M&M Estimation

Subject Area(s)   Data analysis & Probability

Associated Unit

Associated Lesson

Activity Title M&M Estimation

Grade Level 5 (4 -6)

Time Required 1 hour

Group Size 4

Expendable Cost per Group US$ 4

Summary

This activity is designed to teach students how to analyze data using mean, median, mode, and range. Students perform the analysis by counting M & M's from various sized packages. Students will discuss when it is appropriate to estimate and when it is appropriate to use exact measurements.

Engineering Connection

Engineers, of all disciplines, perform data analysis. While making calculations they must determine when it is acceptable to estimate and when it is necessary to use exact measurements. When designing specifications for a bridge or road a civil engineer wants to be exact with her measurements. To be sturdy and safe it is important that the structure is built exactly to the measurements in the specification. On the other hand, if a materials engineer were rehydrating a material he may not need to have an exact amount of water to complete the process.

Keywords

Estimation, Sampling, Mean, Median, Mode

PA Educational Standards
- Math:
    - 2.6.5 (B) Describe data sets using mean, median, mode, and range.
    - 2.6.5 (A) Organize and display data using pictures, tallies, tables, charts, bar graphs, and circle graphs

Pre-Requisite Knowledge
The students should be familiar with mean, median, mode, and range although it is not necessary.

Learning Objectives
After this activity, students should be able to:
- Find the Mean, Median, Mode, and Range of a series of data

- Understand when to estimate and when to use exact measurements

Materials List
Each student needs:
- 1 snack-sized bag of M & M's

Each group needs:
- 1 small bag of M & M's

To share with the entire class
- 1 family sized, very large, bag of M&M's

- Crayons or colored pencils – red, blue, green, brown, orange, green, yellow

Introduction / Motivation
The use of samples enables them to better understand the larger population using information from the smaller group. This is often done when it is either too costly or impractical to collect data from the larger group. For example, if an environmental engineer wants to learn about the impact a substance has on grazing patterns of a wild animal she might identify a few animals to study out of a larger group. Using this data she can find out about the entire group without having to monitor each animal individually.

Vocabulary / Definitions

Word	Definition
Mean	The sum of the set of numbers divided by n, the number of numbers in the set.
Median	The number that lies in the middle when a set of numbers is arranged in order. If there are two middle values, the median is the mean of these values.
Mode	The number(s) that occurs most often in a set of numbers
Range	The difference between the greatest number and the least number in a set of data.
Estimate	An approximate calculation or judgment of a value

Procedure

1) Construct an unlabeled data table, similar to the one in worksheet, and ask the students to fill in the appropriate labels. Discuss why the labels belong in the correct locations.

2) Provide each student with one snack sized pack of M&M's. Instruct them to count the number of each color in their package.

3) In their individual notebooks/papers have students recreate and complete the table with the values of from their personal pack of candies.

4) Have the students calculate the percent of each color and note this in the table.

5) Construct a chart of your choice such as, bar chart, pie chart, etc., based on the data table. Allow students to construct charts based on their own data.

6) Calculate the mean, median, mode, and range for the data from each set of colors.

7) Provide each group of students with a larger bag of M&M's.

8) Repeat the procedure allowing them to work in a group to count the colors, record the data in a new table, and create a new chart.

9) As a class calculate the mean, median, mode, and range for each of the colors.

10) Construct a chart of your choice using the data from the larger package.

Assessment

Post-Activity Assessment

- Discuss the patterns in the data; does one color have the greatest frequency from all of the packs? Is one color the least frequent among all the packs? Did it take longer to count the smaller or larger packs?

- Discuss how students could use the information gained from counting the smallest snack pack and larger packs to estimate the percentage of the colors in the largest family sized bag.

- Considering how much longer it took to count the larger packs would want to count the very large pack to find out how many of each color are inside? Would you estimate using the information you know from the other packs?

Owner

Drexel University GK-12 Program

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M&M Estimation Worksheet

Name_____

Date_____

M & M Sample Table

Color	Group 1	Group 2
Yellow		
Red		
Orange		
Green		
Blue		
Brown		