

Probability Using M&M's

Benchmarks:

Grades 3-4

Data Analysis and Probability

- A. Gather and organize data from surveys and classroom experiments.
- C. Construct charts, tables and graphs to represent data.
- F. Conduct a simple probability experiment and draw conclusions about the likelihood of possible outcomes.

Grades 5 – 7

Data Analysis and Probability

- B. Interpret data by looking for patterns and relationships, draw and justify conclusions, and answer related questions.
- E. Collect, organize, display and interpret data for a specific purpose or need.
- I. Describe the probability of an event using ratios, including fractional notation.
- K. Make and justify predictions based on experimental and theoretical probabilities.

Grades 8-10

Data Analysis and Probability

- A. Create, interpret and use graphical displays and statistical measures to describe data.
- K. Make predictions based on theoretical probabilities and experimental results.

Materials:

- Individual bags of M & M's
- Colored pencils (optional)

Process:

1. Give each student a bag of M&M's.
2. Before opening the bags, ask students to predict which color of M&M's will occur most frequently in their bag and which color will occur least often in their bag.
3. Have students open their bag of M&M's and sort them by color.
4. Have students complete the chart indicating the number of M&M's of each color in their bag.
5. Have students complete a pictograph for the distribution of colors in their bags.
6. Have students complete a bar graph for the M&M's in their bag.
7. Have students put their numbers of each color of M&M's on the charts at the front of the room.
8. When all of the numbers have been added to the charts, have students total the number of M&M's of each color to form the class data.
9. Have students enter the numbers of M&M's of each color for the class data in the chart.
10. Go back to the predictions made by students about which color occurred most frequently and least frequently. Talk about how many students predicted correctly.
11. Define experimental probability of an event. Recall that the probability of an event is the ratio of the number of times the event occurs compared to the total number of outcomes.
12. Have students calculate the probability of getting each color based on the number of M&M's of each color in their bags.
13. Have students calculate the probability of getting each color based on the total number of M&M's using the class data from the charts.
14. Have students compare the probability of each color in the student bags and the class data. Discuss why the probabilities might be different in individual student bags and the class data.
15. Which is more reliable data – the color count in a student bag or the totals found in the class data? Why?
16. Have students complete the "What's in the Bag?" worksheet.

My Bag of M&M's Color Chart

Color	Number
Brown	
Green	
Orange	
Red	
Blue	
Yellow	
Total	

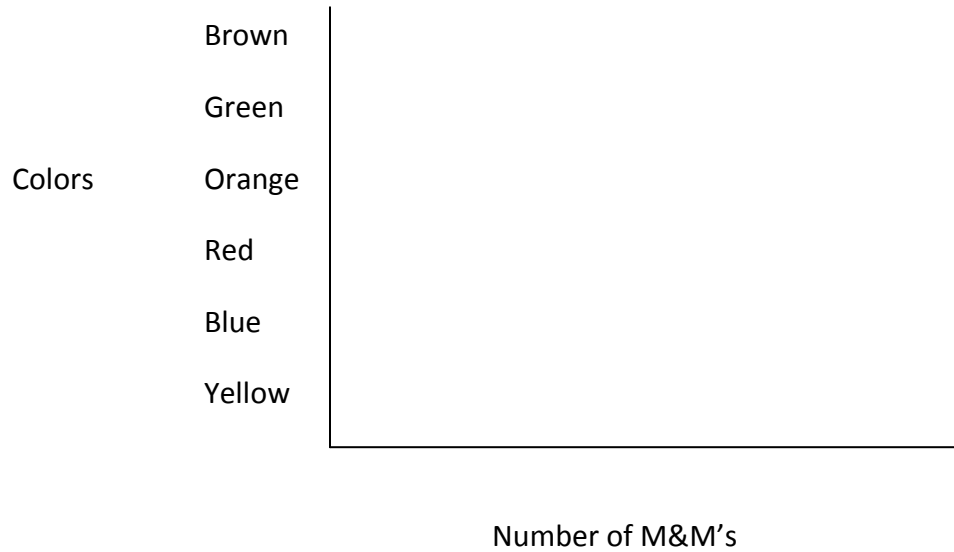
Pictograph of my bag of M&M's



Brown Green Orange Red Blue Yellow

Colors

Bar Graph of My Bag of M&M's



Compute the probability of each color based on the number of M&M's in student bag.

$P(\text{Brown}) = \underline{\hspace{2cm}}$

$P(\text{Green}) = \underline{\hspace{2cm}}$

$P(\text{Orange}) = \underline{\hspace{2cm}}$

$P(\text{Red}) = \underline{\hspace{2cm}}$

$P(\text{Blue}) = \underline{\hspace{2cm}}$

$P(\text{Yellow}) = \underline{\hspace{2cm}}$

Number of each color in class data:

Color	Number
Brown	
Green	
Orange	
Red	
Blue	
Yellow	
Total	

Probabilities Using Class Data:

Compute the probability of each color based on the number of M&M's in class data.

$P(\text{Brown}) =$ _____

$P(\text{Green}) =$ _____

$P(\text{Orange}) =$ _____

$P(\text{Red}) =$ _____

$P(\text{Blue}) =$ _____

$P(\text{Yellow}) =$ _____

What's In The Bag?

According to Mars, Inc., the manufacturers of M&M's plain chocolate candies, the distribution of colors in a 13.3 ounce bag of fun size bags should be: 24% blue; 20% orange; 16% green; 14% yellow; 13% red; and 13% brown. The average number of fun size bags in a big bag should be 18. Bags are packed by weight and the average weight of a fun size bag is 21 grams. The average number of M&M's in a fun size bag is 25. They only reject fun bags that are too light.

Record the number of each color of M&M's in the class data set in the table below.

Determine the total number of M&M's and the percent of each color.

Color	Brown	Green	Orange	Red	Blue	Yellow	Total
Number							
Percent							

Do the percents you found in the class data match the distribution given by the Mars company? Why might your percentages be different?

How could the company explain any discrepancies between its claim and the percents you found?