

Half-life Practice Worksheet

Name KEY.
Period _____ Date _____

1. The half-life of cobalt-60 is 5.26 years. How many half-lives have passed in 10.52 years?

$$\frac{\text{Total time}}{\text{Half-life}} = \frac{10.52}{5.26} = 2 \text{ half-lives}$$

2. 12.5% of a radioactive sample are left. How many half-lives have passed?

3

3. After 3 half-lives, how much of a 400 gram sample of radioactive uranium remains?

50g

4. After 4 half-lives 10 grams of uranium remains. How much uranium did you start with?

$$160g \xleftarrow{\times 2} 80g \xleftarrow{\times 2} 40g \xleftarrow{\times 2} 20g \xleftarrow{\times 2} 10g$$

5. How old is an artifact if four half-lives have occurred and the half-life of carbon-14 is 5730 years?

$$5730 \text{ years} \times 4 = 22920 \text{ years}$$

6. How much time has passed if carbon-14 has a half-life of 5730 years and 2 half-lives have passed?

$$\underline{\times 2}$$

11 460 years

7. A rock that originally had a mass of 1.00 gram of uranium-238 now has only 0.50 grams. How old is the rock if the half-life of uranium-238 is 4.5 billions of years.

1st HLF

$$1.00g \div 2 = 0.50g$$

since 1 half-life event = 4.5 Billion years

8. The radioisotope radon-222 has a half-life of 3.8 days. How much of a 10 g sample of radon-222 would be left after 15.2 days?

$$\frac{\text{Total time}}{\text{Half-life}} = \frac{15.2d}{3.8d} = 4 \text{ half-lives}$$

$$10 \overset{1st}{\div 2} \overset{2nd}{\div 2} \overset{3rd}{\div 2} \overset{4th}{\div 2} = 0.625g$$

9. A piece of wood found in an ancient burial mound contains only half as much carbon-14 as a piece of wood cut from a living tree growing nearby. If the half-life for carbon-14 is 5730 years, what is the approximate age of the ancient wood?

$\frac{1}{2}$ of the C-14 remaining means 1 half-life has occurred = 5730 years

10. Iodine-131 has a half-life of 8 days. If the amount of iodine-131 in a sample is 8 g, how much iodine-131 will remain after 32 days?

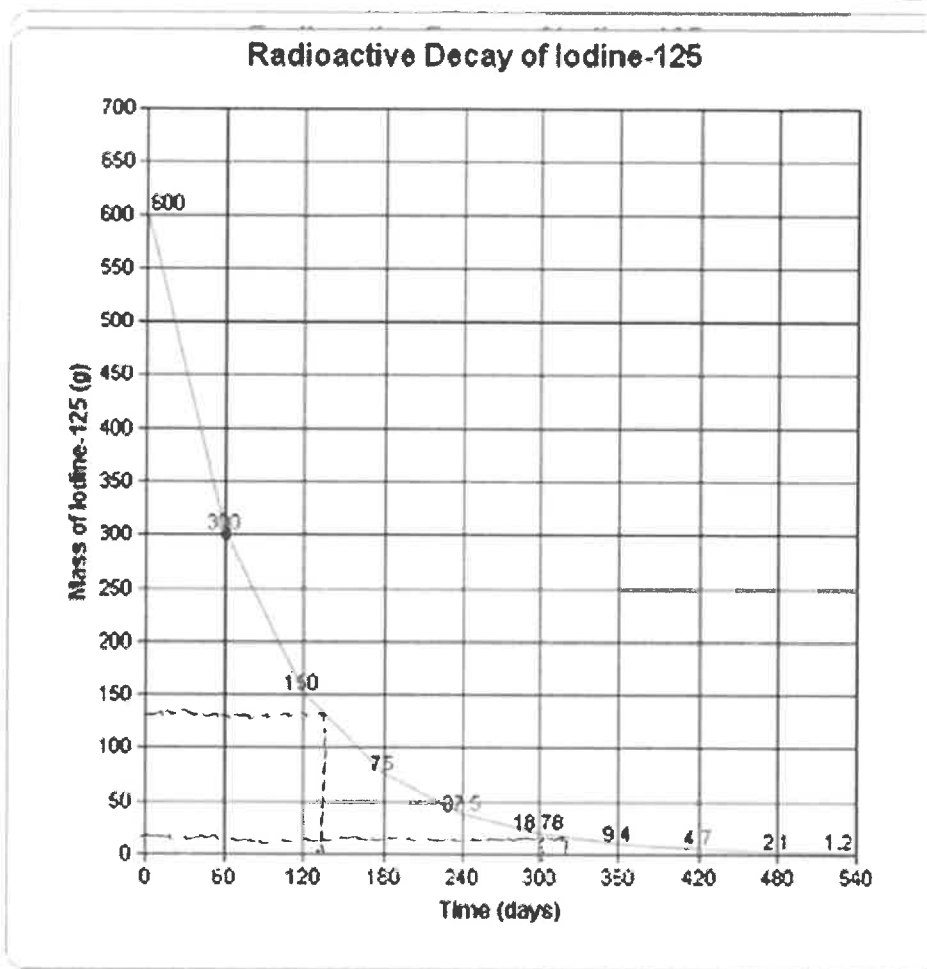
$$\frac{\text{Total time}}{\text{Half-life}} = \frac{32 \text{ days}}{8 \text{ days}} = 4 \text{ half lives}$$

$$8g \div 2 \div 2 \div 2 \div 2 = 0.5g \text{ remains.}$$

KEY

96.9%

this is what's left



1. What percent of iodine has decayed if 5 half-lives have passed?

60 days = 1 half-life
 $\times 5$
 300 days

18.75g
 $\therefore 581.25$ decayed

2. If three half-lives have passed, how many grams of iodine-125 remain undecayed?

75g remain

3. What fraction of iodine-125 has decayed if there are 37.5 grams left from the original sample?

$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{16}$
 4 half-lives

4. If 130 days have passed approximately how many grams of iodine-125 will remain?

Interpolate on the graph

~ 130 g remain

5. What is the half-life of iodine-125?

60 days.

6. If 315 days have passed, how many grams of iodine-125 will remain undecayed?

Interpolate

~ 15 g

← this is approximate

7. What mass of iodine-125 has decayed after 6 half-lives?

9.375g remain

$\therefore 600 - 9.375g = 590.625g$ have decayed

8. How many grams of Iodine-125 have decayed away if 12.5% is remaining?

12.5% = 3 H-L's

$\therefore 75g$ remain

$\therefore 525g$ have decayed

9. What fraction of Iodine-125 remains after 300 days have passed?

3.125%

18.75g remain

10. How many half-lives have passed if 1.2 grams remains?

9

How many grams decayed?

598.8g

$600 - 1.2g = 598.8g$

