

MR SULLY UNFOLDS PHYSICS

Atoms, isotopes and the model of the atom

AQA 4.4.1
Atomic structure · Paper 1
Foundation & Higher

Name _____ Class _____ Date _____

Atoms are tiny, but we know a lot about what's inside them, and our model has changed as new evidence has been found.

KEY IDEAS

- Atoms have a radius of about 1×10^{-10} m. The nucleus is less than 1/10 000 of the atom's radius but holds almost all the mass.
- Atomic number = number of protons. Mass number = protons + neutrons. **Isotopes** have the same number of protons, different numbers of neutrons.
- Model history: solid spheres → plum pudding → nuclear model (alpha scattering) → Bohr's electron shells → neutron (Chadwick).

Section A · Recall

Grade 4–5

1 Complete the table. [6]

Particle	Relative charge	Where it is found
Proton		
Neutron		
Electron		

2 An atom of aluminium has atomic number 13 and mass number 27. State the number of protons, neutrons and electrons. [3]

3 What is an isotope? [1]

Section B · Explain

Grade 5–6

4 Explain why atoms have no overall charge. [2]

5 Describe the plum pudding model of the atom. [2]

6 Explain how an atom becomes a positive ion. [1]

Section C · Stretch

Grade 7+

7 Explain how electrons can move between energy levels. [2]

Exam-style question

AQA style

8 In the alpha particle scattering experiment, alpha particles were fired at a very thin sheet of gold foil.

a Describe and explain what the results showed about the structure of the atom. [4]

b Explain why the plum pudding model was replaced. [2]

Total: _____ / 23

How confident am I?	Not yet	Nearly	Got it
I can describe the structure of an atom and its size	☐	☐	☐
I can calculate the numbers of protons, neutrons and electrons	☐	☐	☐
I can explain how the model of the atom developed	☐	☐	☐