

NAME _____

CLASS _____

DATE _____



M&M Probability



Which M&M color are you most likely to get? If you were to open a bag of Plain M&M's, what color would you most likely get? What color would you least likely get? Would your results be the same if you opened a bag of Peanut, Almond, Peanut Butter, Crispy, or Mini M&M's? Whenever you start to use the words "most likely" or "least likely", you are talking about probability.

I. Conducting the Experiment

Because we are not able to count all the different colors of M&M's that were created or will be created, we are not able to calculate the theoretical probability. So instead, we will find the experimental probability.

1. Take one bag of M&M's
2. Count the total number in the bag.
3. Separate the M&M's into each color.
4. Count how many M&Ms are in each pile.
5. Organize your data in a table. Answer the following questions:
 - Which color has the largest quantity?
 - Which color has the smallest quantity?
 - Is this what you expected to find? Why or why not?

II. Calculations

1. Calculate the probability of picking a certain color of M&M for each category. The probability is found by creating a ratio. (Do you remember what this is?) The number of M&M's in a color is placed in the numerator, the total number of M&M's is placed in the denominator. (Example, If there are 6 red M&M's and 54 total M&M's, the probability of picking a red M&M is $6/54$.)
2. Convert your fractions into decimals and percentages. Add these values to your table.
3. Remember, the more likely something is, the closer to 1 the probability will be. Answer the following questions:
 - What color is most likely?
 - Which one is least likely?
 - Are there any that are equally likely? (This means the probabilities are the same.)

III. Theoretical Probability

Before, we said that we could not calculate the theoretical probability for the colors of M&M's because we do not know all the possibilities. However, because The Mars Candy Company creates the M&M's, they can regulate the amounts of each color of M&M's that are created. They have posted the theoretical probabilities for the type of M&M's you used. (See <http://us.mms.com>.) Record this on your table in ratio form.

IV. Sample Table

Here is a sample table. Remember to record all the data you collect. Round decimals to the nearest hundredths place.

COLORS	TOTAL	FRACTION	DECIMAL	PERCENT	THEORETICAL
Red	6	6/54	.11	11%	13/100
TOTAL	54	1	1.0	100%	100%

V. Predictions

Make a prediction: How many of each color would be likely to be found in a bag of 50? 100? 250? 500? 1000?

Combine all the data from your class. Are your predictions close?

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Assignment/Reflection

1. Create a bar graph of your experimental probability.
2. Write a paragraph or more describing the process you went through, your findings, and reflections on those findings.

Include the following information in your paper:

- Compare the theoretical probabilities to the experimental probabilities.
- Describe any similarities and differences.
- Which do you think is more accurate? Why?
- Why do you think the makers of M&M's make more brown candies than green?

3. Try this experiment:

- Place 2 Brown, 2 Red, 2 Yellow, and 2 Green M&Ms in the bag.
- Draw another M&M out of the bag and do not put it back in the bag.
- Locate the row with that color
- Draw another M&M out of the bag.
- Locate the column with that color
- Place a tally mark in that cell
- Replace both M&Ms and repeat the process.
- Repeat the process the 20 times.

SECOND M&M

		BROWN	RED	YELLOW	GREEN
FIRST M&M	BROWN				
	RED				
	YELLOW				
	GREEN				

EXTRA: Research to find out why there was a period of years that no red M&M's were made. When did they start including red M&M's in the packages again? Write a paragraph or more to share your findings.