Radioactive Popcorn   Name_____Per._____

Introduction: Finding out how old something is helps scientists understand its history. Radioactive dating is an important tool scientists use to do this. To find a radioactive date, the object being dated must contain a radioactive element such as uranium-235 or carbon 14. These elements are decaying by emitting a small part of the atom. As the element decays, it becomes something new. By determining the ratio of the radioactive element in the sample, it can be determined how long that item has been around. In this activity you will model the decay of two different "radioactive" atoms, each with a different half-life. Half-life is a common way to describe the length of time it takes for half the atoms in a particular element to decay.

Materials: 100 popcorn seeds, box marker
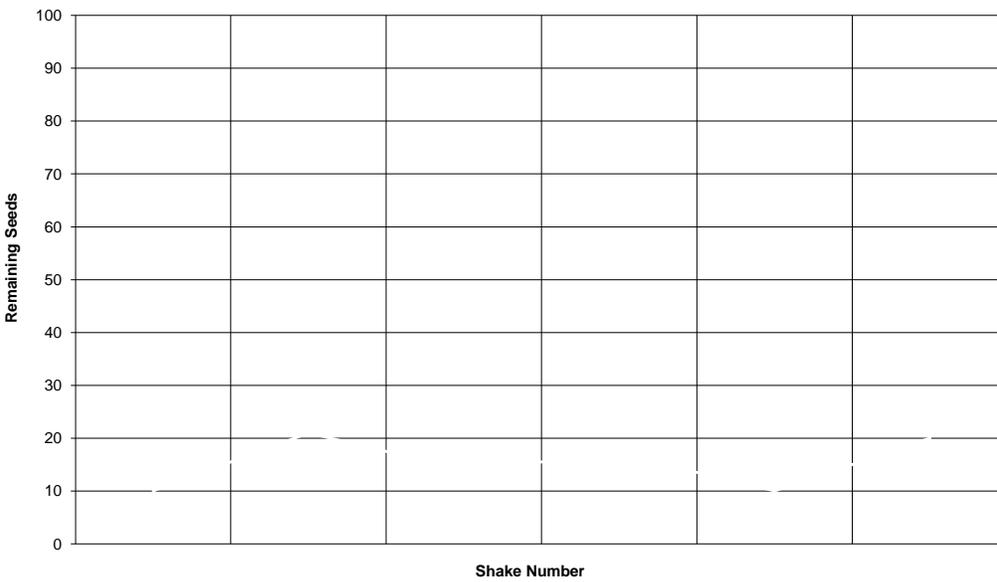
Procedures:
1. Number each side on the inside of the shoe box 1, 2, 3, and 4. Put all 100 popcorn kernels inside the box. Cover the box and give it a shake.

2. Open the box and remove all the kernels that have the small end pointed toward side 1. Count them, and subtract that number from 100. Record the number of remaining kernels in the data table. **Do not return the kernels to the box.**

3. Repeat this process until all of the popcorn kernels have been removed from the box.

4. Return all 100 pieces of corn to the box, cover it, and repeat the above procedure except this time, after each shake, remove the corn kernels that are pointed toward side 1 and 2. Count the corn remaining after each shake and record your data. Continue this procedure until all of the corn has been removed from the box.

5. Finally, return all of the corn to the box and repeat the entire procedure a third time except this time remove the kernels that are facing sides 1, 2, and 3. Repeat until all the corn has been removed from the box. Count and record each of your observations in the data table.

6. Graph your data. The number of shakes is on the X axis and number of corn kernels remaining on the Y axis. Your graph should show 3 lines, **in 3 different colors**, one for each column of figures in your data table. Fill out the key to show which line is which.

Data Table

Corn Remaining

Shake Number	Side 1	Sides 1 & 2	Sides 1, 2, &3
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

Graph of Data

Key:

Questions

1. a. What is the half-life, (number of shakes until half the seeds are gone), for the first set of data?

    b. What is the half-life for the second set of data?

    c. What is the half-life for the third set of data?

2. Why are the three half-lives different?

3. As radioactive material decays and the percentage of new material in the original sample increases, does the age of the sample substance increase, decrease, or remain the same?

4. Using your first set of data, how old would your sample be if you had 10 kernels left? (assume 1 shake=3 million years)

5. Using your second set of data, how old would your sample be if you had 10 kernels left? (assume 1 shake=3 million years)

6. Using your third set of data, how old would your sample be if you had 10 kernels left? (assume 1 shake=3 million years)

7. Summarize, in your own words, how this activity helped you understand the concept of radiometric dating.