

PERIODIC TABLE OF THE ELEMENTS

1 H 1.008																	2 He 4.00
3 Li 6.94	4 Be 9.01											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 22.99	12 Mg 24.30											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.06	17 Cl 35.45	18 Ar 39.95
19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.90	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.39	31 Ga 69.72	32 Ge 72.59	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.75	52 Te 127.60	53 I 126.91	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	* La 138.91	Hf 178.49	Ta 180.95	W 183.85	Re 186.21	Os 190.2	Ir 192.2	Pt 195.08	Au 196.97	Hg 200.59	Tl 204.38	Pb 207.2	Bi 208.98	Po (209)	At (210)	Rn (222)
87 Fr (223)	88 Ra 226.02	† Ac 227.03	Rf (261)	Db (262)	Sg (266)	Bh (264)	Hs (277)	Mt (268)	Ds (271)	Rg (272)							

*Lanthanide Series

58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm (145)	62 Sm 150.4	63 Eu 151.97	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97	
†Actinide Series	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np (237)	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (262)

SOLUBILITY RULES FOR IONIC COMPOUNDS

- Compounds containing **Group IA metals, ammonium, acetates, nitrates and perchlorates** are all soluble.
- Most **halides** (Group 7A - chlorides etc.) are soluble. Exceptions include Ag^+ , Pb^{+2} , and Hg_2^{+2} halides.
- Most **sulfates** are soluble. Exceptions include Ba^{+2} , Sr^{+2} , Ag^+ , Pb^{+2} , and Ca^{+2} sulfates.
- Most **hydroxides** insoluble. Exceptions include hydroxides of Group 1A metals, ammonium, Ca^{+2} , Sr^{+2} , and Ba^{+2} .
- Most **phosphates, carbonates, chromates, and sulfides** are insoluble. Exceptions include those compounds containing Group 1A metals and ammonium.
- In addition, all acids are soluble!

ACTIVITY SERIES FOR METALS (and HYDROGEN)

highest activity

Li
K
Ca
Na
Mg
Al
Zn → Zn^{+2}
Cr → Cr^{+3}
Fe → Fe^{+2}
Cd → Cd^{+2}
Ni → Ni^{+2}
Sn → Sn^{+2}
Pb → Pb^{+2}

H₂

lowest activity

Cu → Cu^{+2}
Ag → Ag^{+1}
Hg → Hg^{+2}
Au → Au^{+3}

EQUATIONS

$$K = {}^{\circ}C + 273$$

$${}^{\circ}F = (1.8 \times {}^{\circ}C) + 32$$

$$d = \frac{m}{V}$$

$$q = mc\Delta T$$

$$c = \lambda \times \nu$$

$$E = h \times \nu$$

$$PV = nRT$$

$$\frac{P_1V_1}{n_1T_1} = \frac{P_2V_2}{n_2T_2}$$

$$M = \frac{n}{V}$$

$$M_1V_1 = M_2V_2$$

$$pH = -\log[H_3O^+]$$

$$[H_3O^+] = 10^{-pH}$$

CONSTANTS

Density of water = 1.00 g/mL

$$c = 2.998 \times 10^8 \text{ m/s}$$

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$

Avogadro's Number = 6.022×10^{23}

$$R = 0.08206 \text{ L}\cdot\text{atm/K}\cdot\text{mol}$$

Molar Volume at STP = 22.4 L

$$K_w = 1.0 \times 10^{-14}$$

CONVERSIONS

$$1 \text{ inch} = 2.54 \text{ cm}$$

$$1 \text{ foot} = 12 \text{ inches}$$

$$1 \text{ mile} = 5280 \text{ feet}$$

$$1 \text{ L} = 1.057 \text{ quarts}$$

$$1 \text{ gallon} = 4 \text{ quarts}$$

$$1 \text{ mL} = 1 \text{ cm}^3$$

$$1 \text{ kg} = 2.20 \text{ lbs}$$

$$1 \text{ lb} = 16 \text{ oz}$$

$$1 \text{ atm} = 760 \text{ torr (or mmHg)}$$