Chemistry Reference Sheet

Periodic Table of the Elements

Key

11 — Atomic Number
Na — Element Symbol
Sodium — Element Name
22.990 — Average Atomic Mass *

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 **H** Hydrogen 1.008																	2 **He** Helium 4.003
2	3 **Li** Lithium 6.941	4 **Be** Beryllium 9.012											5 **B** Boron 10.811	6 **C** Carbon 12.011	7 **N** Nitrogen 14.007	8 **O** Oxygen 15.999	9 **F** Fluorine 18.998	10 **Ne** Neon 20.180
3	11 **Na** Sodium 22.990	12 **Mg** Magnesium 24.305											13 **Al** Aluminum 26.982	14 **Si** Silicon 28.086	15 **P** Phosphorus 30.974	16 **S** Sulfur 32.066	17 **Cl** Chlorine 35.453	18 **Ar** Argon 39.948
4	19 **K** Potassium 39.098	20 **Ca** Calcium 40.078	21 **Sc** Scandium 44.956	22 **Ti** Titanium 47.867	23 **V** Vanadium 50.942	24 **Cr** Chromium 51.996	25 **Mn** Manganese 54.938	26 **Fe** Iron 55.845	27 **Co** Cobalt 58.933	28 **Ni** Nickel 58.693	29 **Cu** Copper 63.546	30 **Zn** Zinc 65.409	31 **Ga** Gallium 69.723	32 **Ge** Germanium 72.610	33 **As** Arsenic 74.922	34 **Se** Selenium 78.960	35 **Br** Bromine 79.904	36 **Kr** Krypton 83.800
5	37 **Rb** Rubidium 85.468	38 **Sr** Strontium 87.620	39 **Y** Yttrium 88.906	40 **Zr** Zirconium 91.224	41 **Nb** Niobium 92.906	42 **Mo** Molybdenum 95.940	43 **Tc** Technetium (98)	44 **Ru** Ruthenium 101.070	45 **Rh** Rhodium 102.906	46 **Pd** Palladium 106.420	47 **Ag** Silver 107.868	48 **Cd** Cadmium 112.411	49 **In** Indium 114.818	50 **Sn** Tin 118.710	51 **Sb** Antimony 121.760	52 **Te** Tellurium 127.600	53 **I** Iodine 126.904	54 **Xe** Xenon 131.290
6	55 **Cs** Cesium 132.905	56 **Ba** Barium 137.327	57 **La** Lanthanum 138.905	72 **Hf** Hafnium 178.490	73 **Ta** Tantalum 180.948	74 **W** Tungsten 183.840	75 **Re** Rhenium 186.207	76 **Os** Osmium 190.230	77 **Ir** Iridium 192.217	78 **Pt** Platinum 195.084	79 **Au** Gold 196.967	80 **Hg** Mercury 200.590	81 **Tl** Thallium 204.383	82 **Pb** Lead 207.200	83 **Bi** Bismuth 208.980	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
7	87 **Fr** Francium (223)	88 **Ra** Radium (226)	89 **Ac** Actinium (227)	104 **Rf** Rutherfordium (261)	105 **Db** Dubnium (262)	106 **Sg** Seaborgium (266)	107 **Bh** Bohrium (264)	108 **Hs** Hassium (269)	109 **Mt** Meitnerium (268)	110 **Ds** Darmstadtium (271)	111 **Rg** Roentgenium (272)	112 **Cn** Copernicium (285)	113 **Uut** ?	114 **Fl** Flerovium (289)	115 **Uup** ?	116 **Lv** Livermorium (292)	117 **Uus** ?	118 **Uuo** ?

58 **Ce** Cerium 140.116	59 **Pr** Praseodymium 140.908	60 **Nd** Neodymium 144.242	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.360	63 **Eu** Europium 151.964	64 **Gd** Gadolinium 157.250	65 **Tb** Terbium 158.925	66 **Dy** Dysprosium 162.500	67 **Ho** Holmium 164.930	68 **Er** Erbium 167.259	69 **Tm** Thulium 168.934	70 **Yb** Ytterbium 173.040	71 **Lu** Lutetium 174.967
90 **Th** Thorium 232.038	91 **Pa** Protactinium 231.036	92 **U** Uranium 238.029	93 **Np** Neptunium (237)	94 **Pu** Plutonium (244)	95 **Am** Americium (243)	96 **Cm** Curium (247)	97 **Bk** Berkelium (247)	98 **Cf** Californium (251)	99 **Es** Einsteinium (252)	100 **Fm** Fermium (257)	101 **Md** Mendelevium (258)	102 **No** Nobelium (259)	103 **Lr** Lawrencium (262)

* If this number is in parentheses, then it refers to the atomic mass of the most stable isotope.

Turn over for Formulas, Constants, and Unit Conversions

Chemistry Reference Page

Formulas, Constants, and Unit Conversions

Formulas

Change in Enthalpy (Heat): $Q = m(\triangle T)c_p$

Heat of Fusion: $Q = m\triangle H_{fus}$

Ideal Gas Law: $PV = nRT$

Heat of Vaporization: $Q = m\triangle H_{vap}$

Density: $d = \dfrac{m}{V}$

Molarity (M) = $\dfrac{\text{mol of solute}}{\text{L of solution}}$

Combined Gas Law: $\dfrac{P_1V_1}{T_1} = \dfrac{P_2V_2}{T_2}$

Molality (m) = $\dfrac{\text{mol of solute}}{\text{kg of solvent}}$

Boiling Point Elevation: $\triangle T_b = k_b \times m$

Freezing Point Depression: $\triangle T_f = k_f \times m$

Constants

Universal Gas Constant (R): $0.0821 \dfrac{\text{atm} \times \text{L}}{\text{mol} \times \text{K}}$, or equal to $8.31 \dfrac{\text{kPa} \times \text{L}}{\text{mol} \times \text{K}}$

Molar Volume at STP: $22.4 \dfrac{\text{L}}{\text{mol}}$

Avogadro's Number (1 mole): 6.02×10^{23}

Specific Heat Capacity of Liquid Water: c_p (H_2O) = $1.00 \dfrac{\text{cal}}{\text{g} \times {}^\circ\text{C}} = 4.18 \dfrac{\text{J}}{\text{g} \times {}^\circ\text{C}}$

Unit Conversions

1 atm = 760 mm Hg = 760 Torr = 101.3 kPa = $14.7 \dfrac{\text{lb}}{\text{in.}^2}$ = 29.92 in. Hg

K = °C + 273

1.000 calorie = 4.184 Joules

1 mL = 1 cm^3

1 L = 1,000 mL = 1,000 cm^3

giga (G) = 10^9, mega (M) = 10^6, kilo (k) = 10^3, hecto (h) = 10^2, deka (da) = 10^1

deci (d) = 10^{-1}, centi (c) = 10^{-2}, milli (m) = 10^{-3}, micro (μ) = 10^{-6}, nano (n) = 10^{-9}

Common Ions

Element Name	Charges	Ions	Charges	Ions	Charges
Silver (Ag^{1+})	1+	Ammonium (NH_4^+)	1+	Oxide (O^{2-})	2–
Zinc (Zn^{2+})	2+	Nitrate (NO_3^-)	1–	Sulfide (S^{2-})	2–
Scandium (Sc^{3+})	3+	Nitrite (NO_2^-)	1–	Sulfate (SO_4^{2-})	2–
Copper (Cu^{1+}, Cu^{2+})	1+, 2+	Hydrogen Carbonate (HCO_3^-)	1–	Sulfite (SO_3^{2-})	2–
Gold (Au^{1+}, Au^{3+})	1+, 3+	Perchlorate (ClO_4^-)	1–	Carbonate (CO_3^{2-})	2–
Cobalt (Co^{2+}, Co^{3+})	2+, 3+	Chlorate (ClO_3^-)	1–	Peroxide (O_2^{2-})	2–
Nickel (Ni^{2+}, Ni^{3+})	2+, 3+	Chlorite (ClO_2^-)	1–	Chromate (CrO_4^{2-})	2–
Lead (Pb^{2+}, Pb^{4+})	2+, 4+	Hypochlorite (ClO^-)	1–	Dichromate ($Cr_2O_7^{2-}$)	2–
Tin (Sn^{2+}, Sn^{4+})	2+, 4+			Phosphate (PO_4^{3-})	3–
Mercury (Hg^{1+}, Hg^{2+})	1+, 2+				
Iron (Fe^{2+}, Fe^{3+})	2+, 3+				
Titanium (Ti^{2+}, Ti^{3+}, Ti^{4+})	2+, 3+, 4+				
Chromium (Cr^{2+}, Cr^{3+})	2+, 3+				
Vanadium (V^{2+}, V^{3+}, V^{4+})	2+, 3+, 4+				
Manganese (Mn^{2+}, Mn^{3+}, Mn^{4+})	2+, 3+, 4+				

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