

# AQA Physics GCSE

## 4.4.1 - Atoms and Isotopes

### Flashcards

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Give an approximation for the radius of an atom.



Give an approximation for the radius of an atom.

$1 \times 10^{-10}$  metres



What are the three subatomic constituents of an atom?



What are the three subatomic constituents of an atom?

1. Proton
2. Neutron
3. Electron



Where is most of the mass of an atom concentrated?



Where is most of the mass of an atom concentrated?

In the nucleus.



Approximately what proportion of the total radius of an atom is the radius of the nucleus?





Approximately what proportion of the total radius of an atom is the radius of the nucleus?

1/10,000



Describe the arrangement of protons, neutrons and electrons in an atom.



Describe the arrangement of protons, neutrons and electrons in an atom.

- The protons and neutrons are found in the atom's nucleus
- The electrons are found in discrete energy levels around the nucleus



What type of charge does the nucleus of an atom have? Why?



What type of charge does the nucleus of an atom have? Why?

- Positive charge
- The nucleus contains protons and neutrons
  - Protons have a positive charge
  - Neutrons have no charge



Give two ways that an atom's electron arrangement can be changed.



Give two ways that an atom's electron arrangement can be changed.

1. Absorbing electromagnetic radiation
2. Emitting electromagnetic radiation



Explain how an atom's electron arrangement changes when it absorbs EM radiation.





Explain how an atom's electron arrangement changes when it absorbs EM radiation.

- Electrons move further away from the nucleus
- They move to a higher energy level



Explain how an atom's electron arrangement changes when it emits EM radiation.



Explain how an atom's electron arrangement changes when it emits EM radiation.

- Electrons move closer to the nucleus
- They move to a lower energy level



How does the ratio of electrons to protons in an atom result in the atom having no overall charge?



How does the ratio of electrons to protons in an atom result in the atom having no overall charge?

- The number of protons is equal to the number of electrons
- Protons and electrons have equal and opposite charges, so charge cancels



What do all forms of the same element  
have in common?



What do all forms of the same element have in common?

They all have the same number of protons.



What is the name given to the number of protons in an atom?





What is the name given to the number of protons in an atom?

Atomic Number



# What is an atom's mass number?



What is an atom's mass number?

The total number of protons and neutrons in the atom.



# What is an isotope of an atom?



## What is an isotope of an atom?

An atom of an element that has a different number of neutrons, but the same number of protons.



# How do atoms turn into positive ions?



## How do atoms turn into positive ions?

- They lose one or more of their outer electrons
- Electrons are negatively charged, so the resultant charge of the atom is positive



What may lead to a scientific model being changed or replaced?





What may lead to a scientific model being changed or replaced?

The discovery of new experimental evidence which doesn't agree with the existing theory.



How did the plum-pudding model describe the atom?



How did the plum-pudding model describe the atom?

A ball of positive charge, with negatively charged electrons distributed evenly throughout it.



Prior to the discovery of the electron  
what was believed about the atom?



Prior to the discovery of the electron, what was believed about the atom?

The atom was believed to be indivisible.



Which experiment led to the plum-pudding model being discarded?



Which experiment led to the plum-pudding model being discarded?

Rutherford's alpha-scattering experiment.



What is the name given to the currently accepted model of the atom?





What is the name given to the currently accepted model of the atom?

The Bohr nuclear model.



State the conclusions of the  
Alpha-Scattering experiment.



State the conclusions of the Alpha-Scattering experiment.

- Most of the mass of the atom is concentrated at the centre in the nucleus
- The nucleus is positively charged



# What reinforces a scientific theory?



# What reinforces a scientific theory?

When experimental results agree with the hypothesised theoretical calculations and theories.



What did James Chadwick's experiments on the atom prove?



What did James Chadwick's experiments on the atom prove?

The existence of neutrons.

