Half-Life of M&M's®

Student Data Collection Sheet

Name: _____

Date: _____

Objectives

- To define the terms half-life and radioactive decay
- To observe the exponential nature of radioactive decay
- To create line graphs from collected data
- To compare data
- To understand how radioactive decay is used to date archaeological artifacts

Procedure

1. Put 10 M&M's® candies of any color into a zip lock bag. Each group is starting with 10 M&M's® candies, which is recorded as Trial 0 in the data table. *All of the* M&M's® *candies are radioactive*.
2. Shake the bag and spill out the candies onto a flat surface.
3. Pick up **ONLY** the candies with the "**m**" showing - *these are still radioactive*. Count the "**m**" candies as you return them to the bag.
4. Record the number of candies you returned to the bag under the next Trial.
5. Move the candies that are blank on the top to the side - *these have now decayed to a stable state*.
6. Repeat steps 2 through 5 until all the candies have decayed or until you have completed Trial 7.
7. Record the results for 9 other groups and total all the Trials for the 100 candies.

Toss Results	Trial 0	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7
Ours	10							
Group 2	10							
Group 3	10							
Group 4	10							
Group 5	10							
Group 6	10							
Group 7	10							
Group 8	10							
Group 9	10							
Group 10	10							
Totals	100							

Name: _____

Date: _____

Questions

1. Define the term **half-life**.

2. What does it mean when we say an atom has "**decayed**"?

3. Do the number of atoms you start with affect the outcome? Explain.

4. Did each group get the same results?

5. Did any group still have candies remaining after Trial 7?

6. Why do the totals for the 10 groups better show what happens during half-life rather than any one group's results?

7. What happens to the total number of candies with each trial (half-life)?

Questions

8. Plot the total results on a graph with number of candies on the vertical axis and trial number on the horizontal axis. Is the result a straight or a curved line? What does the line indicate about the nature of decay of radionuclides?

9. How do scientists use radioactive decay to date fossils and artifacts?

Enrichment Question

1. The population of the earth is doubling every 40 years. If the population of the earth is now 6 billion people, how many people will be here when you are 95 years old?