

M&M's and the Scientific Method-Teacher Version

Grade Levels: High School

Objective:

- Introduce the scientific method including terminology
- Provide a fun activity for students to experience how the scientific method is used

Stage and duration of activity: 50 minutes

Handouts: Yes

- [M&M Group Activity](#)
- [Definition Sheet](#)

Description of activity

Supplies: One regular sized bag of M&M's for every 2 to 3 students
One regular sized bag of M&M's for demonstration
One bag of peanut M&M's and one large bag of M&M's

Introducing M&M Activity to Class

The teacher holds up a bag of regular sized M&M's. The teacher asks a question to begin the discussion--*What things might we want to know about this bag of M&M's?* Students will respond with a variety of inquiries--*How many M&M's are in the bag? What color M&M's are in the bag? How many of each color M&M are in the bag? How much does one M&M weigh? How much does the bag weigh?*

The teacher chooses one question. A useful introductory question is--*How many M&M's are in the bag?* Students guess the number of M&M's. Using the framework of students' guesses, the teacher introduces scientific terminology. For instance, during the discussion of answers to the question of how many M&M's are in the bag, the numbers put forth are **hypotheses**. At this point, the teacher should write the definition of the new scientific term on the board and have students copy it onto their definition sheet. In addition, the teacher writes 'Hypotheses' on the board and lists the numbers volunteered by students underneath the word. After asking many if not all of the class to respond with a hypothesis about how many M&M's are in the bag, the teacher asks—*How do we determine which hypothesis, if any, is correct?* Usually, a student will ask the teacher to open the bag. The teacher then introduces the concept of **data collection** to determine if one's hypothesis is correct. The teacher opens the bag, counts the number of M&M's and writes 'Data' under which she writes the number counted in her bag. Following the introduction, students form small groups to complete the M&M activity.

Activity

Break students into groups of 2 or 3 students. Hand out directions (see Handout). Read directions aloud while students follow along. Allow students about 15 minutes to complete the activity.

Follow-up

The teacher brings the class back together and asks all of the groups about their questions and the answers that were found. At this point, the teacher asks every group to fill out a data table about the multiple bags of M&M's—*How many M&M's are in the bag and How many of each color M&M are in the bag.* By collecting the data from all of the groups, the teacher introduces the concept of **multiple trials**. (One discovers that the number of M&M's per bag is not constant nor is the number

of each color in the bag resulting in variation between M&M bags and the potential for calculations using the data.)

Example Table for Board:

Group #	Total Number of M&M's in bag	Number of Green M&M's	Number of Brown M&M's	Number of Yellow M&M's	Number of Orange M&M's	Number of Blue M&M's
1						
2						
3						
4						

Data Analysis

Using the data from the class, the teacher is able to address the idea of variance in data. To follow up the teacher asks—*From our data, what would be an accurate way to determine the number of M&M's in a random bag I pick up at the grocery store?* The average of the numbers provides an accurate description of the number of M&M's in a randomly chosen bag. Also, the average number of each color M&M per bag may be calculated. In addition to the average calculations, the class determines the median and mode for the total number of M&M's per bag and/or the number of each color of M&M per bag. Students may also graph the data in histograms and/or pie charts (color-coded graphs follow easily from the M&M colors).

Extension

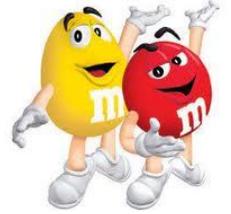
Extending the concepts one step further, the teacher brings out a bag of peanut M&M's and asks—*Do we know anything about this bag of M&M's based on our data?* Additionally, the teacher may want to bring out a large bag of M&M's and ask—*Do we know anything about this bag of M&M's based on our data?* At which point the teacher introduces inference. Often, one group determines the weight of a single M&M during the group activity. If not, the teacher weighs an individual M&M. Dividing the weight of the large bag by the weight of a single M&M determines the number of M&M's in the large bag (disregarding the weight of the bag).

M & M's Activity Sheet

An Introduction to the Scientific Method

Introduction: Mrs. Willis is holding a cup of M & M's in front of the class. What things might we want to know about this cup of M & M's? List 3 questions that you would want to know about this cup.

- 1)
- 2)
- 3)



Background Definitions: Fill these in before we start on the activity.

-Hypothesis:

-Data Collection:

-Multiple Trials:

-Variation:

-Average:

Activity Directions:

1. You will be working in partners (your 2 o'clock partner).
2. Gather 1 cup/bag of M & M's per group.
3. Decide on one question you would like to answer about your bag of M & M's. Write the question down below.
4. Guess what the answer to your question might be (**hypothesize**). Write your hypothesis down below.
5. Pour your cup of M & M's out and answer your question (**data collection/ experimentation**). Record your data in the data table under Group 1. As a class, we will gather other group's information so we can gather an average and a more accurate answer.
6. Also, be sure to count the total number of M & M's in your cup and record in the data.

Question to be Answered:

Hypothesis (Your educated guess to the question):
