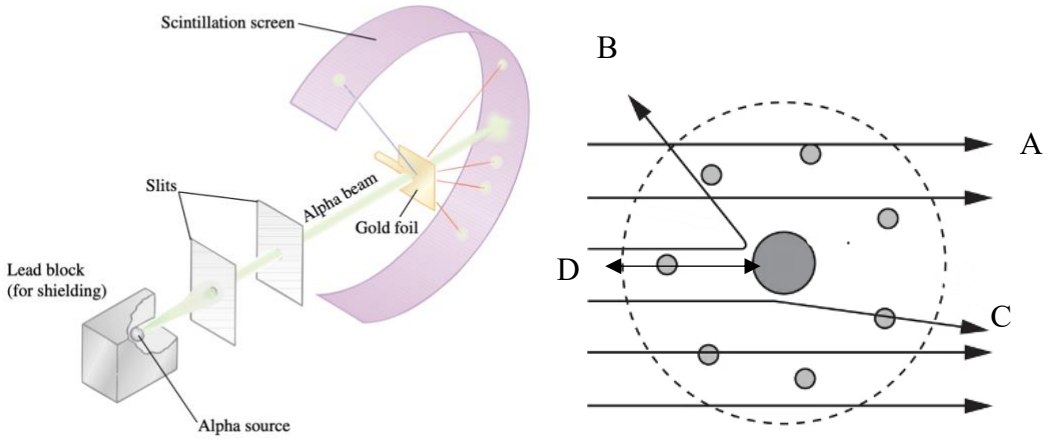
TUTORIAL 4 - RUTHERFORD'S GOLD FOIL EXPERIMENT - 2027

1. Below is a representation of Rutherford's gold foil experiment. The paths of the alpha particles are represented below. Use the diagram to answer the following questions.



1. Which of the following paths was most likely to occur?

A. B. C. D.

2. Which of the following paths was least likely to occur?

A. B. C. D.

3. The charge on an alpha particle is positive. Based on this information, the charge of the nucleus must be...

A. Positive B. Negative C. Neutral D. Both positive and negative

4. According to Rutherford's experiment, the atom is composed largely of ...

A. Alpha particles B. A charged nucleus C. Empty space D. None of the above

5. Path D would most likely...

A. Not be observed B. Be observed with only the fastest moving alpha particles
C. Be observed with alpha particles that move directly towards the nucleus
D. Result in a nuclear explosion

6. Circle the letter of each sentence that is true about the nuclear theory of atoms suggested by Rutherford's experimental results.

1. An atom is mostly empty space.
2. All the positive charge of an atom is concentrated in a small central region called the nucleus.

3. The nucleus is composed of protons.
4. The nucleus is large compared with the atom as a whole.
5. Nearly all the mass of an atom is in its nucleus.

7. 1. What is the charge of an alpha particle?

2. Why is Rutherford's experiment called the gold foil experiment?

3. Why is Rutherford's experiment called the alpha deflection experiment?

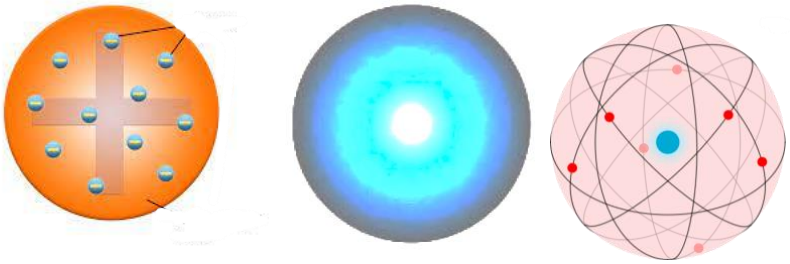
4. How did he know that an atom was mostly empty space?

5. What happened to the alpha particles as they hit the gold foil?

6. How did he know that the nucleus was positively charged?

8. Describe Rutherford's gold foil experiment and explain how his results improved upon Thomson's Plum Pudding model of the atom. Draw a schematic diagram of the Rutherford's atom.

9. Write the names of the scientists proposed the following atomic models.



10. Match the name of the person in the left-hand side with the contribution in science indicated in the right-hand side.

Democritus.	A. discovered the nucleus of an atom
Aristotle.	B. proposed the first scientifically supported atomic theory
Michael Faraday	C. father of modern chemistry
R.A. Millikan.	D. discovered the electron
Antoine Lavoisier.	E. believed in the four elements
John Dalton	F. believed that there is an electrical nature to matter
Ernest Rutherford.	G. discovered the neutron
J. J. Thomson	H. determined the charge of an electron
James Chadwick.	I. first proposed that matter was made of atoms