Warm-up:

1) Balance the following equations:

a) $N_2 + 3H_2 \rightarrow 2NH_3$

b) $2Al + 6HCl \rightarrow 3H_2 + 2AlCl_3$

c) $2N_2 + 5O_2 \rightarrow 2N_2O_5$

2) What specifically do the coefficients in a chemical reaction represent?

- **Coefficients:** represent the reaction ratios in a chemical equation

Ex: $H_{2(g)} + Cl_{2(g)} \rightarrow 2HCl_{(g)}$

Equation Stands For...

- 1 mole of H_2 reacts with 1 mole of Cl_2 to produce 2 moles of Hydrogen chloride
- 1 molecule of H_2 reacts with 1 molecule of Cl_2 to produce 2 molecule of Hydrogen chloride
- 1 Liter of H_2 reacts with 1 Liter of Cl_2 to produce 2 Liter of Hydrogen chloride

- **Stoichiometry:** quantitative information regarding reactants & products in a reaction
  - ↳ deals with ratios in a chemical rxn [coefficients!]

Ex: Find the # of moles of aluminum chloride produced when 2.3 moles of chlorine are consumed in the following:

Have → Want

$2Al_{(s)} + 3Cl_{2(g)} \rightarrow 2AlCl_{3(s)}$

$$2.3 \text{ mol } Cl_2 \left| \frac{2 \text{ mol } AlCl_3}{3 \text{ mol } Cl_2} \right. = 1.5 \text{ mol } AlCl_3$$

Step 1: Balance Eq

Step 2: Mole Bridge to find conversion [have → want]

Step 3: Dimensional Analysis

Step 4: Logic check [Does it make sense?]

Ex 2: How many moles of water from 4.5 moles of O_2?

$2H_{2(g)} + 1O_{2(g)} \rightarrow 2H_2O_{(g)}$

$$4.5 \text{ mol } O_2 \left| \frac{2 \text{ mol } H_2O}{1 \text{ mol } O_2} \right. = 9.0 \text{ mol } H_2O$$