M&M Half-lives



**Introduction:**

Yesterday we were introduced to 2 broad ways scientists age rocks. One was relative dating where scientists use clues around the rock to tell which rock is older or younger relative to the rock layers around it. The other was radioactive dating using half-lives, where scientists measure the amount of radioactive decay to get a more precise age of a particular rock. In today’s lab, we will be looking at radioactive dating using half-lives. A half-life is the time it takes for half of the radioactive atoms to decay. Rather than using elements that a scientist would use we will be using M&Ms!

Today we will be having our M&Ms Represent radioactive atoms…



Parent isotope 🡪 M-side up, radioactive

Daughter isotope 🡪 M-side down, stable

**Materials Needed:**

* 100 M&Ms (don’t eat them until we are done)
* A piece of notebook paper
* 1 plastic container
* Your notebook to write in!

**Collecting Data Directions:**

1. Wash your hands!
2. Gather your materials.
3. On a piece of notebook paper, Place all M&M’s parent isotope side-up.
4. Count how Many M&M’s you have and put that data on your chart. (you should have 100) :)
5. Pour M&Ms into the plastic container (with lid on) and shake for about 10 seconds.
6. Pour M&Ms back onto the paper.
7. Pick up and set aside ONLY the M&Ms that are now stable daughter isotopes.
8. Count the number of pieces of candy left that are still radioactive parent isotopes and put that data on your **Decay Table**.
9. Repeat the same procedure of shaking and counting the radioactive parent isotopes 8 times.
10. Go up to the board and fill in the ***CLASS DECAY TABLE*** with your group results.
11. Calculate the average values for your class.
12. After the results of the final "half life" of the M& M are collected and your results are on the board, the candies are no longer needed. (This means you may eat them!) ☺



**Graphing:**

1. Develop a graph that compares the class average of parent isotopes to the number of half-lives.
2. Be detailed.
3. Put this neatly in your notebook.



**Post Questions:**

*Answer these in your notebook!*

**1.** Why didn't each group get the same results?

**2.** Which results are probably a more accurate depiction of what really happens in nature, your group’s or the class’s? Why?

**3.** After how many half-lives (runs) did the class have about ¼ of its original parent isotope (m-side up)? Explain.

**4.** Why do scientists go through the complex process of radioactive dating rather than just sticking with the relative age of rocks?

Lab adjusted from…

<http://www.ucmp.berkeley.edu/fosrec/McKinney.html>