

# Math 1040 Skittles Term Project

## Introduction

This project will allow you to pull together many of the concepts you are studying this semester, including organizing and analyzing data, drawing conclusions using confidence intervals and hypothesis tests, and presenting your work in a well organized paper. Your overall report will be a narrative that clearly explains your process and your conclusions. Your included mathematical calculations may be neatly handwritten and scanned, but overall summaries and written conclusions must be word processed.

This is the signature assignment for this course. It is to be posted in your e-portfolio as a single document. Your e-portfolio must be linked through your SLCC MyPage account. See the specific e-portfolio instructions for details.

## Data Collection

Each student in the class will purchase one 2.17-ounce bag of Original Skittles and record the following data:

Number of red candies	Number of orange candies	Number of yellow candies	Number of green candies	Number of purple candies

Count only whole candies, disregarding any partial candies in the bag.

Record this information on the provided worksheet, so that you may quickly access it again.

**You must e-mail (to my e-mail address, [susan.nelson@jordandistrict.org](mailto:susan.nelson@jordandistrict.org)) this information to your instructor by **DEADLINE March 13th**.**

Your instructor will compile all the data from the whole class, along with the total number of candies in each bag, the total number of bags, and the total number of candies. An Excel file containing this information will be posted on the class website. This will be the data set that you will be using to complete the rest of the term project.

## Report Introduction

Your report must begin with an introduction explaining the process of the project. Do not assume that your reader knows in advance what the assignment is about. Get started on your introduction paragraph. Explain the overall procedures and goals of the assignment in your own words. Note that you will be editing and adding to this introduction as you proceed through all the parts of the project.

## Organizing and Displaying Categorical Data: Colors

First, you will determine the proportion of each color within the overall sample gathered by the class. To do this, you will create a Pie Chart and a Pareto Chart for the numbers of candies of each color. Note that as you work with this variable, the sample size is the total number of candies. Your graphics must have descriptive titles and be appropriately labeled. Throughout this project, represent proportions as decimals rounded to three places.

Write a paragraph discussing your observations of this data. Do the graphs reflect what you expected to see? Does the overall data collected by the whole class agree with your own data from a single bag of candies? In addition to the Pie and Pareto charts, include tables showing the results of your own bag of candies and the results for the entire sample.

## Organizing and Displaying Quantitative Data: the Number of Candies per Bag

Here we are interested in the mean number of candies per bag. Note that for this variable the sample size is the total number of bags. Using the total number of candies in each bag in the class sample, calculate the mean, standard deviation, and 5-number summary. Round the mean and the values in the 5-number-summary to one decimal place. Round the standard deviation to two decimal places. Create a frequency histogram and a boxplot for this data. Your graphics must have descriptive titles and be appropriately labeled.

Write a paragraph discussing your observations of this data. What is the shape of the distribution? Do the graphs reflect what you expected to see? Does the overall data collected by the whole class agree with your own data from a single bag of candies? In addition to the summary statistics and boxplot, include the number of candies from your own bag and the total number of bags in the sample.

### Reflection

Explain the difference between categorical and quantitative data. What types of graphs make sense and what types of graphs do not make sense for categorical data? For quantitative data? Explain why. What types of calculations make sense and what types of calculations do not make sense for categorical data? For quantitative data? Explain why.

**Submit your work to this point (in class, *on paper*) to your instructor by the DEADLINE April 3rd.**

## **PART 2 of your semester project for Math 1040**

### Confidence Interval Estimates

Explain in general the purpose and meaning of a confidence interval.

Construct a 95% confidence interval estimate for the true proportion of red candies.

Construct a 99% confidence interval estimate for the true mean number of candies per bag.

Discuss and interpret the results of each of your two interval estimates. Include neatly written and scanned copies of your work.

### Hypothesis Tests

Explain in general the purpose and meaning of a hypothesis test.

Use a 0.05 significance level to test the claim that 20% of all Skittles candies are red.

Use a 0.01 significance level to test the claim that the mean number of candies in a bag of Skittles is 55.

Discuss and interpret the results of each of your two hypothesis tests. Include neatly written and scanned copies of your work.

### Reflection

Discuss the conditions for doing interval estimates and hypothesis tests and discuss whether or not your samples met these conditions. What possible errors could have been made by using this data? How could the sampling method be improved? State what conclusions you have drawn from your statistical research.

**Submit your work to this point to your instructor by the DEADLINE May 8th.**

## Optional:

### Reflective Writing and e-Portfolio

You may use one or more of the following ideas to build your reflection paper. Your paper must be at least one page (double spaced) and use correct spelling and grammar. See specific e-portfolio instructions in your syllabus.

What have you learned as a result of this project?

Discuss how the math skills that you applied in this project will impact other classes you will take in your school career.

Identify specific parts of the project and your own process in completing the project that may have applications for other classes.

Discuss how the project helped to develop your problem solving skills.

Discuss how this project changed the way you think about real-world math applications. If your thinking was not changed, then discuss how the project supported your views about real-world math applications.

**Your completed project will be posted on your e-Portfolio and linked through MyPage by DEADLINE May 8th.**