Radioactive Decay and Half-life   Name: _____

Problem:
Calculate how many years it takes certain substances to decay by the half-life theory.
**SHOW ALL WORK FOR FULL CREDIT

Procedure:
1. Answer the questions as best as you can.
2. Don't forget to count half-lives carefully.
3. Make sure to keep units the same. (If you are dealing with grams, make sure you label your final answer in grams.)

Activity:
1. If you are given a 2,900-gram sample of Hydrogen, and hydrogen has a half-life of 2,450 years.

   Calculate the following:
   A. How much hydrogen is left after 19,600 years?

   B. How many half-lives must occur to reach 5.66 grams of hydrogen?

   C. How many half-lives must occur to reach 45.31grams?

   D. How many years have passed for B? How many years have passed for C?

2. If you have a 2,300 gram sample of Uranium-235, calculate the following:

   A. What is the half-life of Uranium?

   B. How many years is 4 uranium half-lives equal to?

   C. How many half-lives does it take to reach 71.875 grams?

3. How many half-lives does the following diagram show?
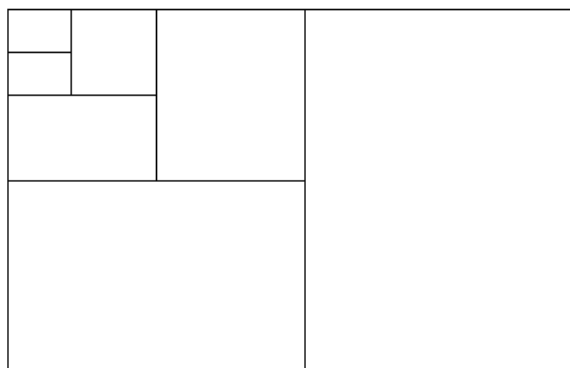
4. If that were a 3,500-gram sample how much would be left?

5. If that sample had a half-life of 2.2 million years, how many years will have passed?

Base your answers to questions 6 and 7 on the diagram below, which represents a model of a radioactive sample with a half-life of 5,000 years.

6. How many more boxes should be shaded to represent the additional decayed material formed during the second half-life?
   a. 12
   b. 6
   c. 3
   d. 0
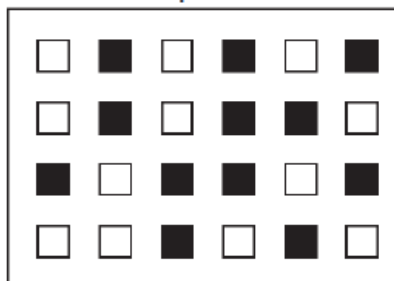
7. Which radioactive isotope has a half-life closest in duration to this radioactive sample?
   a. carbon-14
   b. potassium-40
   c. uranium-238
   d. rubidium-87

Radioactive Sample After First Half-Life

Key
Undecayed radioactive material
Decayed material

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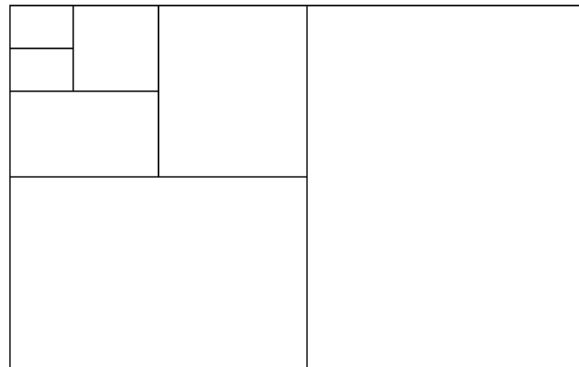
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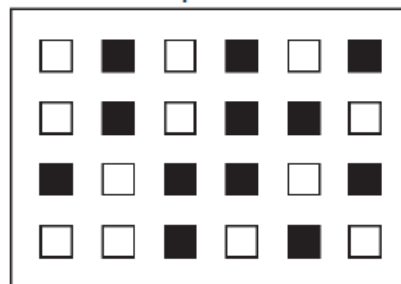3. How many half-lives does the following diagram show?

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