CLASS NOTES:

Key Terms:
Radioactive Isotopes
Half Life

A radioactive date indicates the time period when that rock actually formed. This method is particularly useful in dating igneous and metamorphic rocks.

A- Radioactive Decay

1. Occurs when the nuclei of unstable atoms break down, or decay, giving off particles and energy.
2. Radioactive decay changes the original atoms to atoms of another element. (These elements are called isotopes)

B- Half-life

1. The rate of radioactive decay is measured in terms of half-life
2. The half-life of a substance is the time it takes for one-half of the atoms of that substance to decay to another substance.
3. At the end of one half-life, one half the atoms of a radioactive sample will remain.
4. The length of the half-life period is different for each different radioactive isotope. (see page 2 of the Earth Science Reference Tables)
5. The half-life is **always** the same for a given isotope.
6. The half-life of an isotope is a constant, slow process that **always** happens at the same rate.
7. ***The half-life is not affected by heat, pressure, chemical action, amount of isotope present or any other physical factors.***

C- Dating Objects

1. Compare the ratio between present day amounts of the radioactive isotope and the amount of its decay product.
2. Uranium 238 has a half-life of 4.5 billion years - Useful for dating the old objects especially rocks.
3. Carbon 14 has a half-life of 5700 years
   Useful for dating **recent organic** objects (not good for rocks)

Assessment/Closing:

In class students will answer the following two questions before leaving the room:

1. Imagine we found a human bone, containing 10 grams of C^{14} and 10 grams of N^{14}.
    a. How many C^{14} half lives have passed? (One)
    b. How old is the bone? (5,700 years old)
2. A second bone is found to be 11,400 years old. What percentage of the original radioactive C^{14} is left?

As a homework or possible follow up the next day, students will complete the following worksheet.