

Candy Quality Control

Have you ever purchased a product and been so excited to open it just to learn it is broken or something is missing? Manufacturers want to ensure their products satisfy their customers and meet the standards they claim. These quality standards are sometimes regulated and are referred to as quality control. Mars Inc. has hired you as a quality control specialist to use your math skills to inspect a bag of *M&Ms™* to determine if the bag meets the company's standards.

TEKS:

- 6.1A Apply mathematics to problems arising in everyday life, society, and the workplace.
- 6.4G Generate equivalent forms of fractions, decimals, and percentages using real-world problems.

How To:

- You have just started working for Mars, Inc. in the *M&M™* Department. You have been assigned to the Quality Control division. As with all new employees, your supervisor provided you with the following facts about *M&Ms™*:
 - The six-color blend in *M&Ms™* should include:
 - 30% brown
 - 20% yellow
 - 20% red
 - 10% orange
 - 10% green
 - 10% blue
- First, make predictions about what you think you'll find in the bag. *What percentage of M&Ms™ do you think will be chipped or broken? What percentage of each color do you think you'll find?* Record your predictions on your *Quality Control Activity Sheet*.

Materials:

- Bag of *M&Ms™*
- Quality Control Activity Sheet (attached below)
- Calculator
- Pencil

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How To (continued):

3. Next, open the bag and count the total number of *M&Ms™*. Record this number in the 'Total Number of *M&Ms™*' row. Separate the chipped or broken *M&Ms™* from the rest and count the number of unbroken *M&Ms™*. Record this number on the sheet in the 'Actual Numbers of *M&Ms™*' column.
4. Then, sort all of the *M&Ms™* (including chipped/broken) into the 6 color groups. Count and record these numbers.
5. Finally, find the percentage of each color for the '*M&Ms™* Quality Control Check' column. Take the 'Actual Number of *M&Ms™*' for a color and divide it by the 'Total Number of *M&Ms™*' and multiply by 100. Compare this number to the '*M&Ms™* Quality Standard' percentage and determine if the standard was achieved.

The STEM Explanation:

Percentages are the rate of an event out of 100. For example, if you were to flip a coin 100 times, you could tally the number of times it lands heads up and that number would be the percentage of time the coin lands heads up. When you can't observe something 100 times (because a bag of *M&Ms™* doesn't contain 100 pieces), you can count your observations and divide your event by the total number and then multiply by 100. *Did you find that the percentages of each color in your bag matched the percentages for *M&Ms™* Quality Standard?* Unfortunately, there are too many bags of *M&Ms™* in the world to verify that every bag has the correct blend of colors. Quality control specialists test a few bags and then use the average results to predict the quality of the rest of the bags.

Career Connection:

The main function of a *quality control specialist* is measuring whether or not a current product meets a set of quality standards. They are also involved in planning how often sampling will be performed, determining the standards by which quality will be judged, and make recommendations as to how products and the quality control process can be improved. Quality control specialists work in a variety of industries; they monitor quality standards for nearly all manufactured products, including foods, textiles, clothing, glassware, motor vehicles, electronic components, computers, and structural steel.

Resources:

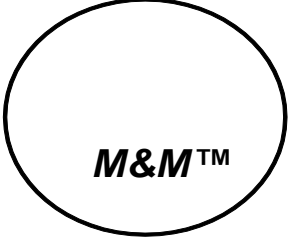
- <http://www.academicinvest.com/science-careers/mathematics-careers/how-to-become-a-quality-control-specialist>
- <http://www.m-ms.com>

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Quality Control at the M&Ms™ Factory Activity Sheet

What color of M&M™ is your favorite?	M&Ms™ Quality Standard	Unopened Package Predictions	Actual Number of M&Ms™	M&Ms™ Quality Control Check	M&Ms™ Quality Standard Achieved
	Provided by factory	Make predictions before opening the bag of M&Ms™	Count your M&Ms™ and record your data	Calculate the % Divide the # of colored M&Ms™ by the total # of M&Ms™. Then, multiply by 100.	Answer Yes or No
Total Number of M&Ms™	100%				Yes or No
Number of chipped/broken M&Ms™	0%	%			Yes or No
Number of brown M&Ms™	30%	%			Yes or No
Number of yellow M&Ms™	20%	%			Yes or No
Number of red M&Ms™	20%	%			Yes or No
Number of orange M&Ms™	10%	%			Yes or No
Number of green M&Ms™	10%	%			Yes or No
Number of blue M&Ms™	10%	%			Yes or No

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