



Sample GEMS Activity

Topic:—Predicting and Analyzing Data with M & Ms™

It can be difficult to find fun different math activities in some schools because the girls can be at such varied levels of understanding. We use this lesson plan at the beginning of the series of meetings to introduce thinking differently about math.

Goal: to predict, measure, compare, and graph data about the color variation of M & M™ candies.

Supplies Needed:

- A small bag of milk chocolate M & Ms™ for each student—currently selling at \$1.69 oz (they are going to eat these later, so you want to avoid contamination.)
- Worksheet with table for recording data
- Computer and LCD projector for creating and showing the statistics in Excel
- Pencils
- Hand sanitizer
- Paper plates or towels

Preparation:

- If time is short, prepare a small bag for each girl with the worksheet, pencil, paper plate, and bag of M & Ms™.
- Prepare the Excel chart to match the table on the worksheet—see example attached.





GEMS Club meeting:

Introduction:

- Begin by introducing the concept of data, statistics, and probability. Ask the girls if they have ever made predictions. What were they? How did they turn out?
- Ask the girls to think about a time when it is helpful to predict, even if the prediction is wrong. Try to steer them away from the weather—we are looking for other types of predictions.
- Then ask them if they can think of a time when they can predict something based on gathering data. You can see where we are going with this.

The activity:

- Set up the problem/question by introducing some of the vocabulary:
 - Prediction
 - Frequency
 - Graph
- Then set up the activity. Discuss each of these questions with the group and write their predictions on the board.
 - How many M&Ms™ are in each bag?
 - How many of each color are there in a bag?
 - Which color is there the most of or the least of in a bag?
 - Do all of the bags have the same number of candies?
 - Does each bag have the same mix of colors?
 - What is the distribution of colors over the bag?

Lay out small bags of M&Ms™ and paper towels on the tables, and have the girls use hand sanitizer before they open their bags and start counting. Remind them that they are allowed to eat the candy later, not now!

First have them count the total number of candies in the bag and enter the numbers on the worksheet

	Red	Yellow	Blue	Green	Orange	Brown	Total
Name							

Then have them enter their data into the Excel chart.



Here is a sample Excel chart for the girls to complete. You can set up two or three laptops for them to use, or have them each put their data into the same chart, which makes it easier to make charts on. If you pre-fill the formula for calculating percentages (but show the girls how you did it), they will be able to enter their data and see the percentages fill. Elementary girls don't get to use Excel much, but I find that they are fascinated by its power.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
1							M & Ms								
2	Name/Color	Red	Percentage	Blue	Percentage	Yellow	Percentage	Green	Percentage	Brown	Percentage	Orange	Percentage	Total in Bag	
3	(Girl)														
4	(Girl)														
5	(Girl)														
6	(Girl)														
7	(Girl)														
8	(Girl)														
9	(Girl)														
10	(Girl)														
11	(Girl)														
12	(Girl)														
13	(Girl)														
14	(Girl)														
15	(Girl)														
16	(Girl)														
17	(Girl)														
18	(Girl)														
19															
20	Total														
21															
22															
23															

Before you run the charts and graphs in Excel, discuss each of the predictions with the girls.

- How many M&Ms™ were in each bag?
- How many of each color were there in a bag?
- Which color was there the most of or the least of in a bag?
- Did all of the bags have the same number of candies?
- Did each bag have the same mix of colors?
- What was the distribution of colors over the bag?

Then run the charts and see how their predictions came out. You will all be surprised by the results, which are never the same from group to group or year to year.



Analyze and reflect

- What patterns do you see?
- How accurate are your predictions?
- How wide was the variation between the bags?
- What is the most commonly found color of candy?
- What is the least common?
- What are some possible reasons for variation in the bags?
- According to this article on eHow, http://www.ehow.com/how-does_4970368_how-candy-mms-made.html, the Mars Company predicts this distribution of colors. How did your data stack up against theirs?
- And here is a heavy statistic article for more investigation: <https://blogs.sas.com/content/iml/2017/02/20/proportion-of-colors-mandms.html>

And now, they can eat the M & M™s!