

Metals and Nonmetals

Order of Elements in the Periodic Table

Scientists arrange the elements in a table called the periodic table. So, what is the periodic table?

The Periodic Table: It consists of squares arranged in horizontal rows called **periods** and vertical columns called **groups**. Each square contains information about an element, including its name, chemical symbol, and the number of protons that distinguishes it from other elements.

1 1.008 H Hydrogen																	2 4.002 He Helium
3 6.94 Li Lithium	4 9.012 Be Beryllium											5 10.81 B Boron	6 12.01 C Carbon	7 14.01 N Nitrogen	8 16.00 O Oxygen	9 18.99 F Fluorine	10 20.18 Ne Neon
11 22.99 Na Sodium	12 24.31 Mg Magnesium											13 26.98 Al Aluminum	14 28.09 Si Silicon	15 30.97 P Phosphorus	16 32.06 S Sulfur	17 35.45 Cl Chlorine	18 39.95 Ar Argon
19 39.09 K Potassium	20 40.08 Ca Calcium	21 44.96 Sc Scandium	22 47.87 Ti Titanium	23 50.94 V Vanadium	24 51.99 Cr Chromium	25 54.94 Mn Manganese	26 55.85 Fe Iron	27 58.93 Co Cobalt	28 58.93 Ni Nickel	29 63.55 Cu Copper	30 65.38 Zn Zinc	31 69.72 Ga Gallium	32 72.63 Ge Germanium	33 74.92 As Arsenic	34 78.97 Se Selenium	35 79.90 Br Bromine	36 83.79 Kr Krypton
37 85.47 Rb Rubidium	38 87.62 Sr Strontium	39 88.91 Y Yttrium	40 91.22 Zr Zirconium	41 92.91 Nb Niobium	42 95.94 Mo Molybdenum	43 95.94 Tc Technetium	44 101.07 Ru Ruthenium	45 101.07 Rh Rhodium	46 106.42 Pd Palladium	47 107.87 Ag Silver	48 112.41 Cd Cadmium	49 114.82 In Indium	50 118.71 Sn Tin	51 127.60 Sb Antimony	52 127.60 Te Tellurium	53 126.91 I Iodine	54 131.29 Xe Xenon
55 132.91 Cs Cesium	56 137.33 Ba Barium	57-71 Lanthanides	72 178.49 Hf Hafnium	73 180.94 Ta Tantalum	74 183.84 W Tungsten	75 186.21 Re Rhenium	76 186.21 Os Osmium	77 193.22 Ir Iridium	78 195.08 Pt Platinum	79 196.97 Au Gold	80 200.59 Hg Mercury	81 204.38 Tl Thallium	82 207.2 Pb Lead	83 208.98 Bi Bismuth	84 (209) Po Polonium	85 (210) At Astatine	86 (222) Rn Radon
87 (223) Fr Francium	88 (226) Ra Radium	89-103 Actinides	104 (261) Rf Rutherfordium	105 (262) Db Dubnium	106 (263) Sg Seaborgium	107 (263) Bh Bohrium	108 (265) Hs Hassium	109 (264) Mt Meitnerium	110 (265) Ds Darmstadtium	111 (268) Rg Roentgenium	112 (268) Cn Copernicium	113 (268) Nh Nihonium	114 (269) Fl Flerovium	115 (270) Mc Moscovium	116 (271) Lv Livermorium	117 (272) Ts Tennessine	118 (284) Og Oganesson
57 138.91 La Lanthanum	58 140.12 Ce Cerium	59 140.91 Pr Praseodymium	60 141.91 Nd Neodymium	61 (145) Pm Promethium	62 150.36 Sm Samarium	63 151.96 Eu Europium	64 157.25 Gd Gadolinium	65 158.93 Tb Terbium	66 162.5 Dy Dysprosium	67 164.93 Ho Holmium	68 167.26 Er Erbium	69 168.93 Tm Thulium	70 173.04 Yb Ytterbium	71 174.97 Lu Lutetium			
89 (223) Ac Actinium	90 232.04 Th Thorium	91 231.04 Pa Protactinium	92 238.03 U Uranium	93 (237) Np Neptunium	94 (241) Pu Plutonium	95 (243) Am Americium	96 (247) Cm Curium	97 (247) Bk Berkelium	98 (251) Cf Californium	99 (252) Es Einsteinium	100 (257) Fm Fermium	101 (257) Md Mendelevium	102 (258) No Nobelium	103 (261) Lr Lawrencium			

Elements in the same group have similar physical and chemical properties, and these properties repeat periodically in each period. That's why it's called the periodic table.

Metals and Their Properties

Metals are located on the left and middle of the periodic table (except for hydrogen).

										H							He
Li	Be									B	C	N	O	F	Ne		
Na	Mg									Al	Si	P	S	Cl	Ar		
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

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Properties of Metals:

1. Metals are solid at room temperature (except for mercury, which is liquid).
2. Metals are shiny.
3. Metals are malleable and ductile, meaning they can be hammered into sheets or drawn into wires. For example, aluminum foil used for food packaging and copper wires.
4. Metals are good conductors of heat. When you touch a metal spoon, it feels warm after stirring hot food. Metals vary in their ability to conduct heat, with aluminum and iron being good conductors. That's why they are used in cookware.
5. Metals are good conductors of electricity. Metals can pass electric current in a closed electrical circuit. Metals also vary in their ability to conduct electricity, with copper and silver being good conductors. That's why copper is used in electrical wires.

Nonmetals and Their Properties

Nonmetals are located on the right side of the periodic table.

										H							He
Li	Be										B	C	N	O	F	Ne	
Na	Mg										Al	Si	P	S	Cl	Ar	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

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Properties of Nonmetals:

- Nonmetals can be solid, liquid, or gas at room temperature. For example:
 - Phosphorus (P_4) and iodine (I_2) are solid.
 - Bromine (Br_2) is liquid.
 - Most nonmetals are in the gas state, such as oxygen (O_2) and nitrogen (N_2).
- Nonmetals are not shiny.
- Nonmetals are not malleable or ductile. When nonmetals in solid form are struck, they crumble.
- Nonmetals are poor conductors of heat and electricity. Despite carbon being a nonmetal, it is a conductor of electricity.

Uses of Nonmetals:

- Phosphorus is used in the production of fertilizers and matchstick heads. It is also required by the human body in limited quantities and obtained from seafood, chicken, and nuts.
- Chlorine is used in water disinfection tablets and bleach.

Metalloids and Their Properties

There are elements that separate metals and nonmetals in the periodic table. These elements share common properties with both metals and nonmetals and are called metalloids.

Metalloids: They are a group of elements that share some properties with metals and others with nonmetals.

- أشباه الفلزات -

1 H Hydrogen																	2 He Helium																												
3 Li Lithium	4 Be Beryllium											5 B Boron	6 C Carbon	7 N Nitrogen	8 O Oxygen	9 F Fluorine	10 Ne Neon																												
11 Na Sodium	12 Mg Magnesium											13 Al Aluminium	14 Si Silicon	15 P Phosphorus	16 S Sulfur	17 Cl Chlorine	18 Ar Argon																												
19 K Potassium	20 Ca Calcium	21 Sc Scandium	22 Ti Titanium	23 V Vanadium	24 Cr Chromium	25 Mn Manganese	26 Fe Iron	27 Co Cobalt	28 Ni Nickel	29 Cu Copper	30 Zn Zinc	31 Ga Gallium	32 Ge Germanium	33 As Arsenic	34 Se Selenium	35 Br Bromine	36 Kr Krypton																												
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Metalloids are solid at room temperature. Silicon (Si) and germanium (Ge) are examples of metalloids. They are known for their ability to conduct electricity, so they are used in the production of electronic devices.