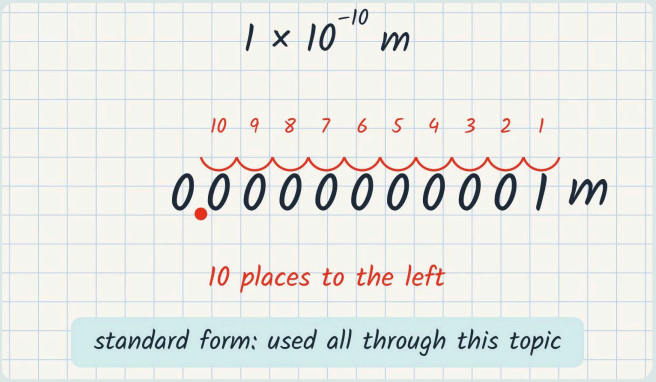
Inside the atom

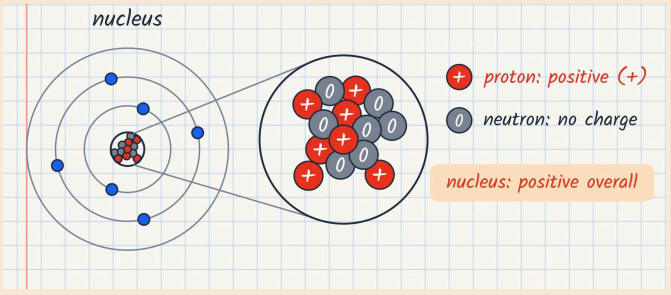
Size, nucleus and electrons

1 How small is an atom?



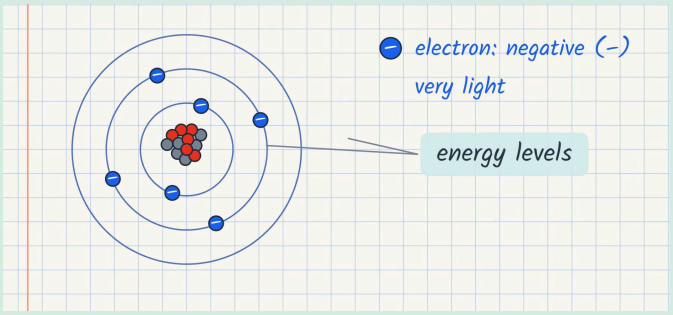
- An atom's **radius** is about **1 × 10^{-10} m** (0.000 000 000 1 m).
- This is **standard form**: the minus ten means move the decimal point ten places to the left.

2 What's in the middle?



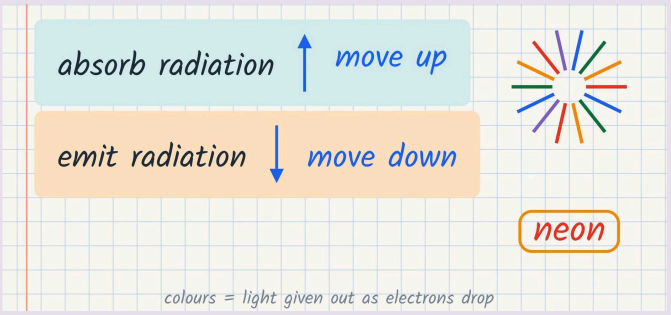
- The **nucleus** holds **protons** (positive) and **neutrons** (no charge), so it is **positive** overall.
- Its radius is less than **1/10 000** of the atom's, yet it holds **almost all the mass**.

3 Where the electrons are



- **Electrons** are negative and very light. They are found at fixed distances from the nucleus: **energy levels**.
- Diagrams of atoms are **never to scale**: a nucleus drawn the right size would be too small to see.

4 Jumping between levels



- An electron moves **up** a level when it **absorbs** electromagnetic radiation.
- It moves **down** a level when it **emits** electromagnetic radiation.

Exam tip

Where is most of an atom's mass? "In the nucleus." What is most of an atom? "Empty space."

Check yourself

1. What is the charge on a neutron?
2. What must an electron do to move to a higher energy level?

Answers: 1. No charge (neutral) 2. Absorb electromagnetic radiation