The Age Of Earth

-Accepted to be 4.6 billion years

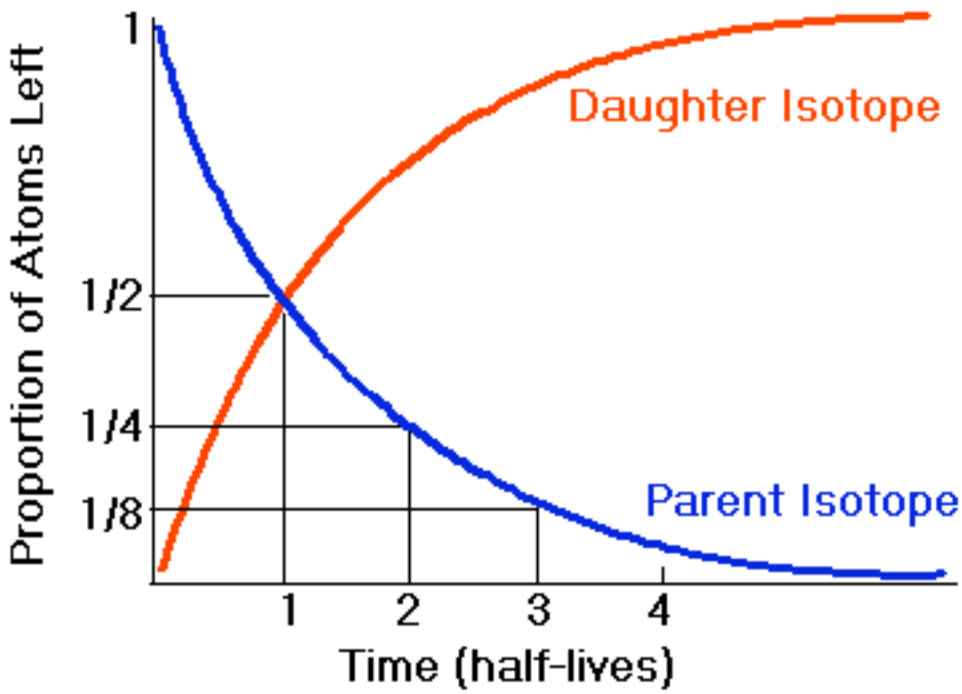
1600s Archbishop Usher of Ireland counted generations listed in the Bible and came up with day 1 as October 23, 4004 BC.

Late 1800s Lord Kelvin calculated the time necessary for molten rock to cool and dated the Earth as 20-40 million years old.

1899 John Joly used the amount of salt in the oceans to determine the time it took for all of that salt to be eroded away…100 million years.

20^{th} century, radiometric dating provides a more accurate age by knowing about radioactive isotopes.

K-40 half life – 1.3 billion years
C-14 half life -- 5730 years
U-235 half life – 704 million years.



As the time for half of the substance is a constant, by measuring the amount of remaining radioactive element in proportion to that of the daughter atom, the age may be determined.

Earth's oldest rocks have been dated at 4 billion years, while moon rocks have been dated at 4.4 billion years and many meteorites from our solar system have been dated to be 4.5 – 4.6 billion years. This is how we come up with the accepted value of 4.6 billion years, as we believe the Earth formed alongside the other planets, moons, and meteor fragments.

Activity:

Take a piece of paper and fold it in half. Mark one half dark and then tear it off of the main paper. This represents 1 half life.

Fold the white part again in half and mark one half dark and tear it off again from the main. This represents the second half life.

Fold the white part again in half and mark one half dark and tear it off from the main. This represents the third half life.

Rebuild the puzzle so your original paper is there.

- ☐ What percent of the paper is still white after 3 half lives?
- ☐ If you were told that a sample decays to 87.5% “daughter” isotope, could you determine how many half lives have occurred?
- ☐ If you know that each half life takes 1000 years could you tell me how old the sample should be?

answer is 3 half lives
and thus 3000 years