The Periodic Table of the Elements

	1 IA	2 IIA	3 IIIA	4 IVB	5 VB	6 VIB	7 VIIB	8 VIIIB	9 VIIIB	10 VIIIB	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1	1 1.0079 **H** Hydrogen																	2 4.0025 **He** Helium
2	3 6.941 **Li** Lithium	4 9.0122 **Be** Beryllium											5 10.811 **B** Boron	6 12.011 **C** Carbon	7 14.007 **N** Nitrogen	8 15.999 **O** Oxygen	9 18.998 **F** Flourine	10 20.180 **Ne** Neon
3	11 22.990 **Na** Sodium	12 24.305 **Mg** Magnesium											13 26.982 **Al** Aluminium	14 28.086 **Si** Silicon	15 30.974 **P** Phosphorus	16 32.065 **S** Sulphur	17 35.453 **Cl** Chlorine	18 39.948 **Ar** Argon
4	19 39.098 **K** Potassium	20 40.078 **Ca** Calcium	21 44.956 **Sc** Scandium	22 47.867 **Ti** Titanium	23 50.942 **V** Vanadium	24 51.996 **Cr** Chromium	25 54.938 **Mn** Manganese	26 55.845 **Fe** Iron	27 58.933 **Co** Cobalt	28 58.693 **Ni** Nickel	29 63.546 **Cu** Copper	30 65.39 **Zn** Zinc	31 69.723 **Ga** Gallium	32 72.64 **Ge** Germanium	33 74.922 **As** Arsenic	34 78.96 **Se** Selenium	35 79.904 **Br** Bromine	36 83.8 **Kr** Krypton
5	37 85.468 **Rb** Rubidium	38 87.62 **Sr** Strontium	39 88.906 **Y** Yttrium	40 91.224 **Zr** Zirconium	41 92.906 **Nb** Niobium	42 95.94 **Mo** Molybdenum	43 96 **Tc** Technetium	44 101.07 **Ru** Ruthenium	45 102.91 **Rh** Rhodium	46 106.42 **Pd** Palladium	47 107.87 **Ag** Silver	48 112.41 **Cd** Cadmium	49 114.82 **In** Indium	50 118.71 **Sn** Tin	51 121.76 **Sb** Antimony	52 127.6 **Te** Tellurium	53 126.9 **I** Iodine	54 131.29 **Xe** Xenon
6	55 132.91 **Cs** Caesium	56 137.33 **Ba** Barium	57 138.91 **La** Lanthanum	72 178.49 **Hf** Halfnium	73 180.95 **Ta** Tantalum	74 183.84 **W** Tungsten	75 186.21 **Re** Rhenium	76 190.23 **Os** Osmium	77 192.22 **Ir** Iridium	78 195.08 **Pt** Platinum	79 196.97 **Au** Gold	80 200.59 **Hg** Mercury	81 204.38 **Tl** Thallium	82 207.2 **Pb** Lead	83 208.98 **Bi** Bismuth	84 209 **Po** Polonium	85 210 **At** Astatine	86 222 **Rn** Radon
7	87 223 **Fr** Francium	88 226 **Ra** Radium	89 227 **Ac** Actinium	104 261 **Rf** Rutherfordium	105 262 **Db** Dubnium	106 266 **Sg** Seaborgium	107 264 **Bh** Bohrium	108 277 **Hs** Hassium	109 268 **Mt** Meitnerium	110 281 **Ds** Darmstadtium	111 280 **Rg** Roentgenium	112 285 **Cn** Copernicium	113 286 **Nh** Nihonium	114 289 **Fl** Flerovium	115 289 **Mc** Moscovium	116 293 **Lv** Livermorium	117 294 **Ts** Tennessine	118 295 **Og** Oganesson

58 140.12 **Ce** Cerium	59 140.91 **Pr** Praseodymium	60 144.24 **Nd** Neodymium	61 145 **Pm** Promethium	62 150.36 **Sm** Samarium	63 151.96 **Eu** Europium	64 157.25 **Gd** Gadolinium	65 158.93 **Tb** Terbium	66 162.50 **Dy** Dysprosium	67 164.93 **Ho** Holmium	68 167.26 **Er** Erbium	69 168.93 **Tm** Thulium	70 173.04 **Yb** Ytterbium	71 174.97 **Lu** Lutetium
90 232.04 **Th** Thorium	91 231.04 **Pa** Protactinium	92 238.03 **U** Uranium	93 237 **Np** Neptunium	94 244 **Pu** Plutonium	95 243 **Am** Americium	96 247 **Cm** Curium	97 247 **Bk** Berkelium	98 251 **Cf** Californium	99 252 **Es** Einsteinium	100 257 **Fm** Fermium	101 258 **Md** Mendelevium	102 259 **No** Nobelium	103 266 **Lr** Lawrencium

Z mass **Symbol** Name — Synthetic

Abbreviations and Symbols

amount of substance	n	joule	J
atmosphere	atm	kelvin	K
boiling pt. elev. const.	K_b	liter	L
Celcius temperature	°C	molal	m
electromotive force	$\mathscr{E}$	molar	M
energy of activation	E_a	molar mass	$\mathcal{M}$
enthalpy	H	mole	mol
entropy	S	pressure	P
equilibrium constant	K_eq	second	s
free energy	G	sp. heat capacity	C_P
freezing pt. depr. const.	K_f	temperature	T
gram	g	volt	V
hour	h	volume	V

Constants

Plank's constant
$h = 6.626 \times 10^{-34}$ J·s

Gas constant
$R = 0.08206$ L·atm/mol·K
$R = 8.314$ J/mol·K

Speed of light
$c = 2.998 \times 10^{8}$ m/s

Water dissoc. constant
$K_\mathrm{w} = 1.0 \times 10^{-14}$ at 25 °C

Rydberg constant
$R_\mathrm{H} = 2.18 \times 10^{-18}$ J
$R_\mathrm{H} = 1.0974 \times 10^{7}$ m^{-1}

Avogadro constant
$N_\mathrm{A} = 6.022 \times 10^{23}$ mol^{-1}

Faraday constant
$F = 96485$ C/mol e$^-$

Boltzmann constant
$k_\mathrm{B} = 1.38 \times 10^{-23}$ J/K

Equations

$$E = \frac{hc}{\lambda} \qquad E = h\nu \qquad \frac{\text{rate}_1}{\text{rate}_2} = \sqrt{\frac{\mathcal{M}_2}{\mathcal{M}_1}} \qquad \text{pH} = \text{p}K_\mathrm{a} + \log\left(\frac{[\text{A}^-]}{[\text{HA}]}\right) \qquad \ln K_\mathrm{sp} = \frac{-\Delta H^\circ}{RT} + \frac{\Delta S^\circ}{R}$$

$$\Delta E = -Z^2 R_\mathrm{H}\left(\frac{1}{n_\mathrm{f}^2} - \frac{1}{n_\mathrm{i}^2}\right) \qquad \Delta T_\mathrm{f} = iK_\mathrm{f}m \quad \Delta T_\mathrm{b} = iK_\mathrm{b}m \qquad \Delta G^\circ = \Delta H^\circ - T\Delta S^\circ \qquad \Delta G^\circ = -nF\mathscr{E}^\circ$$

$$q = mC_P\Delta T \qquad \Pi = iMRT \qquad \Delta G^\circ - RT\ln K_\mathrm{eq} \qquad \mathscr{E}^\circ = \frac{RT}{nF}\ln K$$

$$PV = nRT \qquad \ln\frac{k_1}{k_2} = \frac{-E_\mathrm{a}}{R}\left(\frac{1}{T_1} - \frac{1}{T_2}\right) \qquad \Delta G = \Delta G^\circ + RT\ln Q \qquad \mathscr{E} = \mathscr{E}^\circ - \frac{RT}{nF}\ln Q$$