Name: _____ Date: _____

Radioactive Decay

A Sweet Simulation of Half-Life

Purpose:

Students shall investigate:

- How do radioactive nuclei decay over time?

Materials:

- M&M's (~80 candies per pair)
- Paper/plastic cup
- Paper towel

Procedure:

1. Count your nuclei (M&M candies). Write that number in the data table under the heading "Number of Radioactive Nuclei".

2. In the column marked "Prediction for Next Toss" write the number of radioactive nuclei you think you will have with your next round. (**Radioactive nuclei will be those candies with the marked side facing DOWN.**) In the third column labeled 'Decayed Nuclei' write the number of candies with the writing facing up.

3. Place your 'nuclei' in a plastic cup. Cover and shake the cup. Pour the 'nuclei' onto your paper towel. Separate the 'nuclei' into two (2) piles; one with the marked side up and the other with the marked side down. Count the number of 'nuclei' in each pile. On your data table, record the number of 'radioactive nuclei' candies with the marked side down and 'decayed nuclei' with the marked side up.

4. Return only the **'radioactive nuclei'** to your paper cup. (Record the total number of 'decayed nuclei' in the third column of Table 1.)

5. Continue shaking the radioactive nuclei in the cup and separating out the 'transmuted nuclei' until there are none left. Record all of your data in Table 1. The decayed 'nuclei' column will be cumulative; meaning you should add the total from the previous round to how many newly 'decayed nuclei' you have after each round.

Name: _____ *Date:* _____

Table 1. Radioactive Decay Data

Round	Number of radioactive nuclei	Prediction for next round	Decayed nuclei
0		----------	0
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

Questions

1. Using your, prepare a graph by plotting the number of radioactive 'nuclei' and decayed 'nuclei' on the y-axis (radioactive will be y_1 and decayed will be y_2) and the round, which we will call half-lives, on the x-axis. *Draw your graph in the space provided at the end of this laboratory or (better yet)* ***prepare a Google Sheet for your graph****.*

2. If 175 un-decayed nuclei remained from a sample of 2800 nuclei, how many half-lives have passed?

   _____

   _____

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3. If you started with a sample of 600 radioactive nuclei, how many would remain undecayed after three half-lives?

   _____

   _____

4. What do we mean by half-life? With what kinds of materials do we use this term?

   _____

   _____

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