

The Periodic Table of the Elements: 118 elements, colour by family

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89 Ac Actinium [227]	90 Th Thorium 232.04	91 Pa Protactinium 231.04	92 U Uranium 238.03	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 [260]

Alkali metal Alkaline earth metal Transition metal Post-transition metal Metalloid Non-metal Halogen Noble gas Lanthanide Actinide Properties unknown

Each cell: atomic number, symbol, name, standard atomic weight (IUPAC, rounded); [] = mass number of the most stable isotope. Groups 1 to 18 across the top, periods 1 to 7 down. Lanthanides (57-71) and actinides (89-103) sit below the table.

How to read it, and who built it

Three rules that make the table make sense

1. The atomic number goes up by one from left to right and row by row: it is the number of protons, and it is what the table is ordered by. 2. A column (group) holds elements with the same number of outer electrons, so they react the same way: group 1 all react with water, group 17 all form salts with sodium, group 18 do not react at all. 3. A row (period) is one electron shell being filled: period 2 fills the second shell from lithium (1 outer electron) to neon (8).

Who modernized the periodic table

Dmitri Mendeleev (1869) arranged the 63 known elements by atomic mass and left gaps for elements he predicted (gallium, scandium, germanium were found within 15 years with the properties he wrote down). Henry Moseley (1913) showed with X-rays that the order is by atomic number (protons), not mass, which fixed the places where mass put elements the wrong way round (argon before potassium, tellurium before iodine). Glenn Seaborg (1945) moved the actinides out of the main body into the row below, giving the table its modern shape. The last four elements (113, 115, 117, 118) were named in 2016.

What your class needs

CBSE Class 9 and 10: the first 20 elements with symbols and atomic numbers, the metal/non-metal split, and the trends down a group and across a period (Class 10, chapter 5 in the old book, folded into Class 11 in the rationalised syllabus). IGCSE and GCSE: groups 1, 7 and 0 by name and behaviour, the transition metals as a block, and the reading of a data-book table. Class 11 and A-level: the s, p, d and f blocks, electronic configuration by block, and the periodicity of ionisation energy and atomic radius. The full list of all 118 with masses is the companion PDF on sciencewithshobha.com.