

North Penn School District
Elementary Math Parent Letter

Grade 6

Unit 5 – Chapter 12: Data Displays and Measures of Center

Examples for each lesson:

Lesson 12.1

Recognize Statistical Questions

A **statistical question** is a question about a set of **data** that can vary. To answer a statistical question, you need to collect or look at a set of data.

Identify the statistical questions about Jack’s homework time.

- A.** How many times did Jack spend longer than an hour on homework this week?
Statistical question. Jack is unlikely to do homework for the same amount of time each day, so the question asks about a set of data that can vary. You could answer it with data about Jack’s homework time for a week.
- B.** How long did Jack do homework today?
Not a statistical question. It asks about Jack’s homework time on one day. It does not refer to a set of data that varies.

Write a statistical question about your school’s cafeteria.

Think of what kind of data could vary in the situation. In this situation, it might be menu items, students, or activities.

These are both statistical questions:

- A.** How many students were in the cafeteria during fourth period each day for the past two weeks?
- B.** What was the greatest number of entrees served in one day in the cafeteria last month?

Lesson 12.2

Describe Data Collection

To describe a set of data, describe these features:

Attribute: the characteristic being recorded or measured

Unit: the unit of measurement, such as inches or grams

Means: the tool used for the observations or measurements

Observations: the number of observations or measurements

Describe the data set shown in the chart.

Step 1 What attribute is measured?

The attribute is *length of time* spent walking a dog.

Step 2 What unit of measurement is used?

The time is shown in *minutes*.

Step 3 What means was likely used to obtain the measurements?

To measure time, you use a *clock, timer, or stopwatch*.

Step 4 How many observations were made?

Count the number of observations: 8

Daily Dog Walks

Day	Time (min)	Day	Time (min)
1	35	5	60
2	40	6	25
3	25	7	90
4	55	8	20

Lesson 12.3

Dot Plots and Frequency Tables

A **dot plot** displays data by placing dots above a number line. Each dot represents one data value.

Paloma sells produce at the farmers' market. The chart shows the number of pounds she sells each day. What was the most common number of pounds that Paloma sold?

Step 1 Draw a number line with an appropriate scale. The chart contains numbers from 11 to 20, so use a scale from 10 to 20.

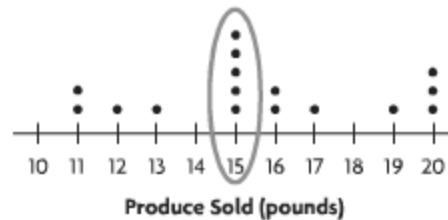
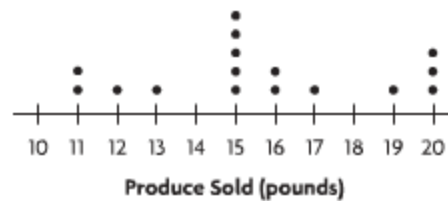
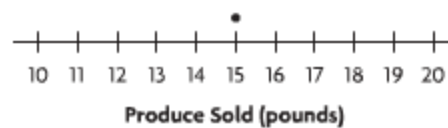
Step 2 For each data value in the chart, plot a dot above the number on the number line. The first data value in the chart is 15, so the dot is placed above 15 on the number line.

Complete the dot plot for the other values in the table. Since there are 16 data values, there should be 16 dots in all.

Step 3 The number of pounds Paloma sells most often is the value with the most dots. The stack with the most dots is at 15 pounds.

So, Paloma most often sells 15 pounds of produce.

Produce Sold (pounds)			
15	19	15	16
20	16	17	20
11	12	15	20
15	13	11	15



Lesson 12.4

Histograms

A **histogram** looks like a bar graph without spaces between bars. When you have data to organize, it is helpful to group the data into intervals and let each bar show the frequency, or number of data, in that interval.

Complete the frequency table below, using the data to the right. Then make a histogram.

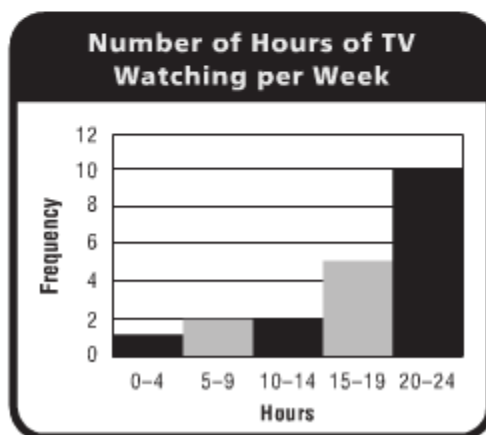
- Step 1** Sort the data into each interval.
Only the 4 (1 item) is in the interval 1–4.
8 and 5 (2 items) are in 5–9.
10 and 14 (2 items) are in 10–14.
17, 15, 19, 18, 19 (5 items) are in 15–19.
24, 21, 21, 20, 23, 22, 24, 20, 22, 24
(10 items) are in 20–24.

Hours of TV/week	1–4	5–9	10–14	15–19	20–24
Frequency	1	2	2	5	10

- Step 2** Check that all 20 items in the table are in the frequency table by adding.
 $1 + 2 + 2 + 5 + 10 = 20$

- Step 3** Make the histogram of the data.
Use a vertical scale from 0 to 12.
Title and label the histogram.
Draw a bar for each interval.
Draw bars the same width.
Draw the bar as high as the frequency.

Number of Hours of TV Watching per Week				
4	14	24	17	10
21	21	15	20	23
5	22	19	18	8
24	19	20	22	24



Lesson 12.5

Mean as Fair Share and Balance Point

Five students brought 3, 4, 5, 3, and 5 cups of flour to the cooking club. They divided it evenly so that each student got the same amount for cooking. Use counters to show how many cups each student got.

Step 1 Make 5 stacks of counters: one stack for each student.

Use one counter for each cup of flour.



Step 2 Take counters from taller stacks and put them on shorter stacks. Move counters until all the stacks are the same height.



Step 3 Count the counters in each stack. There are 4 counters in each stack.



So, 4 is the mean of the data. When you divide the flour equally, each student gets 4 cups.

Lesson 12.6

Measures of Center

A **measure of center** is a single value that describes the middle of a data set.

The **mean** is the sum of all items in a set of data divided by the number of items in the set.

The **median** is the middle number or the mean of the middle two numbers when the items in the data set are listed in order.

The **mode** is the data value that is repeated more than other values. A data set can have more than one mode, or no mode.

Find the mean, median, and mode for the set of data.
80, 74, 82, 77, 86, 75

Find the mean.

Step 1 Find the sum of the data.
 $80 + 74 + 82 + 77 + 86 + 75 = 474$

Step 2 Count the number of data items.
There are 6 items.

Step 3 Divide.
$$\frac{\text{sum}}{\text{number of items}} = \frac{474}{6} = 79$$

So, the mean is 79.

Find the mode.

Use the ordered list and look for numbers that repeat.
No numbers repeat. So, there is no mode.

Find the median.

Step 1 Order the data.
74, 75, 77, 80, 82, 86

Step 2 Find the middle number.
There are two middle numbers:
77 and 80.

Step 3 Find their mean.
$$\frac{77 + 80}{2} = 78.5$$

So, the median is 78.5.

More information on this strategy is available on Animated Math Models #36, 37.

Lesson 12.7

Effects of Outliers

Sometimes a data set contains a number that is much less or much greater than the rest. This number is called an **outlier**. Taking note of outliers can help you understand a data set.

Use a dot plot to find the outlier for the quiz scores. Then tell how the outlier affects the mean and median.

Step 1 Plot the data on the number line.



Scores on 20-question Quiz

15	16	17	13	18
12	5	14	14	16

Mean: 14 Median: 14.5

Step 2 Find the outlier.

Most of the points are between 12 and 18.
5 is much less than the rest, so it is an outlier.

Step 3 Find the median and mean without the outlier.

Median: Make an ordered list and find the middle value.

12, 13, 14, 14, 15, 16, 16, 17, 18
The new median is 15.

Mean: One value has been removed. Add the new list of values and divide by 9.

$$\frac{12 + 13 + 14 + 14 + 15 + 16 + 16 + 17 + 18}{9} = 15$$

The new mean is 15.

Step 4 Describe the effect of the outlier.

Without the outlier, the mean went up from 14 to 15.
The median went up from 14.5 to 15.

Lesson 12.8

Problem Solving • Data Displays

The table shows the highest state populations in 2007, rounded to the nearest million. What percent of the states had at least 15 million residents?

2007 State Populations (in millions)					
18	10	6	9	6	9
6	37	13	12	6	11
24	8	6	6	19	6
10	6				

Read the Problem		
<p>What do I need to find?</p> <p>I need to find the _____</p> <p>that had at least _____ million people.</p>	<p>What information do I need to use?</p> <p>I will use the _____.</p>	<p>How will I use the information?</p> <p>I will pick _____ for the data, find the _____ for each interval and use the frequencies to make a _____. I will use the information from the histogram to find a _____.</p>

Solve the Problem								
Make a frequency table.	Millions	5–9	10–14	15–19	20–24	25–29	30–34	35–40
	Frequency			2			0	
Use the frequency table to make a _____.								
States with at least 15 million: $2 + \underline{\quad} + \underline{\quad} = \underline{\quad}$								
Total states: 20								
Percent with at least 15 million: $\frac{\square}{20} = \underline{\quad} = \underline{\quad}\%$								
So, _____ of the states have populations over 15 million.								

2007 Population of States

Vocabulary

Data – information collected about people or things

Dot plot – a graph that records each piece of data on a number line

Frequency table – a table that lists the number of times each piece of data occurs

Histogram – a bar graph that shows the frequency of data in intervals

Mean – the sum of a set of data values divided by the number of data values

Measure of center – a single value used to describe the middle of a set of data

Median – the middle number in a set of data that are arranged in order, or the average of the two middle values if the number of data values is even

Mode – the value(s) that occurs most often in a set of data

Outlier – a value that is much less or much greater than the other values in a data set

Relative frequency table – a table that shows the percent of time each piece of data or group of data occurs

Statistical question – a question that asks about a set of data that can vary