# Stoichiometry (IB Chem Chapter 1) Cheat Sheet

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## Formulas

| | |
|---|---|
| No. of molecules = n [no. of moles] x A [Avogadro's Constant] | No. of moles (n) = Mass (m)/ Molar Mass (Mr) |
| No. of Atoms = No. of Molecules [n x A] x Atomicity | No. of moles (n) = Volume (dm3) / Molar volume (STP or RTP) |
| % yield = [Experimental yield/ Theoretical Yield] x 100 | C [molarity] = no. of moles [n]/ Volume of concentration [v] |
| Ideal Gas Law - PV = nRT | Volume/concentration constant - C1V1 = C2V2 |

## Finding Percentage Yield of a Reaction

Note: % yield always applies on PRODUCTS

1: In any situation, first determine which of the products is the limiting reagent

2: Using the compound which is limiting, form a ration such that [limiting reactant : product]

3: Under the ratio, write the coefficient ratio of reactant : product

4: Add the molar mass OF 1 MOLE

5: Multiply the Molar mass with the number of moles = mass value

6: Cross multiply to find the THEORETICAL YIELD

7: Use the mass of the product given in the question - (EXPERIMENTAL YIELD)

8: Substitute in the formula: **[Experimental Yield/ Theoretical Yield] x 100** to find % yield

## How to Find the Limiting Reagent

Step 1: Write down the whole equation

Step 2: Balance the entire equation

Step 3: Using the balanced equation, determine the coefficient ratio of the reactants

Step 4: Write down the ratios of the values given in the question

Step 5: Convert the amounts to moles

Step 6: divide the values (mole ratio / coefficient ratio)

Ans: The smallest value is the limiting reagent

## Ideal Gas Law

**PV = nRT**; where

P - Pressure (Pa)

V = Volume ($m^3$)

T - Temperature (K) *Take celsius value and + 273

R - Constant (8.31 JK/mol)

n - no. of moles (mol)

## Molar Volume Values

| STP - Standard Temperature and Pressure | RTP - Room Temperature and Pressure |
|---|---|
| Temp.: 0 degrees Celsius | Temp.: 20 degrees Celsius |
| Pressure: 1 atm | Pressure = approx. 1atm |
| Volume: 22.7 dm3 | Volume: 24 dm3 |

## Ideal Gas vs. Real Gas

| Ideal Gas | Real Gas |
|---|---|
| Obeys all gas laws | All properties change |
| *No forces of attraction* | Forces of attraction |
| Collide in straight lines | Collision in random motion |
| No mass or volume | |
| High Temperature | Low Temperature |
| Low Pressure | High Pressure |
| High Volume | Low Volume |

## Steps to Find a Standard Solution

**Standard Solution**: a solution of accurately known concentration

Step 1: Weigh a known amount of solute

Step 2: Dissolve the Solute in a minimal amount of water

Step 3: Transfer the solution to a volumetric flask without washing

Step 4: Make the solution fill the flask till the meniscus reaches accurate value

Step 5: Place stopper and invert into mix solution

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