

Structure of the atom

Understanding **atomic structure** helps us explain why **elements** behave the way they do and why they form different substances. We use a simple **planetary model** to describe an atom's structure, but we will use more complex models at post-16 study.

Subatomic particles

Subatomic particles are **protons**, **neutrons** and **electrons**. **Protons** (positively charged) and **neutrons** (neutral) are found in the **nucleus** at the centre of the atom. **Electrons** (negatively charged) orbit the nucleus in **shells** (energy levels).

Electron shells

The **first shell** holds up to two **electrons**; the **second shell** holds up to eight **electrons**. The **third shell** can hold up to 18 **electrons** but at this stage, we focus on a **subshell** within it, which contains up to eight electrons.

The periodic table

We can determine some aspects of an element's atomic structure from its place in the periodic table. The **group** number tells us how many **electrons** are in the **outer shell** (for the first three **periods**) and the **period** number is equivalent to the number of **electron shells**.

Atomic number

On the periodic table, you'll find an element's symbol, name and how many **subatomic particles** it contains. However, it is the **atomic number** (number of **protons**) that determines its identity. The number of **neutrons** and **electrons** may vary for a given element, but all **atoms** and **ions** of a particular **element** contain the same number of **protons**.

Mass number

The **mass number** is the number of **protons** and **neutrons**. The number of **neutrons** may vary for a given **element**, but the number of **protons** is always the same.