Chemistry for the IB Diploma Programme



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Guiding Question revisited

How do we quantify matter on the atomic scale?

In this chapter we have introduced the mole as the unit of amount in chemistry.

One mole of any substance contains the Avogadro number of elementary entit	ities
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Elementary entities can be any form of particle, including atoms, molecules, ions, electrons, or a specified group of particles.

The Avogadro constant enables us to interconvert the number of moles and the number of entities.

The molar mass, M, of a substance is its relative atomic mass, A_r , or relative formula mass, M_r , expressed in grams. A_r and M_r are expressed relative to carbon-12, and are a weighted average taking into account the abundance of isotopes.

The molar mass enables us to interconvert the number of moles and the mass of the substance.

The empirical formula of a compound can be determined from its percentage composition by mass. It gives the simplest ratio of atoms of elements in the compound.

The molecular formula can be determined from the empirical formula and the molar mass. It gives the actual number of atoms of each element present in a molecule.

The molar concentration of a solution is expressed as the moles of solute per volume of solution.

Equal volumes of all gases at the same temperature and pressure contain the same number of moles.