

This is a mole and this is a mol and this is Quantitative Chemistry.

We can compare elements in the periodic table, by calculating their relative atomic mass (Ar). An element's relative atomic mass, is its mass, compared to the mass of an atom of Carbon-12. Relative atomic masses are given in the periodic table. The relative formula mass is used find the sum of all of the relative atomic masses of all atoms in a formula. To calculate a relative formula mass, all you have to do is add up all of the relative atomic masses of the elements in a formula.

The law of the conservation of mass states during a chemical reaction, no atoms are created or lost, this means that the relative formula mass of the reactants must equal the relative formula mass of the products. What goes in must come out.

Chemical reactions can take place in a closed or non-enclosed system. In a closed system, no reactants or products can escape, so this means that the mass of the reaction must remain constant. In a non-enclosed system, substances can enter or leave during a chemical reaction, this means that the mass of the products or reactants can change, however, the mass of the entire reaction will not change.

On the topic of reactions, we have to be able to measure reactions in order to make observations. However, whenever we measure a reaction, there is always a degree of uncertainty about the result. We can calculate uncertainty considering the resolution of the equipment being used or by considering the range of data.

Errors can also cause uncertainty in a result. There are two types of errors: random errors, and systematic errors. Random errors may be caused by human errors or by faulty equipment. Systematic errors are errors that are reproduced consistently. Uncertainty can be calculated by using the equation: $\text{uncertainty} = \text{range of results} / 2$.

Continuing on the topic of measurements, concentration is the measure of the amount of substance in a volume of liquid. The higher the concentration, the more particles of a substance present in a solution. In chemistry, we can calculate the concentration of a solution by using the equation: $\text{Concentration} = \text{Mass} / \text{volume}$. We can also substitute

moles in place of mass to calculate the concentration of a solution, so:
Concentration=Moles/Volume.

When I say moles, I am referring to a unique chemical measurement. 1 mol is the amount of substance that contains the same number of particles as there are atoms in 12.0 g of carbon-12. We have to remember that the value of 1 mol is 6.02×10^{23} this is known as Avogadro's constant, named after the scientist who discovered it. It is also very important to know that the mass of one mole of a substance in grams is equal to its relative formula mass.

The scientist Amedeo Avogadro, is also responsible for the creation of the appropriately names Avogadro's law. Avogadro's law states that different gases that have the same volume contain equal numbers of volumes.