How can you help at home?

✓ Every day, ask your child what they learned in school and ask them to show you an example.
✓ Ask your child to create a data set that represents a symmetrical distribution.

One possible solution is below:

Symmetrical Data Set:
{-2,-2,-1,0,1,2,2)

Statistics

In this 22-lesson module, students will move from simply representing data into analysis of data. Students will begin to think and reason statistically, first by recognizing a statistical question as one that can be answered by collecting data. Students will learn that the data collected to answer a statistical question has a distribution that is often summarized in terms of center, variability, and shape. Students will also see and represent data distributions using dot plots, histograms, and box plots.

The Shape of a Distribution and how it Relates to Center and Variability

Mound-Shaped or Symmetric Distribution
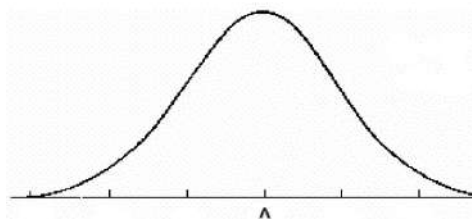
Skewed Distribution
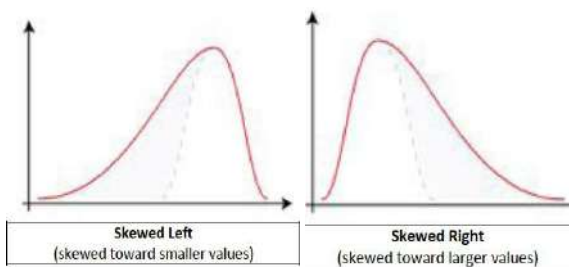
Skewed distributions have values that are not typical of the rest of the data. They may have data much greater or much lower than the rest of the data.

Key Common Core Standards:

Develop understanding of statistical variability.

- Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.
- Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.
- Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

Summarize and describe distributions.

- Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

- Summarize numerical data sets in relation to their context, such as by:
  - ❖ reporting the number of observations.
  - ❖ describing the nature of the attribute under investigation, including how it was measured and its units of measurement.
  - ❖ giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
  - ❖ relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Key Words

Statistical Question
A question that anticipates variability in the data that would be collected in order to answer the question.

Median
A measure of center appropriate for skewed data distributions. It is the middle value when the data are ordered from smallest to largest if there are an odd number of observations and half way between the middle two observations if the number of observations is even.

Mean
A measure of center appropriate for data distributions that are approximately symmetric. It is the average of the values in the data set. Two common interpretations of the mean are as a "fair share" and as the balance point of the data distribution.

Dot Plot
A plot of numerical data along a number line.

Histogram
A graphical representation of a numerical data set that has been grouped into intervals. Each interval is represented by a bar drawn above that interval that has a height corresponding to the number of observations in that interval.

Box Plot
A graph of five numerical summary measures: the minimum, lower quartile, median, upper quartile, and the maximum. It conveys information about center and variability in a data set.

Variability
Variability in a data set occurs when the observations in the data set are not all the same.

Deviations from the Mean
The differences calculated by subtracting the mean from the observations in a data set.

Mean Absolute Deviation (MAD)
A measure of variability appropriate for data distributions that are approximately symmetric. It is the average of the absolute value of the deviations from the mean.

Interquartile Range (IQR)
A measure of variability appropriate for data distributions that are skewed. It is the difference between the upper quartile and the lower quartile of a data set and describes how spread out the middle 50% of the data are.
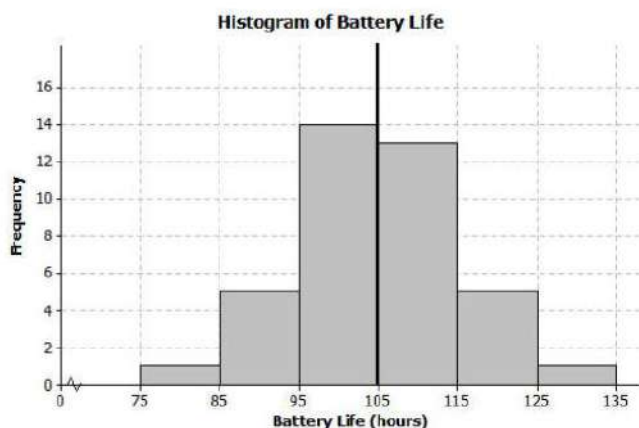
What is a Statistical Question?

Examples:

1. How old are the students in my school? *(ages will vary)*

2. What are the favorite colors of 6th graders in my school? *(colors will vary)*

Non-Examples:

1. How old am I? *(only one age)*

2. What is my favorite color? *(only one color)*

Graphs Frequently Seen in this Module

Histogram of Battery Life

Dot Plot of Heart Rate

Ask your child to explain the measures of center for each graph and have them explain how they determined the centers.