**Radioactive Decay of Candium**: Names\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Radioactive decay occurs at a steady rate throughout the life of an isotope. This simulation provides a simple example of the rate at which a radioactive isotope decays.

**Procedure:**

1. Place 60 atoms of candium in the cup.
2. Cover the cup with your hand and gently shake for 10 seconds.
3. Gently pour out the candy
4. Count the number of pieces with the print side up and record the data. These atoms have “decayed”.
5. Return only the pieces with the print side down to the bag. Reseal the bag.
6. Consume the “decayed atoms”.
7. Gently shake the cup for 10 seconds and repeat steps 3-6.
8. Continue shaking, counting and consuming until all the atoms have decayed.
9. Graph the number of un-decayed atoms vs. time.

**Data Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| Half-Life | Total Time(sec) | # of Un-decayed Atoms | # of Decayed Atoms |
| 0 | 0 | 60 | 0 |
| 1 |  |  |  |
| 2 |  |  |  |
| 3 |  |  |  |
| 4 |  |  |  |
| 5 |  |  |  |
| 6 |  |  |  |
| 7 |  |  |  |
| 8 |  |  |  |
| 9 |  |  |  |
| 10 |  |  |  |

Some naturally occurring isotopes of elements are not stable. They slowly decompose by discarding part of the nucleus. The isotope is said to be radioactive. This nuclear decomposition is called nuclear decay. The length of time required for half of the isotope to decay is the substance’s half-life. Each radioactive isotope has its own particular half-life.

**Answer the questions on the back side.**

**Questions:**

1. What is a half-life?
2. In the experiment, what was the half-life of the element candium?
3. At the end of two half-lives, what fraction of the atoms have not decayed?
4. Describe the shape of the curve drawn in step 9.
5. If you were to repeat the experiment two more times starting with 20 atoms and then 100 atoms, what would you predict about the results?
6. If you repeated the experiment using a half-life of 20 seconds, how would a graph of the data compare with the original graph? If it is different, why would it be different?