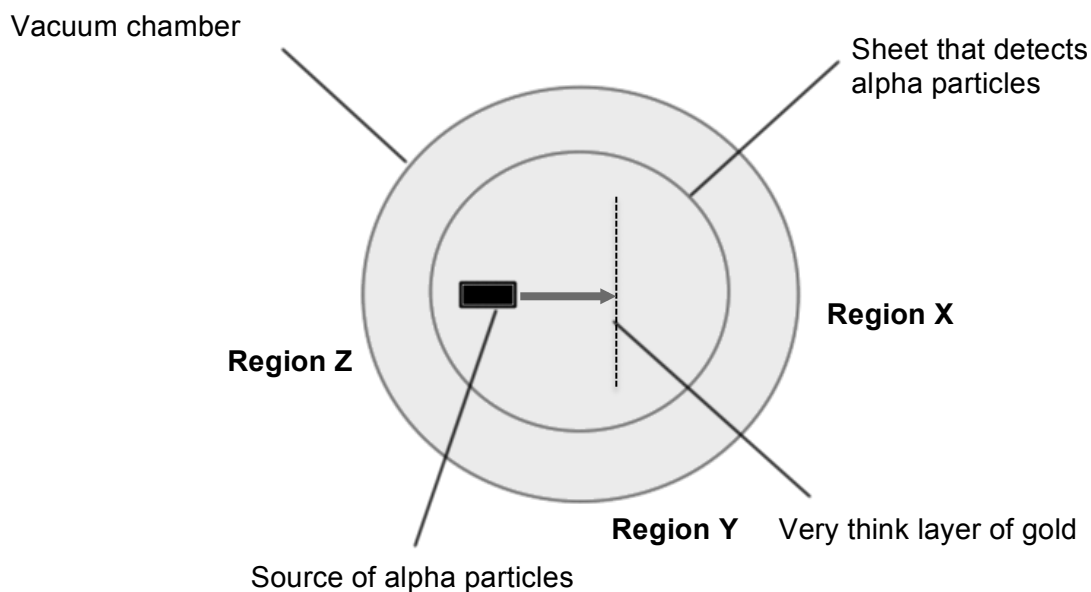


### Plum Pudding Model of the Atom

- 1 In the early 20<sup>th</sup> Century, Ernest Rutherford and his associate carried out an investigation into the structure of atoms. They fired alpha particles at a very thin layer of gold atoms. A detector screen was used to determine the pathway taken by the alpha particles.



- 1 (a) (i) Suggest why the apparatus was set up inside a vacuum chamber.

.....  
 .....  
 (1 mark)

- 1 (b) The following table gives the proportion of alpha particles hitting the screen for detecting alpha particles for various regions.

Region	Percentage of alpha particles detected
<b>X</b>	87 %
<b>Y</b>	7 %
<b>Z</b>	0.5 %
<b>Other regions</b>	

- 1 (b) (i) Calculate the percentage of alpha particles detected in other regions.

.....  
 .....  
 (2 marks)

1 (b) (ii) For each observation, tick the box that gives the best conclusion for the observation.

Observation: the vast majority of alpha particles were detected at region X

The nucleus is mostly empty space

The atom is mostly empty space

The nucleus has a dense concentration of electrons

Atoms are neutral

Observation: A tiny percentage of alpha particles were deflected directly back to towards the source.

The electrons repel alpha particles

The nucleus is tiny, dense and positive

The nucleus has a dense concentration of electrons

Atoms have a strong magnetic field

(2 marks)

1 (b) (iii) As a result of this investigation, the existing theory for the structure of atoms was replaced. Why do scientists sometimes change theories?

.....  
.....

(1 mark)

**Total (6 marks)**

**Login or subscribe to [my-GCSEscience.com](http://my-GCSEscience.com) to see the answers and commentary.**