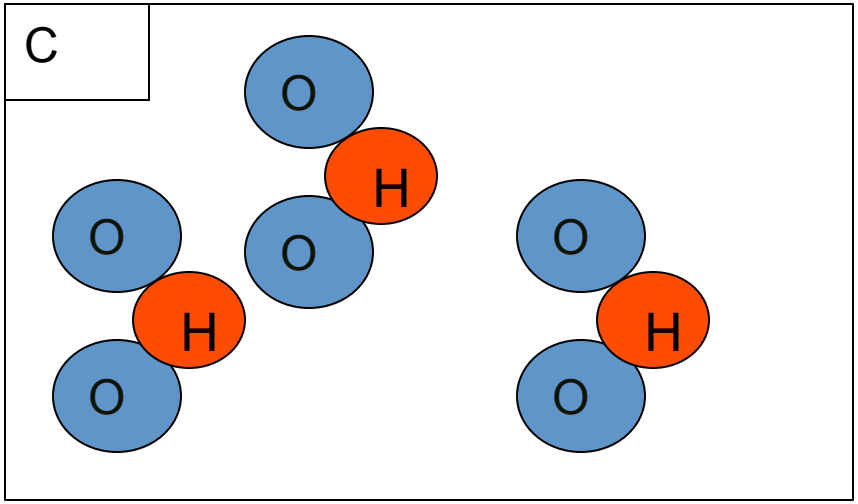
1. C and CuO
2. C and Cu
3. CO_2 and CuO
4. CO_2 and Cu

Reflection

#3. Using Dalton's postulates, explain the difference between the three pictures below:

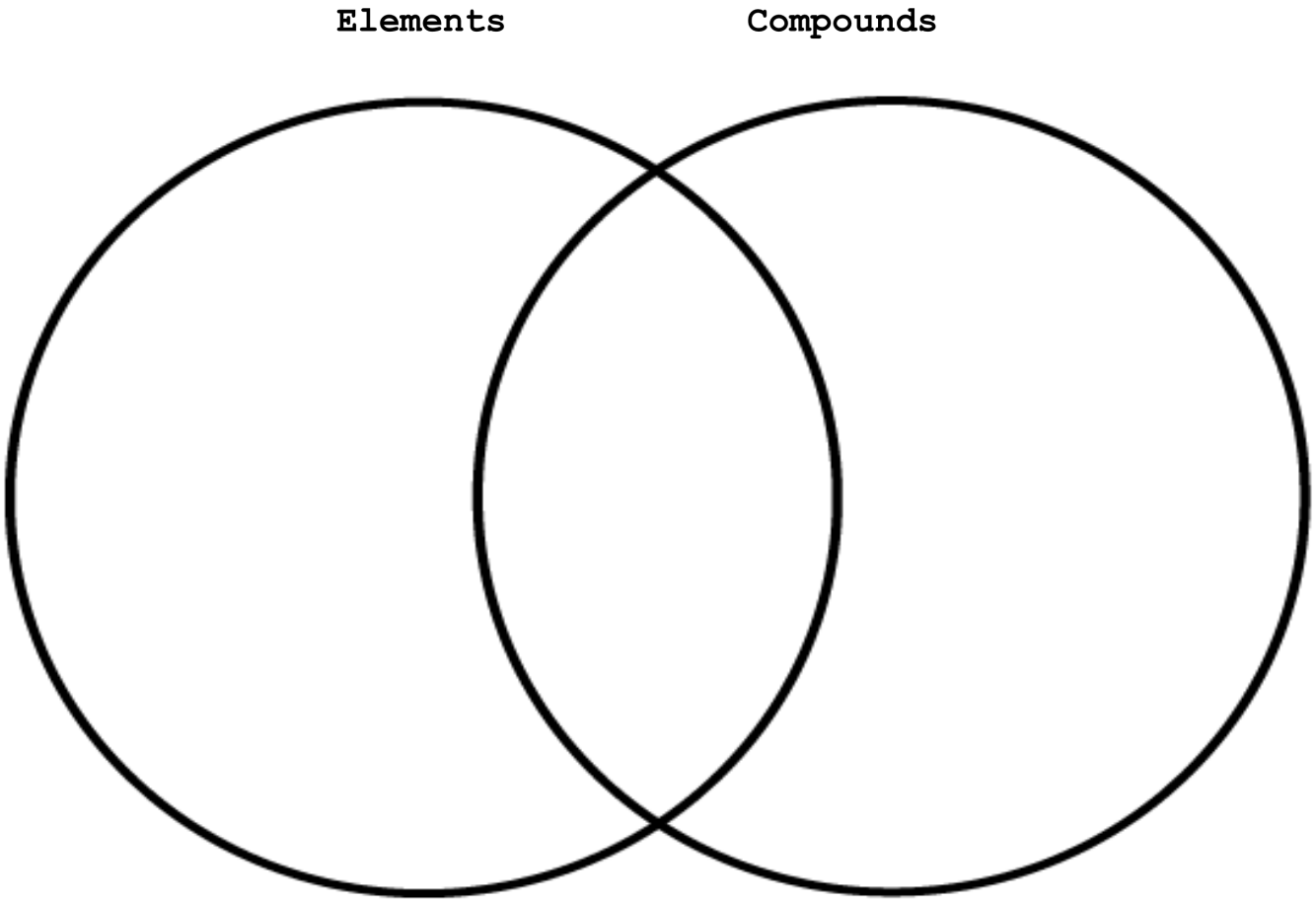






Independent Practice

Complete Venn Diagram!



HOMEWORK

Complete 3.1 HW

Element symbol and atomic number quiz tomorrow!!