Grade/Subject	Grade 7/ Mathematics Grade 7/Accelerated Mathematics
Unit Title	Unit 7: Inferences and Populations
Overview of Unit	**Statistics** • Use random sampling to draw inferences about a population. • Draw informal comparative inferences about two populations.
Pacing	

Background Information For The Teacher
Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences. In order for students to be successful, the following skills and concepts need to be maintained. Some of the following concepts may be new to students. • Analyzing patterns and seeing relationships • Represent and interpret data, using addition and subtraction, multiplication and division • Data can be represented graphically in a variety of ways. The type of graph is selected to best represent a particular data set. • Measures of center (mean, median, mode) and measures of variation (range, quartiles, interquartile range) can be used to analyze data. • Larger samples are more likely to be representative of a population. In this unit students will: • Use real-life situations to show the purpose for using random sampling to make inferences about a population. • Understand that random sampling guarantees that each element of the population has an

equal opportunity to be selected in the sample.
- Compare the random sample to the population, asking questions like, “Are all the elements of the entire population represented in the sample?” and “Are the elements represented proportionally?”
- Make inferences given random samples from a population along with the statistical measures.
- Learn to draw inferences about one population from a random sampling of that population.
- Draw informal comparative inferences about two populations.
- Deal with small populations and determine measures of center and variability for a population.
- Compare measures of center and variability and make inferences.
- Use graphical representations of data to compare measures of center and variability.
- Begin to develop understanding of the benefits of the measures of center and variability by analyzing data with both methods.
- Understand that when they study large populations, random sampling is used as a basis for the population inference.
- Understand that measures of center and variability are used to make inferences on each of the general populations
- Make comparisons for two populations based on inferences made from the measures of center and variability.

Note: Creation of box plots and histograms (moved to 6th grade – 7th grade continues to compare). Statistical measures also moved to 6th grade.

Essential Questions (and Corresponding Big Ideas)
What are different sampling techniques used in real life? • Understand that statistics can be used to gain information about a population by examining sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population.

How do I determine an appropriate sample size?

- Understand that random sampling tends to produce representative samples and support valid inferences.

How can random samples be used to make predications about populations?

How are proportions used to estimate information about populations?

- Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.

How does the data describe its center, spread, and representation of the population?

- Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.
- Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

What is the difference between the measure of center and measure of variation?

- Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about tow populations.

Core Content Standards	Explanations and Examples
7.SP.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences. Sampling is taught in this standard as a statistical tool used to gain information about a population without examining the entire population. Sampling is the process of taking a subset of subjects that is representative of the entire population and collecting data on that subset. The sample must have sufficient size to warrant statistical analysis. Samples need to be representative of the population in order to make valid generalizations and, therefore, should be randomly selected. A random sampling guarantees that each element of the population has an equal opportunity to be selected in the sample. An example of a random sample is taking a list of names at a school and selecting every fourth person to be in the sample to represent the population of the school.	7.SP.1 The school food service wants to increase the number of students who eat hot lunch in the cafeteria. The student council has been asked to conduct a survey of the student body to determine the students' preferences for hot lunch. They have determined two ways to do the survey. The two methods are listed below. Identify the type of sampling used in each survey option. Which survey option should the student council use and why? ○ Write all of the students' names on cards and pull them out in a draw to determine who will complete the survey. Survey the first 20 students that enter the lunchroom.

What the Teacher Does:

- Facilitate a discussion about statistics as an introduction. Ask students questions such as, "What is statistics? Why do we study it? How is it useful?"
- Propose a generalization about students at your school such as, "Students at our school do at least 5 hours of homework per night." Sample discussion questions include, "How do I know that is true? Is it true? Is this a valid generalization?" Facilitate a whole class discussion about sampling. Model vocabulary: sampling, population, and valid generalization.
- Ask students to work with a partner to brainstorm three ways to collect a sampling of data. Share the methods and facilitate a class discussion with questions that lead to the importance of random samples. Sample questions may include the following: "Is it possible to ask everyone at the school? Are all grade levels included in the sample? Are all the elements of the entire population represented in the sample? Are the elements represented proportionally? Should there be the same number of boys and girls in the sample? Define random and how it is representative of a population." Allow students to offer random sampling ideas.
- Provide a list of sampling examples for students to critique. Ask students "Are they random?" Look for students to use appropriate vocabulary in their critiques.

What the Students Do:

- Critique examples of random sampling as statistical tools using precise mathematical vocabulary: random sampling, population, and valid generalizations.
- Design random samplings to collect the data given statistical questions. Defend the samplings as random.

Misconceptions and Common Errors:

This domain has many vocabulary worlds for students to learn and use. Use word walls and the Frayer model. For words that are easily confused, have students create foldables.

The concept of random is difficult for some students. It may be necessary to physically demonstrate a random versus non-random sampling to eliminate misconceptions for the students. For example, a non-random sampling in the classroom would be to ask all the girls to stand up to answer a question about video game preferences. A random sample would be to ask every third student to stand up and answer the same question. Ask students how they answers were different in the girls sampling than the mixed sampling and how the generalizations would be different from each group.

7.SP.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

This standard connects to 7.SP.1 by using the sample data collected to draw inferences. Generate multiple samples of the same size from a given population to examine the variation in estimates or predictions. This standard provides an introduction to variability.

7.SP.2

Below is the data collected from two random samples of 100 students regarding student's school lunch preference. Make at least two inferences based on the results.

Lunch Preferences				
Student sample	Ham-burgers	Tacos	Pizza	Total
#1	12	14	74	100
#2	12	11	77	100

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What the Teacher Does:

Use random samples from examples done in class to draw inferences. Ask students to draw inferences and valid generalizations and make predictions whenever random data are collected in class. Expect students to use appropriate vocabulary when explaining the sampling process and their generalizations.
Collect multiple samples. Using examples, discuss why someone would want to use this technique and why the samples need to be the same size.
Give students practice collecting multiple samples after making estimates or predictions for given situations such as estimating the man word length in a book. Gauge how far off estimates are.

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What the Students Do:

Draw valid inferences and generalizations from random samplings of populations and justify their inferences and generalizations as valid using appropriate vocabulary.
Explain the variability in multiple random samples and gauge how far off an estimate may be.

Misconceptions and Common Errors:

Students may have difficulty understanding why it is necessary to conduct multiple samples of the same size. A misconception is that only one of the samples is correct. Conduct multiple data collections in class so that students realize that none of the samples are exactly the population, but together they provide a good picture of the population.

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7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For* difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*

Students compare statistics on two data sets for the first time. Build on their understanding of graphs, mean, median, mean absolute deviation (MAD) and interquartile range from sixth grade. Students understand that variability is responsible for the overlap of two data sets, which can

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7.SP.3 Students can readily find data as described in the example on sports team or college websites. Other sources for data include American Fact Finder (Census Bureau), Fed Stats, Ecology Explorers, USGS, or CIA World Fact book. Researching data sets provides opportunities to connect mathematics to their interests and other academic subjects. Students can utilize statistic functions in graphing calculators or spreadsheets for calculations with larger data sets or to check their computations. Students calculate mean absolute deviations in preparation for later work with standard deviations.

Example:
Jason wanted to compare the mean height of the players on his favorite basketball and soccer teams. He thinks the mean height of the players on the basketball team will be greater but doesn't know how much greater. He also wonders if the variability of heights of the athletes is related to the sport they play. He thinks that there will be a greater variability in the heights of soccer players as compared to basketball players. He used the rosters and player statistics from the team websites to generate the following lists.

Basketball Team – Height of Players in inches for 2010-2011 Season

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be visible when the data are presented in graphic form - two dot plots or box and whisker plots, for example. With two data distributions with similar variability, students will express the difference between centers (mean, median, mode) as a multiple of a measure of variability.

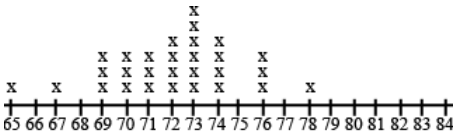
What the Teacher Does:

- Build on students' understanding of graphs, mean, median, mean absolute deviation, and interquartile range from Grade 6 by beginning with one data set and adding a second for comparisons.
- Display two data sets presented on dot plots and ask students what they notice. Ask about the variability of the sets. Guide the discussions to point out that the greater the variability, the more overlap visible in a graph. Facilitate a discussion about why that makes sense to them.
- Provide numerical data sets that are of interest to students. Data can be found in fact books and online about sports, the environment, and government statistics – local, state, and federal. Use of contextual examples allows students to understand how to not only calculate the measures of centers and variability but also understand their meaning in the given context.
- Use the example from the standard to model measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- Provide opportunities for students to calculate with and without graphing calculators. Large data sets can be compared using graphing calculators.

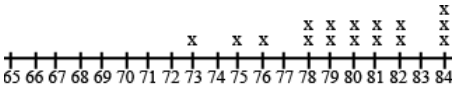
75, 73, 76, 78, 79, 78, 79, 81, 80, 82, 81, 84, 82, 84, 80, 84

Soccer Team – Height of Players in inches for 2010
73, 73, 73, 72, 69, 76, 72, 73, 74, 70, 65, 71, 74, 76, 70, 72, 71, 74, 71, 74, 73, 67, 70, 72, 69, 78, 73, 76, 69

To compare the data sets, Jason creates a two dot plots on the same scale. The shortest player is 65 inches and the tallest players are 84 inches.



Height of Soccer Players (in)



Height of Basketball Players (in)

In looking at the distribution of the data, Jason observes that there is some overlap between the two data sets. Some players on both teams have players between 73 and 78 inches tall. Jason decides to use the mean and mean absolute deviation to compare the data sets. Jason sets up a table for each data set to help him with the calculations. The mean height of the basketball players is 79.75 inches as compared to the mean height of the soccer players at 72.07 inches, a difference of 7.68 inches.
The mean absolute deviation (MAD) is calculated by taking the mean of the absolute deviations for each data point. The difference between each data point and the mean is recorded in the second column of the table. Jason used rounded values (80 inches for the mean height of basketball players and 72 inches for the mean height of soccer players) to find the differences. The absolute deviation, absolute value of the deviation, is recorded in the third column. The absolute deviations are summed and divided by the number of data points in the set.
The mean absolute deviation is 2.53 inches for the basketball players and 2.14 for the soccer

players. These values indicate moderate variation in both data sets. There is slightly more variability in the height of the soccer players. The difference between the heights of the teams is approximately 3 times the variability of the data sets (7.68 ÷ 2.53 = 3.04).

Soccer Players (n = 29)		
Height (in)	Deviation from Mean (in)	Absolute Deviation (in)
65	-7	7
67	-5	5
69	-3	3
69	-3	3
69	-3	3
70	-2	2
70	-2	2
70	-2	2
71	-1	1
71	-1	1
71	-1	1
72	0	0
72	0	0
72	0	0
72	0	0
73	+1	1
73	+1	1
73	+1	1
73	+1	1
73	+1	1
73	+1	1
74	+2	2
74	+2	2
74	+2	2
74	+2	2
76	+4	4
76	+4	4
76	+4	4
78	+6	6
Σ = 2090		Σ = 62

Basketball Players (n = 16)		
Height (in)	Deviation from Mean (in)	Absolute Deviation (in)
73	-7	7
75	-5	5
76	-4	4
78	-2	2
78	-2	2
79	-1	1
79	-1	1
80	0	0
80	0	0
81	1	1
81	1	1
82	2	2
82	2	2
84	4	4
84	4	4
84	4	4
Σ = 1276		Σ = 40

Mean = 2090 ÷ 29 =72 inches Mean = 1276 ÷ 16 =80 inches

MAD = 62 ÷ 29 = 2.14 inches MAD = 40 ÷ 16 = 2.53 inches

What the Students Do:

- Compare two data sets for variability by comparing graphs.
- Explain orally and/or in writing why it makes sense that the greater the variability, the more visible the overlap on graphs presenting two numerical data sets.
- Use statistical functions on graphing calculators for large data sets.
- Model and compare two real-world data sets by measuring the difference between centers and expressing it as a multiple of a measure of variability.

	Misconceptions and Common Errors: Comparing two data sets and expressing the difference between centers as a multiple of a measure of variability has several steps. Some students become overwhelmed and need the teacher to break down the steps so thy make sense. These students may need access to the graphing calculator for smaller data sets. Measures of center and measures of variability are easily confused. Spend time concentrating on the difference between these two concepts. A foldable may help students separate the two concepts.
7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.* Draw valid comparative inferences about two populations. The inferences are drawn from using measures of center (mean, median, mode) and variability (range, mean absolute deviation, and interquartile range) from random samples. This standard differs from the previous in that students are not drawing inferences. Using the examples from the previous standard where the data were collected will unify this work. What the Teacher Does: • Introduces the example by comparing it to example from Standard 7 SP2 about word length in books. Ask the students how the two questions differ. In 7 SP2, there is only one data set and you are looking for only one statistic. • Walk through the example with the class, asking questions along the way such as, "What should we do first? Next?" • Encourage students to practice using precise vocabulary as they answer the questions: measures of center, measures of variability, mean, median, mode, range, interquartile range and mean absolute deviation. • Present other data sets to students in different formats (dot plots, box and whisker plots, etc.) and have them determine which measures to use to compare the sets. Comparative inferences are phrases such as, "Set A has more variability than Set B" or "Group 2 has the larger mean." • Share data sets and inferences with students and have them determine if the inferences are valid. Ask students to justify their determinations.	Measures of center include mean, median, and mode. The measures of variability include range, mean absolute deviation, and interquartile range. Example: • The two data sets below depict random samples of the housing prices sold in the King River and Toby Ranch areas of Arizona. Based on the prices below, which measure of center will provide the most accurate estimation of housing prices in Arizona? Explain your reasoning. ○ King River area {1.2 million, 242000, 265500, 140000, 281000, 265000, 211000} Toby Ranch homes {5million, 154000, 250000, 250000, 200000, 160000, 190000} What the Students Do: • Identify what the question asks. This is a key step in problem solving. • Use appropriate vocabulary when explaining key concepts and computations. • Select the correct measure(s) of center or variability in comparing two data sets. • Draw valid comparative inferences for two data sets. • Identify valid inferences and justify why they are valid (or why other inferences are not valid.) Misconceptions and Common Errors: This standard requires the use of many new vocabulary words. This may be overwhelming to some students. Use word walls, foldables, and graphic organizers to help students become fluent in each of these words.

Standards for Mathematical Practice	**Explanations and Examples**
Use random sampling to draw inferences about a population. **7.SP.1, 7.SP.2** In this cluster students learn about sampling populations. Specifically, they learn that a sampling must be representative of a population in order to make valid inferences and generalizations. Students conduct multiple samples of the same size from populations with an unknown characteristic to measure variation in estimates or predictions about the characteristic. **MP 2. Reason abstractly and quantitatively.** **MP 3. Construct viable arguments and critique the reasoning of others.** **MP 4. Model with mathematics.** **MP 5. Use appropriate tools strategically.** **Use random sampling to draw inferences about a population.** **7.SP.3, 7.SP.4** In the previous cluster students worked with one population. In this cluster students draw valid comparable inferences about two populations using measures of center (mean, median) and measures of variability. **MP 2. Reason abstractly and quantitatively.** **MP 3. Construct viable arguments and critique the reasoning of others.** **MP 5. Use appropriate tools strategically.** **MP 6. Attend to precision.**	Students make generalizations and predictions based on random samples. Students use statistical methods as justification for predictions and inferences. Students develop probability models and use them to find probabilities of events. Students use organized lists, tables, tree diagrams and simulation tools. Students compare statistical measures on two populations. Students use statistical methods as justification for inferences. Students use statistical functions on graphing calculators for large data sets. Students calculate measures of center and variability with accurancy.

<table>
<tr><th colspan="2">K-U-D</th></tr>
<tr><th>KNOW
Facts, formulas, information, vocabulary</th><th>DO
Skills of the discipline, social skills, production skills, processes (usually verbs/verb phrases)</th></tr>
<tr><td>• Statistics
• Population
  ○ Representative
• Sample
  ○ Representative/valid
  ○ Random
• Measures of center
• Measures of variability
• Inferences
  ○ Informal comparative
• Data
• Variation
• Data distribution
  ○ Variability
  ○ Center
• Mean absolute deviation</td><td>• UNDERSTAND and USE statistics.
• EXAMINE a sample of a population.
• GENERALIZE information about a population.
• DETERMINE if a sample is representative/valid.
• USE measures of center and measures of variability for numerical data from random samples.
• DRAW informal comparative inferences.
• USE data from a random sample.
• DRAW inferences about a population.
• GENERATE multiple samples of the same size.
• GAUGE the variation in estimates or predictions.
• EXPRESS/CALCULATE the difference between the centers of two numerical data distributions as a multiple of a measure of variability – mean absolute deviation.</td></tr>
<tr><th colspan="2">UNDERSTAND
Big ideas, generalizations, principles, concepts, ideas that transfer across situations</th></tr>
<tr><td colspan="2">How to formulate questions and design studies.

Collecting data about a population through random sampling allow us to make inferences and compare data.</td></tr>
<tr><th colspan="2">Common Student Misconceptions for this Unit</th></tr>
</table>

When working with sampling, middle school students have difficulty recognizing that the procedures they are using provides a prediction, not a certainty, of likely results given a similar population.

Drawing inferences is based upon mathematical data. The central tendencies and measures of variability tell us different qualities about the data. Drawing inferences is not an opinion statement but rather part of constructing a viable argument.

Knowing the difference between the mean and the mean absolute deviation (MAD), and what each says about the data being presented, is difficult for students. The mean gives the average result, while the MAD describes the variance among the values given from that norm result.

Unit Assessment/Performance Task	DOK
Unit 7 Test Unit 7 Performance Task "Analyzing Test Scores"	

Vocabulary
• **Box and Whisker Plot:** A diagram that summarizes data using the median, the upper and lowers quartiles, and the extreme values (minimum and maximum). Box and whisker plots are also known as box plots. It is constructed from the five-number summary of the data: Minimum, Q1 (lower quartile), Q2 (median), Q3 (upper quartile), Maximum • **Frequency:** The number of times an item, number, or event occurs in a set of data

- **Grouped Frequency Table:** The organization of raw data in table form with classes and frequencies.

- **Histogram:** A way of displaying numeric data using horizontal or vertical bars so that the height or length of the bars indicates frequency

- **Inter-Quartile Range (IQR):** The difference between the first and third quartiles. (Note that the first quartile and third quartiles are sometimes called upper and lower quartiles.)

- **Maximum value:** The largest value in a set of data.

- **Mean Absolute Deviation:** The average distance of each data value from the mean. The $MAD = \frac{total\ distance\ from\ the\ mean\ for\ all\ values}{number\ of\ data\ values}$ MAD is a gauge of "on average" how different the data values are form the mean value.

- **Mean:** The "average" or "fair share" value for the data. The mean is also the balance point of the corresponding data distribution.

- **Measures of Center:** The mean or median are ways to measure the center for a set of data.

- **Measures of Spread:** The range and the mean absolute deviation are both common ways to measure the spread for a set of data.

- **Median:** The value for which half the numbers are larger and half are smaller. If there are two middle numbers, the median is the arithmetic mean of the two middle numbers. Note: The median is a good choice to represent the center of a distribution when the distribution is skewed or outliers are present.

- **Minimum value:** The smallest value in a set of data.

- **Mode:** The number that occurs the most often in a list. There can more than one mode, or no mode.

- **Outlier:** A value that is very far away from most of the values in a data set.

- **Range:** A measure of spread for a set of data. To find the range, subtract the smallest value from the largest value in a set of data.

- **Sample:** A part of the population that we actually examine in order to gather information.

- **Simple Random Sampling:** Consists of individuals from the population chosen in such a way that every set of individuals has an equal chance to be a part of the sample actually selected. Poor sampling methods, that are not random and do not represent the population well, can lead to misleading conclusions.

- **Stem and Leaf Plot:** A graphical method used to represent ordered numerical data. Once the data are ordered, the stem and leaves are determined. Typically the stem is all but the last digit of each data point and the leaf is that last digit.

Other vocab words may include:

Certain Event
Compound Event
Data
Event
Likelihood
Likely
Mean
Mean Absolute Deviation
Measures of Center
Measures of Variation
Median
Outcome
Population
Sample Space

Statistics
Statistical Question
Survey Data
Variability

Key Learning Activities/Possible Lesson Focuses (order may vary)

These are ideas for lessons.

Pre-assessment (Recall prior knowledge) and Pre-requisite skills review (if needed)

Lesson 1:

Gaining information about population by examining a sample of the population.

Random sampling (valid only if the sample is representative of that population).

Estimating size of a crowd by taking a sample of the population (capture-recapture method). Explain why random sampling produces a sample representative of a population.

Understand that random sampling tends to produce representative samples and support valid inferences.

Example:

- The school food service wants to increase the number of students who eat hot lunch in the cafeteria. The student council has been asked to conduct a survey of the student body to determine the students' preferences for hot lunch. They have determined two ways to do the survey. The two methods are listed below. Identify the type of sampling used in each survey option. Which survey option should the student council use and why?

    - Write all of the students' names on cards and pull them out in a draw to determine who will complete the survey.
    - Survey the first 20 students that enter the lunch room.
    -

Lesson 2:

Using collected data to make inferences.

Given data about a sample size, use proportions to find expectations of the whole population.

Draw inferences about a population with a certain characteristic from data gathered from a random sample.

Make inferences based on data displayed in a table.

Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.

Generate multiple samples of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*

- Below is the data collected from two random samples of 100 students regarding student's school lunch preference. Make at least two inferences based on the results.

Lunch Preferences				
Student sample	Hamburgers	Tacos	Pizza	Total
#1	12	14	74	100
#2	12	11	77	100

Comparing Two Populations

Gather data from multiple random samples of the same size in reference to a certain characteristic.

The student council wanted to determine which lunch was the most popular among their students. They conducted surveys on two random samples of 100 students. Make at least two inferences based on the results. (Missing picture.)

Sample answers: Most students prefer pizza, or more people prefer pizza than hamburgers and tacos combined.

Lesson 3:

Measures of Central Tendency (include mean, median, and mode)

Measures of Variability (include range, mean absolute deviation, and interquartile range)

Use the above measures from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*

Example:

- The two data sets below depict random samples of the housing prices sold in the King River and Toby Ranch areas of Arizona. Based on the prices below, which measure of center will provide the most accurate estimation of housing prices in Arizona? Explain your reasoning.
  - King River area {1.2 million, 242000, 265500, 140000, 281000, 265000, 211000}
  - Toby Ranch homes {5million, 154000, 250000, 250000, 200000, 160000, 190000}

Lesson 4:

Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*

Example:

Victor wants to compare the mean height of the players on his favorite basketball and soccer teams. He thinks the mean height of the players on the basketball team will be greater but does not know how much greater. He also wonders if the variability of heights of the athletes is related to the sport they play. He thinks that there will be a greater variability in the heights of soccer players as compare to basketball players. He uses the rosters and player statistics from the team websites to generate the following lists.

Height of Soccer Players (inches) 73, 73, 73, 72, 69, 76, 72, 73, 74, 70, 65, 71, 74, 76, 70, 72, 71, 74, 71, 74, 73, 67, 70, 72, 69, 78, 73, 76, 69

Height of Basketball Players (inches) 75, 73, 76, 78, 79, 78, 79, 81, 80, 82, 81, 84, 82, 84, 80, 84

Victor notices that although generally the basketball players are taller, there is an overlap between the two data sets. Both teams have players that are between 73 and 78 inches tall.

Supplemental Materials and Resources

Online Lessons

- Counting Trees
  http://map.mathshell.org.uk/materials/lessons.php?taskid=422
- Candy Bars
  http://map.mathshell.org.uk/materials/tasks.php?taskid=396

- Short Tasks for Statistics & Probability
  http://map.mathshell.org.uk/materials/tasks.php?taskid=402
- Something Fishy
  http://www.pbs.org/teachers/mathline/lessonplans/msmp/somethingfishy/somethingfishy_procedure.shtm

Online Interactive Activities & Games

- http://www.shodor.org/interactivate/activities/

Inferences about Populations Websites:

Kids' Zone – http://nces.ed.gov/nceskids/createagraph/default.aspx

7th Grade Interactive Math Skill Builders – Data Analysis with Graphs - http://www.internet4classrooms.com/skill_builders/data_analysis_graphs_math_seventh_7th_grade.htm

7th Grade Interactive Math Skill Builders – Data Analysis Quizzes - http://www.internet4classrooms.com/skill_builders/data_analysis_quizzes_math_seventh_7th_grade.htm

Literature connections:

This is the Statistics Handbook Your Professor Doesn't Want You to See: So Easy It's Practically Cheating! By S. Deviant

Data, Graphing, and Statistics Smarts! (Math Smarts!) By Rebecca Wingard-Nelson

Mashed Potatoes: Collecting and Reporting Data By Nancy Harris

Interdisciplinary connections:
Social Studies:

- Populations of different cultures

Science:

- Using data to draw inferences

Tools/Manipulatives

Computer
Graphing Calculators
Graph paper (large charts size and individual size)

Suggested Formative Assessment Practices/Processes

Teacher created exit slips and quizzes

Differentiation and Accommodations

- Provide graphic organizers
- Provide additional examples and opportunities for repetition
- Provide tutoring opportunities
- Provide retesting opportunities after remediation (up to teacher and district discretion)
- Teach for mastery not test
- Teaching concepts in different modalities
- Adjust homework assignments

Note: Struggling students may need less data points to graph. They may need to use a piece of spaghetti to find the line of best fit. Higher-level students may use their line and make predictions or make some general statements about the relationships.