Mole Ratios
Let's Practice!

Given the following balanced chemical equation, CO_2 (g) + 4 H_2 (g) → CH_4 (g) + 2 H_2O (l), write the mole ratio need to calculate:
a. The moles of H_2O produced from 3 moles of CO_2

b. The moles of H_2 needed to produce 3 moles of H_2O.

Mole Ratios
Let's Practice!

Given the following balanced chemical equation, what is the mole ratio needed to calculate the following: the moles of KCl produced when 4.5 moles of O_2 are formed?

$$2\ KClO_3\ (s) \rightarrow 2\ KCl\ (s) + 3\ O_2\ (g)$$

Mole-Mole Calculations
Let's Practice!

How many moles of CO_2 will be produced by reaction of 2.0 mol of glucose, given the following balanced equation?

$$C_6H_{12}O_6 + 6\ O_2 \rightarrow 6\ CO_2 + 6\ H_2O$$

Mole-Mole Calculations
Let's Practice!

How many H_2O molecules are produced when 0.010 mol O_2 react, given the following balanced equation?

$$2\ H_2 + O_2 \rightarrow 2\ H_2O$$

Mole-Mole Calculations
Let's Practice!

How many moles of Al are produced when 0.5 mol of O_2 react, given the following balanced equation?

$$4\ Al + 3\ O_2 \rightarrow 2\ Al_2O_3$$

Mass-Mole Calculations
Let's Practice!

What mass of H_2 can be produced when 6.0 mol of Al reacts with HCl?

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

Mole-Mass Calculations
Let's Practice!

How many moles of water are produced when 325 g of octane (C_8H_{18}) are burned?

$$2\ C_8H_{18} + 25\ O_2 \rightarrow 16\ CO_2 + 18\ H_2O$$

Mass-Mass Calculations
Let's Practice!

How many grams of $CrCl_3$ are required to produce 75.0 g of AgCl using the following reaction?

$$CrCl_3 + 3\ AgNO_3 \rightarrow Cr(NO_3)_3 + 3\ AgCl$$

Mole-Mass Calculations Practice
Let's Practice!

How many grams of $AgNO_3$ are needed to produce 0.25 mol of Ag_2S?

$$2\ AgNO_3 + H_2S \rightarrow Ag_2S + 2\ HNO_3$$

Limiting Reactant Problems
Let's Practice!

How many moles of HCl can be produced from 4.0 mol of H_2 and 3.5 mol of Cl_2? What is the limiting reactant?

$$H_2 + Cl_2 \rightarrow 2\ HCl$$

Mass-Mass Calculations
Let's Practice!

How many grams of HNO_3 are required to produce 8.75 g of N_2O from the following reaction?

$$4\ Zn + 10\ HNO_3 \rightarrow 4\ Zn(NO_3)_2 + N_2O + 5\ H_2O$$

Limiting Reactant Problems
Let's Practice!

How many moles of Fe_3O_4 can be produced from 16.8 g Fe and 10.0 g H_2O? What is the limiting reactant?

$$3\ Fe + 4\ H_2O \rightarrow Fe_3O_4 + 4\ H_2$$

Limiting Reactant Problems
Let's Practice!

How many grams of AgBr can be produced from 50.0 g $MgBr_2$ and 100.0 g $AgNO_3$?

$$MgBr_2 + 2\ AgNO_3 \rightarrow 2\ AgBr + Mg(NO_3)_2$$

How much excess reactant remains?

% Yield
Let's Practice!

Calculate the percent yield of AgBr if 375.0 g of the compound are prepared from 200.0 g of $MgBr_2$.

$$MgBr_2 + 2\ AgNO_3 \rightarrow Mg(NO_3)_2 + 2\ AgBr$$

Limiting Reactant Problems
Let's Practice!

How many grams of $BaSO_4$ can be produced from 200.0 g of $Ba(NO_3)_2$ and 100.0 g of Na_2SO_4?

$$Ba(NO_3)_2 + Na_2SO_4 \rightarrow BaSO_4 + 2\ NaNO_3$$

% Yield
Let's Practice!

Calculate the percent yield of Al_2O_3 if 125.0 g of Al give 100.0 g of Al_2O_3.

$$2\ Al + 3\ CrO \rightarrow Al_2O_3 + 3\ Cr$$