

Ernest Rutherford experiment

Exploitation d'une animation

1. Listen to the animation, tick the words you have heard and cross out the others.
Écrire les mots au tableau et passer l'animation plusieurs fois.

1800th – 1900th – uniform – sphere – fear – negatively – positively – made – matter – plum – plump – pudding – raisins.

2. Make a sentence with these words to sum up the Thomson's model.
On peut écrire plusieurs versions d'élèves au tableau et ils choisissent celle qu'ils veulent conserver sur le cahier.

An atom is a uniform sphere of positively charged matter in which electrons are embedded, similar to raisins in a pudding.

Comment aider les élèves à formuler une phrase difficile ?
→ Leur donner les morceaux à remettre dans l'ordre :

3. Put the following labels in the right order to explain what Rutherford's experiment consists in.

an experiment Rutherford, Geiger and Marsden alpha particles
in which carried out of a thin foil of gold atoms
emitted by a radioactive source was used as target

Rutherford, Geiger and Marsden carried out an experiment in which a thin foil of gold atoms was used as target of alpha particles emitted by a radioactive source.

Tester une écoute plus attentive de la vidéo:

4. What did Rutherford expect?

The positive charged alpha particles should pass through the uniform sphere of positively charged matter with little or no deflection.

5. The actual experimental results.

Résumer un grand nombre d'informations dans un tableau:

- a. Fill in the chart by drawing the different types of trajectory up to the descriptions.
b. Associate the proportions of particles concerned to each trajectory.
Travail sur les quantificateurs revus en anglais.

Observations	Trajectories	Proportions of particles concerned
particles are undeflected or slightly deflected		<i>the majority</i> (most of the particles)
particles are scattered at large angle		<i>some</i> particles
particles are bounced back in the direction from which they come		<i>a few</i> particles (only in some instances)

6. After these results, what did Rutherford postulate?

Compréhension fine de la vidéo:

→ *a nuclear atom.*

Where is all the positive charge concentrated?

→ *in a very small volume.*

→ *in the nucleus*

Where are the electrons kept out?

→ *in the remaining space of the atom*

→ *on electron shells*

How many times is the radius of the atom larger than the radius of the nucleus?

→ *20 000 times*

7. Classify the trajectories of the alpha particles from the most likely to the less likely and justify Rutherford's postulate.

Arriver à la clé du raisonnement de Rutherford:

As the majority of alpha particles go straight on, it means that the positive charge of the atoms must be very tiny otherwise they would be deflected more often.

8. Imagine a dialogue between the two students and their teacher: Prof. Rutherford.

They describe their experiments

They explain their expectations

They relate their experimental results

Rutherford interprets the results by putting forward a new model of atom.

Ce travail peut se faire par groupe de trois : par écrit d'abord, puis par oral, sous la forme d'un jeu de rôle.

9. Si on ne dispose pas de l'animation, on peut utiliser le document « Ernest Rutherford experiment » Les questions pourront être sensiblement les mêmes. S'assurer cependant que les élèves ont tout le vocabulaire nécessaire :

Is there any word you do not understand? Can somebody help him (her) by giving a synonym?

To probe = to investigate

A foil = a very thin piece of paper

Deflected = deviated

To crash straight through = to go through = to pass through

To bounce back = to be reflected

Pour introduire un nouveau mot, penser non seulement aux synonymes, aux périphrases, mais aussi aux gestes, aux dessins, au mime...