

WKS – Honors
Half-Life & Decay Series

Name _____
Period _____ Date _____

Read pp. 708-709 in the textbook.

- 1) What is half-life? What kind of a mathematical function is it?
- 2) What percent of the radioactive substance is left after 1 half-life? After 2 half-lives? After 3?
- 3) In general, what determines how long the half-life of an isotope is?

Half-Life Calculations:

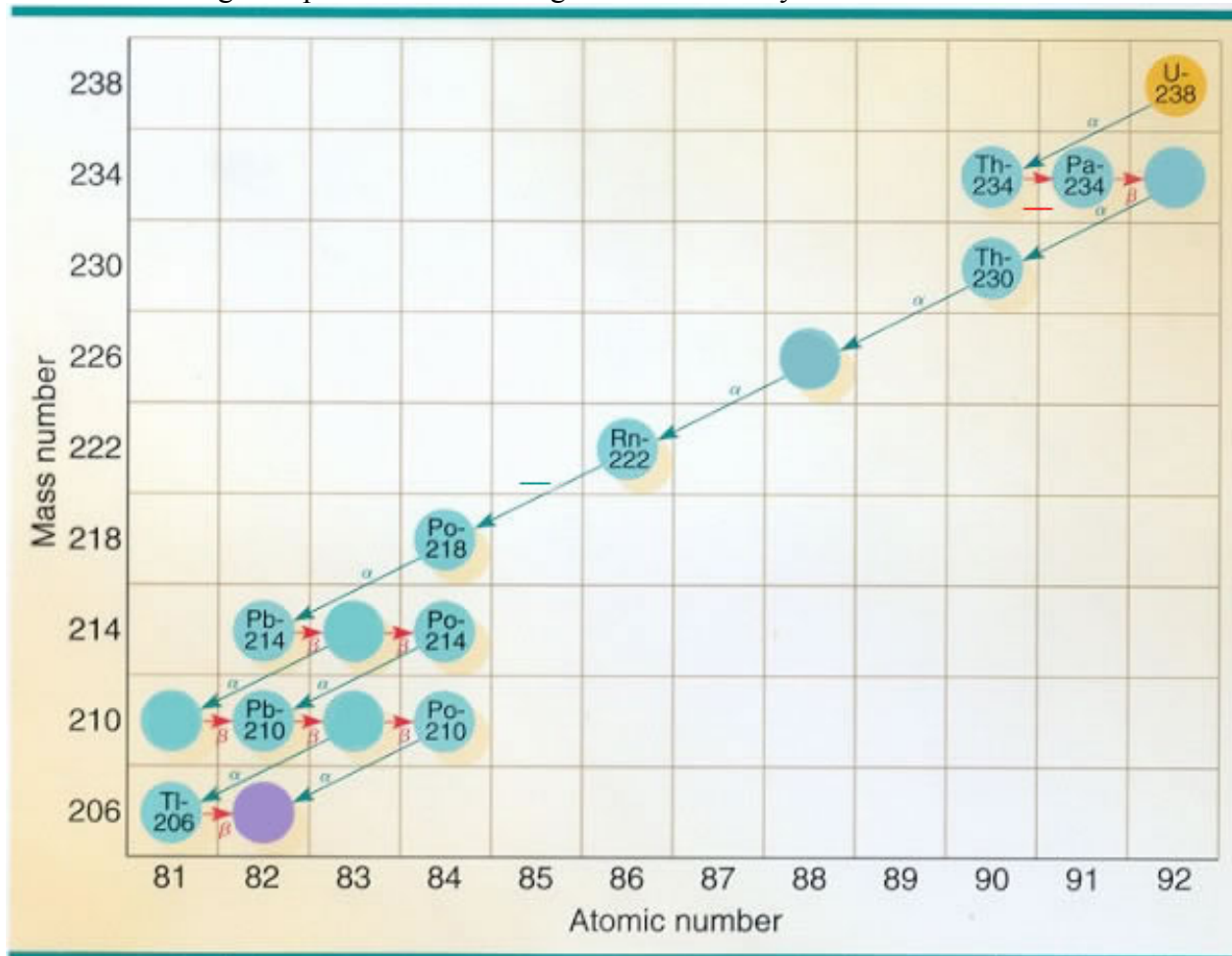
- 4) The half-life of a radioactive isotope is 10 minutes. Starting with 1.0 kg of this isotope, how much will remain after 30 minutes?
- 5) A sample of air from a basement is collected to test for the presence of radon-222. However, delays prevent the sample from being tested until 7.6 days have passed at which time the measurements indicate the presence of only 6.5 μg of radon-222. How much radon-222 was present in the sample when it was initially collected? *The half-life of Rn-222 is 3.8 days.*
- 6) A 64 g sample of germanium-66 is left undisturbed for 10.0 hours. At the end of that period, only 4.0 g remain. What is the half-life of this material?
- 7) With a half-life of 28.8 years, how long will it take for 12.0 g of strontium-90 to decay to 1.50 g?
- 8) The radioisotope technetium-99 is often used as a radiotracer to detect disorders of the body. It has a half-life of 6.0 hours. If a patient received a 25.0-mg dose of this isotope during a medical procedure, how much would remain 24.0 hours after the dose was given?
- 9) Given that the half-life of carbon-14 is 5730 years, consider a sample of fossilized wood that, when alive, would have contained 24.00 g of carbon-14. It now contains 1.500 g of carbon-14. How old is the sample?

10) Cobalt-60 has a half-life of 5.30 years. If a pellet that has been in storage for 26.5 years now contains 14.5 mg of cobalt-60, how much of this radioisotope was present when the pellet was put into storage?

11) The isotope strontium-90 is produced during the testing of nuclear weapons. If 100.0 mg of Sr-90 was released in the atmosphere in 1960, how much of the radioisotope remains 85 years later?

The half life of strontium-90 is 29 years.

12) Fill in the missing isotopes for the following radioactive decay series:



13) What kind of nucleus does every radioactive decay series end with?

For more practice, go to <http://www.chemteam.info/ChemTeamIndex.html> and click on [Radioactivity](#)