

Data About Us

Standards

The student will:

- 2.1 Explore the process of data investigation, such as posing questions, collecting data, analyzing data, and making interpretations to answer questions.
- 2.2 Represent data using line graphs, bar graphs, stem-and-leaf plots, and coordinate graphs.
- 2.3 Explore ways of describing data such as measure of center (mode, median, mean) and range or variability in the data.
- 2.4 Develop strategies for comparing data sets.

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Investigation 1 Looking at Data Day 1 1.1 Organizing Your Data

Connection

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> Analyze and classify integers. 	<ul style="list-style-type: none"> Talking about students' names. Collect data relating to the number of letters in names/ 	<ul style="list-style-type: none"> Gather and organize data from conducting experiments or trails of games.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 10-15 minutes	Read Introduction to Data About Us. Talk about "Did you know?"	<ul style="list-style-type: none"> Ask students to consider how they were named. Engage students in a short discussion of names. "Do you know anything interesting about how you were named or about the history behind your family's name?" "You probably don't spend much time thinking about the number of letters in your name." "But there are times when the 	<ul style="list-style-type: none"> Part of a statistical investigation involves determining exactly what data need to be collected. It is important that the class reach a consensus about what constitute a full name. Students need to discuss exactly what letters they will count. Do they use nicknames, or full first names? Do they use

Steps	Student activity	Teacher Support	Comment/Evaluation
		<p>length of your name matters. Can you think of a situation in which it would matter?"</p> <ul style="list-style-type: none"> • "What do you think is the typical number of letters in the full name of a student in this class?" • "Let's decide what we consider to be a full name." 	<p>middle initials, or full middle names? Does the hyphen in a name count as a letter?</p>
<p>Explore</p> <p>15-20 minutes</p>	<ul style="list-style-type: none"> • Complete Problem 1.1 and Problem 1.1 Follow-Up with partner or with group. 	<ul style="list-style-type: none"> • Students can take turns calling out the number of letters in their names while one person records each number on the board. • Each student can use cubes to make a stack with the same number of cubes as letters in his or her name. The stacks then can be placed where the whole class can see them. • Help students organize the information and to design and label tables and graphs. • Suggest arranging the name lengths from smallest to largest. • "Can you tell from your list where the clusters of name lengths are?" • Can you tell what name length occurs most frequently?" • "What name lengths do not occur in our class?" 	<ul style="list-style-type: none"> • Assess the techniques your student have developed to organize, summarize, and display data. • Take note of which groups may be able to help the class to consider better ways to display the data.
<p>Summarize</p>	<ul style="list-style-type: none"> • Share results with class. • Discuss whether there is a <i>typical</i> 	<ul style="list-style-type: none"> • Allow students to share their results with class. 	<ul style="list-style-type: none"> • Encourage students to look at the data and describe the

Steps	Student activity	Teacher Support	Comment/Evaluation
10-12 minutes	name length.	<ul style="list-style-type: none"> • Ask students to consider ways to describe the <i>shape of the data</i> – the distribution. • “If we did this activity using names of students in another class, what would you expect to find?” 	distribution.
Homework	<ul style="list-style-type: none"> • None 		

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Investigation 1 Looking at Data Day 2 1.2 Interpreting Graphs

Connection

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> Analyze and organize data based on name length. 	<ul style="list-style-type: none"> Review construction of line plots and bar graphs. 	<ul style="list-style-type: none"> Representing data to aid with statistical analysis.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 10-15 minutes	<ul style="list-style-type: none"> Review construction of line plots and bar graphs. 	<ul style="list-style-type: none"> Review the construction and representation of line plots and bar graphs. “What do the Xs on the line plot represent?” “What do the bars on the bar graph represent?” “What do each of the axes represent?” 	<ul style="list-style-type: none"> Students do not automatically “translate across representations” – they may not initially view the line plot and the bar graph as comparable representations and may not recognize when a line plot and a bar graph display identical information. The line plot and bar graph may be produced using MS Excel, Fathom or the graphing calculator to be used for teacher

			demonstration.
Explore 15-20 minutes	<ul style="list-style-type: none"> Complete Problem 1.2 and Problem 1.2 Follow-Up with partner or with group. 	<ul style="list-style-type: none"> Emphasize that the height of the bar does NOT represent a name length; it represents the number of people with a particular name length. 	<ul style="list-style-type: none"> Students may use calculators but need to reproduce the line plot or bar graph on grid paper.
Summarize 8-10 minutes	<ul style="list-style-type: none"> Discuss answers to Problem 1.2 and Problem 1.2 Follow-Up. 	<ul style="list-style-type: none"> Help student clarify specific features of line plots and bar graphs. 	
Homework	<ul style="list-style-type: none"> ACE question 1 		

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Investigation 1: Looking At Data Day 3 1.3 Identifying the Mode and Range

Connections

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> Organize data with line plots or bar graphs. 	<ul style="list-style-type: none"> Identify the mode and range for a given set of data. 	<ul style="list-style-type: none"> Using measures of center to make inferences and predictions about events.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
<p>Launch</p> <p>10-15 minutes</p>	<ul style="list-style-type: none"> Read and clarify the details of Problem 1.3. Discuss the ideas of mode and range. 	<ul style="list-style-type: none"> Use the data set from Problem 1.2 to explain the words <i>mode</i> and <i>range</i>. On a line graph, the mode has the highest stack of Xs. On a bar graph, the mode has the tallest bar. Read aloud the description of the hypothetical class given in Problem 1.3. Ask student questions about the information. What facts do we know about this class of students? How can we use this information to come up with a set of name lengths for this class? 	<ul style="list-style-type: none"> Students should see that there are many data sets that fit the description given. Then range can be described in more than one way. It can be given by specifying the lowest and the highest values. The range can also be given by determining the number of values from the lowest to highest value. The range is also commonly given by subtracting the lowest value from the highest value.

Steps	Student activity	Teacher Support	Comment/Evaluation
		<ul style="list-style-type: none"> • Is there more than one possible set of names lengths that fits the description? Why or why not? 	
<p>Explore</p> <p>25 minutes</p>	<ul style="list-style-type: none"> • Work in pairs to explore Problem 1.3. • Construct line plots to display the data. 	<ul style="list-style-type: none"> • Circulate as pairs work. • Each pair should create a line plot that meets the criteria of the problem and can be posted for the rest of the class to see. 	<ul style="list-style-type: none"> • Line plots could be constructed from sticky notes instead of Xs to make graphs that can easily be erased and redrawn. • Bar graphs may be constructed using the graphing calculator or MS Excel.
<p>Summarize</p> <p>15-20 minutes</p>	<ul style="list-style-type: none"> • Display and compare the various line plots created. • Complete Problem 1.3 Follow-Up. 	<ul style="list-style-type: none"> • Ask students to display their line plots. • Any graph that satisfies the conditions of the problem is acceptable. • Look at the different line plots that were made. How are they alike? • How are the line plots different? • Why are different displays possible? 	<ul style="list-style-type: none"> • The goal is not for students to determine all possible answers, but to realize that many solutions are possible. • Not enough information was given to create a unique data set.
<p>Homework</p>	<ul style="list-style-type: none"> • ACE questions 3-5, 7, 11-14 		

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Investigation 1 Looking at Data Day 4 1.4 Identifying the Median

Connection

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none"> Organize data in the form a line plots or bar graphs. 	<ul style="list-style-type: none"> Identify the median for a given set of data. 	<ul style="list-style-type: none"> Use measures of center to make inferences and predictions about events.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 10-15 minutes	<ul style="list-style-type: none"> Discuss ideas of averages. 	<ul style="list-style-type: none"> Discuss the idea of “average.” Students know the word “average” in context of “add up all the numbers and divide by the number of numbers.” This procedure gives the mean, which is only one type of average. The mean, median, and mode are all types of averages, 	<ul style="list-style-type: none"> The mean, median, and mode are all types of averages, <i>or measures of center.</i> When hearing the word <i>average</i> with respect to a set of data, students should want to know which “average” is being used.
Explore 15-20 minutes	<ul style="list-style-type: none"> Complete Problem 1.4 and Problem 1.4 Follow-Up with partner or with group. 	<ul style="list-style-type: none"> Write each name length on a large stick-on note. Help students arrange the name 	<ul style="list-style-type: none"> Stick-on notes work more effectively than graphing calculators or computer for

		lengths in order from smallest to largest.	this investigation.
Summarize 10-12 minutes	<ul style="list-style-type: none"> Give examples of how each set of criteria was met. 	<ul style="list-style-type: none"> Help students understand the stability of the median. 	<ul style="list-style-type: none"> Often two measures of center can have the same value.
Homework'	<ul style="list-style-type: none"> ACE questions 2, 6, 8, 9. 		

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Investigation 1 Looking at Data

Day 5

1.5 Experimenting with the Median

Connection

Prior Work	Current Big Idea	Future Work
<ul style="list-style-type: none">Organize data in the form a line plots or bar graphs.	<ul style="list-style-type: none">Identify the median for a given set of data.	<ul style="list-style-type: none">Use measures of center to make inferences and predictions about events.

Lesson Process

Steps	Student activity	Teacher Support	Comment/Evaluation
Launch 10-15 minutes	<ul style="list-style-type: none">Read "Think about this!"Prepare index cards for experiment with the median.	<ul style="list-style-type: none">Does the median change if we add a very large or a very small value to the data?What happens to the median as we make other changes in the data?	<ul style="list-style-type: none">The idea of the median and its stability is important in making judgments about statistical data.
Explore 15-20 minutes	<ul style="list-style-type: none">Complete Problem 1.5 and Problem 1.5 Follow-Up with partner or with group.	<ul style="list-style-type: none">Help students make generalization related to the change in the data set.	<ul style="list-style-type: none">Specific data may be entered into MS Excel to produce bar graphs.Data can easily be removed or added to demonstrate the behavior of the median.

Steps	Student activity	Teacher Support	Comment/Evaluation
Summarize 8-10 minutes	<ul style="list-style-type: none"> Present and discuss examples that meet the set criteria. 	<ul style="list-style-type: none"> Help students realize that the median is a fairly stable value. 	
Homework	<ul style="list-style-type: none"> ACE questions 11-14 		