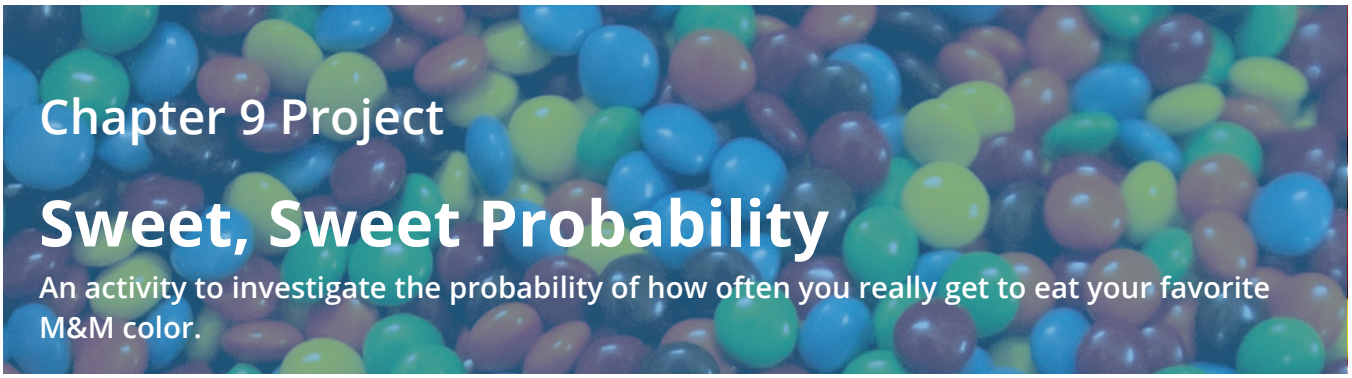

Chapter 9 Project

Sweet, Sweet Probability

An activity to investigate the probability of how often you really get to eat your favorite M&M color.

Probability is integral to the field of statistics. Many companies use probability...make decisions regarding what products they produce and how they produce them. For example, the confectionary division of Mars Inc. uses probability to determine how many M&M's they will make of each color. The color of M&M's candies has changed several times and for varied reasons since the candy was introduced in the 1940s. For example, in 1995, Mars Inc. launched an M&M's Color Campaign, which was a contest that introduced three new colors (purple, blue, and pink) to the public while asking the public to pick one of those colors to replace the tan M&M (blue won).

Mars Inc. used to publish the color distribution on their website but no longer does. Let's investigate the proportions used.

Assume you open a bag of regular M&M's and count the frequency of each color. Your results are shown in the table below.

Color	Frequency
Red	10
Orange	8
Yellow	12
Green	9
Blue	3
Brown	6

Use the data from the table above to answer the following questions.

1. What type of probability is being used for this investigation? Explain your answer.

2. If one M&M is randomly selected, find the probability of selecting a red M&M.

3. If one M&M is randomly selected, find the probability of selecting a blue M&M.

4. If one M&M is randomly selected, find the probability of selecting a pink M&M.

5. If one M&M is randomly selected, find the probability of selecting an M&M that is not brown.

6. If one M&M is randomly selected, find the probability of selecting an orange or a yellow M&M.
   - **a.** $P(\text{orange or yellow}) =$
   - **b.** Is this event mutually exclusive? Explain your answer.

7. If one M&M is randomly selected, find the probability of selecting a red or an orange M&M.
   - **a.** $P(\text{red or orange}) =$
   - **b.** Is this event mutually exclusive? Explain your answer.

8. If two M&M's are randomly selected, find the probability of selecting a blue M&M and a green M&M.

a. With replacement,

$P(\text{blue and green}) =$

Is this event independent or dependent? Explain your answer.

b. Without replacement,

$P(\text{blue and green}) =$

Is this event independent or dependent? Explain your answer.

9. If two M&M's are randomly selected, find the probability of selecting two red M&M's.

a. With replacement,

$P(\text{red and red}) =$

Is this event independent or dependent? Explain your answer.

b. Without replacement,

$P(\text{red and red}) =$

Is this event independent or dependent? Explain your answer.

10. Explain why the "with replacement" and "without replacement" probabilities are different.