

Module 8 Math Notes for Stoichiometry

Stoichiometry is defined as The quantitative relationships of reactants and products in a chemical reaction.

We must understand mathematically how everything in a chemical equation relates to each other.

We must understand what coefficients mean:

- How they relate to each other
- What information can be derived from them
- How to manipulate them mathematically

We can look at coefficients as related to an amount of particles or as a ratio.

could not find exactly why the said help?

The coefficients of any chemical equation actually give the ratio of molecule to molecule in the reaction. They work for us because the ratios remain small.

The coefficients can represent molar ratios.

There are 3 types of calculations:

1. mole-mole calculations
2. mass-mass calculations
3. other stoichiometry calculations

You write down what you have and multiply it by the coefficient ratio.

Write down the form for the central calculation of any stoichiometry problem:

$$\cancel{\frac{X}{1}} \cdot \frac{\text{want}}{\text{have}} \quad \left| \quad 7.5 \text{ mol H}_2 \cdot \frac{1 \text{ N}_2}{3 \text{ H}_2} = 2.5 \text{ mol N}_2$$

Write down the map for converting from Mass A to Mass B:

A = amount given B = amount wanted

$$A \cdot \frac{\text{Coeff B}}{\text{Coeff A}} = B$$

mole-mole

$$\text{Mass A} \cdot \frac{1 \text{ mol A}}{\text{molar mass A}} \cdot \frac{\text{moles A} \cdot \text{Coeff A}}{\text{Coeff B}} \cdot \frac{\text{molar mass B}}{1 \text{ mol B}} = \text{Mass B}$$

mass-mass

This is called mass to mass stoichiometry. It is dimensional analysis.

You basically multiply all the numbers in numerator and dividing everything in the denominator.

Stoichiometry is a straightforward way for the chemist to determine how much product will form in the reaction or how much of one reactant is needed to react with some quantity of the other reactant.

WE CANNOT DO STOICHIOMETRY WITHOUT coefficients SO WE WILL NEED TO balance OUR CHEMICAL EQUATION FIRST !!

Identify what is given and what is wanted.

Make sure everything cancel out.

Multiply what is on top and then divide by what is on bottom.

Other types of stoichiometry include p articles and v volume conversions.

