

Developing Models of Matter – Summary Note

Theory	Model	Analogy
<p>1. Dalton's Theory</p> <ul style="list-style-type: none"> • John Dalton • 1808 • matter is made up of indivisible atoms • each element has its own kind of atom with its own particular mass. 		
<p>2. Thomson's Theory</p> <ul style="list-style-type: none"> • J.J. Thomson • 1904 • atom is a positive sphere with embedded negative electrons 		
<p>3. Rutherford's Theory</p> <ul style="list-style-type: none"> • Ernest Rutherford • 1911 • atom has a small positive nucleus (with protons), which is surrounded by mostly empty space and rapidly moving electrons 		
<p>Gold Foil Experiment</p>		
<p>4. Chadwick's Theory</p> <ul style="list-style-type: none"> • James Chadwick • 1932 • discovered the neutron 		
<p>5. Bohr's Theory</p> <ul style="list-style-type: none"> • Niels Bohr • 1921 • electrons move around nucleus in orbits • certain number of electrons in quantized energy levels → more on Bohr's theory later! 		

Electron Arrangements

Rutherford's Model → _____

Bohr's Theory :

1. _____
2. Energy of electrons are quantized → _____

Bohr – Rutherford Diagrams:

Example 1. Nitrogen

Draw Bohr-Rutherford diagrams for H, Li, Na and K

Isotopes

Isotopes are atoms with the same number of protons , but differing numbers of neutrons . Isotopes are _____ of a single element .

Example:

C-12	Carbon-12	${}^12_6\text{C}$	p=_____	n=_____
C-13	Carbon-13	${}^{13}_6\text{C}$	p=_____	n=_____
C-14	Carbon-14	${}^{14}_6\text{C}$	p=_____	n=_____

Radio-isotopes :

- Many elements have _____ that are _____.
- Atoms of unstable isotopes _____, emitting radiation as their nucleus changes.
- The _____, is the time taken for the activity of a given amount of a radioactive substance to decay _____.
- Depending on the nucleus, these nuclear changes might happen _____ or _____.

Example:

Medical isotopes:

A medical isotope is a very _____ of radioactive substance used in imaging and treatment of disease.

- Medical isotopes can be delivered directly to the _____ of the diseased cell.