Absolute Dating PowerPoint Notes

Evidence from geologic layers and radioactive dating indicates Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.

Absolute dating
Absolute dating is a method of estimating the age of a fossil in _______________. Absolute dating requires the use of a natural “clock.” That clock is the ________________ decay of certain naturally-occurring ________________ like uranium and carbon.

What is radioactive decay?
Elements that undergo radioactive decay contain ________________ atoms. All atoms are made of tiny particles held together by strong _________________. Atoms of different elements contain different numbers of _________________. Unstable atoms contain ________________ particles than can be held together by the strong forces. They undergo radioactive decay by ________________ some of those particles. In the process, they ________________ into different kinds of atoms. For example, when uranium atoms decay, one of the products is ________________ atoms.

What is half-life?
Half-life is the amount of ________________ it takes for half of the unstable atoms in a sample to ________________. Half-lives range from fractions of a ________________ to billions of ________________.

A. The unstable atoms in the sample of volcanic rock have a half-life of 1.3 billion years. The sample contained 4 g of unstable atoms when the rock formed.
B. After 1.3 billion years, or one half-life, only 2 g of the unstable atoms will be left in the rock, and 2 g of its stable decay product will have formed.
C. After another 1.3 billion years (two half-lives), there will only be 1 g of the unstable atoms and 3 g of the decay atoms.
D. How many grams of unstable atoms are left after 3 half-lives?
In a sample of uranium-238, it takes 4.5 billion years for half of the uranium atoms to transform into ______________ atoms.

The half-life of carbon-14 is ____________________ years. One of the products of carbon-14 decay is ______________.

Using absolute dating
Scientists estimate the age of fossils by measuring the ______________ of unstable to stable atoms in a sample of rock from a fossil. Earth’s age is estimated by measuring the radioactive decay of ______________ to ______________. Scientists compared the amount of lead to uranium in a piece of uranium ore. With that measurement, the age of Earth was estimated to be about ________ billion years. The fossils of ancient ______________, the first life forms, have been dated to be over ______________ years old.