

First name Last Name

Period

Due Date of Lab

Color Proportions in Skittles Candies

(title of lab, centered, and underlined; DO NOT include “Lab” or “Lab Report” in title)

Problem: What are the color proportions of Skittles candies? *(stated as a question, broad)*

Background Through personal experience, there appeared to be a difference in the color

Information: proportions within an individual bag of Skittles. According to the Wrigley’s Consumer Care Department, the fruit candies are produced in equal proportions—20% of each of the five colors (green, red, orange, yellow, and purple). However, although these candies are made in equal proportions, the individual Skittles bags are filled by weight and by machines. Since each Skittle weighs differently due to the coating process that is used to make the Skittle, they do not always get sorted in equal proportions in each individual bag, but they are still produced in equal proportions.

Wrigley’s Home page. 2012. Web. 7 September 2013.

Barnes, Sandy. “Re: In Response to your Website Comments.” Message to Theresa Hollenbeck. 9 Sept. 2013. E-mail.

Colors, Brighton. The Rainbow Story. New York: Sunshine Publishing House, 2002. 112-120.

(this section should provide enough information to come up with a reasonable hypothesis; references are listed at the end of this section and are not numbered)

Purpose: To determine the average color proportion of Skittles original candies in an individual bag. (*must be underlined; specific to this particular experiment*)

Hypothesis: If the color proportions of Skittles candies are equal for each color because they are produced in equal proportions, then there will be an average of 20% of each of the five colors of Skittles in the individual bags. (*“If this is the answer to the question **because this is true, then this will be the results.**”*)

- independent variable: color of Skittles (*the variable that is manipulated*)
- dependent variable: number of Skittles (*the recorded data*)
(when relevant, the control group is also listed here)

Materials: 1 bag (61.5 grams) of Original Skittles *(materials listed in columns; do not number)*
scissors
paper towel

Procedure:

1. The bag of Skittles candies was cut open using the scissors.
2. The Skittles candies were carefully poured out of the bag onto the paper towel.
3. The Skittles candies were placed in groups by color.
4. Each group was counted to determine the number of Skittles candies per color.
5. The data was recorded and shared with the rest of the class.

(Each step must be numbered and in a downward list; written in past tense and in passive voice. Do not include “I”, “they,” or any other pronouns.)

Data: (This section includes separate tables for raw and derived data. Use metric units when possible; each table/graph needs a specific title, which includes both independent & dependent variables. If a table cannot fit entirely on a page, put it on the next page.)

Color Distribution of Original Skittles Candies

Color of Skittles Candy	Individual Bag	Class Data
Green	10	302
Red	11	318
Orange	13	381
Yellow	10	370
Purple	15	394
TOTAL	59	1765

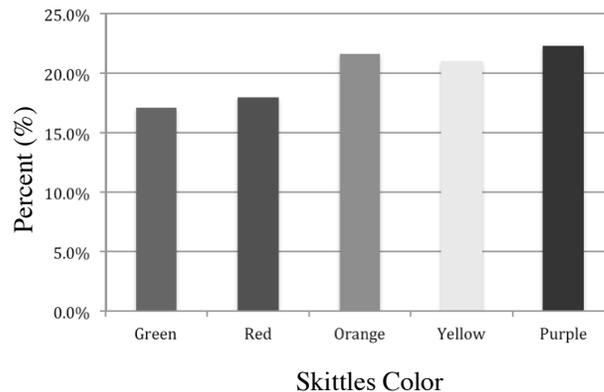
Overall Color Proportions of Original Skittles Candies

Color of Skittles Candy	Individual Percentage	Class Percentage
Green	16.9	17.1
Red	18.6	18.0
Orange	22.0	21.6
Yellow	16.9	21.0
Purple	25.4	22.3
TOTAL	99.8%	100%

Data Presentation:

a) Graph

Overall Color Proportions of Original Skittles Candies



b) Analysis Paragraph:

According to the class data, there was a higher percentage of purple Skittles in the individual bags and green was found to be in the lowest proportion. The color proportions were calculated to be as follows: 22.3% purple, 21.6% orange, 21.0% yellow, 18.0% red, and 17.1% green.

The reason that the Skittles candies were not exactly 20% for each color is because Skittles are packaged by machines and by weight, not by color. Since the individual Skittles vary in weight due to the coating process of making the Skittles themselves, regardless of their individual colors, they are not always distributed into the individual bags in the same proportions that they are produced. However, it would be expected that, on average, there still should have been about equal proportions of each color in the overall class data.

There are several possible explanations for this difference. It is possible that the class data does not reflect the overall proportions of Skittles candies in individual bags. The bags used in this experiment might not have had as many green candies as the typical bag or perhaps had a higher number of purple candies than average. The Skittles candies might also have varied in individual weight more than usual and therefore were not distributed into bags in true random assortment. The purple Skittles may have been lighter and the green Skittles heavier, on average, and therefore needed more or less candies to make up the overall weight of the individual bags.

c) Analysis Questions:

1. It was important to use class average data rather than just individual data for this experiment because the larger sample size gives more accurate information.
2. It is better to compare percentages of each Skittles color rather than total number of each color because each bag has a different total number of Skittles.
3. In order to get more accurate data, a larger sample size of bags could be used.

(This section includes up to 3 parts: (1) graphs with calculated data may be located here; (2) must always include paragraph(s) stating specific data and an explanation as to why this data was obtained—refer back to the background information; (3) any questions posed by the teacher are answered using complete sentences and they are numbered. If there are no graph or analysis questions, don't include the headings.)

Conclusion:

a) Evaluate Hypothesis:

My hypothesis, which stated that the average color proportion for Skittles candies would be 20% for each of the five colors, was not supported by the results. The class average data showed purple to have the highest percentage of 22.3%, which was significantly greater than the 17.1% average for green candies. *(re-state the hypothesis and whether it was supported or not; state the evidence.)*

b) Sources of Error:

There were several sources of error in this experiment. Students may have incorrectly tallied the total number of candies for each color, which would give inaccurate results. The candies may have varied in weight more than the average

Skittles, which led to an unequal distribution of the different colors into the individual bags. The size of the bag could be too small of a sample size and therefore skew the results as well. *(Describe at least 3 ways that error might have been introduced and caused unexpected results. Include factors that were not held constant during the experiment; you may not simply include human error or equipment failure.)*

c) Critique:

From this experiment, I learned that some Skittles weigh more than other Skittles based on their color coating. I also learned that there are a lot of Skittles in an individual size bag. Some possible follow-up experiments could be to test whether or not the color proportion varies depending on the type of Skittles (tropical, sour, wild berry, etc.) as well as bag size (snack, king, share size, etc.). In order to improve this lab, we could have students verify the numbers they counted from their individual bags with their lab group members before sharing the data with the rest of the class; this might help give us more accurate class data. *(Describe what you learned in this section as well as possible questions for follow-up experiments. Discuss the validity of the method; what improvements can be made to the procedure to give more valid results?)*

Formal lab reports should be typed, double-spaced, with 1-inch margins and written in 12-point font. Don't put an extra space in between sections; every line should have writing on it. Exception: if a heading is at the bottom of a page and it's text is on the following page, then move the heading to the next page as well so it is directly above the text. If tables and/or graphs are located on separate pages, still include the heading in the correct part of the lab report and write, "See attached," where it would normally be found. If written by hand, use blue or black ink and write single-spaced.