Radioactive Decay Practice Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Unit 10 – Geological History Date: \_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_\_\_\_\_

**W.S. – Radioactive Decay Practice**

**Pre-Questions**: Answer the following questions using the **Radioactive Decay Data** chart located on page one of your *Handy Dandy Earth Science Reference Table*.

1. What are the four **radioactive isotopes** listed in the reference table?

 a.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. What is the decay product (daughter or **disintegration**) of the following radioactive isotopes?

 a. Carbon-14 (14C) **→** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. Potasium-40 (40K) → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 c. Uranium-238 (238U) → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 d. Rubidium-87 (87Rb) → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What is the half-life (in years) of the following radioactive isotopes (**NOT in scientific notation**)?

 a. Carbon-14 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. Uranium-238 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. Potasium-40 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. Rubidium-87 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Discussion Questions:**

1. What happens to the amount of Nitrogen-14 as the Carbon-14 decays? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. How old is a bone in which the Carbon-14 in it has undergone 3 half-lives? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What happens to the amount of unstable isotopes disintegrates into the stabile isotope? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. If a sample contains 25g of Carbon-14 and 175g of Nitrogen-14, how many half-lives has it undergone?

5. What percent of Carbon-14 is left after 5 half-lives?

6. If a 20g of Carbon-14 has a half-life of 5,700 years, what would be the half-life of a 40g sample? Why?

7. Which radioactive isotope would be best used in dating the following items?

 a. A buried tree stump: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 b. The oldest know rocks on Earth: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. Why would Carbon dating not be a useful way to date *Coelophysis* fossils? Use your ESRT!

**Procedure**:

1. Complete the following table which shows the process of decay of Carbon-14.

2. Plot the number of half-life vs 14C and 14N (Make sure to have a difference symbol for 14C and 14N)

|  |  |  |  |
| --- | --- | --- | --- |
| **Half-Life** | **Years** | **Atoms of 14C** | **Atoms of 14N** |
| 0 | 0 | 100,000 | 0 |
| 1 | 1 | 50,000 | 50,000 |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| 8 |  |  |  |

**Number of Half-Life vs. 14C and 14N**



**Key**: 14C 14N