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1. **Stoichiometry → All Conversions**

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The Mole Wheel

Individual particles of A
(atoms, molecules, etc.)

Individual particles of B
(atoms, molecules, etc.)

Avogadro's number

Avogadro's number

Grams
of A

Grams
of B

Molar mass

Molar mass

**Moles
of A**

Molar ratio

**Moles
of B**

STP Gas relationship

STP Gas relationship

Volume
of
gas A

Volume
of
gas B

Molarity

Molarity

Volume of
solution A

Volume of
solution B
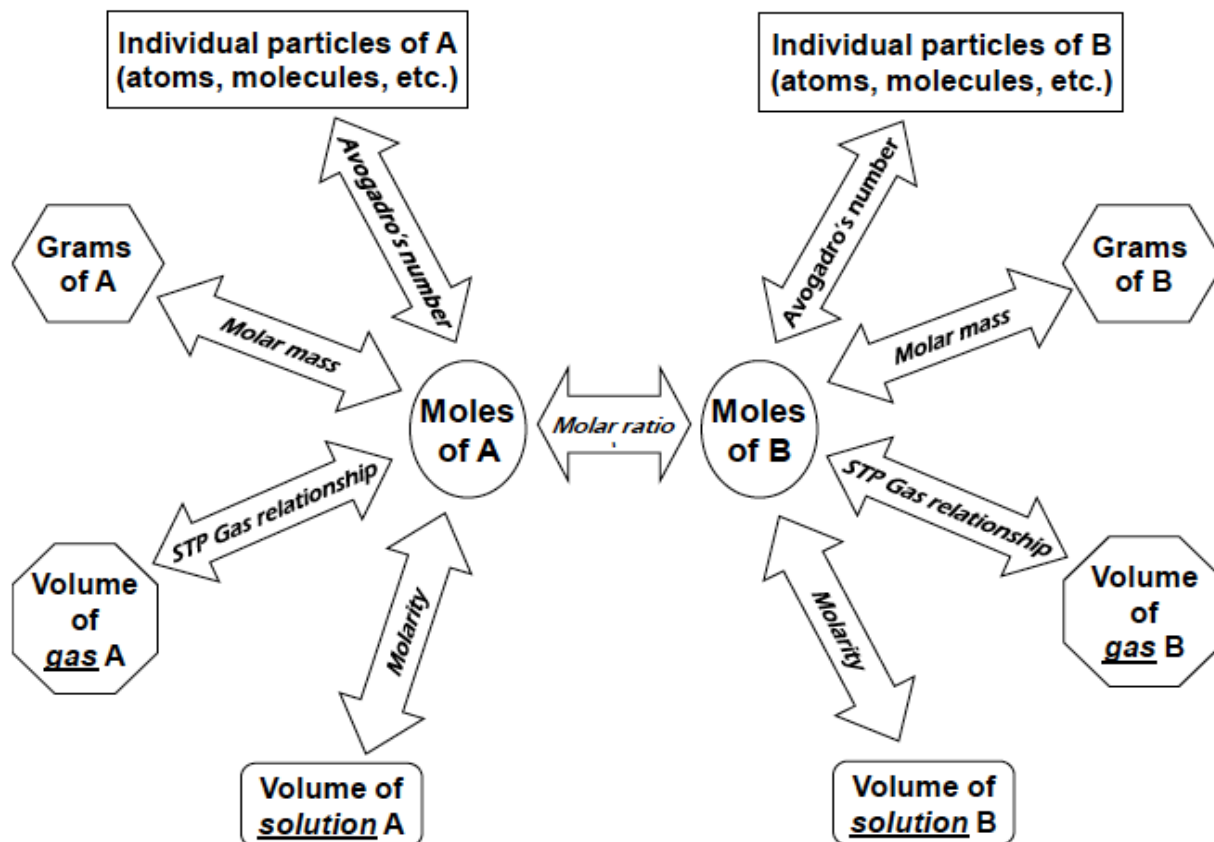
Aluminum metal reacts with the oxygen gas in the air to produce aluminum oxide.

a) Write out the balanced equation below:

b) If 4.71 grams of aluminum reacted, how many liters of oxygen reacted at STP?

c) If 6.14 L of oxygen reacted at STP, how many molecules of the aluminum oxide were produced?

Sodium metal reacts with the oxygen gas in the air to produce sodium oxide.
   a) Write out the balanced equation below:

   b) If 9.11 moles of sodium reacted, how many liters of oxygen reacted at STP?

   c) If 1.38 grams of sodium reacted, how many grams of sodium oxide were produced?

Chromium(II) oxide reacts with barium metal in a single replacement reaction.
   a) Write out the balanced equation below:

   b) If 1.11 grams of chromium(II) oxide reacted, how many atoms of barium reacted?

   c) If 2.34 grams of chromium metal were produced, how many grams of the barium reacted?

Lead(III) oxide reacts with calcium metal in a single replacement reaction.
   a) Write out the balanced equation below:

   b) If 1.67 grams of lead(III) oxide reacted, how many grams of lead metal is produced?

   c) If 4.34 grams of CaO were produced, how many grams of calcium metal reacted?

With a special focus on MOLAR CONCENTRATION...

Nickel reacts with silver nitrate to produce nickel (II) nitrate and silver metal. What mass of nickel reacts with silver nitrate in 1.25 L of a 0.15 M solution? Begin by writing a balanced equation.

What volume of hydrogen gas is formed at STP with 150. mL of 0.185M HI acid?

$2 \text{ HI} + \text{Zn} \rightarrow \text{H}_2 + \text{ZnI}_2$
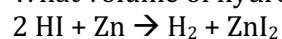
A flask containing 450. mL of 0.500M HBr was accidentally knocked to the floor. How many grams of potassium chromate would you need to put on the spill to completely neutralize the acid? Begin by writing a balanced equation.

Potassium permanganate reacts with oxalic acid ($H_2C_2O_4$) in sulphuric acid (H_2SO_4) to produce manganese (II) sulphate, carbon dioxide, water and potassium sulphate.

- Balanced Reaction:

- How many mL of 0.250M $KMnO_4$ are needed to react with 3.225g of oxalic acid?

How many litres of CO_2 would be formed at STP if 1.500L of 1.75M phosphoric acid (H_3PO_4) were reacted with potassium carbonate?

___ H_3PO_4 + ___ K_2CO_3 → ___ CO_2 + ___ K_3PO_4 + ___ H_2O