

Chemistry calculations – a little help sheet

Chemistry is a science and therefore has a vocabulary designed to bewilder those who haven't studied it – hence the use of the word 'mole'. Do not be scared by the mole. It is simply a way of counting particles...

Atoms are tiny, and therefore the number of atoms in a gram of hydrogen is a horribly large number. The mole is used as the unit of **amount of substance**. It is 6.02×10^{23} particles. A mole of anything contains 6.02×10^{23} of them.

A mole of hydrogen atoms (H) contains 6.02×10^{23} hydrogen atoms
A mole of hydrogen gas (H₂) contains 6.02×10^{23} hydrogen molecules

How many moles of hydrogen **atoms** are there in a mole of hydrogen **molecules**?

The periodic table you will get in exams has the relative atomic masses of the elements on it.

The mass of a mole of atoms is the relative atomic mass in grams.

A mole of hydrogen atoms weighs 1g

How much does a mole of hydrogen molecules, H₂, weigh?

Percentage composition

You should be able to work out the relative formula mass of hydrated copper (II) sulphate crystals, given that their formula is CuSO₄.5H₂O.

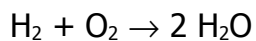
What is the percentage composition by mass of copper in the crystals?

What is the percentage composition by mass of water in the crystals?

Calculations from equations

These can seem a bit daunting, but there are some simple rules which will always work when you are asked to calculate the masses of reactants or products in a reaction...

Oxygen and hydrogen react together to make water. The equation is:



This means that 1 mole of hydrogen reacts with 1 mole of oxygen to make two moles of water.

How much oxygen is needed to react with 2g of hydrogen, H_2 ?

How much water can be produced from 2g of hydrogen, H_2 ?