

# ADV Unit 6 Statistics

Statistical Questioning  
Mean, Median, Mode &  
Range  
Dot Plots  
Frequency Tables  
Histograms  
Box Plots

Name: \_\_\_\_\_

Math Teacher: \_\_\_\_\_

## Advanced Unit 6 Pacing

### Week of 2/7:

Statistical Questions, Mean, Median, Mode, Range and IQR,  
**QUIZ (Stat ?/MMMR and IQR)**

### Week of 2/14:

Dot Plots, Frequency Tables and Histograms, **QUIZ (Dot Plots,  
Frequency Tables and Histograms)**

### Week of 2/21:

No School February Break

### Week of 2/28:

Box Plots, Review & **TEST**

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**Unit 6: Statistics  
Standards, Checklist and Concept Map**

**Georgia Standards of Excellence (GSE):**

**MGSE6.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.

**MGSE6.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.

**MGSE6.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.

**MGSE6.SP.4:** Display numerical data plots on a number line, including dot plots, histograms, and box plots.

**MGSE6.SP.5:** 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/mean) and variability (interquartile range, mean absolute deviation), as well as describing any overall pattern or any striking deviations from the overall pattern with reference to the context in which the data was gathered.
- Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data was gathered.

.....  
**What Will I Need to Learn??**

- \_\_\_\_\_ Know that a statistical question will receive many different answers
  - \_\_\_\_\_ To produce questions that include a variety of answer choices
  - \_\_\_\_\_ To interpret graph of data by describing its center, spread, and shape
  - \_\_\_\_\_ Know that mean, median, & mode describe the center of a set of data
  - \_\_\_\_\_ Know that range describes how much a set of data varies
  - \_\_\_\_\_ How to display data in a dot plot
  - \_\_\_\_\_ How to display data in a histogram
  - \_\_\_\_\_ How to display data in a box plot
  - \_\_\_\_\_ To describe the topic in question, including methods, units of measure
  - \_\_\_\_\_ How to calculate mean and median
  - \_\_\_\_\_ How to find IQR (interquartile range) and MAD (mean absolute deviation)
  - \_\_\_\_\_ To explain outliers in data
- .....

# Unit 6 IXL Tracking Log

| <u>Required Skills</u>   |                   |
|--|-------------------|
| <u>Skill</u>   | <u>Your Score</u> |
| <b>HH.1</b> (Identify Statistical Questions)                         |                   |
| <b>HH.8</b> (Identify an Outlier)                                    |                   |
| <b>HH.3</b> (Interpret Charts and Graphs to Find MMMR)               |                   |
| <b>HH.2</b> (Calculate M, M, M & R)                                  |                   |
| <b>*HH.4</b> (MMMR: Find the Missing Number)                         |                   |
| <b>HH.7</b> (Calculate Quartiles and IQR)                            |                   |
| <b>HH.9</b> (Identify Outlier & Describe the Effects of Removing it) |                   |
| <b>*HH.5</b> (Changes in MMMR)                                       |                   |
| <b>*HH.11</b> (Identify Representative, Random and Biased Samples)   |                   |
| <b>HH.10</b> (Describe Distributions in Line Plots)                  |                   |
| <b>GG.3</b> (Interpreting Line Plots)                                |                   |
| <b>GG.4</b> (Creating Line Plots)                                    |                   |
| <b>GG.6</b> (Create Frequency Charts)                                |                   |
| <b>GG.14</b> (Interpret Histograms)                                  |                   |
| <b>GG.15</b> (Create Histograms)                                     |                   |
| <b>GG.23</b> (Box Plots)   |                   |

**Unit 6 Circle Map:** Below, make a circle map of the standards listed above. Underline the verbs and circle the nouns they modify. Then, place those verbs on the connector lines of your concept map, and the nouns in the bubbles of the concept map.

## Unit 6 Vocabulary

| Vocabulary Term                      | Definition   |
|--------------------------------------|--|
| Box-and-Whisker plot (or "box plot") | A graph that uses a number line to show how data is distributed. It shows the maximum and minimum values of the data, along with the upper and lower quartiles and the median. |
| Dot plot                             | A graph in which each value is shown as a dot above a number line  |
| Frequency                            | The number of times a value appears in a set of data   |
| Frequency Table                      | A table that lists the number of times (frequency) that a piece of data occurs. This table is often used as a method of recording data.  |
| Histogram                            | A bar graph used to display numerical data grouped in equal intervals.   |
| Interquartile range (IQR)            | The range between the upper and lower quartiles on a box plot. This represents the middle 50% of the data.   |
| Maximum value                        | The largest number in a set of data, and the endpoint of one whisker on a box plot.  |
| Mean                                 | The "average" of a set of data, found by adding all values in a set of data and dividing by the number of values you added.  |

## Unit 6 Vocabulary

| Vocabulary Term                   | Definition  |
|-----------------------------------|---|
| Measures of center                | A number that describes the middle of the data.   |
| Measures of spread (or variation) | A number that describes how spread out the data is. (how much the data varies)  |
| Median                            | The middle number when a set of data is arranged in order.  |
| Minimum value                     | The smallest number in a set of data, and the endpoint of one whisker on a box plot.  |
| Mode                              | The number that occurs the most in a set of data.   |
| Outlier                           | A value that is far away from most other values in a data set.  |
| Range                             | The difference between the highest and lowest values in a set of data.  |
| Stem-and-leaf plot                | A graph that organizes numerical data by splitting each piece of data into a "stem" and a "leaf", which each represent place value. |

# Understanding Statistical Questions

A **STATISTICAL QUESTION** is a question that can have a variety of answers.

| <u>Examples</u>   | <u>Non-Examples</u>  |
|---|--|
| <p>How many books did my friends read this summer?</p> <p>How tall are my classmates?</p> <p>Write a few examples here:</p> | <p>How many pages are in the <u>Hunger Games</u>?</p> <p>How old am I?</p> <p>Write a few non-examples here:</p> |

**Statistical example or not? Circle one choice.**

What grades did the students in my class score on the test?  
**EXAMPLE** or **NOT**

How many marbles in the jar? **EXAMPLE** or **NOT**

What does this apple cost? **EXAMPLE** or **NOT**

How fast can dogs run 100 yards? **EXAMPLE** or **NOT**

How old are each of the 6<sup>th</sup> grade teachers at East Cobb Middle School? **EXAMPLE** or **NOT**

**YOU TRY:**

*Write 4 examples of statistical questions below:*

- 1) \_\_\_\_\_  
\_\_\_\_\_
- 2) \_\_\_\_\_  
\_\_\_\_\_
- 3) \_\_\_\_\_  
\_\_\_\_\_
- 4) \_\_\_\_\_  
\_\_\_\_\_

**Are the following examples of statistical questions?**

5) How many days are in March? **EXAMPLE** or **NOT**

6) How many pets does each of my friends have?

**EXAMPLE** or **NOT**

7) What did my students score on their Unit 4 test?

**EXAMPLE** or **NOT**

8) What was the winning score in the last 20 Super Bowls?

**EXAMPLE** or **NOT**

9) Do you like peaches? **EXAMPLE** or **NOT**

10) What was the temperature at noon today at City Hall?

**EXAMPLE** or **NOT**

# Analyzing Data

## CENTER

## SPREAD

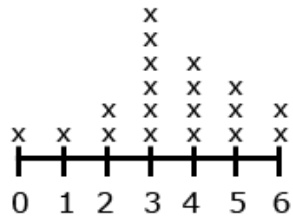


## CENTER

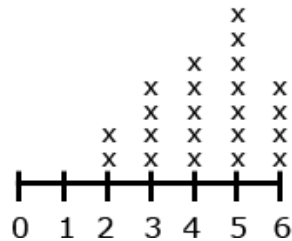
A measure of **center** is a single number that describes how data looks in the **middle**!

Examples include **mean**, **median** and **mode**.

**Graph A:**  
Number of Siblings



**Graph B:**  
Number of Pets



Let's take a look at the two graphs above, and see what you notice about their **CENTER**.

The **CENTER** of Graph A is about 3.

The **CENTER** of Graph B is about \_\_\_\_\_.

What does this tell you? \_\_\_\_\_

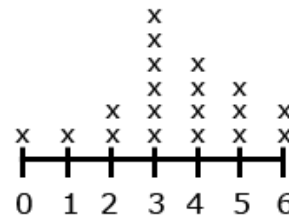
\_\_\_\_\_

## SPREAD

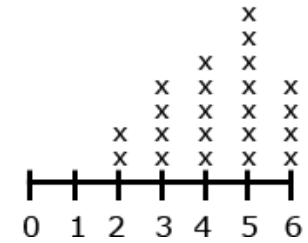
A measure of **spread** (or variation) is a single number that describes how far data is **spread out**.

Examples include **range** and **interquartile range (IQR)**

**Graph A:**  
Number of Siblings



**Graph B:**  
Number of Pets



Now, look at the **SPREAD** in both graphs.

Which graph has data that is CLOSER together? \_\_\_\_\_

Which graph has data that is FARTHER apart? \_\_\_\_\_

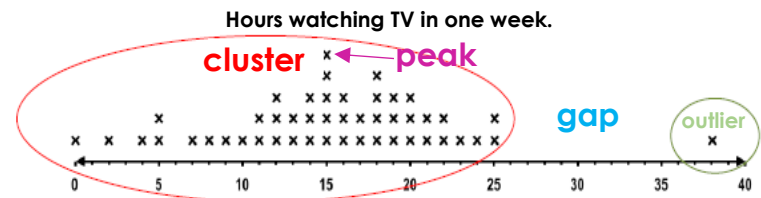
What does this tell you? \_\_\_\_\_

\_\_\_\_\_

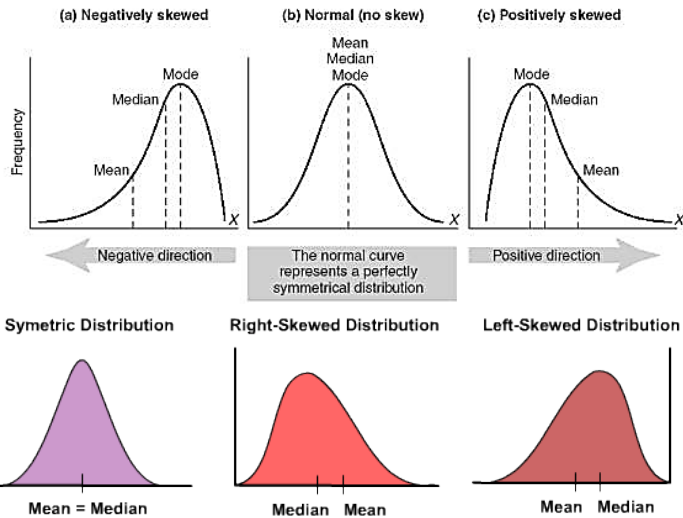


The of a set of data gives a quick snapshot of its characteristics.

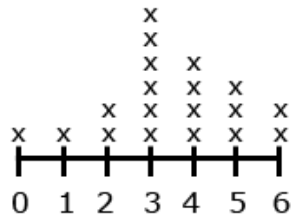
You want to look for things like **clusters** (groups of data close together), **gaps** ("holes" where no data is present), **outliers** (pieces of data that is far from the rest and **peaks** (the highest points on the graph – the mode)



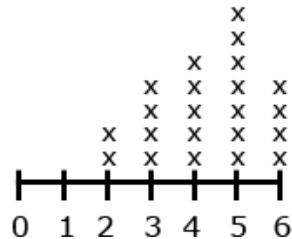
Data can also be skewed based on the relationship between the Mean, Median and Mode. The way we describe the skew is based on the direction of the “tail”.



**Graph A:**  
Number of Siblings



**Graph B:**  
Number of Pets



Now, look at the **SHAPE** of both graphs.

Which graph is skewed left? \_\_\_\_\_

Do either of the graphs have an outlier? \_\_\_\_\_

What is the peak of Graph B? \_\_\_\_\_

Does Graph A have any gaps? \_\_\_\_\_

## Measures of Center: Mean, Median & Mode

### Mean (a.k.a. “average”)

You find the mean by: adding up all the numbers in your data set and dividing by the number of numbers in the set.

**Example:** Find the mean of 6, 4, 10, 11 and 4.

**Solution:**  $6 + 4 + 10 + 11 + 4 = 35$

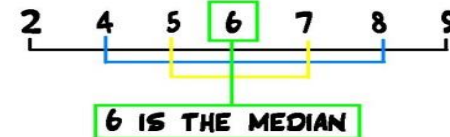
$35 \div 5 = 7$ ; The mean of this data is 7.

**You Try:** Find the mean of 8, 33, 20, 11, 6 and 12.

### Median (a.k.a. “the middle”)

The median is the **middle** number when all data values are in **order**. If there are two middle numbers, find the **mean (average)** of the two numbers.

**Example:** Find the median of 2, 8, 9, 5, 6, 7, and 4.



**You Try:** Find the median of 8, 33, 20, 11, 6, and 12.

### Mode (a.k.a. “the most”)

The mode is the number that occurs the **most** in a set of data. You will have **no mode** if all of the numbers in your data have the same frequency. You will have **more** than one mode if more than one number occurs most in a data set.

**Example:** Find the mode of 6, **4**, 10, 11, and **4**. Mode = **4**

### You Try:

a. Find the mode of 8, 33, 20, 11, 6, and 12. \_\_\_\_\_

b. Find the mode of 1, 3, 4, 1, 5, 6, and 3. \_\_\_\_\_

c. Find the mode of 15, 62, 76, and 62. \_\_\_\_\_

**More Practice:** Find the mean, median and mode for the following data:

3, 5, 13, 6, 1, 2, 3, 2, 1

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

100, 111, 122, 133, 144, 155, 166

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

84, 140, 105, 119, 105, 84, 105

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

## Mean, Median & Mode Extra Practice

1) What is the **median** of the following set of numbers? \_\_\_\_\_

{1, 2, 4, 6, 4}

2) What is the **mean** of the following set of numbers? \_\_\_\_\_

{4, 3, 1, 9, 3, 7, 3, 5, 10}

3) What is the **median** of the following set of numbers? \_\_\_\_\_

{4, 9, 6, 3, 4, 2}

4) What is the **mode** of the following set of numbers? \_\_\_\_\_

{1, 2, 4, 6, 4}

5) What is the **mean** of the following set of numbers? \_\_\_\_\_

{8, 10, 10, 10, 4, 6, 8}

6) What is the **median** of the following set of numbers? \_\_\_\_\_

{8, 10, 8, 5, 4, 7, 5, 10, 8}

7) What is the **mode** of the following set of numbers? \_\_\_\_\_

{8, 10, 8, 5, 4, 7, 5, 10, 8, 10}

8) What is the **median** of the following set of numbers? \_\_\_\_\_

{18, 17, 9, 9, 14, 20, 18}

9) What is the **mode** of the following set of numbers? \_\_\_\_\_

{16, 18, 10, 12, 11, 5, 9}

10) What is the **mean** of the following set of numbers? \_\_\_\_\_

{15, 17, 16, 10, 17, 7, 11, 19}

# Measures of S P R E A D (variation): Range & Interquartile Range (IQR)

**Measures of Spread** tell you how spread out your data is, or how much it varies.

**Range:** the difference between the **highest** and **lowest** values in a data set (simply subtract the highest and lowest numbers!)

Maximum Value Minimum Value

**Example:** 20, 13, 22, 17, **28**, **10**, 25     **Range** →  $28 - 10 = 18$

**You Try:** Find the range for the following data.

1) 34, 15, 9, 33, 27, 12, 27, 25, 30 \_\_\_\_\_

2) 8, 90, 5, 80, 27, 50 \_\_\_\_\_

3) 5, 4, 3, 5, 4, 2, 2, 6 \_\_\_\_\_

4) 35, 41, 68, 35, 83 \_\_\_\_\_

5) 5, 7, 5, 9, 6, 5, 5, 8, 4 \_\_\_\_\_

What does a LARGE range tell you about the data? \_\_\_\_\_

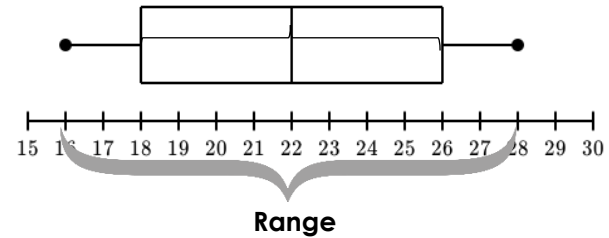
\_\_\_\_\_

What does a SMALL range tell you about the data? \_\_\_\_\_

\_\_\_\_\_

**Interquartile Range (IQR):** The range between the upper and lower quartiles on a box plot. This represents the middle 50% of the data. Simply subtract the upper and lower quartiles  $Q_3 - Q_1$ .

**Interquartile Range (IQR)**

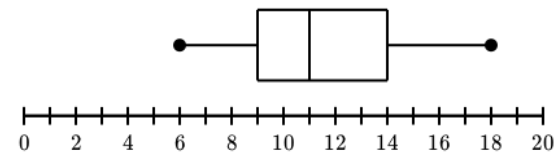


**How to find the IQR:**

- 1) Put the data in order from least to greatest.
- 2) Find the Median.
- 3) Separate the numbers below and above the median.
- 4) Find the medians of the lower ( $Q_1$ ) and the higher ( $Q_3$ ) group.
- 5) Subtract those two medians to get the IQR.

**You Try:** Based on the Box Plot above, answer the following questions.


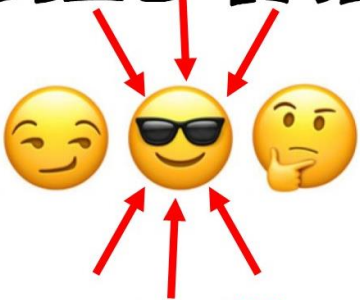


- 1) What is the median? \_\_\_\_\_
- 2) What is  $Q_1$ ? \_\_\_\_\_
- 3) What is  $Q_3$ ? \_\_\_\_\_
- 4) What is the IQR? \_\_\_\_\_



- 1) What is the median? \_\_\_\_\_
- 2) What is  $Q_1$ ? \_\_\_\_\_
- 3) What is  $Q_3$ ? \_\_\_\_\_
- 4) What is the IQR? \_\_\_\_\_



# Measures of Center and Spread Summary

|  |  |
|--|--|
| <h2>Mean</h2>  <p>The <b>MEAN</b> is the <b>average</b> of a set of numbers. You find it by finding the sum of a set of numbers and dividing by the number of numbers in the set.</p> | <h2>MEDIAN</h2>  <p>The <b>MEDIAN</b> is the <b>middle</b> of a set of numbers. You find it by putting your data in order and finding the one in the middle.<br/><small>If there are two, you average the two middle numbers.</small></p> |
| <p>The <b>MODE</b> is the number that occurs <b>most</b> in a set of numbers. You only have a mode if one or more numbers are repeated in a data set.</p>  <h2>MODE</h2>            | <p>The <b>RANGE</b> is the <b>difference</b> between the biggest (maximum value) and the smallest (minimum value) of numbers in a data set.</p>  <h2>RANGE</h2>   |

# Extra Practice

- 1) Write an example of a statistical question.
- 2) Write a non-example of a statistical question.

Matching: Match the following measures of center with the key word to remember what they find.

- |           |            |
|-----------|------------|
| 3) Mean   | a) middle  |
| 4) Median | b) average |
| 5) Mode   | c) most    |

Find the mean, median, mode, range and IQR for the following data.

- 6) 5, 12, 8, 16, 12, 19

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

Range: \_\_\_\_\_

IQR: \_\_\_\_\_

- 7) 5, 7, 5, 9, 6, 5, 5, 8, 4

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

Range: \_\_\_\_\_

IQR: \_\_\_\_\_

- 8) 38, 42, 36, 17, 38, 21, 24, 38

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

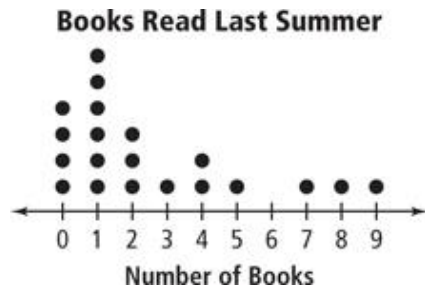
Mode: \_\_\_\_\_

Range: \_\_\_\_\_

IQR: \_\_\_\_\_

# Dot Plots (Line Plots)

A dot plot (also called a line plot) is used to easily organize large sets of data. It is a graph in which each value is shown as a **dot** (or and x) above a number line. Each dot (or x) represents a **single** response.



- 1) How many people read 4 books last summer? \_\_\_\_\_
- 2) How many people read 1 book last summer? \_\_\_\_\_
- 3) How many people were surveyed? \_\_\_\_\_
- 4) Only 2 people read \_\_\_\_\_ books last summer.

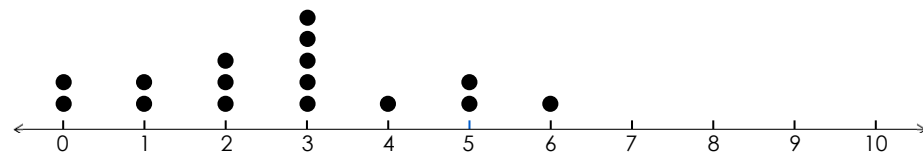
## How to make a dot plot?

- 1) Draw a number line.
- 2) Mark off the minimum and maximum values and ALL numbers in between.
- 3) Make a dot (or x) for EACH data value above its number on the number line. Take care to make it neat and easy to read.
- 4) Title your dot plot.

## Example:

Number of Jolly Ranchers eaten per day:

1, 2, 4, 3, 5, 2, 3, 6, 1, 0, 0, 5, 2, 3, 3, 3

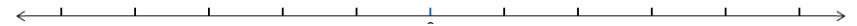


## You Try:

Use the sets of data below to create dot plots and then use the data to find the mean, median, mode and range.

- 1) Number of siblings:

3, 2, 0, 4, 1, 1, 1, 2, 1, 3, 5, 3, 4, 0, 2, 1, 0, 8



Mean: \_\_\_\_\_ Median: \_\_\_\_\_  
 Mode: \_\_\_\_\_ Range: \_\_\_\_\_  
 Outliers: \_\_\_\_\_ Min: \_\_\_\_\_ Max: \_\_\_\_\_

- 2) Number of downloaded apps on teens' cell phones:

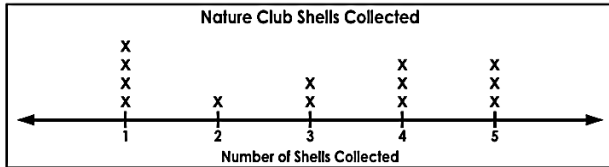
8, 12, 10, 15, 11, 20, 12, 12, 9, 10, 11, 13, 12, 9, 10, 13, 11, 13, 9, 12, 14, 9, 12, 15, 10, 11



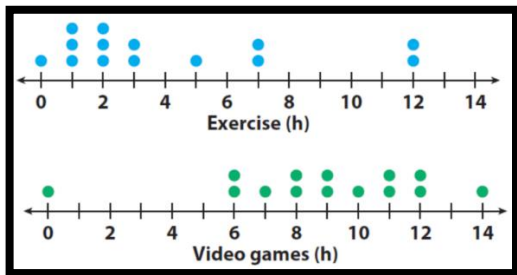
Mean: \_\_\_\_\_ Median: \_\_\_\_\_  
 Mode: \_\_\_\_\_ Range: \_\_\_\_\_  
 Outliers: \_\_\_\_\_ Min: \_\_\_\_\_ Max: \_\_\_\_\_

# Interpreting Dot Plots (Line Plots)

Use the data in the dot plot to answer questions 1-4.



- 1) What is the mean number of shells collected? \_\_\_\_\_
- 2) What is the median number of shells collected? \_\_\_\_\_
- 3) What is the mode? \_\_\_\_\_
- 4) What is the range? \_\_\_\_\_



Fourteen students were surveyed about the time they spend exercising and playing video games each week. Compare the data by answering the questions 5-8.

- 5) What is the **range** for the hours of exercise? \_\_\_\_\_  
For playing video games? \_\_\_\_\_
- 6) What is the **mode** for exercise? \_\_\_\_\_  
Playing video games? \_\_\_\_\_
- 7) What is the **median** hours spent exercising? \_\_\_\_\_  
Playing video games? \_\_\_\_\_
- 8) What is the **mean** number of hours spent exercising? \_\_\_\_\_  
Playing video games? \_\_\_\_\_

# Frequency Tables

A **frequency table (chart)** displays data that has been collected.

## Season Soccer Scores

| Score | Tally | Frequency |
|-------|-------|-----------|
| 1     | /     | 1         |
| 2     | /     | 1         |
| 3     | ///   | 3         |
| 4     | /     | 1         |
| 5     | ////  | 4         |

## Intervals & Frequency Tables

### Number of Cups of Coffee

| Intervals | Tally | Frequency |
|-----------|-------|-----------|
| 0 - 3     | //    | 2         |
| 4 - 7     | ///   | 3         |
| 8 - 11    | ////  | 8         |
| 12 - 15   | ///   | 3         |
| 16 - 19   | //    | 2         |

Intervals must be:

- 1) **equal in values**
- 2) **inclusive of all the data**
- 3) **non-overlapping**

**You Try:** If your data ranges from 2 to 38, are the intervals below good (👍) or bad (👎)?

- 1) 1-10, 11-20, 21-30, 31-40
- 2) 1-10, 10-20, 20-30, 30-40
- 3) 1-10, 11-15, 16-35, 36-40
- 4) 1-8, 9-16, 17-24, 25-32, 33-40
- 5) 1-10, 11-20, 21-30

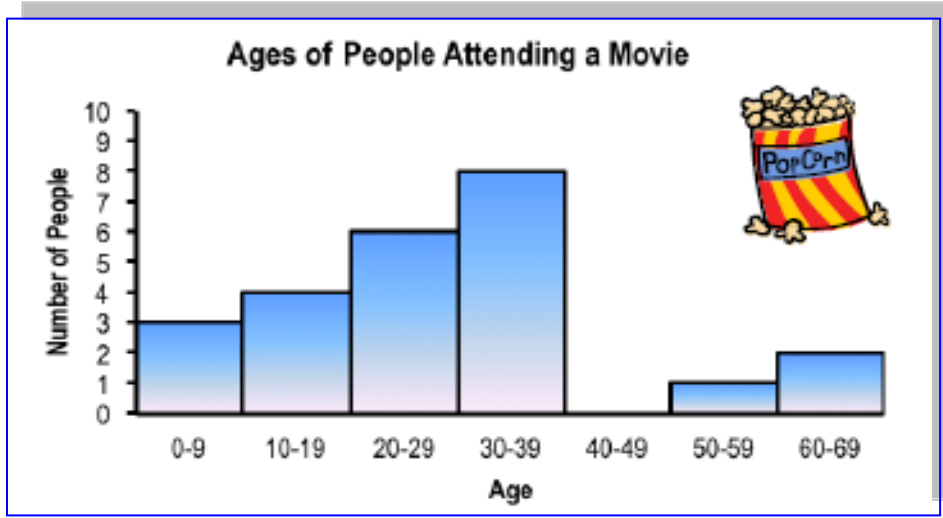


# Histograms

A **histogram** is a bar graph used to display numerical data grouped in equal intervals.

## Example:

The students of Monster High took a survey of the ages of everyone attending the "Ghoul's Rule" Movie. The results are displayed in the histogram below.



- How many people from ages 10-19 attended the movie? \_\_\_\_\_
- How many people aged 50 or over attended the movie? \_\_\_\_\_
- How many kids younger than 20 attended the movie? \_\_\_\_\_
- How many total people attended the movie? \_\_\_\_\_
- What does the gap at the interval 40-49 mean? \_\_\_\_\_  
\_\_\_\_\_
- Can you tell whether a 25-year-old attended the movie? \_\_\_\_\_  
Why or why not? \_\_\_\_\_
- Why must the bars on a histogram always be touching (unless there is a gap in data)? \_\_\_\_\_

# Making a Histogram

## Determining Intervals

Look at your data. What is the best way to break that data up?

## Examples:

| Data Range | Scale   | Intervals                                 |
|------------|---------|---|
| 3 to 46    | 0 – 50  | 0-10, 11-20, 21-30, 31-40, 41-50          |
| 1 to 248   | 0 – 300 | 0-50, 51-100, 101-150, 151-200, 201-250   |
| 4.1 to 5.4 | 4 – 5.5 | 4-4.2, 4.3-4.5, 4.6-4.8, 4.9-5.1, 5.2-5.4 |
| 52 to 964  |         |   |

Organize the data in a \_\_\_\_\_ using the intervals.

## Example:

| Pages Read per Student Last Weekend |     |    |    |     |
|-------------------------------------|-----|----|----|-----|
| 78                                  | 15  | 40 | 19 | 188 |
| 50                                  | 122 | 96 | 37 | 102 |

The data ranges from \_\_\_\_\_ to \_\_\_\_\_. The scale will go from \_\_\_\_\_ to \_\_\_\_\_. We can use the interval of \_\_\_\_\_.

Make a frequency table:

| Pages Read per Student Last Weekend |      |        |         |         |
|-------------------------------------|------|--------|---------|---------|
| NUMBER:                             | 1-50 | 51-100 | 101-150 | 151-200 |
| TALLY:                              |      |        |         |         |
| FREQUENCY:                          | 5    | 2      | 2       | 1       |

Use the information in the frequency table on the previous page to create a histogram for the data.

| Pages Read per Student Last Weekend |      |        |         |         |
|-------------------------------------|------|--------|---------|---------|
| NUMBER:                             | 1-50 | 51-100 | 101-150 | 151-200 |
| TALLY:                              |      |        |         |         |
| FREQUENCY:                          | 5    | 2      | 2       | 1       |

Title: \_\_\_\_\_



Remember: Bars must \_\_\_\_\_. Label both \_\_\_\_\_.

Make a histogram for the following data:

How many songs are on your phone?

50, 33, 100, 202, 114, 44, 45, 203, 123, 176, 225, 15, 23, 111, 132, 156, 210, 43, 65, 66, 83, 90, 15, 140, 199, 134, 56, 14, 2

|           |  |  |  |  |  |
|-----------|--|--|--|--|--|
|           |  |  |  |  |  |
| Number    |  |  |  |  |  |
| Tally     |  |  |  |  |  |
| Frequency |  |  |  |  |  |

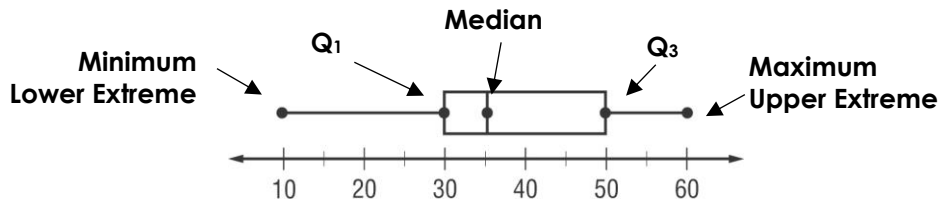
Title: \_\_\_\_\_



Remember: Bars must \_\_\_\_\_. Label both \_\_\_\_\_.

# Box Plot (Box & Whiskers Plot)

A box plot (a.k.a. "box and whisker plot") uses a **number** line to show how data is distributed. It shows the **minimum**, and the **maximum** values, which are also called the **upper extreme** and **lower extreme**, the **median** and the **upper** and **lower quartiles**.

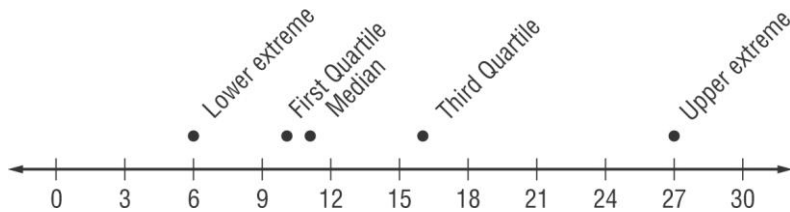


## Example:

The list below shows the number of model airplanes owned by the members of the aviation club. Draw a box plot of the data.

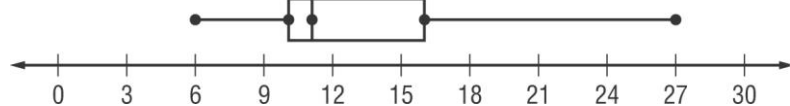
**6, 8, 10, 10, 10, 11, 12, 14, 16, 18, 27**

- 1) Order the numbers from least to greatest. Then draw a number line that covers the range of the data.
- 2) Find the median, the extremes, and the first and third quartiles. Mark these points above the number line.



- 3) Draw the box so that it includes the quartile values. Draw a vertical line through the median value. Extend the whiskers from each quartile to the extreme data points.
- 4) Title your box plot!

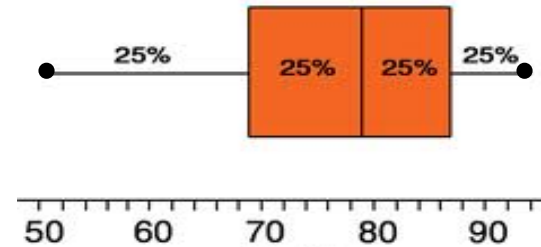
**Numbers of Model Airplanes Owned**



## Tip:

One key understanding about box plots is that each section represents 25% of the data. If one section is large, that tells you that the numbers in that section are more spread out. If the section is small, that tells you the data is closer together.

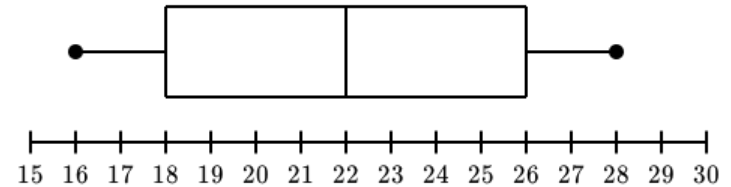
In the box plot below, you can see that the whisker for the upper quartile is much smaller than the whisker for the lower quartile. However, they both have the same number of data values. What does this tell you?



## You Try:

- 1) Use the box and whiskers plot to answer the following questions:

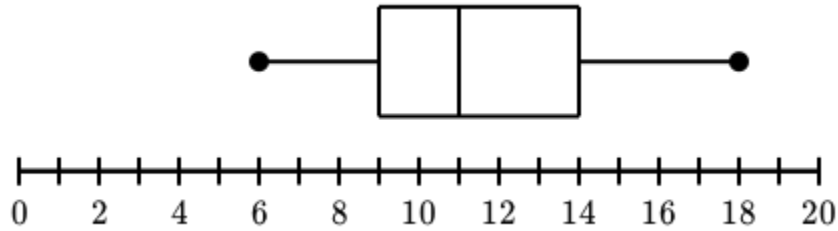
**Student Cell Phones per 6<sup>th</sup> Grade Class**



- a) What is the lowest number of students with cell phones in the data? \_\_\_\_\_
- b) What is the highest number of students with cell phones in the data? \_\_\_\_\_
- c) What is the median number of students with cell phones? \_\_\_\_\_
- d) What is the range of students with cell phones? \_\_\_\_\_

2) Use the box and whiskers plot to answer the following questions:

**Total Points Scored by Basketball Players in 2018**



- a) Median = \_\_\_\_\_
- b) Lower Quartile (Q1) = \_\_\_\_\_
- c) Maximum = \_\_\_\_\_
- d) Minimum = \_\_\_\_\_
- e) Range = \_\_\_\_\_
- f) Upper Quartile (Q3) = \_\_\_\_\_

**Use the data given for each problem to find the requested information and make a box plot.**

1) The number of pencils students have at school:

{4, 7, 5, 3, 12, 6, 5}

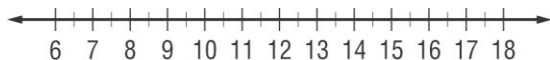
- Median: \_\_\_\_\_
- Q1: \_\_\_\_\_
- Q3: \_\_\_\_\_
- Lower Extreme (Minimum): \_\_\_\_\_
- Upper Extreme (Maximum): \_\_\_\_\_



2) Number of books read by the 6<sup>th</sup> grade teachers:

{13, 8, 17, 10, 6, 11, 18}

- Median: \_\_\_\_\_
- Q1: \_\_\_\_\_
- Q3: \_\_\_\_\_
- Lower Extreme (Minimum): \_\_\_\_\_
- Upper Extreme (Maximum): \_\_\_\_\_



3) The heights of students on the soccer team, in inches, are: 56, 69, 60, 64, 63, 68, 68 and 66. Make a box plot for this data.

- Median: \_\_\_\_\_
- Q1: \_\_\_\_\_
- Q3: \_\_\_\_\_
- Lower Extreme (Minimum): \_\_\_\_\_
- Upper Extreme (Maximum): \_\_\_\_\_

4) The Young Fashionistas Club tallied up the total pairs of shoes that each member owns. Make a box plot of this data:

5, 6, 7, 7, 7, 8, 9, 9, 11, 11, 12, 12, 12, 12, 12, 13, 13, 14, 14, 14, 14, 18, 19, 20, 20

- Median: \_\_\_\_\_
- Q1: \_\_\_\_\_
- Q3: \_\_\_\_\_
- Lower Extreme (Minimum): \_\_\_\_\_
- Upper Extreme (Maximum): \_\_\_\_\_

## Extra Practice

- 1) Make a line plot for each set of data. Find the mean, median, mode, range, and any outliers of the data shown in the line plot.

|    |    |    |    |
|----|----|----|----|
| 52 | 48 | 52 | 51 |
| 52 | 65 | 58 | 48 |
| 60 | 45 | 50 | 52 |
| 56 | 48 | 53 | 58 |
| 62 | 49 | 51 | 49 |

**Student Height in Inches**

Mean: \_\_\_\_\_ Median: \_\_\_\_\_ Mode: \_\_\_\_\_

Range: \_\_\_\_\_ Outliers: \_\_\_\_\_

- 2) The table shows the daily soda sales for a restaurant. Choose intervals, make a frequency table, and construct a histogram to represent the data.

| Number of Sodas Sold Daily |    |    |    |    |    |
|----------------------------|----|----|----|----|----|
| 56                         | 86 | 74 | 63 | 51 | 94 |
| 86                         | 72 | 53 | 77 | 74 | 88 |
| 81                         | 90 | 72 | 76 | 84 | 92 |
| 78                         | 89 | 85 | 75 | 91 | 87 |

- 3) Use the data to create a box and whiskers plot. Find the Median, Q1, Q3, Minimum and Maximum {2, 3, 5, 4, 3, 3, 2, 5, 6}.



Median: \_\_\_\_\_

Q1: \_\_\_\_\_

Q3: \_\_\_\_\_

Lower Extreme (Minimum): \_\_\_\_\_

Upper Extreme (Maximum): \_\_\_\_\_

- 4) Describe how you know a question is a statistical question.

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- 5) Find the mean, median, mode, range, IQR and Outliers for the following data.

1, 5, 9, 1, 2, 4, 8, 2

Mean: \_\_\_\_\_

Median: \_\_\_\_\_

Mode: \_\_\_\_\_

Range: \_\_\_\_\_

IQR: \_\_\_\_\_

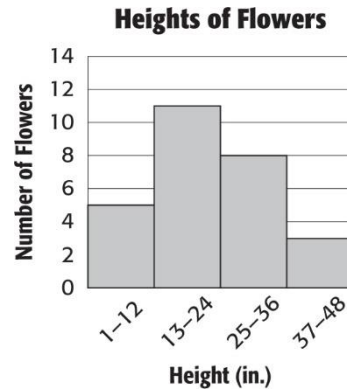
Min: \_\_\_\_\_

Max: \_\_\_\_\_



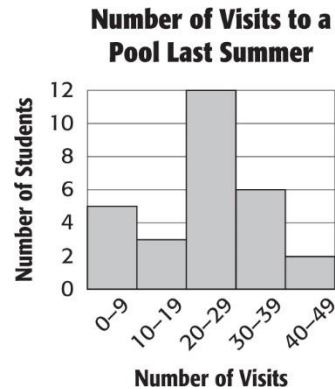
For Exercises 6 – 9, use the histogram at the right.

- 6) Which interval represents the least number of flowers?
- 7) Which interval has 5 flowers?
- 8) How many flowers are 24 inches tall or shorter?
- 9) How many flowers are at least 37 inches tall?



For Exercises 10 – 13, use the histogram shown at the right.

- 10) Which interval represents the most number of students?
- 11) Which interval has three students?
- 12) How many students went to a pool at least ten times last summer?
- 13) How many students went to a pool less than ten times last summer?



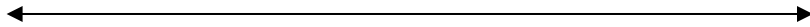
## Unit 6 Study Guide

- 1) What are the measures of center? \_\_\_\_\_  
\_\_\_\_\_
- 2) How do you calculate the mean? \_\_\_\_\_  
\_\_\_\_\_
- 3) How do you calculate the median? \_\_\_\_\_  
\_\_\_\_\_
- 4) What are the measures of spread? \_\_\_\_\_  
\_\_\_\_\_
- 5) How do you calculate the range? \_\_\_\_\_  
\_\_\_\_\_
- 6) How do you calculate the interquartile range (IQR)? \_\_\_\_\_  
\_\_\_\_\_
- 7) What do you look for in the shape of data? \_\_\_\_\_  
\_\_\_\_\_
- 8) Big Bob scored the following points at eight basketball games: {21, 24, 9, 11, 16, 7, 24} Calculate the following:
  - a. Mean: \_\_\_\_\_
  - b. Median: \_\_\_\_\_
  - c. Mode: \_\_\_\_\_
  - d. Range: \_\_\_\_\_
- 9) What is a statistical question? \_\_\_\_\_  
\_\_\_\_\_  
Give an example: \_\_\_\_\_  
\_\_\_\_\_  
Give a non-example: \_\_\_\_\_  
\_\_\_\_\_

10) Use the following data to create a box plot:

| Ages of Students Who Downloaded "Divergent" |    |    |    |    |    |    |    |    |
|---|----|----|----|----|----|----|----|----|
| 10  | 18 | 17 | 12 | 13 | 15 | 15 | 14 | 14 |

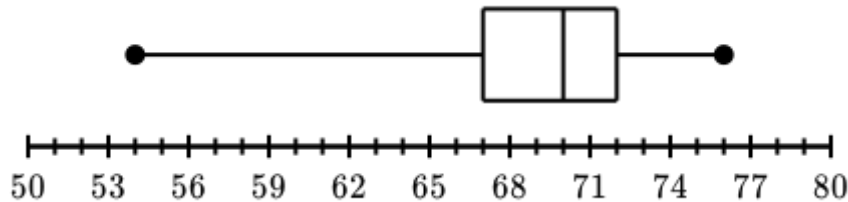
Median: \_\_\_\_\_  
 Q<sub>1</sub>: \_\_\_\_\_  
 Q<sub>3</sub>: \_\_\_\_\_  
 Lower Extreme (Minimum): \_\_\_\_\_  
 Upper Extreme (Maximum): \_\_\_\_\_



11) Which measure is MOST affected by an outlier? \_\_\_\_\_

- a) Mean      b) Median      c) Mode      d) Range

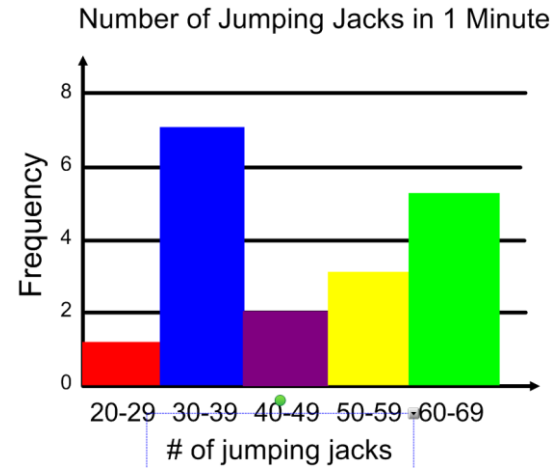
12) Identify the IQR from the box plot below: \_\_\_\_\_



13) Use the box plot above to answer the following questions:

- a) Minimum: \_\_\_\_\_      b) Lower Quartile (Q<sub>1</sub>): \_\_\_\_\_  
 c) Median: \_\_\_\_\_      d) Upper Quartile (Q<sub>3</sub>): \_\_\_\_\_  
 e) Maximum: \_\_\_\_\_      f) Range: \_\_\_\_\_  
 g) What percent of the data is 15 or greater? \_\_\_\_\_  
 h) What percent of the data is between 15 and 25? \_\_\_\_\_  
 i) The data is (Circle One): symmetrical    skewed right    skewed left

Use the Histogram below to answer questions 14-18.



14) According to the histogram, how many students can do more than 49 jumping jacks in 1 minute? \_\_\_\_\_

15) How many students participated in the survey? \_\_\_\_\_

16) Which interval represents the mode of the histogram? \_\_\_\_\_

17) How many people did **EXACTLY** 45 jumping jacks? \_\_\_\_\_

18) Circle the set of intervals that CAN be used for the data in the histogram. Explain why the others cannot be used:

- a) 0-3, 4-7, 8-11, 12-15, 16-19 \_\_\_\_\_  
 b) 0-1, 2-5, 6-7, 8-18 \_\_\_\_\_  
 c) 1-2, 3-4, 5-6, 7-8, 9-10 \_\_\_\_\_  
 d) 0-5, 5-10, 10-15, 15-20 \_\_\_\_\_

Sit-Ups Completed by Students During a Fitness Test

|    |    |    |    |    |    |
|----|----|----|----|----|----|
| 13 | 13 | 10 | 14 | 15 | 12 |
| 17 | 12 | 18 | 14 | 15 | 12 |