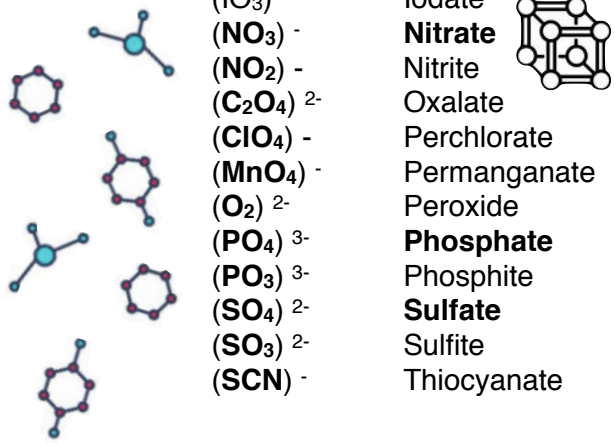
Chemistry Reference Sheet

$(NH_4)^+$	**Ammonium**	$(IO_3)^-$	Iodate
$(C_2H_3O_2)^-$	**Acetate**	$(NO_3)^-$	**Nitrate**
$(AsO_4)^{3-}$	Arsenate	$(NO_2)^-$	Nitrite
$(HCO_3)^-$	Bicarbonate	$(C_2O_4)^{2-}$	Oxalate
$(BrO_3)^-$	Bromate	$(ClO_4)^-$	Perchlorate
$(CO_3)^{2-}$	**Carbonate**	$(MnO_4)^-$	Permanganate
$(ClO_3)^-$	**Chlorate**	$(O_2)^{2-}$	Peroxide
$(ClO_2)^-$	Chlorite	$(PO_4)^{3-}$	**Phosphate**
$(CrO_4)^{2-}$	Chromate	$(PO_3)^{3-}$	Phosphite
$(CN)^-$	Cyanide	$(SO_4)^{2-}$	**Sulfate**
$(Cr_2O_7)^{2-}$	Dichromate	$(SO_3)^{2-}$	Sulfite
$(OH)^-$	**Hydroxide**	$(SCN)^-$	Thiocyanate
(ClO)-	Hypochlorite		



Common Metric Prefixes

(K) Kilo - 10^3	**Base - 10^0**	**(m)** Milli - 10^{-3}	**(p)** Pico - 10^{-12}
(H) Hecto - 10^2	**(d)** Deci - 10^{-1}	**(μ)** Micro - 10^{-6}	**(f)** Fempto - 10^{-15}
(Da) Deca - 10^1	**(c)** Centi - 10^{-2}	**(n)** Nano - 10^{-9}	**(a)** Atto - 10^{-18}

Acid Nomenclature

for formulas that start with H

Binary: **H + nonmetal**
hydro + root + ic acid

Oxyacid: **H + polyatomic**
-ate: -ic acid *(I ate something ic-y)*
-ite: -ous acid *(Sprite is delicious)*

Prefixes

covalent bonding only

1 - Mono	6 - Hexa	**Hydrocarbons**:
2 - Di	7 - Hepta	1 - meth
3 - Tri	8 - Octa	2 - eth
4 - Tetra	9 - Nona	3 - prop
5 - Penta	10 - Deca	4 - but

Conversion Factors Used in Calculations

Mole Conversions

1 mole = molar mass (g)
1 mole = 6.022 x 10^{23} atoms, molecules, particles, f.units
1 mole = 22.4 L of **gas** (@STP)

STP (Standard Temperature and Pressure)

1 atm = 760 Torr = 760 mm Hg = 101.3 kPa = 14.7 psi Standard Temp: **0°C**

Temp. Conversions

°F = (9/5)°C + 32
°C = (°F - 32)(5/9) °C = K - 273
K = 273 + °C

Miscellaneous Conversion Factors:

1 g = 0.03527 oz.	1 ft^3 = 28.32L	1 km = 1000m
1 mile = 5280 ft.	1 cm^3 = 1 mL	100 cm = 1m
1 mile = 1.61 km	1 kg = 2.2 lb	1000 mm = 1m
1 L = 1.058 qt	1 lb = 453.6 g	2.54 cm = 1 in.

Acid-Base

$$pH = -\log[H^+]$$
$$pOH = -\log[OH^-]$$
$$pH + pOH = 14$$
$$[H^+] = 10^{-pH}$$
$$[OH^-] = 10^{-pOH}$$
$$[H^+][OH^-] = 1.0 \times 10^{-14} = K_w$$

pH and pOH

pH Scale

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14

Acid ←7→ *Base*

pOH Scale

14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Formulas

see also "Conversion Factors Used in Calculations" section

Molarity, Dilution and Solution Concentration

$$Molarity(M) = \frac{\text{moles of solute (mol)}}{\text{Liters of solution (L)}} \qquad \%Conc. = \frac{solute(g)}{solution(g)} \times 100$$

$$Dilution:\ M_1V_1 = M_2V_2\ (V\ in\ mL\ or\ L) \qquad solution = solute + solvent$$

Ideal Gas Law & Gas Triangle: *PV = nRT*

P = pressure (atm)
V = volume (L)
n = number of moles
R = gas constant [0.0821 $\frac{L \cdot atm}{mol \cdot K}$]
T = temperature (K)

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

← Boyle's
← Charle's
← Combined

Avogadro's Law: $\frac{V_1}{n_1} = \frac{V_2}{n_2}$

Dalton's Law of Partial Pressures:
$P_{Total} = P_1 + P_2 \ldots P_n$

Thermochemistry:

Calorimetry: ***q = m c ΔT*** ***$q_{gained} = -q_{lost}$*** ***mcΔT = -mcΔT***

q = heat/energy (J or cal); +q = absorbed, -q = released
m = mass (g)
C_p = specific heat capacity ($\frac{J}{g^oC}$ or $\frac{cal}{g^oC}$)
ΔT = change in temperature (°C, $\Delta T = T_{final} - T_{initial}$)

Thermochemistry Conversion Factors:
1 calorie (cal) = 4.184 Joule (J)
1000 calories (cal) = 1 Calorie (Cal)
Specific Heat of Liquid Water 4.184 J/g°C

Miscellaneous:

$$Density = \frac{mass(g)}{volume(mL)} \qquad \%Error = \left|\frac{(true\ value - measured\ value)}{true\ value}\right| \cdot 100\%$$

$$\%Yield = \frac{Actual}{Theoretical} \times 100$$