# Periodic Table of the Elements

| 1 1A | 2 2A | 3 3B | 4 4B | 5 5B | 6 6B | 7 7B | 8 8B | 9 8B | 10 8B | 11 1B | 12 2B | 13 3A | 14 4A | 15 5A | 16 6A | 17 7A | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 **H** 1.008 | | | | | | | | | | | | | | | | | 2 **He** 4.003 |
| 3 **Li** 6.941 | 4 **Be** 9.012 | | | | | | | | | | | 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** 24.31 | | | | | | | | | | | 13 **Al** 26.98 | 14 **Si** 28.09 | 15 **P** 30.97 | 16 **S** 32.07 | 17 **Cl** 35.45 | 18 **Ar** 39.95 |
| 19 **K** 39.10 | 20 **Ca** 40.08 | 21 **Sc** 44.96 | 22 **Ti** 47.88 | 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** 72.61 | 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** 102.9 | 46 **Pd** 106.4 | 47 **Ag** 107.9 | 48 **Cd** 112.4 | 49 **In** 114.8 | 50 **Sn** 118.7 | 51 **Sb** 121.8 | 52 **Te** 127.6 | 53 **I** 126.9 | 54 **Xe** 131.3 |
| 55 **Cs** 132.9 | 56 **Ba** 137.3 | 57 **La** 138.9 | 72 **Hf** 178.5 | 73 **Ta** 180.9 | 74 **W** 183.8 | 75 **Re** 186.2 | 76 **Os** 190.2 | 77 **Ir** 192.2 | 78 **Pt** 195.1 | 79 **Au** 197.0 | 80 **Hg** 200.6 | 81 **Tl** 204.4 | 82 **Pb** 207.2 | 83 **Bi** 209.0 | 84 **Po** (209) | 85 **At** (210) | 86 **Rn** (222) |
| 87 **Fr** (223) | 88 **Ra** (226) | 89 **Ac** (227) | 104 **Rf** (261) | 105 **Db** (262) | 106 **Sg** (263) | 107 **Bh** (262) | 108 **Hs** (265) | 109 **Mt** (266) | 110 (269) | 111 (272) | 112 (277) | | 114 (2??) | | | | |

| 58 **Ce** 140.1 | 59 **Pr** 140.9 | 60 **Nd** 144.2 | 61 **Pm** (145) | 62 **Sm** 150.4 | 63 **Eu** 152.0 | 64 **Gd** 157.3 | 65 **Tb** 158.9 | 66 **Dy** 162.5 | 67 **Ho** 164.9 | 68 **Er** 167.3 | 69 **Tm** 168.9 | 70 **Yb** 173.0 | 71 **Lu** 175.0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 **Th** 232.0 | 91 **Pa** 231.0 | 92 **U** 238.0 | 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) |

## Solubilities of Compounds at 25°C and 1 atm.

| Key: S = soluble, I = insoluble, sS = slightly soluble, d = decomposes in water | acetate | bromide | carbonate | chloride | chromate | hydroxide | nitrate | oxide | phosphate | sulfate | sulfide |
|---|---|---|---|---|---|---|---|---|---|---|---|
| calcium | S | S | I | S | S | S | S | sS | I | sS | I |
| copper(II) | S | S | I | S | I | I | S | I | I | S | I |
| lead(II) | S | S | I | I | I | I | S | I | I | I | I |
| lithium | S | S | sS | S | S | S | S | S | sS | S | S |
| magnesium | S | S | I | S | S | I | S | I | I | S | d |
| potassium | S | S | S | S | S | S | S | S | S | S | S |
| silver | sS | I | I | I | I | – | S | I | I | sS | I |
| sodium | S | S | S | S | S | S | S | S | S | S | S |

## Important Formulas, Equations, and Constants

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

$$q = mC\Delta T$$

$$M_a V_a = M_b V_b$$

$$PV = nRT$$

$$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$

$$R = 8.314 \frac{L \cdot kPa}{mol \cdot K}$$

$$R = 0.0821 \frac{L \cdot atm}{mol \cdot K}$$

$$0°C = 273\ K$$

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

## Common Polyatomic Ions

| | |
|---|---|
| $NH_4^+$ | ammonium |
| $NO_3^-$ | nitrate |
| $SO_4^{2-}$ | sulfate |
| $OH^-$ | hydroxide |
| $PO_4^{3-}$ | phosphate |
| $CO_3^{2-}$ | carbonate |
| $CrO_4^{2-}$ | chromate |
| $C_2H_3O_2^-$ | acetate |
| $SCN^-$ | thiocyanate |

## Activity Series

| Most | Ba |
|---|---|
| | Ca |
| | Na |
| | Mg |
| | Zn |
| | Fe |
| | Pb |
| | H |
| Least | Cu |