

S01 Activity - Data Collection and Visualization

Outcome: EM11 S01 Students will be expected to analyze, interpret, and draw conclusions from one-variable data using numerical and graphical summaries.

Materials Needed:

- 2.17 oz (or smaller) bags of Original Skittles candies - one per group. *As an alternative, teachers may choose to use 5 different colours of multi-link cubes. This activity would be run the same way, instead of opening a package of skittles, students would have a paper bag with a scoop of blocks in it.*
- *If using Multi-link cubes, in front of students, mix these in a large container and then scoop out and dump scoop into paper bags before handing out paper bags to students.*

Part 1 Introduction:

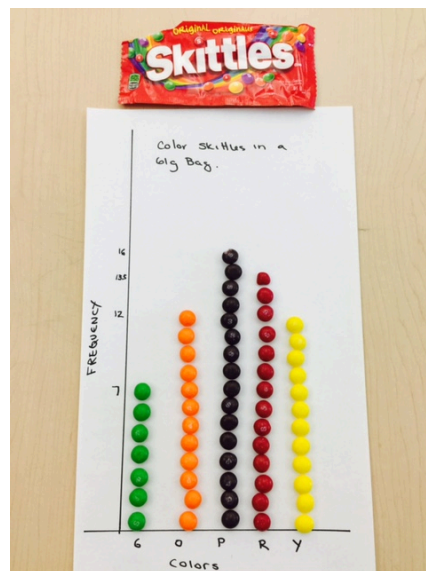
Have students estimate the total number of candies in a bag of Skittles *or the number of multi-link cubes in their bag*. What strategies did students use to make their estimate? Do they think there will be the same amount of each colour? Why or why not? *You might use the "Skittles Estimation Warm-up" google slides file.*

Assessing Prior Knowledge:

To give students some additional practice with data collection and analysis prior to the hands-on part of this activity, *you might choose to use the "Skittles APK" google doc handout or revise this document to use with multi-link cubes.*

Activity Part 1 - Data Collection:

Discuss what students know about the color distribution of Skittles *or multi-link cubes*. Is it possible to predict which color will be most popular in a bag of Skittles *or cubes*? Are the colors evenly distributed? If not, which one is most popular? How can we find out? Discuss appropriate methods for data collection to answer these questions. Hand out Data Collection tables. Explain how students are to collect color information - Do a sample bag on the board for the class. Ask students if they think their bag will be the same as yours...why or why not? Discuss variability. (The picture at right is from Jocelyn Procopio at Citadel High School who did a similar activity with her Math at Work 11 students <http://mathallaroundus.weebly.com/math-all-around-us/skittle-stats>)



Hand out bags or have students take theirs out. All groups should have the same size bag (trial or 2.17 oz). Students should open bags and create a physical bar graph on a sheet of paper

using their skittles **or cubes**. Their page should include axis labels. Once completed, they should record their data in a table. All groups should copy their completed table to a “Master” table or dot plot on the board or submit using a Google Form. When all students are done, have them compare their data to the combined class data. Any similarities? Differences? Extremes? What conclusions can we reach from this activity? Can we answer our original questions?

If you are using Skittles for this activity consider that:

A massive undertaking in 2002 counted 504,032 Skittles and came up with the following distribution: Green 19.7%, Yellow 19.5%, Orange 20.2%, Red 20% and Purple 20.6%. How does your class data compare with this data? Why might there be differences?

Student Data Table:

Color	Green	Yellow	Purple	Red	Orange	Total
Tally						
Percent						

Groups should now remove the Skittles **or cubes** from their bar graphs and draw the bars using coloured pencils.

The overall colour distribution of Skittles **or cubes** is fairly equal. For Skittles the colours of each large production batch are blended and then mixed thoroughly. However, since the individual packages are filled by weight on high-speed equipment, and not by count, it is possible to have an unusual colour distribution. As an extension, you might investigate the colour distribution of M&M candies (or have half the class use Skittles and the other half use M&Ms). There are six different colours of M&Ms and the colour distribution of these candies is not equal. M&M color blends are determined by conducting consumer preference tests, which indicate the assortment of colors that pleased the greatest number of people and created the most attractive overall effect.

Part 2 Introduction:

Have students review Mean, Median, Mode and Range. *You might use the “Mean and Range Game” google slides file. You might also start with the “Which One Doesn’t Belong?” google slides file.*

Activity Part 2:

Review different types of visualizations using the images/information in the following websites:

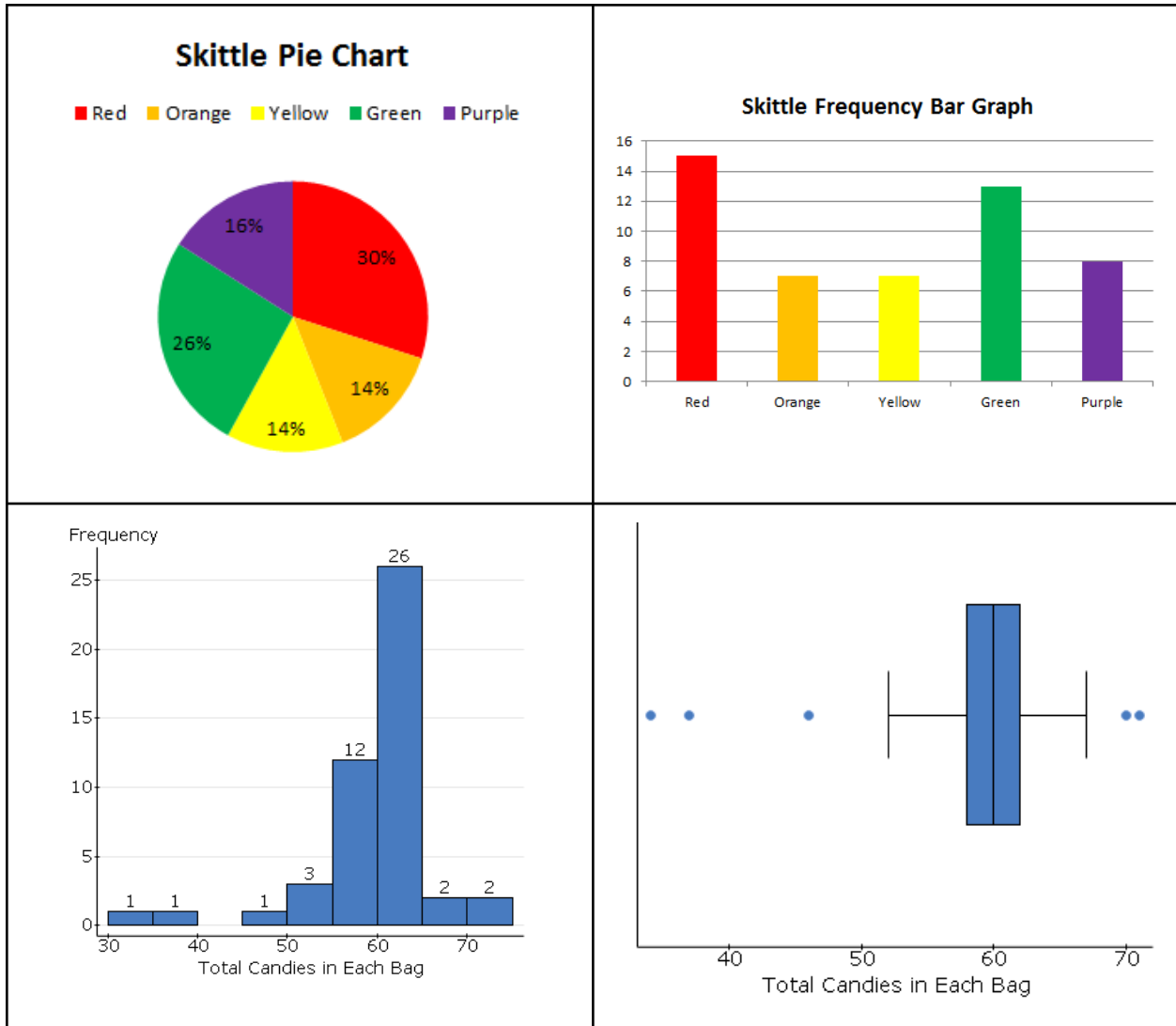
<http://www.everydayanalytics.ca/2015/05/data-visualization-fundamentals-with-skittles.html>

<https://www.labnol.org/software/find-right-chart-type-for-your-data/6523/>

You might also use the “Data Visualization Fundamentals Using Skittles” google slides file.

If available, compare your class data to other Extended Math 11 classes’ data.

Have students create a variety of different visualizations for your class data. You might use box-and-whisker plots, stem-and-leaf plots, and histograms, for the total candies or amount of each colour of candy or cubes in each bag. You might also use bar graphs and pie charts for the colour distribution in each bag. Discuss benefits/disadvantages of each type of display. What are some other types of displays that you might use?



Some graphs from: <http://lchappellportfolio.weebly.com/statistics.html>