HALF-LIFE WORKSHEET – II

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_

Radioactive isotopes, atoms with unstable nuclei, decay over time. As they decay they give off radiation. The decay rate of every radioactive element is different, is stable, and is known.

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| --- | --- |
| **ELEMENT** | **HALF-LIFE** |
| Polonium215 | 0.0018 seconds |
| Oxygen15 | 2 minutes |
| Sodium24 | 15 hours |
| Iodine131 | 8.07 days |
| Cobalt60 | 5.26 years |
| Radium226 | 1600 years |
| Carbon14 | 5,730 years |
| Potassium40 | 1.3 billion years |
| Uranium238 | 4.5 billion years |

Answer the questions below and on the back of this paper. SHOW YOUR WORK!!

1. To date an object or a fossil, scientists compare the amount of the original radioactive element to the amount of the decay product present. Suppose you start with 100g of a certain radioactive isotope that decays to half its original amount in 50,000 years. Complete the chart below so that the parent material (the original radioactive isotope) and the amount of the daughter material (decay product) are correct for the number of years passed.

|  |  |  |  |
| --- | --- | --- | --- |
| **TIME PASSED (years)** | **AMOUNT OF PARENT MATERIAL (g)** | **AMOUNT OF DAUGHTER MATERIAL (g)** | **TOTAL AMOUNT OF MATERIAL (g)** |
| 0 | 100 | 0 | 100 |
| 50,000 |  |  |  |
| 100,000 | 25 |  | 100 |
| 150,000 |  |  |  |
| 200,000 | 6.25 |  |  |
| 250,000 |  | 96.875 |  |

1. Carbon 14 has a half-life of 5,730 years. If an original sample was 100g of C14 and it is now 0.781g of C14, how old is your sample?
2. If 28,650 years have passed since an animal died, and if on that day there was 48g of C14 in its body, how much C14 is left in g?
3. A radioactive element has a half-life of 20 days. How much of a g sample would be undecayed after 80 days?
4. A fossil contains a radioactive element with a half-life of 4.5 million years. If the ration of the radioactive element to decay product is 1:8 (12.5% to 87.5%), how old is the fossil?