

Family Guide to CPM CHAPTER 8

In this chapter, students will learn how to:

- Use measures of central tendency, histograms, stem-and-leaf plots, and box plots to represent and compare data.
- Consider the shape and spread of data both through a visual display and through calculations.
- Decide if a question is a statistical question.
- Solve problems involving distance, rate, and time.

Chapter 8 Main Ideas

Section 8.1

This section introduces another method of representing data, the box plot. Students will decide which of the representations and measure of central tendency will best help compare sets of data. Students will also look at the shape and spread of data.

Section 8.2

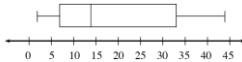
In this section, Students will investigate statistical questions and learn how to write them.

Section 8.3

Students will identify the relationship between distance, rate, and time and will use it to solve word problems. They will compare rates that do not involve the same units and determine when unit conversion is necessary.

Box Plots

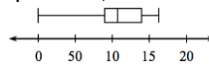
A box plot (also known as a box-and-whisker plot) displays a summary of data using the median, quartiles, and extremes of the data. The box contains “the middle half” of the data. The right segment represents the top 25% of the data and the left segment represents the bottom 25% of the data. A box plot makes it easy to see where the data are spread out and where they are concentrated. The larger the box, the more the data are spread out.



To construct a box plot using a number line that shows the range of the data, draw vertical line segments above the median, first quartile and third quartile. Then connect the lines from the first and third quartiles to form a rectangle. Place a vertical line segment above the number line at the highest and lowest data values. Connect the minimum value to the first quartile and the maximum value to the third quartile using horizontal segments. For the data set used in the Quartile Math Note, namely, 2, 7, 9, 12, 14, 22, 32, 36, and 43, the box plot is shown below.

Key Words

box plot- A graphic way of showing a summary of data using the median, quartiles, and extremes of the data.



first quartile-(Q1) The median of the lower half of an ordered set of data is the lower quartile.

interquartile range- (IQR) A way to measure the spread of data. It is calculated by subtracting the first quartile from the third quartile.

mean absolute deviation- A method for measuring the spread (variability) in a set of data by calculating the average distance each data point is from the mean. Since the calculation is based on the mean, it is best to use this measure of spread when the distribution is symmetric.

measures of central tendencies- Mean and median are all measures of central tendency, reflecting special statistical information about a set of data.

median- The middle number of an ordered set of data. If there is no distinct middle, then the average of the two middle numbers is the median. The median is generally more accurate than the mean as a measure of central tendency when there are outliers in the data set.

outlier- A number in a set of data that is much larger or much smaller than the other numbers in the set.

third quartile-(Q3) The median of the upper half of an ordered set of data.

Where These Topics Are Revisited

Students will use multipliers as they calculate percentages for simple interest, tips, and discounts in Chapter 9.

What's Coming Up in the Next Chapter

Students will look at in Volume and Percent Chapter 9.

How You Can Help at Home

Encourage your student by asking them to think about these questions:
 “What can I measure?”
 “How much will it hold?”
 “Am I measuring in one, two, or three dimensions?”
 “Is there another way to see it?”
 “How can I estimate it?”

On the Chapter 8 assessment, students will be expected to show their understanding of the following:

6.RP.3b Solve unit rate problems including those involving unit pricing and constant speed

6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities

6.EE.7 Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers.

6.EE.9 Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

6.SP.1 Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

6.SP.2 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

6.SP.3 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.

6.SP.4 Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

6.SP.5 Summarize numerical data sets in relation to their context, such as by:

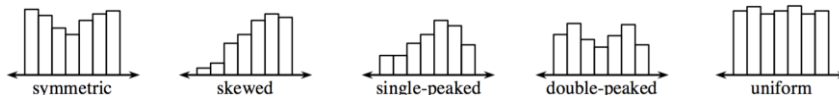
a. Reporting the number of observations.

b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement

c. 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

d. 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.

Statisticians use the following words to describe the overall shape of a data distribution: symmetric, skewed, single-peaked, double-peaked, and uniform. Examples are shown below.



Sample Problems from the chapter

The set of data is organized in a frequency table.

Score	Frequency
1	1
2	5
3	12
4	15
5	11
6	4
7	2

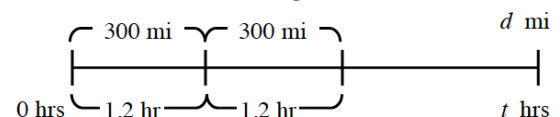
If you were to create a dot plot of this data, how would you describe the shape?

How many total scores are there?

Using the table, calculate the sum of all of the scores.

Is it appropriate to calculate the mean? Why or why not? If so, what is the mean?

A new high-speed train travels 300 miles in 1.2 hours. Luis and Omar are trying to figure out how they can find the distance the train has traveled after any number of hours. Omar decided to draw a diagram to help figure out the problem. He drew the diagram below.



Find a unit rate (in miles per hour) for the train. Then copy and change Omar's diagram to show the unit rate.

How far will the train travel in 5 hours? Write an equation to represent how far the train will go in d miles after t hours.