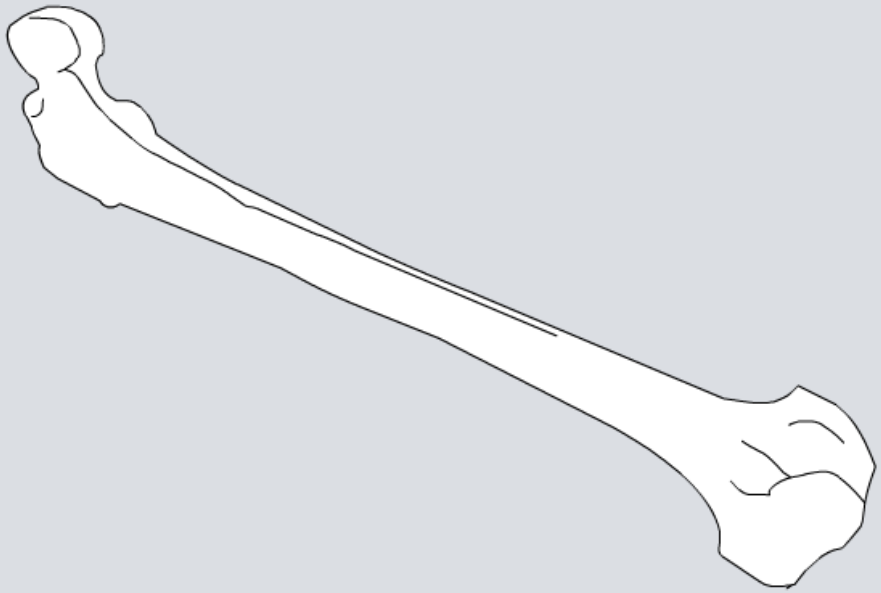
Radioactive Dating



What is the half-life of carbon-14?

How does carbon dating work?

How do scientists date archaeological objects?

Scientists can date archaeological objects using measurements of the amount of the radioactive isotope carbon-14 in the remains.

This process is called **carbon dating**.

Click "**play**" to find out more about how carbon dating works.

What are the problems of using carbon dating?

What are some of the problems with using carbon dating to predict the age of a sample?

- The half-life of carbon-14 is 5,700 years. If the sample is older than 60,000 years, the amount of carbon-14 is too small to measure accurately. Instead, radioactive isotopes with longer half-lives, such as uranium-235 with a half-life of 710 million years, can be used to date older samples.
- Samples can become contaminated with materials of a different age which may confuse the readings of carbon-14.
- Precisely carbon dating anything that died after the 1940s, when nuclear bombs, nuclear reactors and open-air nuclear tests began, is harder due to contamination from this increased background radioactivity.

Using half-life to date a sample

Half-life can be used to do many useful calculations.

For example, the half-life of carbon-14 is 5,700 years. If a fossil bone has a count of 25, and a piece of bone from a living body has a count of 200, how old is the fossil?

- After one half-life, the count will decrease by half to 100.
- After the second half-life, the count decreases by half again to 50.
- After the third half-life, the count decreases to 25.
- Three half-lives of carbon-14 have passed, so 3 × 5,700 years makes the fossil **17,100 years old**.

Using half-life in calculations

Remember this definition to answer the following questions about half-life:

half-life = the time taken for the number of radioactive atoms in a sample to decrease by half

Click "**start**" to begin.

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