Quantitative (calculations)

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The law of conservation of mass states that no atoms are lost or made during a chemical reaction so the mass of the products equals the mass of the reactants. This means that chemical reactions can be represented by symbol equations which are balanced in terms of the numbers of atoms of each element involved on both sides of the equation.	124	125	43	1
The relative formula mass (M_r) of a compound is the sum of the relative atomic masses of the atoms in the numbers shown in the formula. In a balanced chemical equation, the sum of the relative formula masses of the reactants in the quantities shown equals the sum of the relative formula masses of the products in the quantities shown.	123	123	41	1
Some reactions may appear to involve a change in mass but this can usually be explained because a reactant or product is a gas and its mass has not been taken into account. For example: when a metal reacts with oxygen the mass of the oxide produced is greater than the mass of the metal or in thermal decompositions of metal carbonates carbon dioxide is produced and escapes into the atmosphere leaving the metal oxide as the only solid product. Whenever a measurement is made there is always some uncertainty about the result obtained.	124	125	41-43	1
Chemical amounts are measured in moles. The symbol for the unit mole is mol. **The mass of one mole of a substance in grams is numerically equal to its relative formula mass.** **One mole of a substance contains the same number of the stated particles, atoms, molecules or ions as one mole of any other substance.** **The number of atoms, molecules or ions in a mole of a given substance is the Avogadro constant. The value of the Avogadro constant is 6.02 x 10^{23} per mole.**		124	42-44	1
The masses of reactants and products can be calculated from balanced symbol equations. **Chemical equations can be interpreted in terms of moles. For example:** $$Mg + 2HCl \rightarrow MgCl_2 + H_2$$		126	42-44	1

shows that one mole of magnesium reacts with two moles of hydrochloric acid to produce one mole of magnesium chloride and one mole of hydrogen gas.				
1The balancing numbers in a symbol equation can be calculated from the masses of reactants and products by converting the masses in grams to amounts in moles and converting the numbers of moles to simple whole number ratios.		126		1
In a chemical reaction involving two reactants, it is common to use an excess of one of the reactants to ensure that all of the other reactant is used. The reactant that is completely used up is called the limiting reactant because it limits the amount of products.		127	45	1
Many chemical reactions take place in solutions. The concentration of a solution can be measured in mass per given volume of solution, eg grams per dm^3 (g/dm^3).	126	128	46	1