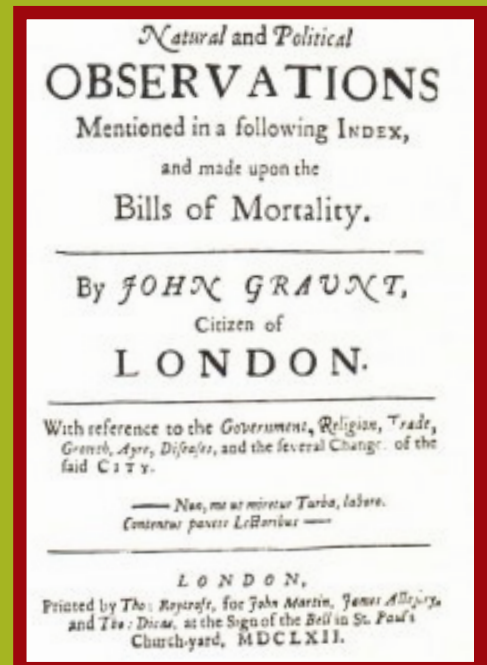# STEM Sims™

# Stats Entertainment

## Do you need an idea for a scientific study?
## Try out one of our ideas or make one of your own.

**Start learning right now about real-world applications of statistics and probability. Take the following brief quiz to see how much you already know about statistics and probability.** See the bottom of page 4 to check your answers.

1.  If the term "statistics" was taken back to its Italian roots and then converted back into English, it would be most closely aligned with which field of study?
    a.  sculpture
    b.  philosophy
    c.  political science
    d.  agricultural science

2.  When was *Natural and Political Observations upon the Bills of Mortality* by John Graunt published, marking the origin of statistics?
    a.  5th century B.C.
    b.  1662
    c.  1805
    d.  1916

3.  A normal distribution tends to be represented as:
    a.  a sloping hill
    b.  a perfect semicircle
    c.  an S-shaped curve
    d.  a straight line

4.  Which of the following is *not* one of statistics' levels of measurement?
    a.  nominal
    b.  ordinal
    c.  ratio
    d.  cardinal

5.  Which American author is famously quoted for calling statistics the third kind of lie?
    a.  William Faulkner
    b.  Mark Twain
    c.  F. Scott Fitzgerald
    d.  Ernest Hemingway



Natural and Political
OBSERVATIONS
Mentioned in a following INDEX,
and made upon the
Bills of Mortality.

By JOHN GRAUNT,
Citizen of
LONDON.

With reference to the Government, Religion, Trade, Growth, Ayre, Diseases, and the several Changes of the said CITY.

—— Non, me ut miretur Turba, laboro.
Contentus paucis Lectoribus ——

LONDON,
Printed by Tho: Roycroft, for John Martin, James Allestry, and Tho: Dicas, at the Sign of the Bell in St. Paul's Church-yard, MDCLXII.

# Sweet Statistics

In the United States, Nutrition Fact labels are provided for nearly everything we eat. Often times we make our decisions about what we will eat based on how many total calories there are. Descriptive statistics, however, teaches us that by "weighting" the averages, we can get a better idea of which food is actually better for us.

**Supplies Needed:**
- assorted candy bag with Nutritional Facts
- paper, pencil, and ruler

1. Fill out the table below.

| Name of Candy | Calories per Serving | Weight (g) |
|---|---|---|
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

2. On a separate piece of paper, create a bar graph to chart just the number of calories for each type of candy.

3. In order to find out which candy is most calorie-dense, create a scatter-plot graph on your other sheet of paper. Label your x-axis as *weight (g)* and your y-axis as *No. of calories*. Plot each candy as a dot based on the data you collected in the chart above.

**Questions**

1. Which of the candies has the most calories (without adjusting for weight)? the least calories?

2. Based on your data on the scatter-plot chart, which candy would you choose for a snack? Why?

3. What is another example of a data set that would be better as a scatter-plot graph than a bar graph?

## Give me the Stats!

Statistics, which is just one branch of mathematics, branches off in multiple ways to analyze and interpret data. Descriptive statistics are representations of results collected, summarizing the sample rather than the whole. Inferential statistics uses inductive reasoning to hypothesize conclusions about a whole population based on a sample. Statistics is closely aligned with probability theory, which possibly explains why some mistakenly use the two terms interchangeably. In reality, probability and statistics can actually be seen as opposites; probability takes the data from every possibility of the population and makes conclusions about likelihoods of smaller samples, while statistical inference requires learning about the samples to make inductive inferences about the population as a whole.

The most common types of statistical descriptions of data are mean, median, mode, and frequency distribution. Mean is the raw average of all the data and is easy to calculate; all you have to do is find the sum of all of the data, and then divide the sum by how many variables you had. The median of an odd set is the middle number of the data set when arranged in ascending order. If the data set is even, the average of the two middle numbers comprises the median. The mode represents the number that appears most frequently. It is possible to have no mode, one mode, or multiple modes. A frequency distribution is another way to represent data. The most commonly known distribution is the normal distribution curve.

Please visit our site for more helpful information:
**STEMsims.com**