Name: _____   Date: _____

Life Science   Period: _____

Scientific Method: *M&M Lab*

Pre-Lab Questions

Answer the following questions, *in complete sentences,* prior to participating in the lab activity:

1. What process will we be using to solve the activity's problem?

   _____

   _____

2. What materials must we collect prior to beginning the lab activity?

   _____

   _____

3. What expert will you consult to gather information on the lab activity?

   _____

   _____

4. What tools will you use to record and organize your data?

   _____

   _____

5. At what point will eating the M&M's be permitted?

   _____

   _____

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Scientific Method: *M&M Lab*

The **scientific method** is a way to think about problems and a way to solve them. Scientists do not always follow the steps of the scientific method in order. However, after a problem is solved, a scientist can use the scientific method to explain how the solution was reached.

The **scientific method** can be broken down into the following parts:

1. State the problem.
2. Gather information on the topic.
3. Form a hypothesis.
4. Experiment!
5. Record and analyze data.
6. State a conclusion.

INTRODUCTION
In this activity, you will follow the steps of the **scientific method** to discover how many candies of each color are in one bag of M&Ms. It will show you how scientists record **data** on charts, make graphs, and draw **conclusions**. Do not eat any of the candies until you are permitted, because it will affect your results. Do not open the bag until you are instructed to do so.

OBJECTIVES
1. Name and describe the steps of the scientific method.
2. Follow the steps of the scientific method to solve a problem.
3. Record data in a table or chart.
4. Construct a graph that shows the results of the investigation.

MATERIALS
       1 "fun-size" bag of M&Ms
       Colored pencils to match M&M colors
       Pencil

DIRECTIONS
1. State the **problem**: (*Hint – What are you trying to find out?*)

_____

_____

2. **Gather information.** It is unlikely that you will find any information about colored candies in the library. Most likely, your best sources of information are experts, people who have experience with colored candies. Look around, and you will find some experts. In fact, you may be an expert yourself!

What colors of candies are found in these bags?

_____

Which color do you think is most common? _____

3. Form a **hypothesis.** Write a statement that tells <u>how many candies you think will be in the bag</u> and <u>how many there will be of each color</u>. Remember, the total number of candies must equal the sum of candies of each color.

_____

_____

_____

4. **Experiment!** Open the bag of candies. ***No eating yet!*** Sort the candies by color.

5. **Record and analyze data.**
   a. Write the colors of the candies in the first column of the **data** table.
   b. Count how many candies there are per color. Record the results in the frequency column of the table.
   c. Add the numbers in the frequency column, from the top line to the bottom. Write the total number of candies on the bottom of the frequency column where it says "Total".
   d. Determine the percentage that each candy color is of the entire bag, and record it in the percentage column of the table.

Percentage = # of candies of one color   X 100
total # of candies in the bag

Color	Frequency (how many)	Percentage
	Total:	**100%**

e. Use the data that you entered to make a bar graph below.
   i. Label the horizontal axis with the colors of the candies.
   ii. Label the vertical axis with the numbers from 1 to 12.
   iii. Color the bars the same colors as the candies.
   iv. Give your bar graph an appropriate title.

Title: _____

_____
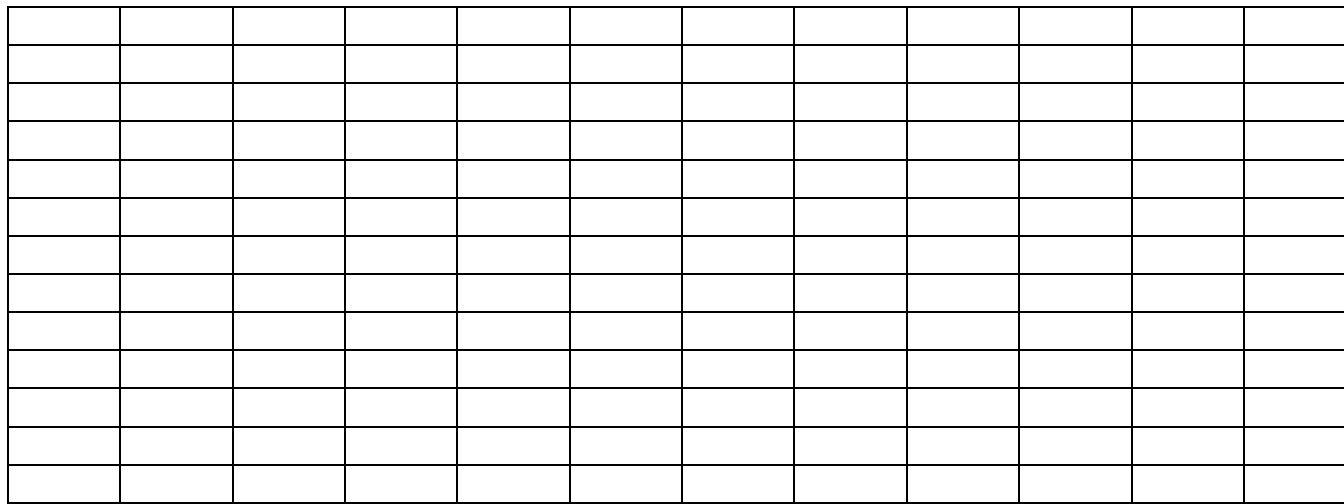
6. Form a **conclusion**.
On the lines below, form a **paragraph** that answers the problem you looked to solve in the M&M lab. Your paragraph should include:
- An answer to the question addressed in #1.
- The total number of candies in your bag and how many there were of each color (frequency).
- How your actual results compare with your hypothesis (was your hypothesis correct? If not, how close were you?)

_____

_____

_____

_____

_____

_____

_____

_____