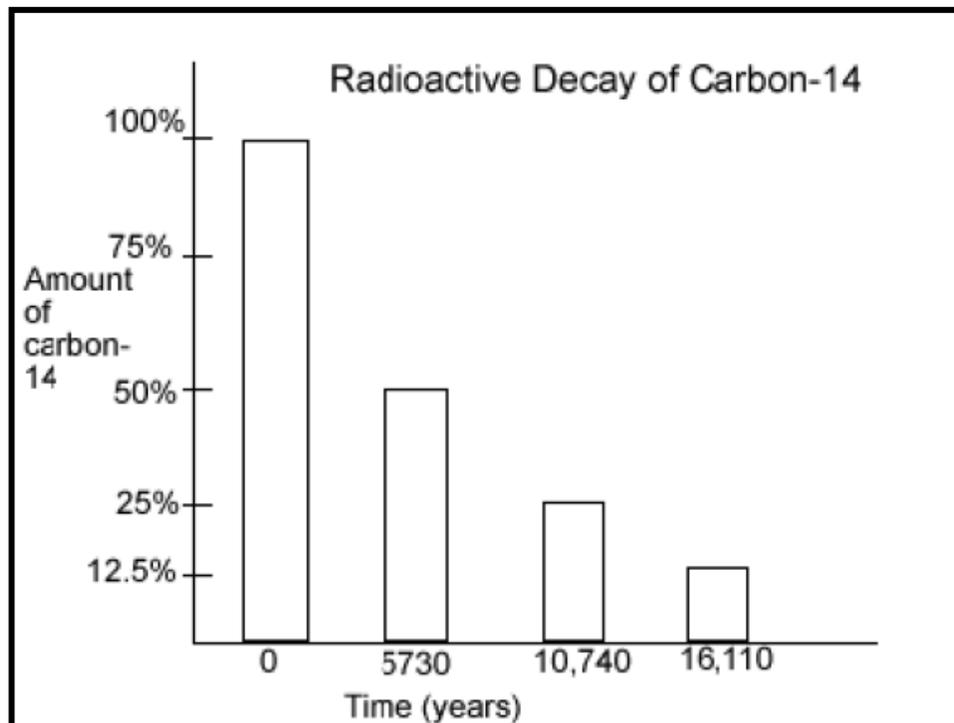


**HALF-LIFE WORKSHEET**

1. What is radioactivity?
2. What is half-life?
3. If we start with 400 atoms of a radioactive substance, how many would remain after one half-life? \_\_\_\_\_ after two half-lives? \_\_\_\_\_  
after three half-lives? \_\_\_\_\_ after four half-lives? \_\_\_\_\_
4. If we start with 48 atoms of a radioactive substance, how many would remain after one half-life? \_\_\_\_\_ after two half-lives? \_\_\_\_\_  
after three half-lives? \_\_\_\_\_ after four half-lives? \_\_\_\_\_
5. If we start with 16 grams of a radioactive substance, how much will remain after three half-lives? \_\_\_\_\_
6. If we start with 120 atoms of a radioactive substance, how many will remain after three half-lives? \_\_\_\_\_

**Use the following graph to answer questions 7-10.**



7. How long is a half-life for carbon-14? \_\_\_\_\_
8. If only 25% of the carbon-14 remains, how old is the material containing the carbon-14? \_\_\_\_\_
9. If a sample originally had 120 atoms of carbon-14, how many atoms will remain after 16,110 years? \_\_\_\_\_
10. If a sample known to be about 10,740 years old has 400 carbon-14 atoms, how many atoms were in the sample when the organism died? \_\_\_\_\_

Use the following chart to answer questions 11-14.

Radioactive Substance	Approximate half-life
Radon-222	4 days
Iodine-131	8 days
Radium-226	1600 years
Carbon-14	5,730 years
Plutonium-239	24,120 years
Uranium-238	4,470,000,000

11. If we start with 8000 atoms of radium-226, how much would remain after 3,200 years?  
\_\_\_\_\_

12. If we start with 20 atoms of plutonium-239, how many would remain after 48,240 years?  
\_\_\_\_\_

13. If we start with 60 atoms of uranium-238, how many remain after 4,470,000,000 years?  
\_\_\_\_\_

14. If we start with 24 atoms of iodine-131, how many remain after 32 days? \_\_\_\_\_

**Use the Reference Table on the side to assist you in answering the remaining questions.**

15. How long does it take a 100.00g sample of As-81 to decay to 6.25g?

16. How long does it take a 180g sample of Au-198 to decay to 1/8 its original mass?

<b>Half-lives:</b> <b>As-81 = 33 seconds</b> <b>Au-198 = 2.69 days</b> <b>C-14 = 5730 years</b>
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17. What percent of a sample of As-81 remains un-decayed after 43.2 seconds?

18. What is the half-life of a radioactive isotope if a 500.0g sample decays to 62.5g in 24.3 hours?

19. How old is a bone if it presently contains 0.3125g of C-14, but it was estimated to have originally contained 80.000g of C-14?