

PERIODIC TABLE OF THE ELEMENTS

1 H 1.00																	2 He 4.0
3 Li 6.9	4 Be 9.0											5 B 10.8	6 C 12.0	7 N 14.0	8 O 16.0	9 F 19.0	10 Ne 20.2
11 Na 23.0	12 Mg 24.3											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)	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 183.9	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 226.0	89 Ac† 227.0	104 Unq (261)	105 Unp (262)	106 Unh (263)	107 Uns (262)	108 Uno (265)	109 Une (267)									

	* 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)	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 (260)

Charges of some Common Monatomic ions

H 1+																
Li 1+	Be 2+											N 3-	O 2-	F 1-		
Na 1+	Mg 2+											Al 3+		Cl 1-		
K 1+	Ca 2+	Sc 3+	Ti 3+	V 3+	Cr 2+	Mn 2+	Fe 2+	Co 2+	Ni 2+	Cu 1+	Zn 2+			Br 1-		
Rb 1+	Sr 2+								Pd 2+	Ag 1+	Cd 2+		Sn 2+	I 1-		
Cs 1+	Ba 2+								Pt 2+	Au 1+	Hg 2+		Pb 2+			
Fr 1+	Ra 2+										*					

Please note that many of the metals shown here can have more possibilities than I can show here. Vanadium, for example, can be 2+, 3+, 4+ or 5+. I have only shown the more common charges.

*Mercury can be 1+ in the polyatomic ion Hg₂²⁺.

Solubility Rules

1. All compounds containing Na^+ , K^+ , or NH_4^+ ions are soluble in water.
2. All nitrates (NO_3^-) are soluble in water.
3. Most chlorides (Cl^-), and sulfates (SO_4^{2-}) are soluble. Some important exceptions are silver chloride (AgCl), barium sulfate (BaSO_4), and lead sulfate (PbSO_4) which are insoluble.
4. Most carbonates (CO_3^{2-}), phosphates (PO_4^{3-}), sulfides (S^{2-}), and hydroxides (OH^-) are insoluble in water. Important exceptions are those of Na^+ , K^+ , and NH_4^+ , as well as barium hydroxide, $\text{Ba}(\text{OH})_2$.

pH equations

$$[\text{H}_3\text{O}^+][\text{OH}^-] = 1 \times 10^{-14} \quad \text{pH} + \text{pOH} = 14$$

$$\text{pH} = -\log[\text{H}_3\text{O}^+] \quad [\text{H}_3\text{O}^+] = 10^{-\text{pH}}$$

$$\text{pOH} = -\log[\text{OH}^-] \quad [\text{OH}^-] = 10^{-\text{pOH}}$$

Avogadro's Number:

$$6.02 \times 10^{23}$$

TABLE: Some Acids and Their Conjugate Bases, in Decreasing Order of Acid Strength

Acid	Conjugate Base
HI	I^- Iodide ion
H_2SO_4	HSO_4^- Hydrogen sulfate ion
HCl	Cl^- Chloride ion
HNO_3	NO_3^- Nitrate ion
H_3O^+	H_2O Water
HSO_4^-	SO_4^{2-} Sulfate ion
H_3PO_4	H_2PO_4^- Dihydrogen phosphate ion
HF	F^- Fluoride Ion
$\text{CH}_3\text{CO}_2\text{H}$	CH_3CO_2^- Acetate ion
H_2CO_3	HCO_3^- Bicarbonate ion
H_2S	HS^- Hydrogen sulfide ion
H_2PO_4^-	HPO_4^{2-} Hydrogen phosphate ion
NH_4^+	NH_3 Ammonia
$\text{C}_6\text{H}_5\text{OH}$	$\text{C}_6\text{H}_5\text{O}^-$ Phenoxide ion
HCO_3^-	CO_3^{2-} Carbonate ion
HPO_4^{2-}	PO_4^{3-} Phosphate ion
H_2O	OH^- Hydroxide ion
$\text{C}_2\text{H}_5\text{OH}$	$\text{C}_2\text{H}_5\text{O}^-$ Ethoxide ion

Strong Acids

Weak Bases

Weak Acids

Strong Bases