# Radiometric Dating Assignment (Teacher Copy)

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1. **Suppose the radioactive isotope you are modeling has a half-life of 713 million years. How old is the sample if 1/32 of the original isotope remains?**

$$\frac{1}{32} = \frac{1}{2^5}$$

*This means that 5 half-lives have passed.*

$$5 \times 713\,000\,000 = 3{,}565{,}000{,}000$$

*The sample is 3 billion, 565 million years old.*

2. **Some fossils contain 1/8 of their original amount of carbon-14. How many half-lives have passed? How old are the bones? (Remember: C-14 has a half-life of 5730 years)**

$$\frac{1}{8} = \frac{1}{2^3}$$

*This means that 3 half-lives have passed.*

$$3 \times 5730 = 17,190$$

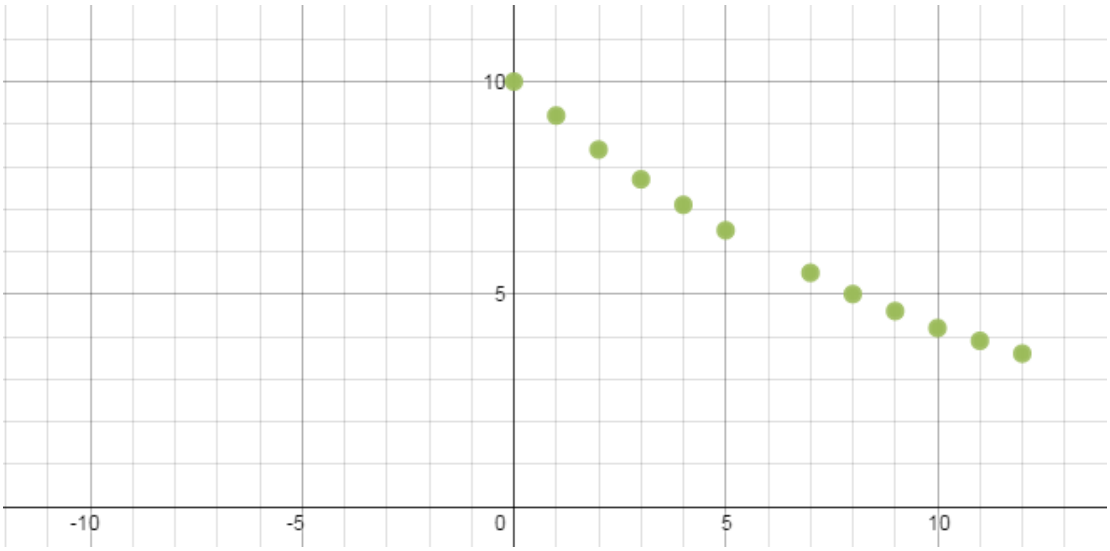
*The bones are 17 190 years old.*

3. **A 10 g sample of iodine-131 is giving off β radiation. The amount of iodine that remains is measured every day at 12:00 pm and recorded in the chart below:**

| Day | Amount Remaining (in g) |
|---|---|
| 0 | 10 |
| 1 | 9.2 |
| 2 | 8.4 |
| 3 | 7.7 |

| | |
|---|---|
| 4 | 7.1 |
| 5 | 6.5 |
| 6 | 6.0 |
| 7 | 5.5 |
| 8 | 5.0 |
| 9 | 4.6 |
| 10 | 4.2 |
| 11 | 3.9 |
| 12 | 3.6 |

**a. Plot the data on a graph where time is on the horizontal axis and amount remaining is on the vertical axis. Draw a smooth curve through the data points.**




**b. Locate the spot on the graph where the original amount has dropped to half its original value. At what time is this? This is the half-life of the substance.**

*At 8 s, the original amount dropped to half of its original value.*

**c. How long does it take for the amount remaining to drop to 30% of its original value?**

*It takes 13 s for the amount remaining to drop to 30% of its original value.*