What's in the Bag

Candy – Chart Project

What's in the Bag

In this lesson, students learn the benefits of using different kinds of graphs to communicate information, answer questions, and solve problems as they investigate color distribution in bags of M&M's. Working with actual bags of candy, students sort and classify contents, learn to use formulas in a Microsoft Office Excel spreadsheet, summarize their findings on a worksheet, convert the numbers into charts, and make predictions about color distribution in other bags of candy.

Goal:
Students will be introduced to the concept of charting as a way to communicate information. This charting will be done using Microsoft Excel.

Objectives:

Students will work in pairs to record color distribution in a spreadsheet format.

Students will use formulas in an Office Excel spreadsheet.

Students will convert the spreadsheet information into several kinds of charts.

Students will utilize information obtained to predict distributions.

Lesson Procedure

Introduction:
Not all information is the same. To communicate different kinds of information effectively, we need to graph the information in different kinds of charts. Some data collections are better represented by bar charts, for example, while others may be easier to interpret as line charts or pie charts. It is important to select a chart type that gets the message across in the most effective way. There are no sure-fire rules that determine which chart type to select for a particular data set, but there are helpful guidelines. For example, bar charts allow for a comparison of values within a category, line charts emphasize a progression of change, and pie charts show the relationship of a part to the whole.

In this lesson you will learn how to use charts to communicate information effectively by conducting market research about M&M's. First, you will sort and classify the contents of several bags of M&M's by color, using bags with different weights. Next you will record the number of candies for each color and summarize your findings on a worksheet created in Office Excel. Then you will convert the numbers into several kinds of charts and make predictions about color distribution in other bags of candy.

Main Activity

Step 1 – Color Distribution
Work in pairs to gather data from several small-sized bags of M&M's or from two larger-sized bags.

1. Before opening the bag, answer the questions on the ***"What's In the Bag - Predictions"*** worksheet.
2. Open the bag and write down how many M&M's there are of each color.

Step 2 – Create a Spreadsheet

1. Open **Microsoft Office – Excel**
2. Click on **Row 1**
3. Type these Column Headings in the correct cell (Type in all caps)
    a. **A1** – COLORS
    b. **B1** – BAG 1
    c. **C1** – BAG 2
    d. **D1** – BAG 3
4. Format the Headings – All Caps, Center and Bold
    a. Click the **1** on the side (Highlights the whole row)
    b. Format the text by clicking on **Bold** and **Center**
5. Click on **Column A**
6. Type these Row Titles in the correct cell (Text automatically Aligns Left)
    a. **A2** – Blue
    b. **A3** – Brown
    c. **A4** – Green
    d. **A5** – Orange
    e. **A6** – Red
    f. **A7** – Yellow
    g. **A8** – TOTAL
    h. Since Cell A8 is a title
        i. Click on **Cell A8**
        ii. All Caps, Bold, Center

Step 3 – Add Up Colors in Each Bag and Create a Column Chart

1. Create a formula that adds the numbers in each column
    a. Click on cell, **B8**
        a. Type this formula - ***=sum(B2:B7)***
        iii. Hit **enter**
    b. Drag the formula across to all cells in the TOTALS row
        i. Click on cell **B8** and put the mouse in the right corner to get a black cross **+**
        ii. Hold the mouse and drag to highlight Cells **B8 to D8**
        iii. The formula is now in all of the columns
    c. Enter the data from the "What's In The Bag – Predictions and Results" worksheet
        a. Numbers will Align Right
        b. Notice as numbers are entered that the TOTALS row changes
2. Create a Column Chart
    a. Click on cell, **A1**
    b. Hold your mouse
    c. Highlight cells **A1-A8**, **down to D8**
    d. Release the mouse
    e. Click on **Insert – Chart**
    f. Click on **Column Chart** (default chart)
    g. Click **Next**
    h. Make sure **Columns** is selected
    i. Click **Next**
    j. **Chart Title** = What's In The Bag
    k. **X-Axis Title** = M&M Colors
    l. **Y-Axis Title** = Number of M&Ms
    m. Click **Next**
    n. Make sure **As Object In** is selected
    o. Click **Finish**

Step 4 – Sort the Data

1. Change the order so that the colors are arranged from least to greatest
    a. Click on Cell, **A2**
    b. Hold your mouse
    c. Highlight over to cell, **E2 and down to cell, E7**
    d. Click on **Data – Sort**
    e. Sort by, **COLOR TOTALS**
    f. Click **OK**

Step 5 – Add Up Color Totals and Create a Pie Chart

1. Create a formula that adds up the totals of each color
    b. Click in cell, **E1**
    c. Type the title – **COLOR TOTALS**
    d. Format the cell
        i. All Caps, Bold, Center
        ii. **Wrap Text** so title fits in cell
            1. Click on cell, **E1**
            2. Click on **Format – Cell**
            3. Click on **Alignment tab**
            4. Put a checkmark next to **Wrap Text**
            5. Click **OK**
    e. Click in cell, **E2**
        i. Type this formula - ***=sum(E2:E7)***
        ii. Hit **enter**
    f. Drag the formula across to all cells in the COLOR TOTALS columns
        i. Click on cell **E2** and put the mouse in the right corner to get a black cross **+**
        ii. Hold the mouse and drag to highlight Cells **E2 to E7**
        iii. The formula is now in all of the cells
2. Create a Pie Chart
    a. Click on cell, **A1**
    b. Hold your mouse
    c. Highlight cells **A1-A7**
    d. Hold the **Ctrl key**
    e. Click on cell, **E1**
    f. Hold the **Ctrl key** and the mouse and scroll down to **E7**
    g. Release the mouse
    h. Click on **Insert – Chart**
    i. Click on **Pie Chart**
    j. Click **Next**
    k. Make sure **Columns** is selected
    l. Click **Next**
    m. **Chart Title** – Color Totals
    n. Click **Next**
    o. Make sure **As Object In** is selected
    p. Click **Finish**
3. Change the Color on the Pie Chart to Match the Color of the M&M
    a. **Double-Click** the little square in the legend next to the first color
    b. Choose the **right color**
    c. Click **OK**
    d. Continue until all colors are accurate

Conclusion

Assess students on any or all of the following skills:

- ☐ The accuracy of their data collection
- ☐ The successful completion of a spreadsheet that includes formulas
- ☐ Their ability to work and problem solve collaboratively
- ☐ Their ability to create different and appropriate charts

Lesson extension activities:

- ☐ After the lesson, encourage students to use Internet Explorer to visit the M&M's Web page and take a virtual tour of the factory. They can send electronic mail to the company, indicating which colors they like best, which colors they would like to see more of, and which new colors they would like to see in future bags of candies.
- ☐ Encourage older students to summarize their research findings in a letter to the Consumer Affairs Department, M&M/Mars, 800 High Street, Hackettstown, NJ 07840-1503. Students can use the Microsoft Word Letter Wizard to get started.

Teacher Tips:

A ratio is a comparison between two numbers, usually represented by two numbers separated by a colon. Students can find multiple ratios with the colored candies. For example, you may ask them to find the ratio of yellow candies to brown candies. If there are seven yellow candies and nine brown candies the ratio of yellow to brown candies would be represented by 7:9.

When using ratios, the order of numbers and words are important. The numbers should be written in the same order as stated. For example, in the ratio of yellow to brown candies the number of yellow candies is written in front of the colon while the number of brown candies is written behind.

To compare ratios, change the ratio to a fraction, having the first number become the numerator and the second the denominator. Using the example above, the ratio 7:9 would become 7/9. The ratios are equal if the fractions are equal, for example, 7:9 = 14:18 because 7/9 = 14/18.

Credit:

The following information was adapted from the following sources:

http://www.microsoft.com/education/candy.mspx

http://www.sedl.org/afterschool/lessonplans/index.cgi?show_record=100

What's In the Bag?
Predictions

Work with your partner to make predictions about what is in your bag of M&M's. Before opening the bag, answer each question.

1. Do bags of equal weight have an identical number of candies?

2. Are all colors represented equally, or are some more popular than others?

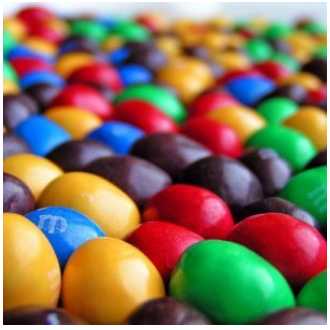
3. Does color distribution remain constant, no matter how small or large the bag?

4. Open your bag and write down how many of each color are in your bag:

Colors

Blue	
Brown	
Green	
Orange	
Red	
Yellow	

What's In the Bag?
Results



Work with your partner to answer the questions about what was in your bag of M&M's. Use your Excel spreadsheet and chart to answer each question.

5. Do bags of equal weight have an identical number of candies?

6. Are all colors represented equally, or are some more popular than others?

7. Does color distribution remain constant, no matter how small or large the bag?

8. Summarize how your predictions compare to your results.