Atomic structure

Isotopes

1. Atoms with the same number of protons and different numbers of neutrons.
   e.g. $^{16}_{8}O$ 8 protons, **8 neutrons**

   $^{18}_{8}O$ 8 protons, 10 **neutrons**
2. **All** elements have isotopes, but not all isotopes are stable.

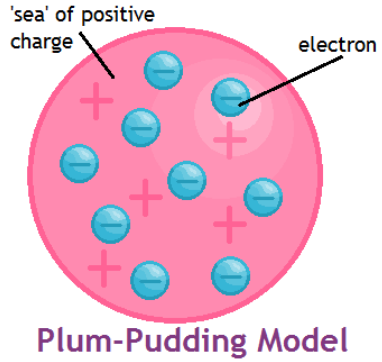
Radiation

3. A radioactive substance contains unstable nuclei that become stable by emitting radiation.
4. There are three main types of radiation from radioactive substances – **α**, **β** and **λ**.
5. Radioactive decay is a random event – you can't predict or influence when it will happen.

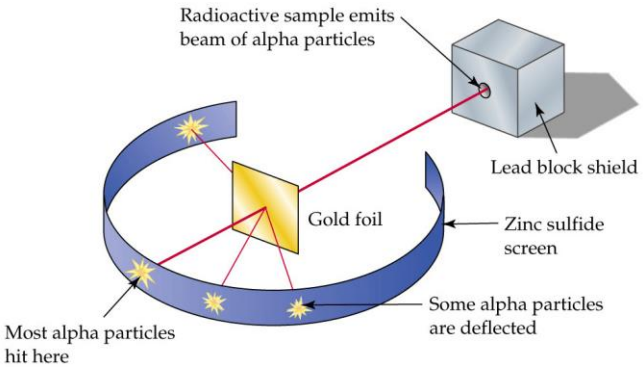
Discovery of the nucleus

6. The discovery of the electron led to the 'plum pudding' model of the atom proposed by J. J. Thomson in the late 19th century.
7. The 'plum pudding' model suggested that the atom is a ball of positive charge with negative electrons embedded in it.
8. [picture below]
9. Rutherford used α particles to investigate inside atoms. He found that some of the α particles were scattered through large angles.
10. [picture below]
11. Rutherford concluded that the mass of an atom was concentrated at the centre and that the nucleus was charged.
12. This discovery meant that the plum pudding model of the atom was no longer accepted by scientists.
13. Bohr adapted this model and put forward the theory that electrons orbit the nucleus at specific distances.
14. James Chadwick later proved the existence of neutrons within the nucleus of the atom.
15. These theories have led us to the nuclear model of the atom we know now.
16. [picture below]

8. J. J. Thomson's plum pudding model



10. Alpha scattering experiment by Rutherford



16. Nuclear model of the atom