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	1.0mL=-0.03381 floz	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=29.58 mL	1.0 ft = 30.48 cm
1.0 oz = 28.34 g	1.0 in^3=29.58 mL	1.0 ft = 0.3048 m
	1.0 ft^3=28.317 L	1.0 in = 2.54 cm
	1.0 ft^3=1.264 mol	1.0 in = 0.0254 m

Mole Conversions

Gram to Mole	Mole=mass/FW
Mole to Gram	Mass=mol x FW
Particle to Mole	mole = particles/(6.022 x 10^{23}
Mole to Particle	part = mol x (6.022 x 10^{23})

Misc. Conversions

1 amu =	1.66054×10^{-24} g
1 Joule =	1 kg x m^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 NH4, NO3, ClO4, ClO3, and C2H3O2 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 ($SO4^{2-}$) 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+}, $NH4^+$, and Ba^{2+}. When metal oxides do dissolve, they give hydroxides.
6. All compounds that contain $PO4^{3-}$, $CO3^{2-}$, $SO3^{2-}$, and S^{2-} are insoluble, except those of group IA and NH4

Chemical Reactions

Combination Reaction	A + B = C
Decomposition Reaction	C = A + B
Combustion Reaction	ends in CO2 and H2O

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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... (H group)	LiOH, NaOH... (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	[(# of atoms x atomic weight)/FW] x 100
% error	[(experimental - true)/true] x 100
% yield	[(actual -theoretical)/theoretical] x 100

Basic Formulas

Area of a Circle	$3.14 \times r^2$
Volume	area x height
Molarity	(moles of a solute)/(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		