Name: _____ *Date:* _____

Unit 3 - Topic 1

Review

<u>Part 1</u>: The Matter Flow Chart

This unit will focus on COMPOUNDS, how and why they are formed, how they are named, how to write their formulas, and how they react with each other.

- Elements are the basic building block of matter that cannot be broken down by a chemical change.
- A compound is formed when atoms **combine** in a **fixed** ratio.

Ex. Formation of water (compound) from hydrogen and oxygen (elements)

1. Use Table S to compare some basic physical properties of O_2, H_2, and H_2O:

Substance	Melting Point (K)	Boiling Point (K)	Density (g/mL)
O_2			
H_2			
H_2O	273	373	1

Based on this chart, compounds have (same or unique) chemical and physical properties?

<u>Part 2</u>: Exothermic & Endothermic Changes

Exothermic: _____

_____

Endothermic: _____

_____

Identify each of these as either exothermic or endothermic:

a) Heating a chunk of iron until it melts. _____
b) $2Na + Cl_2 \rightarrow 2NaCl$ + Heat & Light _____
c) Substances interacting in a test tube are changing. You touch the tube and it feels cold. _____

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Part 3: Working with Formulas

- A **subscript** in a formula tells how many atoms of each kind are in one unit of that compound. **(no subscript = 1 atom)**
  Example: Na_2SO_4 2 Na, 1 S and 4 O in each unit
- Subscripts are **distributed** when they are behind a parentheses, but only to the atoms in the parentheses.
  Example: $Ca(NO_3)_2$ 1 Ca, 2 N and 6 O in each unit
- A number before the formula is called a **coefficient.** This number tells how many molecules we are dealing with or describing. That number is **ALWAYS** distributed to all atoms.
  Example: $7\ Na_2CO_3$ 7 molecules of Na_2CO_3 containing a total of 14 Na, 7 C and 21 O

How many atoms of EACH TYPE are shown by:

a) NH_4Cl #N: _____ #H: _____ #Cl: _____

b) $(NH_4)_3PO_4$ #N: _____ #H: _____ #P: _____ #O: _____

c) $7(NH_4)_2S$ #N: _____ #H: _____ #S: _____

Part 4: Reminders about Chemical Equations

When substances interact, they often end up combining their set of atoms into new and difference substances. For example:

$$\_\_\_\_\ Ca + \_\_\_\_\ H_2O \rightarrow \_\_\_\_\ Ca(OH)_2 + \_\_\_\_\ H_2$$

a) How many different *substances* are described on the left side of the equation? _____

b) How many different *substances* are described on the right side of the equation? _____

c) How many types of *elements* are on the left? _____ On the right? _____

d) The **chemical equation** describes a chemical change or reaction. We know this shows a chemical change because... _____

e) **Reactants** (the substances that react) are on the _____ of the equation.

f) **Products** (the substances that are produced) are on the _____ of the equation.

g) Reactants and product are separated by an _____. It shows the direction of the chemical change.

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Matter cannot be created or destroyed. It can only change forms. This is called the **Law of Conservation of Matter and Energy.** This means that the number of atoms on one side of a chemical equation MUST equal the number of atoms on the other side of the equation. Let's practice.

Try to balance the following ... we'll have more practice later on this unit.

____ NaCl + ____ Br_2 → ____ NaBr + ____ Cl_2

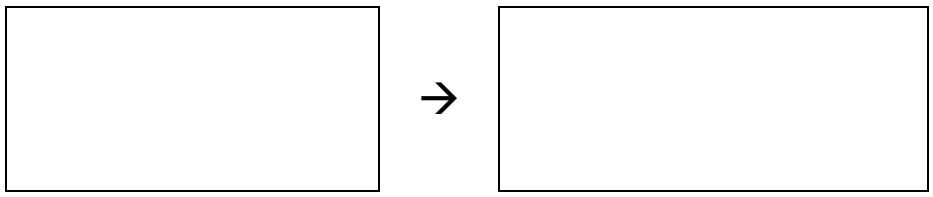
____ Al + ____ Cl_2 → ____ $AlCl_3$

____ C + ____ O_2 → ____ CO

Part 5: Particle Drawings

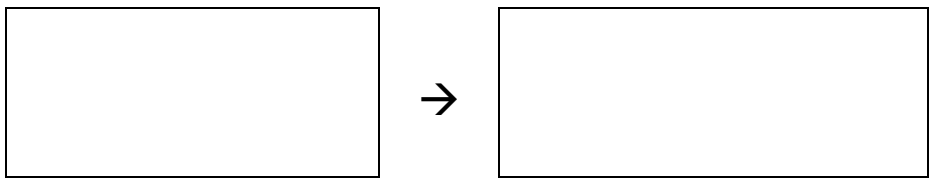
Use particle diagrams to illustrate each of the reactions from the previous page. **Use the balanced equation (notice they are the same as above).**

a.) _____**NaCl** (s) + _____**Br_2** (g) → _____**NaBr** (s) + _____**Cl_2** (g)



Reactants Box (Before) Products Box (After)

b.) _____**Al** (s) + _____ **Cl_2** (g) → _____**$AlCl_3$** (s)



c.) _____**C** (s) + _____**O_2** (g) → _____**CO** (g)