# 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 halflife?_____ after two half-lives? _____
    after three half-lives? _____ after four halflives?_____

4. If we start with 48 atoms of a radioactive substance, how many would remain after one halflife?_____ after two half-lives? _____
    after three half-lives? _____ after four halflives?_____

5. If we start with 16 grams of a radioactive substance, how much will remain after three halflives?_____

6. If we start with 120 atoms of a radioactive substance, how many will remain after three halflives?_____

Use the following graph to answer questions 7-10.
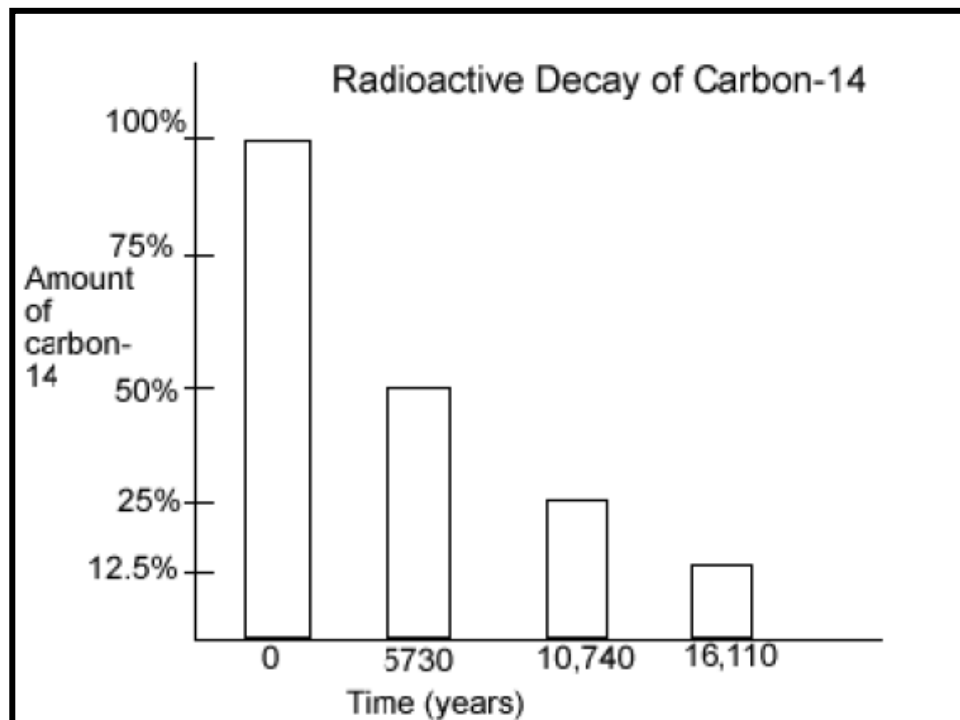
7. How long is a half-life for carbon-14?_____

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?

Half-lives:
As-81 = 33 seconds
Au-198 = 2.69 days
C-14 = 5730 years

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?