Common Polyatomic Ions

ammonium	NH_4^+
acetate	CH_3COO^-
carbonate	CO_3^{2-}
hydrogen carbonate (bicarbonate)	HCO_3^-
hydroxide	OH^-
nitrite	NO_2^-
nitrate	NO_3^-
phosphate	PO_4^{3-}
hydrogen phosphate	HPO_4^{2-}
dihydrogen phosphate	$H_2PO_4^-$
hypochlorite	ClO^-
sulfite	SO_3^{2-}
sulfate	SO_4^{2-}
hydrogen sulfite (bisulfite)	HSO_3^-
hydrogen sulfate (bisulfate)	HSO_4^-
cyanide	CN^-

Prefix	Symbol	Multiplier
tera	T	10^{12}
giga	G	10^9
mega	M	10^6
kilo	k	10^3
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}
femto	f	10^{-15}

Conversions

1 pound = 453.6 grams

1 inch = 2.54 cm

1 foot = 12 inches

1 mile = 5280 feet

1 mile = 1.609 km

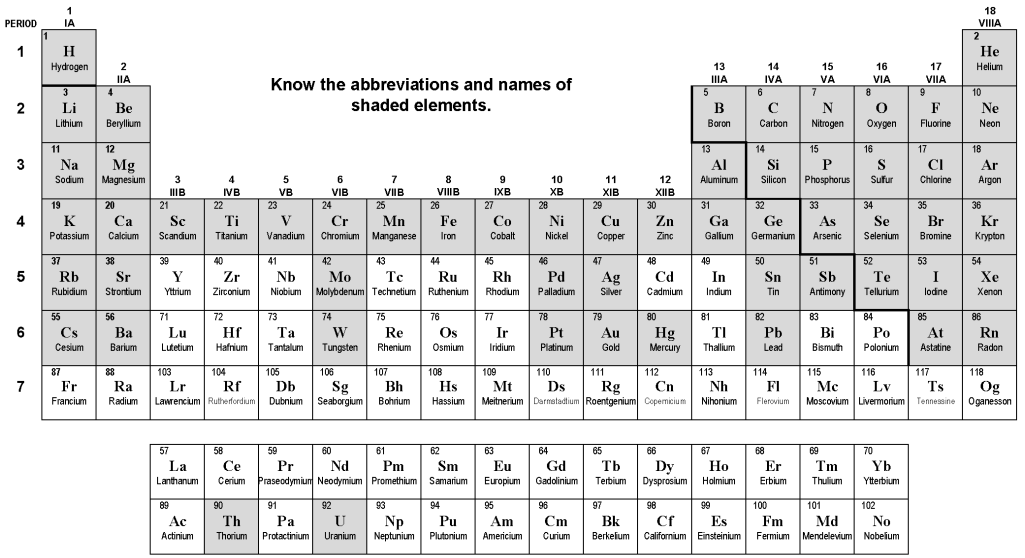
1 mL = 1 cm^3 = 1 cc

1 gallon = 4 quarts

1 liter = 1.06 quarts

1 atm = 760 mmHg = 760 torr = 1.013×10^5 Pa

molar volume of gas = 22.4 L/mol at STP



Nuclear Decay Reactions

Type of radiation	Symbol	Mass number	charge
Alpha particle	α or ^4_2He	4	2+
Beta particle	β or $^0_{-1}e$	0	1−
Gamma ray	γ or $^0_0\gamma$	0	0
Neutron	^1_0n	1	0
Positron	β^+ or ^0_1e	0	1+

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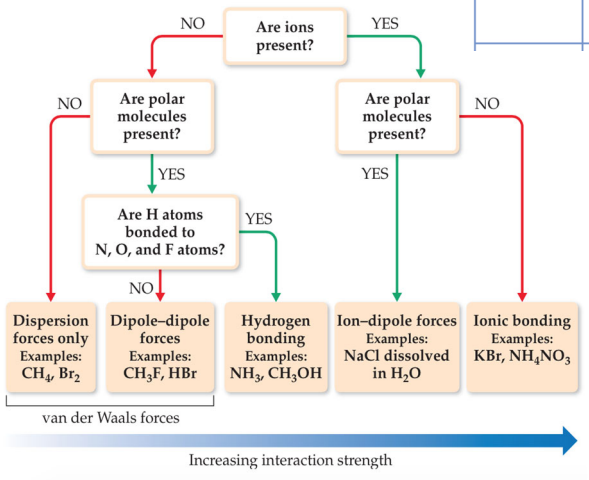
Strong Acids	Strong Bases
HCl, HBr, HI, HNO_3, $HClO_4$, H_2SO_4	Group I & II metal hydroxides

Concentration Unit	Definition
molarity (M)	$\frac{\text{mol solute}}{\text{L solution}}$
mole fraction (c)	$\frac{\text{moles of solute}}{\text{moles of solute+solvent}}$
percent by mass (%)	$\frac{\text{mass of solute}}{\text{mass of solution}} \times 100$
parts per million (ppm)	$\frac{\text{mass of solute}}{\text{mass of solution}} \times 10^6$
parts per billion (ppb)	$\frac{\text{mass of solute}}{\text{mass of solution}} \times 10^9$

Dilution formula

$M_1V_1 = M_2V_2$

Intermolecular Forces



Number of electron pairs	Electron pair geometries: 0 lone pair	1 lone pair	2 lone pairs	3 lone pairs	4 lone pairs
2	180° Linear				
3	120° Trigonal planar	<120° Bent or angular			
4	109° Tetrahedral	<109° Trigonal pyramid	<<109° Bent or angular		

Soluble compounds contain	Except when paired with
Group I metal cations or NH_4^+	None
CH_3COO^-, HCO_3^-, NO_3^-, or ClO_3^-	None
Cl^-, Br^-, or I^-	Ag^+, Hg_2^{2+}, Pb^{2+}
SO_4^{2-}	Ag^+, Hg_2^{2+}, Pb^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}
Insoluble compounds contain	**Except when paired with**
CO_3^{2-}, CrO_4^{2-}, PO_4^{3-}, or S^{2-}	Group I cations or NH_4^+
OH^-	Group I cations or NH_4^+, or Ba^{2+}