

Metric Conversions	
micro	0.000001
milli	0.001
centi	0.01
deci	0.1
(base unit)	1.0
deca	10.0
hecto	100.0
kilo	1000.0
Mega	1000000.0

Temperature Conversions	
Fahrenheit to Celsius	$C = 0.555(F - 32)$
Celsius to Fahrenheit	$F = 1.8C + 32$
Celsius to Kelvin	$K = C + 273$
Kelvin to Celsius	$C = K - 273$
Fahrenheit to Kelvin	$K = 0.555(F - 32) + 273$
Kelvin to Fahrenheit	$F = 1.8(K - 273) + 32$

Unit Conversions		
Mass	Volume	Distance
1.0 kg = 2.205 lb	1.0 L = 1.057 qt	1.0 km = 0.6214 mi
1.0 kg = 35.280 oz	1.0 L = 0.2642 gal	1.0 km = 3281.0 ft

Unit Conversions (cont)		
1.0 g = 0.0353 oz	1.0 L = 61.0 in ³	1.0 mi = 1.609 km
1.0 g = 0.0022 lb	1.0 mL = 0.03381 fl oz	1.0 m = 3.28 ft
1.0 lb = 0.454 kg	1.0 mL = 0.061 in ³	1.0 m = 39.37 in
1.0 lb = 453.51 g	1.0 fl oz = 29.57 mL	1.0 ft = 30.48 cm
1.0 oz = 28.34 g	1.0 in ³ = 16.01 mL	1.0 ft = 0.3048 m
	1.0 ft ³ = 28.32 L	1.0 in = 2.54 cm
	1.0 ft ³ = 1.264 m ³	1.0 in = 0.0254 m

Mole Conversions	
Gram to Mole	$\text{Mole} = \text{mass} / \text{FW}$
Mole to Gram	$\text{Mass} = \text{mol} \times \text{FW}$
Particle to Mole	$\text{mole} = \text{particles} / (6.022 \times 10^{23})$
Mole to Particle	$\text{part} = \text{mol} \times (6.022 \times 10^{23})$

Misc. Conversions	
1 amu =	$1.66054 \times 10^{-24} \text{ g}$
1 Joule =	$1 \text{ kg} \times \text{m}^2 / \text{s}^2$
1 Cal =	4.184 J
1 GHz =	1,000,000,000 Hz

Formula Types	
Molecular Formula	a chemical formula that indicates the actual # of each element in one molecule of a substance
Empirical Formula	a chemical formula that only shows the reacting substances in the smallest possible whole number ratios
Structural Formula	a chemical formula that shows all of the molecules and placements

Solubility Rules	
Soluble Compounds	
1. All compounds of alkali metals group (IA) are soluble.	
2. All salts containing NH ₄ , NO ₃ , ClO ₄ , ClO ₃ , and C ₂ H ₃ O ₂ are soluble.	
3. All chlorides (Cl ⁻), bromides (Br ⁻), and iodides (I ⁻) are soluble, except those of Ag ⁺ , Pb ²⁺ , and Hg ²⁺	

Solubility Rules (cont)	
4. All sulfates (SO ₄ ²⁻) are soluble, except those of Pb ²⁺ , Ca ²⁺ , Sr ²⁺ , Hg ²⁺ , and Ba ²⁺	
Insoluble Compounds	
5. All hydroxides (OH ⁻) and metal oxides (containing O ²⁻) are insoluble, except those of group IA and Ca ²⁺ , Sr ²⁺ , NH ₄ ⁺ , and Ba ²⁺ . When metal oxides do dissolve, they give hydroxides.	
6. All compounds that contain PO ₄ ³⁻ , CO ₃ ²⁻ , SO ₃ ²⁻ , and S ²⁻ are insoluble, except those of group IA and NH ₄	

Chemical Reactions	
Combination Reaction	$A + B = C$
Decomposition Reaction	$C = A + B$
Combustion Reaction	ends in CO ₂ and H ₂ O



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How to Write a Chemical Formula

1. Write the elemental symbols.
2. Determine the charges.
3. Determine the common multiple of the charges.
4. Balance equation.

Acids and Bases

Acids	ion acceptor
Bases	ion donater

Strong Acids Strong Bases

HCl, HBr...	LiOH, NaOH...
(H group)	(OH group)

Properties of Matter

Physical Properties: properties that can be observed without changing the identity.

Chemical Properties: describe how a substance may change or react to form other substances.

Intensive Properties: temperature and melting point

Extensive Properties: mass and volume

States of Matter

Gas	has no fixed volume or shape
Liquid	has a distinct volume not shape
Solid	has a definite volume and shape

Percent Formulas

% composition of element	$[(\# \text{ of atoms} \times \text{atomic weight})/\text{FW}] \times 100$
% error	$[(\text{experimental} - \text{true})/\text{true}] \times 100$
% yield	$[(\text{actual} - \text{theoretical})/\text{theoretical}] \times 100$

Basic Formulas

Area of a Circle	$3.14 \times r^2$
Volume	area x height
Molarity	$(\text{moles of a solute})/(\text{volume of solution in L})$
Density	mass/volume

Activity Series of Metals

Li	Mg	Co	Bi
Rb	Al	Ni	Cu
K	Mn	Sn	Hg
Ba	Zn	Pb	Ag
Sr	Cr	H2	Pt
Ca	Fe	Sb	Au
Na	Cd		



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