SCH3U Quantitative Chemistry	**Stoichiometry- Limiting Reagent**

Limiting Reagent	
Excess Reagent	

Tutorial 1: Solving LR problems involving moles

EXAMPLE 1: Determine the amount of titanium metal produced when 2.8 mol of titanium (IV) chloride reacts with 5.4 mol of magnesium.

STEP 1: Write a balanced chemical equation with known and unknowns.
STEP 2: Find which reactant is the LR by using moles of one reactant to solve for the other
STEP 3: Use the limiting reagent to find the number of moles of the required substance

Balance Equation:		+		→		
Mole ratio						
Mass given						
Molar mass						
Moles we **HAVE**						
Moles we **NEED**						

Which chemical is the limiting reactant? _____

Tutorial 2: Solving LR problems involving Masses

EXAMPLE 2: Methanol, CH3OH, is made by combining carbon monoxide and oxygen. What mass of CH_3OH is produced from 9.80 g of CO and 1.30 g of H_2?

STEP 1: Write out the balanced chemical equation as well as known's and unknowns underneath.
STEP 2: Convert the mass of both substances to moles under "moles we HAVE".
STEP 3: Using "moles we HAVE" to find "moles we NEED" and compare these two values to determine the LR
STEP 4: Use LR from "moles we HAVE" to find the moles of required substance using mole ratio
STEP 5: Convert moles of required substance to mass of required substance.

Balance Equation:		+		→	
Mole ratio					
Mass given					
Molar mass					
Moles we **HAVE**					
Moles we **NEED**					

Which chemical is the limiting reactant? _____

What mass of methanol will be formed? _____

EXAMPLE 3: In one reaction 100 g of nitrogen gas, N_2 reacts with 10 g of hydrogen gas, H_2. Which reaction will limit the amount of ammonia that can be produced

STEP 1: Write out the balanced chemical equation as well as known's and unknowns underneath.
STEP 2: Convert the mass of both substances to moles under "moles we HAVE".
STEP 3: Using "moles we HAVE" to find "moles we NEED" and compare these two values to determine the LR
STEP 4: Use LR from "moles we HAVE" to find the moles of required substance using mole ratio
STEP 5: Convert moles of required substance to mass of required substance.

Balance Equation:		+		→	
Mole ratio					
Mass given					
Molar mass					
Moles we **HAVE**					
Moles we **NEED**					

Which chemical is the limiting reactant? _____

What mass of ammonia will be formed? _____

EXAMPLE 4: Bromine can be prepared by adding chlorine to an aqueous solution of sodium bromide. How many grams of bromine are formed if 25 g of sodium bromide and 25 g of chlorine are reacted?

Which chemical is the limiting reactant? _____
What mass of zinc sulphide will be formed? _____
What is the mass of the leftover excess reactant? _____

Balance equation:		+		→		
Mole ratio						
Mass given						
Molar mass						
Moles we **HAVE**						
Moles we **NEED**						
Moles **LEFTOVER**						