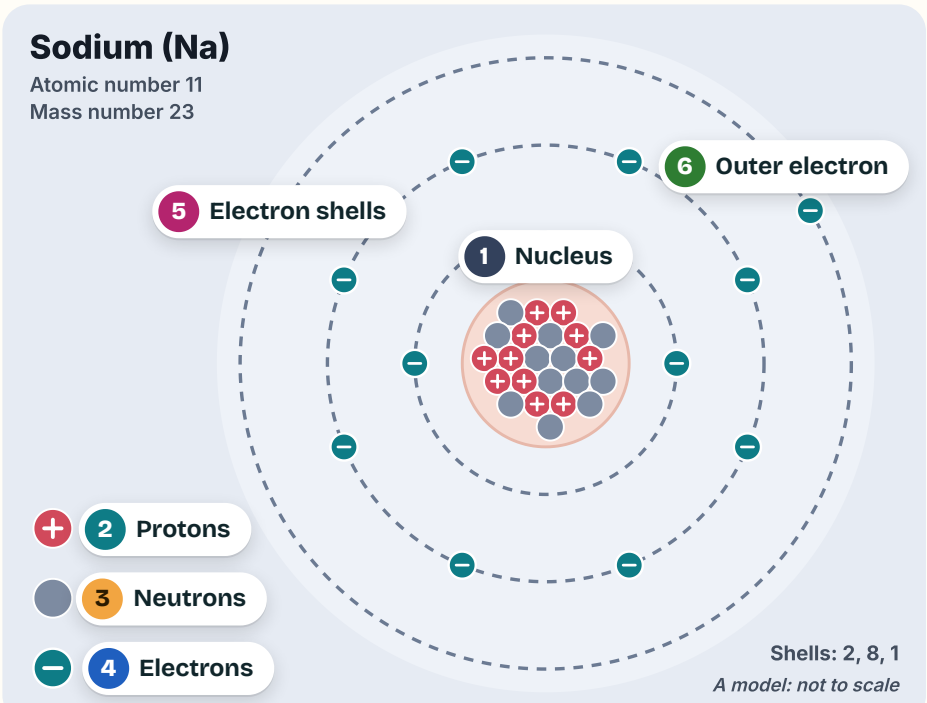
ATOMS AND THE PERIODIC TABLE · PART 1 OF 8 · AGES 11–16

Atoms Explained

Everything around you is built from atoms: a tiny, heavy nucleus at the centre with even tinier electrons arranged around it.



A model of a sodium-23 atom: 11 protons, 12 neutrons and 11 electrons in shells of 2, 8 and 1. Not to scale: a real nucleus is far smaller than drawn.

1 Nucleus

The tiny centre of the atom. It holds the protons and neutrons, so it carries almost all of the mass and has an overall positive charge.

2 Protons

Positive particles in the nucleus. Their number, the atomic number, decides which element the atom is: every sodium atom has 11.

3 Neutrons

Particles with no charge, about as heavy as protons. Sodium-23 has 12, because its mass number is 23 and 23 − 11 = 12.

4 Electrons

Tiny negative particles around the nucleus. An atom has as many electrons as protons, so the charges cancel and the atom is neutral.

5 Electron shells

Electrons sit in shells, or energy levels. The first holds up to 2 and the second up to 8, so sodium's 11 electrons are arranged 2, 8, 1.

6 Outer electron

Sodium has one electron in its outer shell, like every element in group 1. Losing that lone electron easily is why sodium is so reactive.

Same model, different numbers

A carbon-12 atom has 6 protons, 6 neutrons and 6 electrons arranged 2, 4. Change the number of protons and you change the element; change the number of electrons and you make an ion.

NEXT IN THE SERIES
2. Protons, Neutrons and Electrons

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