

PERIODIC TABLE OF THE ELEMENTS

1 1A																	18 8A	
1 H 1.01	2 2A											13 3A	14 4A	15 5A	16 6A	17 7A	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 23.0	12 Mg 24.3	3 3B	4 4B	5 5B	6 6B	7 7B	8 8B	9	10	11 1B	12 2B	13 Al 27.0	14 Si 28.1	15 P 31.0	16 S 32.1	17 Cl 35.5	18 Ar 39.9	
19 K 39.1	20 Ca 40.1	21 Sc 45.0	22 Ti 47.9	23 V 50.9	24 Cr 52.0	25 Mn 54.9	26 Fe 55.8	27 Co 58.9	28 Ni 58.7	29 Cu 63.5	30 Zn 65.4	31 Ga 69.7	32 Ge 72.6	33 As 74.9	34 Se 79.0	35 Br 79.9	36 Kr 83.8	
37 Rb 85.5	38 Sr 87.6	39 Y 88.9	40 Zr 91.2	41 Nb 92.9	42 Mo 95.9	43 Tc (98.9)	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	57–71	72 Hf 178.5	73 Ta 180.9	74 W 183.9	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)	89–103	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (264)	108 Hs (277)	109 Mt (268)	110 Ds (271)	111 Rg (282)	112 Cn (285)	113 Nh (286)	114 Fl (289)	115 Mc (289)	116 Lv (293)	117 Ts (294)	118 Og (294)	

Lanthanide Series	57 La 138.9	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
Actinide Series	89 Ac (227)	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)

Selected Units of Measure

Measure	Unit Name	Symbol
atomic mass	atomic mass unit	u
concentration	parts per million	ppm
concentration	molarity	M
energy, work, quantity of heat	joule	J
length	meter	m
mass	gram	g
pressure	pascal	Pa
quantity of a substance	mole	mol
temperature	kelvin	K
temperature	degree Celsius	°C
volume	liter	L

Prefixes for Metric Units

Factor	Prefix	Symbol
10^{-12}	pico-	p
10^{-9}	nano-	n
10^{-6}	micro-	μ
10^{-3}	milli-	m
10^{-2}	centi-	c
10^{-1}	deci-	d
10^1	deca-	D
10^2	hecto-	h
10^3	kilo-	k

Symbols of Nuclear Chemistry

Name	Symbol
alpha particle	α
beta particle	β^-
gamma radiation	γ
neutron	n
proton	p
positron	β^+

Common Acids

Name	Formula
acetic acid	$\text{HC}_2\text{H}_3\text{O}_2(aq)$
carbonic acid	$\text{H}_2\text{CO}_3(aq)$
hydrochloric acid	$\text{HCl}(aq)$
nitric acid	$\text{HNO}_3(aq)$
nitrous acid	$\text{HNO}_2(aq)$
phosphoric acid	$\text{H}_3\text{PO}_4(aq)$
sulfuric acid	$\text{H}_2\text{SO}_4(aq)$
sulfurous acid	$\text{H}_2\text{SO}_3(aq)$

Common Bases

Name	Formula
aqueous ammonia	$\text{NH}_3(aq)$
calcium hydroxide	$\text{Ca}(\text{OH})_2(aq)$
potassium hydroxide	$\text{KOH}(aq)$
sodium hydroxide	$\text{NaOH}(aq)$

Selected Polyatomic Ions

Name	Formula
acetate	$\text{C}_2\text{H}_3\text{O}_2^-$
ammonium	NH_4^+
carbonate	CO_3^{2-}
chlorite	ClO_2^-
chlorate	ClO_3^-
chromate	CrO_4^{2-}
cyanide	CN^-
dichromate	$\text{Cr}_2\text{O}_7^{2-}$
hydrogen carbonate	HCO_3^-
hydrogen sulfate	HSO_4^-
hydronium	H_3O^+
hydroxide	OH^-
hypochlorite	ClO^-
mercury (I)	Hg_2^{2+}
nitrite	NO_2^-
nitrate	NO_3^-
oxalate	$\text{C}_2\text{O}_4^{2-}$
perchlorate	ClO_4^-
permanganate	MnO_4^-
phosphate	PO_4^{3-}
sulfite	SO_3^{2-}
sulfate	SO_4^{2-}
thiocyanate	SCN^-
thiosulfate	$\text{S}_2\text{O}_3^{2-}$

Selected Formulas and Equations

Description	Formula/Equation	Symbols
Combined gas law	$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$	P = pressure V = volume T = temperature
Titration	$M_A V_A = M_B V_B$	M_A = molarity of H^+ V_A = volume of acid M_B = molarity of OH^- V_B = volume of base
Heat	$q = mC\Delta T$	q = heat m = mass C = specific heat capacity ΔT = change in temperature
Temperature	$K = ^\circ C + 273$	

Standard Temperature and Pressure

Standard temperature	273 K
Standard pressure	101.3 kPa

Physical Constants and Properties of Water

Density at 4°C	1.0 g/mL
Heat of fusion	334 J/g
Heat of vaporization	2260 J/g
Specific heat capacity of $H_2O(l)$	4.18 J/(g•K)