

# THE PERIODIC TABLE OF THE ELEMENTS

Traditionally, elements are represented in a shorthand form by letters. For example, the formula for water, H<sub>2</sub>O, shows that a molecule of water consists of two atoms of hydrogen and one atom of oxygen. These chemical symbols for each of the atoms can be found on any periodic table of the elements. Using the periodic table, we can determine the number and position of the various parts of atoms.

Notice that atoms number 3, 11, 19, and so on are in column one. The atoms in this column act in a similar way since they all have one electron in their outermost layer. In the next column, Be, Mg, Ca, and so on act alike because these metals all have two electrons in their outermost electron layer. Similarly, atoms number 9, 17, 35, and so on all have seven electrons in their outer layer.

Knowing how fluorine, chlorine, and bromine act, you can probably predict how iodine will act under similar conditions. At the far right in the last column, argon, neon, and so on all act alike. They all have eight electrons in their outer electron layer. Atoms with eight electrons in their outer electron layer seldom form bonds with other atoms.

Periodic Table of the Elements

Representative Elements ( <i>s</i> Series)		Transition Metals ( <i>d</i> Series of Transition Elements)										Representative Elements ( <i>p</i> Series)						
IA												IIIA	IVA	VA	VIA	VIIA	VIIIA	
1	1 Hydrogen <b>H</b> 1.0079											5 Boron <b>B</b> 10.811	6 Carbon <b>C</b> 12.0112	7 Nitrogen <b>N</b> 14.0067	8 Oxygen <b>O</b> 15.9994	9 Fluorine <b>F</b> 18.9984	10 Neon <b>Ne</b> 20.179	
2	3 Lithium <b>Li</b> 6.941	4 Beryllium <b>Be</b> 9.0122											13 Aluminum <b>Al</b> 26.9815	14 Silicon <b>Si</b> 28.086	15 Phosphorus <b>P</b> 30.9738	16 Sulfur <b>S</b> 32.064	17 Chlorine <b>Cl</b> 35.453	18 Argon <b>Ar</b> 39.948
3	11 Sodium <b>Na</b> 22.989	12 Magnesium <b>Mg</b> 24.305	IIIB	IVB	VB	VIB	VII B	VIII B			IB	IIB	31 Gallium <b>Ga</b> 69.723	32 Germanium <b>Ge</b> 72.59	33 Arsenic <b>As</b> 74.992	34 Selenium <b>Se</b> 78.96	35 Bromine <b>Br</b> 79.904	36 Krypton <b>Kr</b> 83.80
4	19 Potassium <b>K</b> 39.098	20 Calcium <b>Ca</b> 40.08	21 Scandium <b>Sc</b> 44.956	22 Titanium <b>Ti</b> 47.90	23 Vanadium <b>V</b> 50.942	24 Chromium <b>Cr</b> 51.996	25 Manganese <b>Mn</b> 54.938	26 Iron <b>Fe</b> 55.847	27 Cobalt <b>Co</b> 58.933	28 Nickel <b>Ni</b> 58.71	29 Copper <b>Cu</b> 63.546	30 Zinc <b>Zn</b> 65.38	49 Indium <b>In</b> 114.82	50 Tin <b>Sn</b> 118.69	51 Antimony <b>Sb</b> 121.75	52 Tellurium <b>Te</b> 127.60	53 Iodine <b>I</b> 126.904	54 Xenon <b>Xe</b> 131.30
5	37 Rubidium <b>Rb</b> 85.468	38 Strontium <b>Sr</b> 87.62	39 Yttrium <b>Y</b> 88.905	40 Zirconium <b>Zr</b> 91.22	41 Niobium <b>Nb</b> 92.906	42 Molybdenum <b>Mo</b> 95.94	43 Technetium <b>Tc</b> (99)	44 Ruthenium <b>Ru</b> 101.07	45 Rhodium <b>Rh</b> 102.905	46 Palladium <b>Pd</b> 106.4	47 Silver <b>Ag</b> 107.868	48 Cadmium <b>Cd</b> 112.40	81 Thallium <b>Tl</b> 204.37	82 Lead <b>Pb</b> 207.19	83 Bismuth <b>Bi</b> 208.980	84 Polonium <b>Po</b> (209)	85 Astatine <b>At</b> (210)	86 Radon <b>Rn</b> (222)
6	55 Cesium <b>Cs</b> 132.905	56 Barium <b>Ba</b> 137.34	*57 Lanthanum <b>La</b> 138.91	72 Hafnium <b>Hf</b> 178.49	73 Tantalum <b>Ta</b> 180.948	74 Tungsten <b>W</b> 183.85	75 Rhenium <b>Re</b> 186.2	76 Osmium <b>Os</b> 190.2	77 Iridium <b>Ir</b> 192.22	78 Platinum <b>Pt</b> 195.09	79 Gold <b>Au</b> 196.967	80 Mercury <b>Hg</b> 200.59	81 Thallium <b>Tl</b> 204.37	82 Lead <b>Pb</b> 207.19	83 Bismuth <b>Bi</b> 208.980	84 Polonium <b>Po</b> (209)	85 Astatine <b>At</b> (210)	86 Radon <b>Rn</b> (222)
7	87 Francium <b>Fr</b> (223)	88 Radium <b>Ra</b> (226)	**89 Actinium <b>Ac</b> (227)	104 Rutherfordium <b>Rf</b> (261)	105 Hahnium <b>Ha</b> (262)	106 Seaborgium <b>Sg</b> (263)	107 Nilsbohrium <b>Ns</b> (261)	108 Hassium <b>Hs</b> (265)	109 Meitnerium <b>Mt</b> (266)									

**Key**

1	Atomic Number
Hydrogen	Name
<b>H</b>	Symbol
1.0079	Atomic Weight

Inner Transition Elements (*f* Series)

\*Lanthanides

58 Cerium <b>Ce</b> 140.12	59 Praseodymium <b>Pr</b> 140.907	60 Neodymium <b>Nd</b> 144.24	61 Promethium <b>Pm</b> 144.913	62 Samarium <b>Sm</b> 150.35	63 Europium <b>Eu</b> 151.96	64 Gadolinium <b>Gd</b> 157.25	65 Terbium <b>Tb</b> 158.925	66 Dysprosium <b>Dy</b> 162.50	67 Holmium <b>Ho</b> 164.930	68 Erbium <b>Er</b> 167.26	69 Thulium <b>Tm</b> 168.934	70 Ytterbium <b>Yb</b> 173.04	71 Lutetium <b>Lu</b> 174.97
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\*\* Actinides

90 Thorium <b>Th</b> 232.038	91 Protactinium <b>Pa</b> (231)	92 Uranium <b>U</b> 238.03	93 Neptunium <b>Np</b> (237)	94 Plutonium <b>Pu</b> 244.064	95 Americium <b>Am</b> (243)	96 Curium <b>Cm</b> (247)	97 Berkelium <b>Bk</b> (247)	98 Californium <b>Cf</b> 242.058	99 Einsteinium <b>Es</b> (254)	100 Fermium <b>Fm</b> 257.095	101 Mendelevium <b>Md</b> 258.10	102 Nobelium <b>No</b> 259.10	103 Lawrencium <b>Lr</b> 260.105
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