# M&M Half Lives: Absolute Dating

Earth Science Mr. Traeger

Name: _____ Period: ____ Date: _____

**Purpose**

The purpose of these activities is to become familiar with the concepts of absolute dating of geologic time periods. These labs were adapted from labs found at http://www.ucmp.berkeley.edu.

**Materials**

M&M Half Lives

- 100 M&M candies per group of 4 students
- Your textbook pages 191-196!

**M&M Half Lives: Absolute Dating**

**Procedure and Questions**

1. Count out 100 pieces of M&M candy and place them on a piece of notebook paper with the M facing down. These represent parent isotope. This is 0 half lives.

2. Now put your M&Mûs in a cup and shake them up. Pour them out on to the notebook paper so that all are spread out on the page. Remove the ones with the M facing up. Now count the number of M&Mûs with the M facing down. Record this number in the table below. This is 1 half life.

3. Now repeat the procedure from #2. This will be 2 half lives, 3 half lives, and so oné . Make sure to record your data below!

**Experimental Data**

| Run # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| # of parent isotope atoms (# with M face down) | | | | | | | | | |

4. After you are done recording your data, you may divide the M&Mûs up among the members of your group and eat them! Enjoy!

5. Now, graph your data on the graph of M&M Half Lives on the back. Plot your data over the line that is already drawn for the mathematical calculation. Make this line a different color or line type with a key.

6. Now enter your experimental results data from above into the spreadsheet on the side computer. After everyone has entered data, Mr. T will reveal what the class averages are for each half life. Plot this data on the graph of M&M Half Lives on the back. Make this line a different color or line type with a key.

**Class Average for Half Life**

| Run # | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| # of parent isotope atoms (# with M face down) | | | | | | | | | | |

7. What is an isotope?

8. What does it mean when something is ñradioactive?ò

9. What is radioactive decay?

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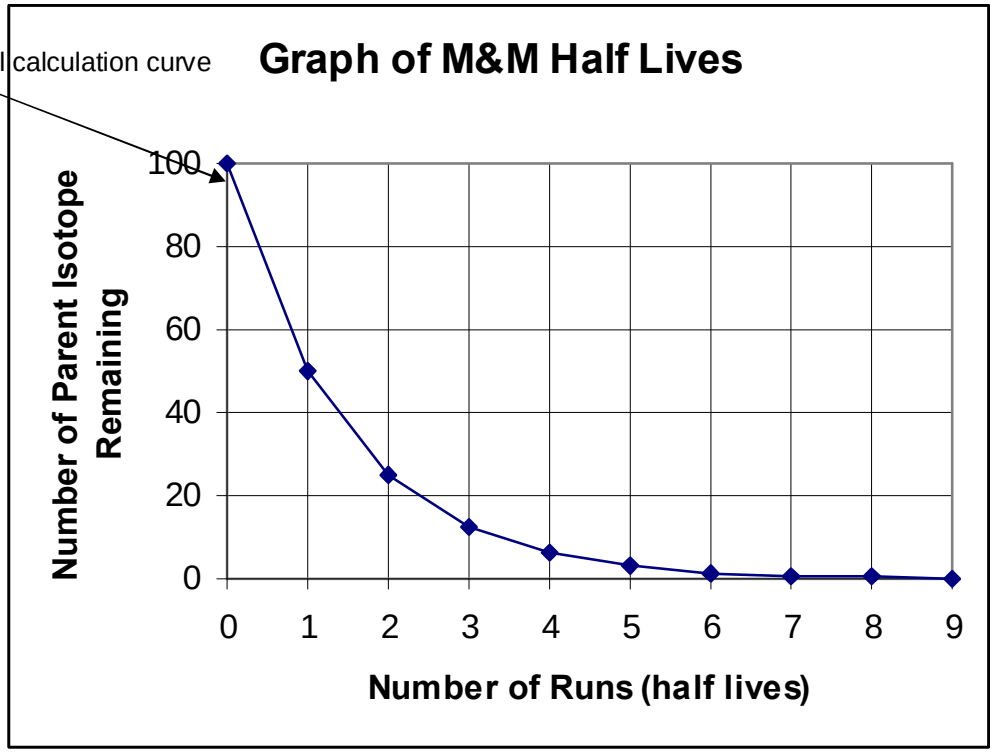
Mathematical calculation curve for half life




Don't forget to make a key for your line graphs. You should have one line for your group's data, one line for the mathematical calculation that is already plotted, and one line for the class average data.

**Additional Questions**

1. The line that is already drawn in the graph is the mathematical calculation of half life. How does your data compare to the mathematical data?

2. Compare the class average data to your experimental data and the mathematical calculation. Why is the average line more accurate?

3. In the mathematical calculation, what happens to the number of parent isotope atoms for each run (half-life)?

For the following questions, assume that the half life of your parent isotope is 1,000,000 years. Age = half life X number of half lives.

4. Fill in the blanks on the following chart based upon the mathematical calculation graph above.

| Percent of parent isotope? | 100% | 50% | 25% | 12.5% | |
|---|---|---|---|---|---|
| Age of Rock? | | | | | 4,000,000 years |

5. What kind of parent isotope would you use to date a set of bones that are 2,000 years old? Hint: Look in your book!

6. What kinds of things would you use Potassium-40 to date? Hint: Look in your book!

7. How does this activity explain half life and the process of radiometric dating?