

Study Guide for Unit 2 Lessons 1-2

Mean, Median, Mode and Range:

Mean, Median, and Mode

Mean, median and mode are measures of central tendency.

To find the **mean** of a set of numbers, find the sum of the numbers and divide by the number of addends.

To find the **median** of a set of numbers, arrange the numbers in order and find the middle number.

To find the **mode** of a set of numbers, find the number that appears most often.

To find the **range** of a set of numbers, subtract the least number from the greatest number.

**Student Heights
in Inches**

65	62	66
59	62	60
64	59	66
62	64	67

Example Find the mean, median, and mode of the student heights.

Mean:
$$\frac{65 + 62 + 66 + 59 + 62 + 60 + 64 + 59 + 66 + 62 + 64 + 67}{12} = 63$$

Median: 59 59 60 62 62 62 64 64 65 66 66 67

(62 + 64) ÷ 2 = 63

Mode: 62

Range: 67 - 59 or 8

Find the mean, median, mode, and range for each set of data.

1. 8, 10, 6, 9, 8, 7
2. 12, 6, 8, 2, 7, 5, 2
3. 11, 9, 6, 14, 5, 5, 13
4. 20, 30, 40, 10, 20, 90, 70

GRAPHING

FREQUENCY TABLE

Choosing a Scale for a Frequency Table	<p>Choose a scale that includes the least and the greatest number.</p> <ul style="list-style-type: none"> • Choose an interval that will give you a manageable number of groups, usually from four to seven. • Make sure all the intervals, or groups, are equal and they do not overlap.
Making a Frequency Table	<ul style="list-style-type: none"> • Draw a table with three columns and tally the responses. In the third column, write the number of tallies (or frequency).

A Name the scale and the interval in this first column of a frequency table:

Free Throws

16–20

11–15

6–10

1–5

The scale goes from 1 to 20. Each interval has 5 scores in it (for example, 16, 17, 18, 19, 20).

The interval is 5.

B Here are the number of free throws made by the third period gym class: 17, 2, 10, 4, 5, 7, 7, 16, 3, 12, 9, 3, 4. Complete the frequency table started in Example A.

Add two columns to the table. Mark tallies for each interval. Then write the frequencies.

Free Throws	Tally	Frequency
16–20		2
11–15		1
6–10		4
1–5	I	6

PRACTICE

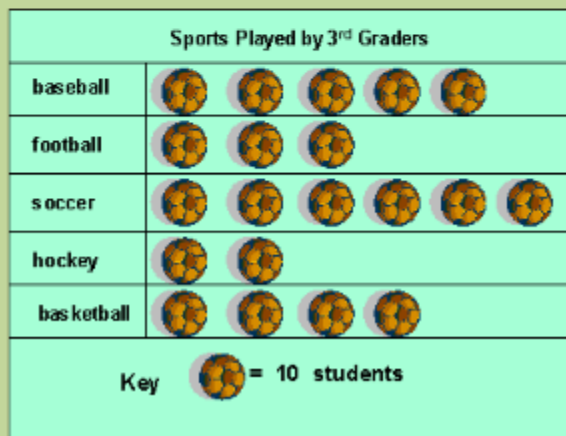
Entertainment Mr. Juarez awarded two points to each student answering the daily bonus question correctly. The data at the right lists the total number of points each student earned for the week. Make a frequency table for the data.

4	10	8	8	6	10
4	8	10	10	8	6
6	4	4	8	8	10
6	10	10	4	8	6

PICTOGRAPH

Pictograph:





- Uses pictures or symbols to display data
- Has a title, pictures/symbols, labels, and a key
- Be sure to check the **KEY**. Each picture/symbol does not always count as one.
- Pictographs can include half of a symbol. These symbols are worth $\frac{1}{2}$ of the whole symbol's value. The symbol's value is determined by the key.



PRACTICE

Look at the pictograph.

Car Colors at the Car Wash

Color	Number of Cars
White	
Red	
Blue	
Silver	

Key: Each  = 2 cars.

Based on the graph, what was the total number of cars at the car wash?

- A 20
- B 18
- C 14
- D 10

CIRCLE GRAPH

A **circle graph** compares parts of a whole. The circle is the whole and the pie-shaped sections show the parts. All the percents in a circle graph add to 100%.

Reading a Circle Graph

- Read the title of the graph and the titles of all the sections.
- Recall that half of a circle is 50% and one-fourth is 25%.
 - See how the percents match the sizes of the sections.

EXAMPLES

- A** The circle graph shows where the coins in Joel's collection come from. The percents are 10%, 20%, 30%, and 40%. Match each percent with the appropriate section of the graph.

The section for Japan is the largest. It is almost one-half. So 40% of his coins come from Japan. The smallest section is Canada. So 10% of his coins come from Canada. The England section is larger than the Mexico one. So 30% come from England and 20% from Mexico.

- B** What percent of his coins come from England and Mexico together?

Add the percents: 30% added to 20% is 50%.

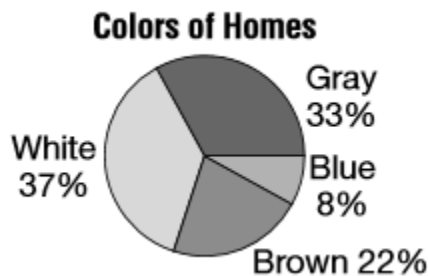


PRACTICE

The circle graph shows the colors of homes in Anissa's neighborhood.

What percent of homes are blue?

What are the two most popular colors for homes in Anissa's neighborhood?



LINE GRAPHS

The graph at the right shows how many books Kara and Bill read each month.

- A** What is the difference in April between the number of books Kara and Bill read?

Kara read 7 and Bill read 4, so the difference is 3.

- B** Predict how many books Bill will read in May.

The extended line has a value on the vertical axis of 3 books.



PRACTICE

Sports The line graph shows how many laps Dominic swam each week for 6 weeks.

- Predict how many laps he will be able to swim in Week 7.
- How many more laps did he swim in Week 4 than in Week 1?
- Would you predict that Dominic will be able to swim more than 10 laps in Week 8?



STEM AND LEAF PLOT

You can make a large data set easier to read with a **stem-and-leaf plot**. The **stems** are the tens digits. The **leaves** are the units digits.

Drawing a Stem-and-Leaf Plot

- Find the digits in the tens place for the least and the greatest numbers.
- Draw a vertical line and write the tens digits in order for the stems.
 - Write the units digits, or leaves, to the right of their stems.
 - Arrange the leaves in order from least to greatest. Include a key.

EXAMPLE

Make a stem-and-leaf plot of this data that shows how many students are in each sixth grade class.

15, 34, 20, 31, 17, 26, 24, 29, 26, 31

The stems are 1, 2, and 3.

Stem	Leaf
1	5 7
2	0 4 6 6 9
3	1 1 4

PRACTICE

2, 5, 16, 22, 15, 14

24, 25, 38, 34, 46, 58

TALLY CHART

Collecting data

The easiest way to collect data is to use a tally chart.

When collecting data for the number of pets survey, it would have been useful to draw a table similar to this one.

As each person answers the question, we put a tally next to the appropriate number of pets. The frequency column is completed once all of the data has been collected. The table below shows the results of a new pets survey.

Number of pets survey

Number of pets	Tally	Frequency
0		3
1		8
2		12
3		1
4		2

PRACTICE

As part of her science project on sleep, Samantha asked 13 students in her class how many hours they had slept the night before, to the nearest half-hour. Here are the results of her survey.

Number of hours slept	Number of students
6	
6.5	
7	/
7.5	//
8	
8.5	////
9	
9.5	///
10	
10.5	///
11	

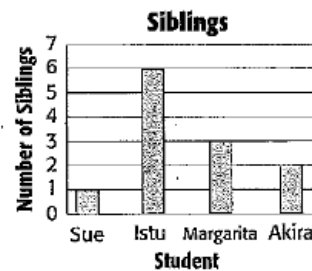
1. How many students slept 9 hours?
2. What is the median number of hours the students slept?
3. What is the maximum number of hours slept?
4. What is the mode?
5. What is the range of hours slept?

BAR GRAPH

A **bar graph** is one method of comparing data by using solid bars to represent quantities. A **histogram** is a special kind of bar graph. It uses bars to represent the frequency of numerical data that have been organized into intervals.

EXAMPLE 1 **SIBLINGS** Make a bar graph to display the data in the table below.

Student	Number of Siblings
Sue	1
Isfu	6
Margarita	3
Akira	2



Step 1 Draw a horizontal and a vertical axis. Label the axes as shown. Add a title.

Step 2 Draw a bar to represent each student. In this case, a bar is used to represent the number of siblings for each student. *Notice the bars do not touch.*

PRACTICE

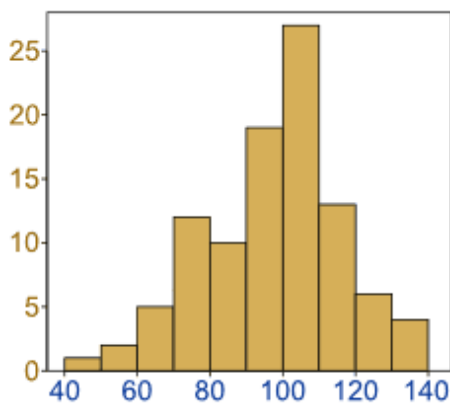
Make a bar graph for the data in the table.

Student	Number of Free Throws
Luis	6
Laura	10
Opal	4
Gad	14

HISTOGRAM

Histograms

A Histogram is a graphical display of data using bars of different heights.



It is similar to a [Bar Chart](#), but a histogram groups numbers into **ranges**

And you decide what ranges to use!

Example: Height of Orange Trees

You measure the height of every tree in the orchard in centimeters (cm)

The heights vary from 100 cm to 340 cm

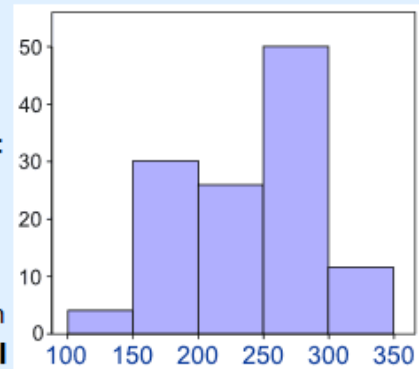
You decide to put the results into groups of 50 cm:

- The **100 to just below 150 cm** range,
- The **150 to just below 200 cm** range,
- etc...

So a tree that is 260 cm tall is added to the "250-300" range.

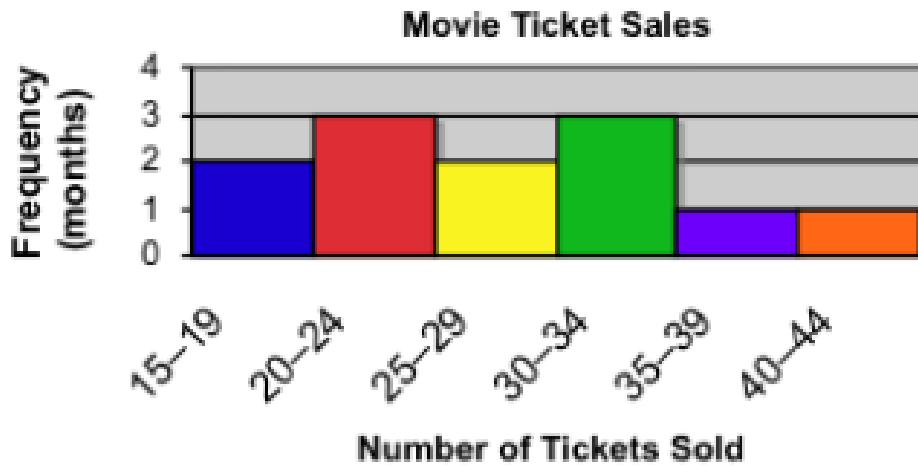
And here is the result:

You can see (for example) that there are **30** trees from **150 cm to just below 200 cm tall**

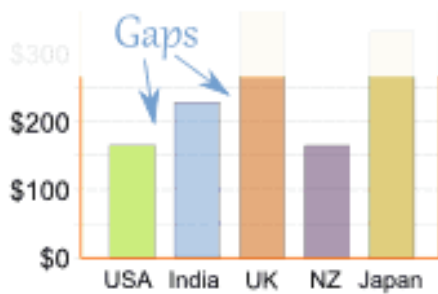


PRACTICE

Look at this histogram. In how many months did the movie theater sell at least 25 tickets?

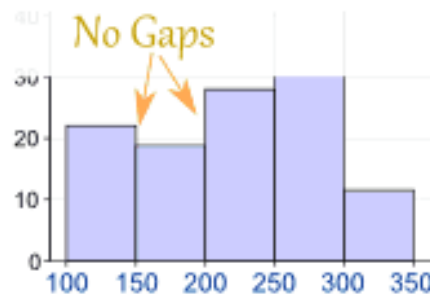


Difference between Histograms and Bar Graphs



← Categories →

Bar Graph



← Number Ranges →

Histogram

ADDITIONAL RESOURCES

Mean, Median, Mode, and Range

<http://www.sciencekids.co.nz/gamesactivities/math/meanmedianmode.html>

http://www.bbc.co.uk/bitesize/ks2/maths/data/mode_median_mean_range/play/

<http://www.pbslearningmedia.org/resource/ea4d290e-7d88-43b6-b50f-5f3355df5e49/ea4d290e-7d88-43b6-b50f-5f3355df5e49/>

<http://interactivesites.weebly.com/mean-median-and-mode.html>

http://www.aasd.k12.wi.us/staff/boldtkatherine/MathResources3-6/Math_MeanMedianModeRange.htm

Graphing

www.studyzone.org/testprep/math4/e/readpicto3l.cfm

<http://www.beaconlearningcenter.com/WebLessons/PlayBall/default.htm#page1>

<http://www.beaconlearningcenter.com/WebLessons/AllTheParts/default.htm#page2>

<http://www.ixl.com/math/grade-4/create-line-graphs>

http://www.softschools.com/math/data_analysis/tally_chart/

<http://studyjams.scholastic.com/studyjams/jams/math/data-analysis/bar-graphs.htm>