

Worksheet 1.1: History of the Atom & Nuclear Model ChemistrySheets

Specification: GCSE Chemistry (AQA 5.1.1.3 / Edexcel SC3 / OCR Gateway C1.1)

Core Concepts: Understand the evolution of atomic models (Dalton, Thomson, Rutherford, Bohr, Chadwick) and the key experimental evidence that led to each refinement. Describe the nuclear model of the atom, including the relative charges and masses of subatomic particles.

Section A: Key Terms & Concepts

1. Match each scientist to their key contribution to the atomic model by drawing lines.

Scientist	Contribution
John Dalton	Discovered the neutron
J.J. Thomson	Proposed electrons orbit in fixed energy shells
Ernest Rutherford	Atoms are solid spheres, indivisible
Niels Bohr	Discovered the nucleus, atom mostly empty space
James Chadwick	Discovered the electron, 'plum pudding' model

2. Complete the sentences below using appropriate scientific terms.

- a) John Dalton described atoms as _____ that were _____.
- b) J.J. Thomson's model, known as the _____, suggested that atoms were a ball of positive charge with negatively charged _____ embedded within it.
- c) Rutherford's alpha-scattering experiment led to the conclusion that the atom has a small, dense, positively charged _____ and is mostly _____.
- d) Niels Bohr adapted Rutherford's model by proposing that electrons orbit the nucleus in fixed _____ or shells.

Section B: Core Concepts & Explanations

3. Describe John Dalton's atomic theory and how it differed from earlier philosophical ideas about atoms.

4. Explain the key features of J.J. Thomson's 'plum pudding' model of the atom and the experimental evidence that led to its development.

5. Ernest Rutherford's alpha-scattering experiment was crucial in developing the nuclear model. Describe the key observations from this experiment and the conclusions drawn from them.

6. Explain how Niels Bohr refined Rutherford's model and the significance of James Chadwick's discovery.

Section C: Exam Application & Extended Writing

7. The diagram below shows a simplified representation of an atom.

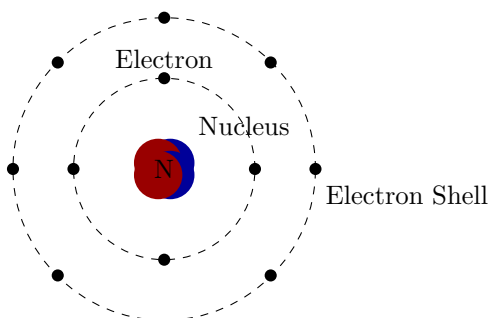


Figure 1: Simplified atomic structure

- a) Identify the three subatomic particles found in an atom and state their relative charge and relative mass.

- b) Describe the evolution of the atomic model from John Dalton's solid sphere model to Niels Bohr's model, explaining how experimental evidence led to each significant change. (6 marks)
