

**➤ Main Ideas, Key Points, Questions:**

*After watching the video segment, write down key points, main ideas, and big questions.*

**➤ Objective(s):**

- *Develop a mathematical model that indicates the relationship between half-life, time, and mass.*
- *Use a mathematical model to relate the amount of a substance, its half-life, and the total time elapsed.*

**➤ Notes:**

*During the video segment, use words, phrases, or drawings to take notes.*

**➤ Summary:**

*After watching the video segment, write at least three sentences explaining what you learned. You may ask yourself: "If I was going to explain this to someone else, what would I say?"*

**Answer the following.**

1. Define half-life in your own words.

*Half-life is the amount of time it takes for half of a radioactive substance to decay.*

2. How much of a radioactive sample decays in one half-life?

*Half of the sample decays in one half-life.*

3. Will the amount of radioactive material ever reach zero?

*No, the amount of radioactive material will never reach zero.*

*It will get closer to zero over time but will never reach zero.*

4. Graph the rate of decay of a radioactive substance, which is the amount of a radioactive substance versus the number of half-lives.



5. What is the equation that relates the remaining mass of a radioactive sample, the initial mass of the sample, and the number of half-lives that pass?

$$mass_{\text{remaining}} = mass_{\text{initial}} \left( \frac{1}{2} \right)^{\# \text{ HLs}}$$

6. What does the length of a radioactive isotope's half-life indicate about the stability of that isotope?

*the longer the half-life, the more stable the isotope*

7. What method do scientists use to determine the age of fossils, and what radioactive isotope do scientists use to determine the age of organic fossils?

*Scientists use radiometric dating to determine the age of fossils. Scientists use carbon-14 to determine*

*the age of organic fossils because living things ingest carbon-14, and carbon-14 decays over time.*