

History of the Atom

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe the plum pudding model of the atom. (2 marks)

Step 1 · The positive part

The atom is a ball of positive charge.

Step 2 · The negative part

Negative electrons are embedded (scattered) through the ball.

Answer: A ball of positive charge with electrons embedded in it

Check: Two separate points for two marks: positive ball, electrons spread through it.

2. Now try one with the steps

In the alpha particle scattering experiment, most alpha particles passed straight through gold foil, but a few were deflected through large angles. Explain what each observation shows. (4 marks)

Step 1 · Most passed straight through

Step 2 · Some were deflected

Step 3 · A very few bounced back

Step 4 · So

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Name the subatomic particle discovered by J. J. Thomson in 1897. [1]

2. Name the model of the atom suggested after the discovery of the electron. [1]

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

4. State the charge on an alpha particle. [1]
- _____
- _____
5. Name the scientist whose work provided the evidence for neutrons, about 20 years after the nucleus was proposed. [1]
- _____
- _____
6. Describe the observations made in the alpha particle scattering experiment. [3]
- _____
- _____
- _____
7. Explain what the observation that most alpha particles passed straight through tells us about the atom. [1]
- _____
- _____
8. Explain why a few alpha particles bounced back from the gold foil. [2]
- _____
- _____
9. Describe Niels Bohr's contribution to the model of the atom. [2]
- _____
- _____
10. In a model of the scattering experiment, 12 out of 30 000 alpha particles are deflected by more than 90° . Calculate the percentage deflected by more than 90° . [2]
- _____
- _____
11. Suggest why Dalton's model showed atoms spheres with no smaller particles. [1]
- _____
- _____
12. Explain why the plum pudding model was replaced by the nuclear model. [2]
- _____
- _____
13. Explain why scientific models of the atom have changed over time. [2]
- _____
- _____

14. Compare the distribution of mass in the plum pudding and nuclear models.

[2]

4. Before you hand it in

"Rutherford discovered the electron."

Thomson: electron and plum pudding. Rutherford (with Geiger and Marsden): nucleus. Bohr: shells. Chadwick: neutron.

"The alpha particles bounced off electrons."

Large deflections were caused by repulsion from the small positive nucleus.

"Old models were wrong, so they were useless."

Models are improved when new evidence appears; older models are still useful simplifications.