

How to Read the Periodic Table

Many periodic tables include the **atomic number** (number of protons) and **atomic weight** (which depends on protons and neutrons). Sometimes they list the full name of each element, but often only include their one- or two-letter symbol, nicknames that make complicated chemical formulas more compact. If the symbol doesn't match the name (as in Au for gold and Na for sodium), it's likely based on the element's original Latin name (aurum and natrium).

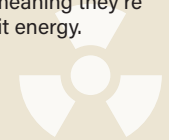
Elements in the same column often share similarities, so chemists call these **groups**. Roughly speaking, the farther to the right a group is, the more electrons it has ready to interact with other elements. The first group, known as the alkali metals, has just one such electron, easy to lose when reacting with an element that has more electrons, such as one from the 17th group, the halogens. The noble gases, in the last column, are so named because they're holding about all the electrons they can, so they don't react easily with other elements — just as the noble houses of old.

Rows in the periodic table are called **periods**, and we currently have seven. They list the elements in order of atomic number before cutting off and continuing again in a new row, repeating established patterns of chemical properties. The tricky part in constructing the table is knowing when they cut off — or, equivalently, how many columns (groups) to include in each row. —BILL ANDREWS

atomic number
Symbol
name
atomic weight

Technetium was just a gap in the periodic table for decades, frustrating chemists who tried to find it. Like most elements, technetium can be forged in the furnaces of stars, but it doesn't stick around long enough for us to stumble upon any. When at last Italian researchers Carlo Perrier and Emilio Segrè isolated a sample, it was only because another science experiment had created some via nuclear reactions. The name comes from the Greek word for artificial, *technētōs*.

Starting with element 84, polonium in the table, all naturally occurring elements are **radioactive**, meaning they're unstable and emit energy.



1 H Hydrogen 1.008																	2 He Helium 4.003	
3 Li Lithium 6.94	4 Be Beryllium 9.012																	10 Ne Neon 20.18
11 Na Sodium 22.99	12 Mg Magnesium 24.31																	18 Ar Argon 39.95
19 K Potassium 39.10	20 Ca Calcium 40.08	21 Sc Scandium 44.96	22 Ti Titanium 47.88	23 V Vanadium 50.94	24 Cr Chromium 52.00	25 Mn Manganese 54.94	26 Fe Iron 55.85	27 Co Cobalt 58.93	28 Ni Nickel 58.69	29 Cu Copper 63.55	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.64	33 As Arsenic 74.92	34 Se Selenium 78.96	35 Br Bromine 79.90	36 Kr Krypton 83.79	
37 Rb Rubidium 85.47	38 Sr Strontium 87.62	39 Y Yttrium 88.91	40 Zr Zirconium 91.22	41 Nb Niobium 92.91	42 Mo Molybdenum 95.96	43 Tc Technetium (98)	44 Ru Ruthenium 101.1	45 Rh Rhodium 102.9	46 Pd Palladium 106.4	47 Ag Silver 107.9	48 Cd Cadmium 112.4	49 In Indium 114.8	50 Sn Tin 118.7	51 Sb Antimony 121.8	52 Te Tellurium 127.6	53 I Iodine 126.9	54 Xe Xenon 131.3	
55 Cs Cesium 132.9	56 Ba Barium 137.3	72 Hf Hafnium 178.5	73 Ta Tantalum 180.9	74 W Tungsten 183.9	75 Re Rhenium 186.2	76 Os Osmium 190.2	77 Ir Iridium 192.2	78 Pt Platinum 195.1	79 Au Gold 197.0	80 Hg Mercury 200.5	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 209.0	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)		
87 Fr Francium (223)	88 Ra Radium (226)	104 Rf Rutherfordium (267)	105 Db Dubnium (268)	106 Sg Seaborgium (269)	107 Bh Bohrium (270)	108 Hs Hassium (277)	109 Mt Meitnerium (278)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (282)	112 Cn Copernicium (285)	113 Nh Nihonium (286)	114 Fl Flerovium (289)	115 Mc Moscovium (289)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)		
		57 La Lanthanum 138.9	58 Ce Cerium 140.1	59 Pr Praseodymium 140.9	60 Nd Neodymium 144.2	61 Pm Promethium (145)	62 Sm Samarium 150.4	63 Eu Europium 152.0	64 Gd Gadolinium 157.2	65 Tb Terbium 158.9	66 Dy Dysprosium 162.5	67 Ho Holmium 164.9	68 Er Erbium 167.3	69 Tm Thulium 168.9	70 Yb Ytterbium 173.0	71 Lu Lutetium 175.0		
		89 Ac Actinium (227)	90 Th Thorium 232	91 Pa Protactinium 231	92 U Uranium 238	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (258)	102 No Nobelium (259)	103 Lr Lawrencium (262)		

Hydrogen is a bit of an oddball, unique among elements with no close analog. Some tables thus have it sitting alone, but most include it in the alkali metal group because, like them, it has one electron.

43
Tc
Technetium
(98)

84
Po
Polonium
(209)

- Alkali metals
- Alkaline earth metals
- Transition metals
- Post-transition metals
- Metalloids
- Nonmetals
- Halogens
- Noble gases
- Lanthanides
- Actinides