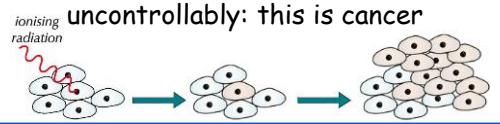


Y8 6.7 Atomic Structure

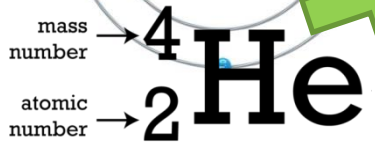
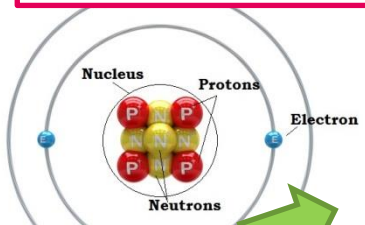
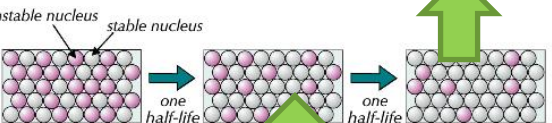
START

Exposure to high doses tends to kill cells, leading to radiation sickness

Exposure to radiation can cause cells to mutate and divide uncontrollably: this is cancer



We are all exposed to low-level radiation all the time. This is called **background radiation**.

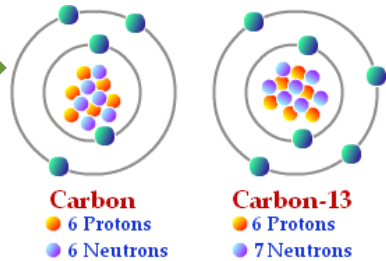


Particle	Charge	Mass
Electron	-1	0
Proton	+1	1
Neutron	0	1

Rules:

1. Mass number = protons + neutrons
2. Atomic number = no. of protons
3. no. of electrons = no. of protons

Isotopes: these are an example



Carbon
6 Protons
6 Neutrons
Nuclear number = 6 + 6 = 12

Carbon-13
6 Protons
7 Neutrons
Nuclear number = 6 + 7 = 13

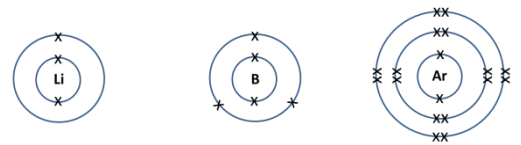
Atoms make up everything. **Element:** a substance made of only one type of atoms. Atoms are about 0.0000000001m across

Electrons exist in shells (energy levels). The inner shells are filled first. Maximum number of electrons in the first three shells are [2,8,8]

Key words:

1. **Isotope:** An atom of an element that has the same number of protons but different number of neutrons. Some isotopes are unstable
2. **Half life:** The time taken for the radioactivity of a sample of an unstable isotope to reduce by half.
3. **Radioactive decay:** the change in the nucleus of an unstable atom. It becomes a different element and emits radiation when this happens. It is a random event.

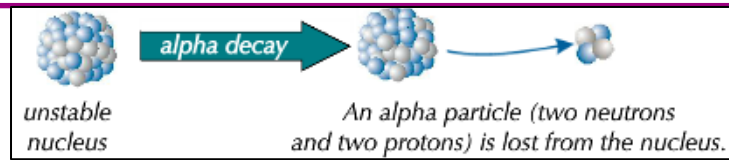
Type of radiation	Symbol	What is it made from?	How far will it travel in air?	What stops it?
Alpha	α	2 protons and 2 neutrons	cm	Air/paper
Beta	β	An electron	10-15 cm	Aluminium
Gamma	γ	High frequency EM wave	Many metres	Thick lead or concrete



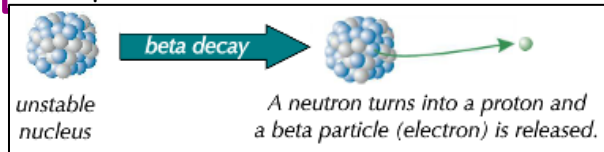
Lithium 2,1 Boron 2,3 Argon 2,8,8

The first shell can only hold 2 electrons but each shell after that can hold 8.

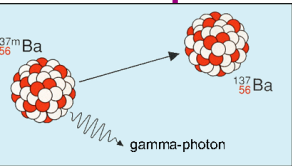
Alpha (α) - an atom decays into a new atom and emits an alpha particle, (He) (2 protons and 2 neutrons)



Beta decay - a neutron turns into a proton and releases an electron



In **gamma decay**, a high frequency EM wave is emitted

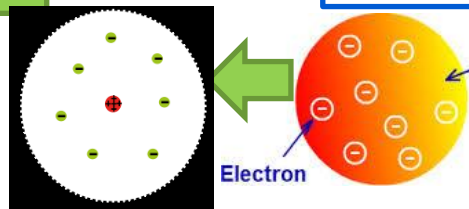
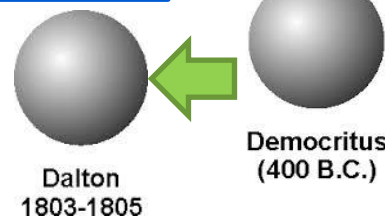


Rutherford 1911
Dense positive nucleus which has most of the mass

Thomson 1897
Plum pudding model, positive ball and negative electrons

Dalton
Thought the atom was a solid dense ball

Historical models of the atom



Positively charged matter

Electron