



The periodic table

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1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18				
Hydrogen H 1.008	Beryllium Be 9.0122	Lithium Li 6.94	Titanium Ti 47.867	Vanadium V 50.942	Chromium Cr 51.995	Manganese Mn 54.938	Iron Fe 55.845(2)	Cobalt Co 58.933	Nickel Ni 58.693	Copper Cu 63.546(3)	Zinc Zn 65.38(2)	Boron B 10.81	Carbon C 12.011	Nitrogen N 14.007	Oxygen O 15.999	Fluorine F 18.998	Helium He 4.0026				
11	12	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36		
Sodium Na 22.990	Magnesium Mg 24.305	Potassium K 39.098	Calcium Ca 40.078(4)	Scandium Sc 44.956	Titanium Ti 47.867	Vanadium V 50.942	Chromium Cr 51.995	Manganese Mn 54.938	Iron Fe 55.845(2)	Cobalt Co 58.933	Nickel Ni 58.693	Copper Cu 63.546(3)	Zinc Zn 65.38(2)	Gallium Ga 69.723	Germanium Ge 72.63	Arsenic As 74.922	Selenium Se 78.96(8)	Bromine Br 79.904	Krypton Kr 83.798(2)		
37	38	55	56	57-70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	
Rubidium Rb 85.468	Sr Sr 87.62	Cesium Cs 132.91	Barium Ba 137.33	* La	Lutetium Lu 174.97	Hafnium Hf 178.49(2)	Tantalum Ta 180.95	W W 183.84	Re Re 186.21	Osmium Os 190.23(2)	Iridium Ir 192.22	Pt Pt 195.08	Au Au 196.967	Hg Hg 200.59	Tl Tl 204.38	Pb Pb 207.2	Bi Bi 208.98	Po Po [209]	At At [209]	Xenon Xe 131.29	
87	88	89-102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	
Francium Fr [223.02]	Radium Ra [226.03]	** Ac	Lanthanum La 138.91	Rutherfordium Rf [261.10]	Dubnium Db [262.11]	Seaborgium Sg [266.10]	Bh Bh [264.10]	Hs Hs [277.10]	Mt Mt [268.10]	Ds Ds [281.10]	Rg Rg [289.10]	Cn Cn [285.10]	Uut Uut [289.10]	Ff Ff [289.10]	Uup Uup [289.10]	Lv Lv [293]	Uus Uus [294]	Uuo Uuo [294]	Uuq Uuq [294]	Uuq Uuq [294]	Uuo Uuo [294]

Key:
Element Name
Atomic number
Symbol
Atomic weight (mean relative mass)

57	58	59	60	61	62	63	64	65	66	67	68	69	70
Lanthanum La	Cerium Ce	Praseodymium Pr	Neodymium Nd	Promethium Pm	Samarium Sm	Europium Eu	Gadolinium Gd	Terbium Tb	Dysprosium Dy	Holmium Ho	Erbium Er	Thulium Tm	Ytterbium Yb
89	90	91	92	93	94	95	96	97	98	99	100	101	102
Actinium Ac	Thorium Th	Protactinium Pa	Uranium U	Neptunium Np	Plutonium Pu	Americium Am	Curium Cm	Berkelium Bk	Californium Cf	Einsteinium Es	Fermium Fm	Mendelevium Md	Nobelium No

*lanthanoids
**actinoids

Symbols and names: the symbols and names of the elements, and their spellings are those recommended by the International Union of Pure and Applied Chemistry (IUPAC - <http://www.iupac.org/>). Names have yet to be proposed for elements 113, 115, 117, and 118 and so those used here are IUPAC's temporary systematic names. In some countries, the spellings **aluminium**, **caesium**, and **sulphur** are usual. Group labels: the numeric system (1-18) used here is the current IUPAC convention. Atomic weights (mean relative masses): these are the IUPAC 2009 values and given to 5 significant figures. The last significant figure of each value is considered reliable to ± 1 except where a larger uncertainty is given in parentheses. Representative values for those elements having an atomic weight interval are given (H, Li, B, C, N, O, Si, S, Cl, Ti). Elements for which the atomic weight is given within brackets have no stable nuclides and are represented by the element's longest lived isotope reported in the IUPAC 2009 values. ©2012 Dr Mark J Winter (WebElements Ltd and University of Sheffield). All rights reserved. For updates to this table see http://www.webelements.com/nexus/Printable_Periodic_Table (Version date: 7 June 2012).

Name **Formula/Symbol and Charge**

Polyatomic Ions and charges	
Phosphate	PO ₄ ⁻³
Carbonate	CO ₃ ⁻²
Sulfate	SO ₄ ⁻²
Nitrate	NO ₃ ⁻¹
Chlorate	ClO ₃ ⁻¹
Acetate	CH ₃ COO ⁻¹ (or C ₂ H ₃ O ₂ ⁻¹)
Hydroxide	OH ⁻¹
Ammonium	NH ₄ ⁺¹
Transition Metals and Metals under stairstep line	
Iron	Fe ⁺² , Fe ⁺³
Copper	Cu ⁺¹ , Cu ⁺²
Aluminum	Al ⁺³
Zinc	Zn ⁺²
Silver	Ag ⁺¹
Lead	Pb ⁺² , Pb ⁺⁴
Tin	Sn ⁺² , Sn ⁺⁴
Bismuth	Bi ⁺⁵
Acids	
Hydrochloric Acid	HCl
Nitric Acid	HNO ₃
Sulfuric Acid	H ₂ SO ₄
Phosphoric Acid	H ₃ PO ₄
Other names to remember	
Hydride	H ⁻¹
Ammonia	NH ₃
Water	H ₂ O

Electronegativity Values																	
H	Li	Be	B	C	N	O	F										
2.2	1.0	1.6	2.0	2.6	3.0	3.4	4.0										
Na	Mg	Al	Si	P	S	Cl											
0.9	1.3	1.5	1.9	2.2	2.6	3.2											
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	
0.8	1.0	1.4	1.5	1.6	1.7	1.6	1.9	1.9	1.9	2.0	1.7	1.8	2.0	2.2	2.5	3.0	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	
0.8	1.0	1.2	1.3	1.6	2.2	1.8	2.2	2.3	2.2	1.9	1.7	1.8	1.9	2.0	2.1	2.7	
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	
0.8	0.9	1.1	1.3	1.5	2.4	1.9	2.3	2.3	2.3	2.5	2.0	1.8	2.1	2.0	2.0	2.2	
Fr	Ra	Ac															
0.7	0.9	1.1															

Single Displacement

Activity Series
Most Active
Lithium
Potassium
Barium
Calcium
Sodium
Magnesium
Aluminum
Manganese
Zinc
Chromium
Iron
Cobalt
Nickel
Tin
Lead
(Hydrogen)
Copper
Silver
Mercury
Platinum
Gold
Least Active

Double Displacement

Solubility Rules in Water	
Soluble Ionic Compounds	Important Exceptions
NO ₃ ⁻¹	None
C ₂ H ₃ O ₂ ⁻¹	None
ClO ₃ ⁻¹	None
F ⁻¹	None
Cl ⁻¹	Ag ⁺ , Hg ⁺ , Pb ⁺²
Br ⁻¹	Ag ⁺ , Hg ⁺ , Pb ⁺²
I ⁻¹	Ag ⁺ , Hg ⁺ , Pb ⁺²
SO ₄ ⁻²	Sr ⁺² , Ba ⁺² , Hg ⁺ , Pb ⁺² , Ag ⁺
Insoluble Ionic Compounds	Important Exceptions
S ⁻²	Alkali metals cations NH ₄ ⁺¹ , Ca ⁺² , Sr ⁺² , Ba ⁺²
CO ₃ ⁻²	Alkali metals cations NH ₄ ⁺¹
PO ₄ ⁻³	Alkali metals cations NH ₄ ⁺¹
OH ⁻¹	Alkali metals cations NH ₄ ⁺¹ , Ca ⁺² , Sr ⁺² , Ba ⁺²

Most Active
F
Cl
Br
I
Least Active