

Chemical Equations			Chemical Equations (cont)		Calculations (cont)		Types of Reactions	
chemical reaction	process that neither creates nor destroys atoms, but that rearranges atoms in chemical compounds. involve changes in energy.		gases, liquids, and solids are labeled with (g), (l), and (s).	aqueous: chemical species that are dissolved in water; labeled (aq)	theoretical yield	amount of product that forms when all the limiting reactant reacts to form the desired product; maximum obtainable yield, predicted by the balanced equation (the limiting reactant produces the theoretical yield).	combination reaction	two or more reactants combine to form a single product - $A + B \rightarrow AB$
chemical equation	uses chemical symbols to denote what occurs in a chemical reaction.		some nonmetals exist as polyatomic molecules: H ₂ , N ₂ , O ₂ , F ₂ , Cl ₂ , Br ₂ , I ₂ , and P ₄ .				decomposition reaction	two or more products form a single reactant; opposite of combination reaction - $AB \rightarrow A + B$
a chemical equation represents a chemical statement.			Balancing Chemical Equations					
reactant	each substance that appears to the left of the arrow.	substances that are consumed in the course of a chemical reaction.	law of conservation of mass	atoms can neither be created nor destroyed.	actual yield	amount of product actually obtained from a reaction; almost always less than the theoretical yield.	combustion reaction	substance burns in the presence of oxygen. produces carbon dioxide gas and water.
product	each species that appears to the right of the arrow.	substances that form during the course of a chemical reaction.	stoichiometric coefficients	numeric values written to the left of each species in a chemical equation to balance the equation.	percent yield	determines the efficiency of a chemical reaction	Combustion Analysis	
			Calculations				combustion analysis	experimental determination of an empirical formula by a reaction with oxygen to produce carbon dioxide and water.
			stoichiometric amount	quantity of reactant in the same relative amount as that represented in the balanced chemical equation.		$\% \text{ yield} = \frac{\text{actual yield}}{\text{theoretical yield}} (100\%)$	organic compounds containing C, H, and O, are carried out using an apparatus in combustion analysis.	
			limiting reactant	reactant used up first in a reaction, limits the amount of product that can form.		temperature and pressure can affect percent yield.		
			excess reactant	present in quantities greater than necessary to react with the quantity of the limiting reactant.	atom economy	theoretical determination of how much of the starting mass of reactants can end up in the final mass of the desired product.		
						atom economy = $\frac{\text{sum of molar mass of desired product}}{\text{sum of molar masses of reactants}} (100\%)$		



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