THE MACAULAY LAND USE RESEARCH INSTITUTE

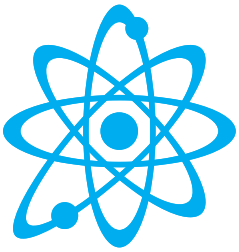
Analysing Our Environment

Dating Rocks

We can determine the age of rocks by measuring **isotopes**.

What is an isotope? Many elements exist in a number of forms called isotopes. Strontium, for example has 31 isotopes. 4 of the most common isotopes are measured in this laboratory. Other isotopes you might have heard of include heavy water, which is water containing the deuterium (H isotope), or isotopes of carbon such as ^{14}C used for carbon dating and ^{13}C used as a tracer.

"Isotopes are forms of an element with different numbers of neutrons in the nucleus. The number of electrons and protons are the same."

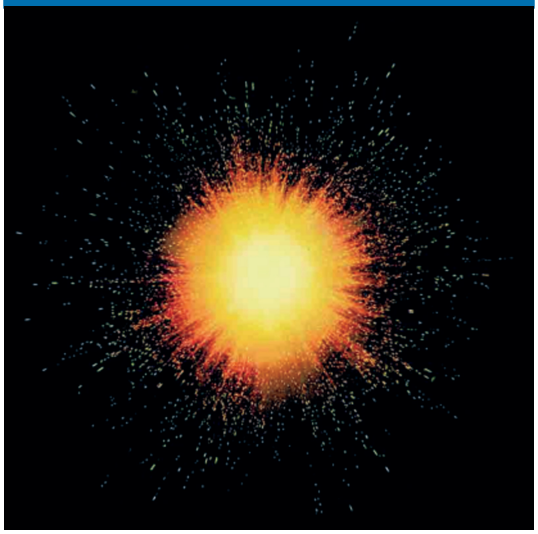


An Atom – not to scale!

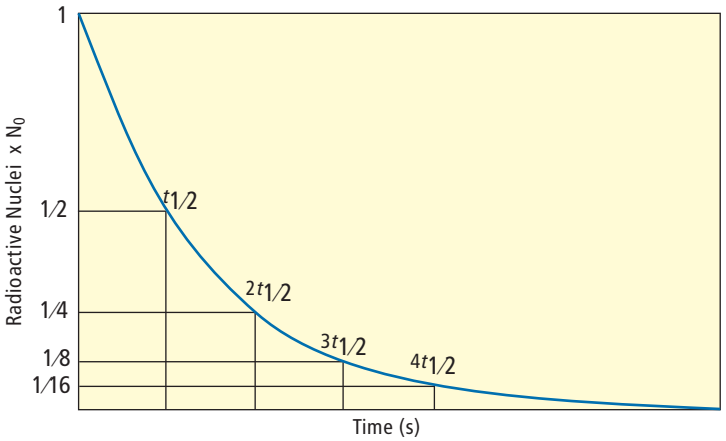
Strontium isotope	^{84}Sr	^{86}Sr	^{87}Sr	^{88}Sr
Number of electrons	38	38	38	38
Number of protons	38	38	38	38
Number of neutrons	**46**	**48**	**49**	**50**
Natural abundancy	0.56%	9.86%	7.0%	82.58%

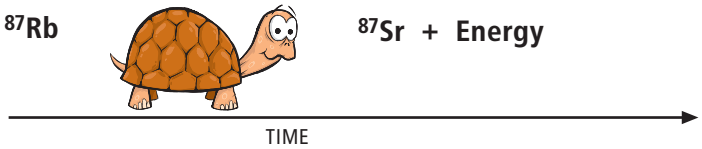
^{87}Sr comes from radioactive decay and has two sources

1 What was produced at the big bang!



2 What is produced from the radioactive decay of ^{87}Rubidium





This decay happens very, very slowly. The time it takes for half the ^{87}Rb atoms to change to ^{87}Sr, known as 'the half life' is **48,800,000** years!

By measuring the ratio of isotope ratios within a sample we can tell how old it is.