Name(s): _____ Date: _____

Scientific Method – Smarties Lab

The scientific method is a way to ask and answer scientific questions by conducting experiments and making observations. Scientists do not always follow the steps of the scientific method exactly in order. However, after a problem 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. (Ask a question)
2. Form a hypothesis.
3. Design a controlled experiment!
4. Record and analyze data.
5. Make conclusions and report your findings.

INTRODUCTION

In this activity, you will follow the steps of the **scientific method** to discover how many candies are in one pack of Smarties. You will also discover how many candies of each color there are in the pack. This activity will show you how scientists record **data** on charts, make graphs and draw **conclusions**. It will also give you a sample of the methods used in writing a final lab report.

Do not eat any of the candies until you are permitted, because it will affect your results.

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 experiment.
5. Create a report of the findings.

MATERIALS

- 1 pack of Smarties
- Colored pencils to match Smarties colors
- Pencil
- Calculator

EXPECTATIONS

- Participate fully with partner to perform the experiment
- Complete a write up on the following pages. Write in full sentences and give detailed answers.

PROCEDURE

1. State the **problem**: (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 packages? _____

   _____

   _____

   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 pack</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 box 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. 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 box, and record it in the percent column of the table.

$$percentage = \frac{\#\ of\ candies\ of\ one\ color}{total\ \#\ of\ candies\ in\ the\ box} \times 100$$

Color	Frequency (How Many)	Percentage
	Total:	**100**

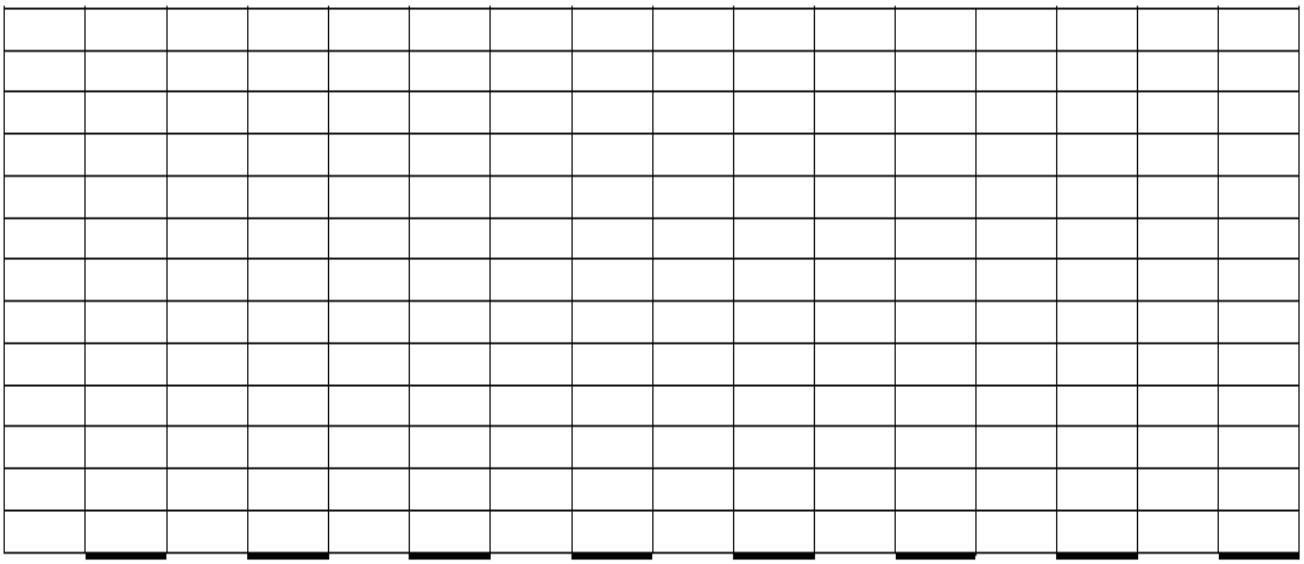
E. Use the data that you entered to make a bar graph below.

i. Label the horizontal axis with the colors of candies and give it an appropriate title.

ii. Label the vertical axis with the numbers 1 to 12 and give it an appropriate title.

iii. Color the bars the same colors as the candies.

iv. Give your bar graph an appropriate title.



6. Form a **conclusion.**
   On the lines below, form a **paragraph** that answers the problem you looked to solve in the lab. Your paragraph should include:
   - An answer to the question addressed in #1 which should include the total number of candies in your box 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?)
   - Did anything go wrong in your experiment? (errors)
   - If you were to do this experiment again, what improvements would you make?