

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 .		actual yield	amount of product actually obtained from a reaction; almost always less than the theoretical yield.	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		percent yield	determines the efficiency of a chemical reaction	combustion reaction	substance burns in the presence of oxygen. produces carbon dioxide gas and water.
reactant	each substances that are consumed in the course of a chemical reaction.	law of conservation of mass	atoms can neither be created nor destroyed.	% yield = $\frac{\text{actual yield}}{\text{theoretical yield}} \times 100\%$		Combustion Analysis	
product	each 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.	temperature and pressure can affect percent yield.		combustion analysis	experimental determination of an empirical formula by a reaction with oxygen to produce carbon dioxide and water.
		Calculations		atom economy	theoretical determination of how much of the starting mass of reactants can end up in the final mass of the desired product.	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.	atom economy = $\frac{\text{sum of molar mass of desired product}}{\text{sum of molar masses of reactants}} \times 100\%$			
		excess reactant	present in quantities greater than necessary to react with the quantity of the limiting reactant.				

