CHAPTER 7

Family Letter

Section A

What We Are Learning

DIsplaying and Analyzing Data

Vocabulary

These are the math words we are learning:

bar graph a graph that uses vertical or horizontal bars to display data

circle graph a graph that shows how a set of data is divided into parts (sometimes called a pie chart)

line graph a graph that uses line segments to connect data points

mean the sum of all the items, divided by the number of items in the set (sometimes called an average)

median the middle value when the data are in numerical order, or the mean of the two middle values if there is an even number of items

mode the value or values that occur most often in a set of data

outlier a value in a set that is very different from the other values; may affect the mean and range of a data set

range the difference between the least and the greatest values in the set

sector a section of a circle graph representing part of the data set

Dear Family,

The student is beginning to study statistics and the different ways that data can be represented and organized. In this section, the student will use mean, median, mode, and range to describe data.

Mean	The sum of the values divided by the number of values, otherwise known as the average of the numbers.
Median	Once the values are organized numerically from least to greatest, the median is the middle value.
Mode	The value or values that occur most often in a set of data. If no value occurs more than once, then there is no mode.
Range	The difference between the greatest value and the least value.

Find the range, mean, median, and mode of the data set.
45, 44, 48, 42, 12, 44, 45

Range Subtract the least value from the greatest value.
$48 - 12 = 36$

The range is 36.

Mean Add the values. Divide the sum by the number of items.
$45 + 44 + 48 + 42 + 12 + 44 + 45 = 280$
$280 \div 7 = 40$

The mean is 40.

Median Arrange the values in numerical order. Select the middle value of the data set.
12, 42, 44, 44, 45, 45, 48

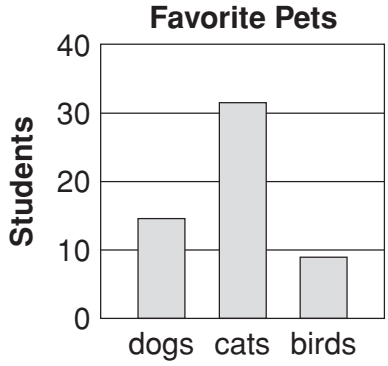
The median is 44.

Mode The values 44 and 45 each occur 2 times.

The modes are 44 and 45.

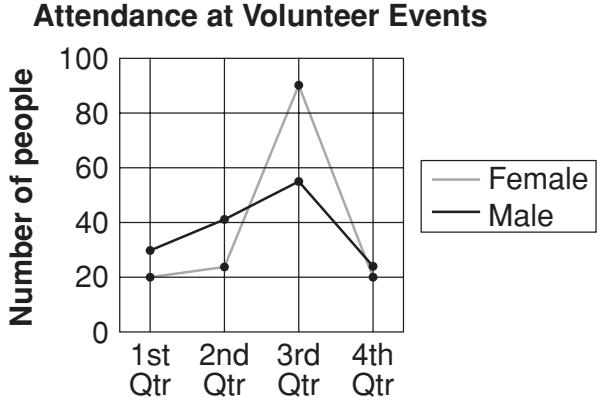
The student will also learn to identify an **outlier**. An outlier is an extreme piece of data that can greatly affect the mean and range of a data set.

The student will also practice analyzing displays of data, such as bar graphs, circle graphs, and line graphs. Bar graphs and double-bar graphs are useful for displaying related sets of data. The following bar graph displays data collected from a survey asking students to name their favorite type of pet.



A circle graph, also called a pie chart, shows how a set of data is divided into parts. The entire circle displays 100% of the data. Each sector of the graph represents one part of the data set.

Line graphs and double-line graphs are useful when displaying data changes over a period of time. The double-line graph shows how the attendance of males and females at volunteer events varies throughout the year.



There are many different ways to display data. Sometimes a graph can display data in a misleading way. Misleading graphs rely on someone looking at the shape of the graph, not what the graph is actually representing. The student will learn to focus on the scale of the graph to be sure that the data is accurately represented.

You may wish to search through magazines and newspapers with the student to find graphs that display misleading data and graphs that accurately represent the data presented.

Sincerely,

CHAPTER 7

Family Letter

Section B

What We Are Learning

Collecting Data

Vocabulary

These are the math words we are learning:

biased question a question that leads people to give a certain answer

biased sample a sample that does not fairly represent the population

convenience sample a group of the population that is easiest to reach

population a whole group that is to be studied

random sample a representative sample that gives every member of the population an equal chance of being chosen

sample a part of a group or population that is being studied

self-selected sample members of the population volunteer to respond to a survey

systematic sample a member of the population is selected at random, and then others are selected by using a pattern

Dear Family,

The student will learn about research methods of collecting data. Usually, it is not possible to collect data from every member of a group, or population. Instead, researchers often study a sample. A sample is a part of a population or group.

In a random sample, every member of the population has an equal chance of being selected. A random sample is more likely to be representative of a population than samples that are chosen in other ways. In the following example, a random sample is used to evaluate a person's claim about an entire population.

Tina estimates that more than 650 of the 1,000 students at her school have only one pet. A random sample of 50 students at her school shows that 19 of them have only one pet. Determine whether Tina's estimate is likely to be accurate.

Set up a proportion to predict the total number of students that have only one pet.

$$\frac{\text{students with only 1 pet in sample}}{\text{size of sample}} = \frac{\text{students with only 1 pet in population}}{\text{size of population}}$$

$\frac{19}{50} = \frac{x}{1{,}000}$ Let x represent the number of students at Tina's school that have only one pet.

$19{,}000 = 50x$ The cross products are equal.

$\frac{19{,}000}{50} = \frac{50x}{50}$ Divide each side by 50.

$380 = x$

Based on the sample, you can predict that 380 students at Tina's school have only one pet. Tina's estimate of 650 students is too great. A more accurate estimate of the number of students at Tina's school having only one pet is about 400 students.

Using a random sample is a popular method of collecting data. Some other methods of collecting data are listed below.

Sampling Methods

Method	Description
random sample	Each member of the population has an equal chance of being selected.
systematic sample	A member of the population is selected at random, and then others are selected by using a pattern.
convenience sample	The most-available members of the population are chosen.
self-selected sample	Members of the population volunteer to respond to a survey.

A biased sample is a sample that does not fairly represent the population. You can evaluate a survey's sampling method to identify potentially biased samples.

Determine whether each sample may be biased. Explain.

A. Bryan wants to know whether people in his town support the construction of a new community sports complex. He surveys 50 people attending a baseball game.

The sample is biased. People attending a sports event are likely to support the construction of a sports complex.

B. Sondra wants to know whether students at her school like to read suspense novels. She randomly selects students from a list of all students at her school.

The sample is not biased. It is a random sample.

Encourage the student to survey family members and friends on a particular topic. This is one way to relate what the student is learning in math class to real-life situations.

Sincerely,