

## Data Analysis Project—Allan Edwards & Chris Cunningham

To develop data and analysis project that can be used in Math 302, an instructional strategies course, for middle school math teachers. This activity will reflect some of the instructional goals and objectives on probability, statistics and technology from seventh and eighth grade mathematics that are required by the State of West Virginia.

Allan Edwards Math 302 class will complete this activity this fall semester.

The IGOs that are covered by each activity are listed below.

**Activity I covers IGOs 7.29, 7.31, 7.54, 8.9, 8.10, 8.26, 8.34**

**Activity II covers IGOs 7.28, 7.32, 7.48, 7.51, 7.54, 8.28, 8.29, 8.30, 8.51, 8.57**

**Activity III covers IGOs 7.4, 7.28, 7.48, 8.25, 8.30, 8.48**



## **M & M Project**

### Materials Needed:

1. Small Package of plain M & M's for each group of students.
2. Package of small Dixie cups.
3. Graphing Calculator with statistical capabilities.
4. Overhead Sheet for Data Collection
5. Straight edge, compass, and protractor for each group
6. Graphing Calculator View-screen or Presenter.

### General Procedure:

1. Give each group of students a bag of M&Ms and seven Dixie cups.
2. Have the groups answer questions 1-4 on Activity I before they open their bags.
3. Have each group sort their M&Ms by color. Place all M&Ms of the same color in each of their seven cups.
4. Have each group count the number of each colored of M&Ms in their bag and note the total number of M&Ms in there bag.
5. Separate the attached Activity Sheets in order to handout the accompanying activities you wish to complete.



8. Construct the bar chart using your calculator that you did by hand in question

9. Construct a bar chart of the total of each color for the class using your calculator. Use the graph link to print a copy of this screen.

## Activity II Measures of Central Tendency and Variance

1. Enter the total column in L1 on your calculator and rename this list as total. Delete L1 and enter each group's totals per color in L1-L6.
2. Complete the following table doing the calculations by hand or by using the statistical features of your grapher.

Statistic	Purple	Red	Yellow	Blue	Green	Orange	Brown	Total
Mean								
Median								
Mode								

3. Which of the three measures would be the best to use as a measure of the middle for each color and total.

4. Complete the following table doing the calculations by hand or by using the statistical features of your calculator.

Statistic	Purple	Red	Yellow	Blue	Green	Orange	Brown	Total
Range								
Standard Deviation								
Inter-quartile Range								

5. What can be said about the variation of each color per-bag?
6. What can be said about the variation in the total number of M&Ms per-bag?
7. Which color appears most frequently? Explain why you think this is the case.
8. Which color has the most variation? Explain how this variation could be made smaller.

9. What observations can you make about the quality control process at M&M Mars based on the information above?

### Activity III-Probability

1. Calculate each of the following probabilities for selecting one M&M from your groups bag of M&Ms. Express each of the probabilities in the following equivalent forms.

Percent

Fraction

Decimal

a. P (Red)

b. P (Yellow)

c. P(Green)

d. P(Blue)

e. P(Orange)

f. P(Brown)

g. P(Purple)

2. Compare your results with that of the other groups. Are they the same or different? Explain.

3. If you were going to select two M&Ms from your bag one at a time eating the first one before you select another, what would the following probabilities be? (You may express these in a form of your choice)

a. P(both are red)

b. P(Yellow on the first and green on the second)

c. P( both are green)

d. P(neither are green)

e. P(Brown on the first or Blue on the second)

f. P(Blue on the first and Brown on the second)

g. P(Purple on the first or red on the second)

4. If the entire classes M&Ms were placed in one bowl, what would the probabilities be for problems 1 and 3?

- |   | <u>Percent</u> | <u>Fraction</u> | <u>Decimal</u> |
|---|----------------|-----------------|----------------|
| a. P (Red)  |                |                 |                |
| b. P (Yellow)                                     |                |                 |                |
| c. P(Green)                                       |                |                 |                |
| d. P(Blue)  |                |                 |                |
| e. P(Orange)                                      |                |                 |                |
| f. P(Brown)                                       |                |                 |                |
| g. P(both are red)                                |                |                 |                |
| h. P(Yellow on the first and green on the second) |                |                 |                |
| i. P(both are green)                              |                |                 |                |
| j. P(neither are green)                           |                |                 |                |
| k. P(Brown on the first or Blue on the second)    |                |                 |                |
| l. P(Blue on the first and Brown on the second)   |                |                 |                |

