CCGPS Frameworks Student Edition

Mathematics

6th Grade
Unit 6: Statistics

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"Making Education Work for All Georgians"

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Unit 6
Statistics

TABLE OF CONTENTS

OVERVIEW

In this unit students will:

- Analyze data from many different sources such as organized lists, box-plots, bar graphs, histograms and dot plots.
- Understand that responses to statistical questions may vary
- Understand that data can be described by a single number
- Determine quantitative measures of center (median and/or mean)
- Determine quantitative measures of variability (interquartile range and/or mean absolute deviation)

KEY STANDARDS

Apply and extend previous understandings of measurement and interpreting data.

MCC6.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. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

MCC6.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.

MCC6.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.

MCC6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

MCC6.SP.5. Summarize numerical data sets in relation to their context, such as by:

MCC6.SP.5.a. Reporting the number of observations.

MCC6.SP.5.b. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement

MCC6.SP.5.c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

MCC6.SP.5.d. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

STANDARDS FOR MATHEMATICAL PRACTICE:

1. **Make sense of problems and persevere in solving them.** Students will make sense of the data distributions by interpreting the measures of center and variability in the context of the situations they represent.

2. **Reason abstractly and quantitatively.** Students reason about the appropriate measures of center or variability to represent a data distribution.

3. **Construct viable arguments and critique the reasoning of others**. Students construct arguments regarding which measures of center or variability they would use to represent a particular data distribution. They may critique other students' choices when considering how outliers are handled in each situation.

4. **Model with mathematics.** They use measures of center and variability and data displays (i.e. box plots and histograms) to draw inferences about and make comparisons between data sets. Students need many opportunities to connect and explain the connections between the different representations. Students collect data regarding real-world contexts and create models to display and interpret the data.

5. **Use appropriate tools strategically.** Students consider available tools (including estimation and technology) when answering questions about data or representing data distributions. They decide when certain tools might be helpful. For instance, students in grade 6 may decide to represent similar data sets using dot plots with the same scale to visually compare the center and variability of the data.

6. **Attend to precision.** Students use appropriate terminology when referring data displays and statistical measures.

7. **Look for and make use of structure.** Students examine the structure of data representations by examining intervals, units, and scale in box plots, line plots, histograms and dot plots.

8. **Look for and express regularity in repeated reasoning**. Students recognize typical situations in which outliers skew data. They can explain patterns in the way data is interpreted in the various representations they study throughout this unit.

RELATED STANDARDS

Apply and extend previous understandings of multiplication and division to divide fractions by fractions.

MCC6.NS.1 Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because ¾ of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share ½ lb. of chocolate equally? How many ¾ - cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length ¾ mi and area ½ square miles?

Compute fluently with multi-digit numbers and find common factors and multiples

MCC6.NS.2 Fluently divide multi-digit numbers using the standard algorithm.

MCC6.NS.3 Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

MCC6.NS.4 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor. For example, express 36 + 8 as 4(9 + 2).

ENDURING UNDERSTANDINGS

- Recognize that statistical questions and the answers account for variability in the data.
- 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.
- 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.
- Understand that numerical data can be displayed in plots on a number line, including dot plots, histograms, and box plots.
- 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 and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
- Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered

CONCEPTS & SKILLS TO MAINTAIN

In order for students to be successful, the following skills and concepts need to be maintained

- Analyzing patterns and seeing relationships
- Fluency with operations on multi-digit numbers and decimals

SELECTED TERMS AND SYMBOLS

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

The definitions below are for teacher reference only and are not to be memorized by the students. Students should explore these concepts using models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

The websites below are interactive and include a math glossary suitable for middle school children. **Note – At the middle school level, different sources use different definitions. Please preview any website for alignment to the definitions given in the frameworks.**

http://www.amathsdictionaryforkids.com/
This web site has activities to help students more fully understand and retain new vocabulary

http://intermath.coe.uga.edu/dictnary/homepg.asp
Definitions and activities for these and other terms can be found on the Intermath website. Intermath is geared towards middle and high school students.

http://www.corestandards.org/Math/Content/mathematics-glossary/glossary

- **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.

- **Distribution** – The arrangement of values that show the spread of the data.

- **Dot Plot** – A statistical chart consisting of data points on a number line, typically using circles.

- **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 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.

$$arithmetic\ mean = \bar{x} = \frac{x_1 + x_2 + x_3 + \cdots x_n}{n}$$

- **Measures of Center**- The mean and the median are both 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 be more than one mode, or no mode.

- **Numerical Data**- Consists of numbers only. Numerical data can be any rational numbers.

- **Outlier-** An outlier is an observation that is numerically distant from the rest of the data.

- **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.

- **Skewed Data** –When a set of data is not symmetrical it can skewed, meaning it tends to have a long tail on the left or right side.

- **Statistical Questions** - A statistical question is one for which you don't expect to get a single answer. Instead, you expect to get a variety of different answers, and you are interested in the distribution and tendency of those answers. For example, "How tall are you?" is not a statistical question, however "How tall are the students in your school?" *is* a statistical question.

- **Variability** – Describes how spread out or closely clustered a set of data is. Variability includes range and mean absolute deviation.

MISCONCEPTIONS

- Students may believe all graphical displays are symmetrical. Exposing students to graphs of various shapes will show this to be false.
- Mode is remembered as the “most” and often students think this means the largest value, not “most frequent”.
- Students do not remember to put the numbers in order before finding median.
- Students assume that mean is always the best way to describe a set of data.
- Students need to understand that mean is a redistribution of the data where mode and median are not.
- Students may think that when data is “skewed to the left” that most of the data is on the left. In fact, the tail of the data is on the left and most of the data is on the right. Students confuse clustering and skewing.

Formative Assessment Lessons (FALs)

Formative Assessment Lessons are intended to support teachers in formative assessment. They reveal and develop students' understanding of key mathematical ideas and applications. These lessons enable teachers and students to monitor in more detail their progress towards the targets of the standards. They assess students' understanding of important concepts and problem solving performance, and help teachers and their students to work effectively together to move each student's mathematical reasoning forward.
More information on types of Formative Assessment Lessons may be found in the Comprehensive Course Guide.

LEARNING TASK: WHAT IS A STATISTICAL QUESTION?

1. Which of these questions can be categorized as a STATISTICAL QUESTION? Put an X beside the questions that ARE NOT statistical, and an S beside those that are statistical questions.

A. What is Shawn's pant size?

B. What are the shoe sizes of students that ride my bus?

C. How tall are the students in Coach Dixon's sixth grade science class?

D. How far does Terrence drive to work?

E. How old are the students at Ebenezer Middle School?

F. How old is Michelle's mom?

G. How old are my friends' parents?

H. How does the pesticide Roundup harm ladybugs?

I. How far do the teachers at Sandy Beach Middle School drive to work each day?

J. How have the CRCT math scores changed for our school?

2. What must be true about a question for it to classified as a statistical question?

3. For each question, decide if it is a statistical question; if it is, put an S beside it. If it is not, EXPLAIN why it is not and REWRITE it as a statistical question.

A. How many words are there in this sentence?

B. How many TV's are in your house?

C. How many siblings do the students on Team B have living in their homes?

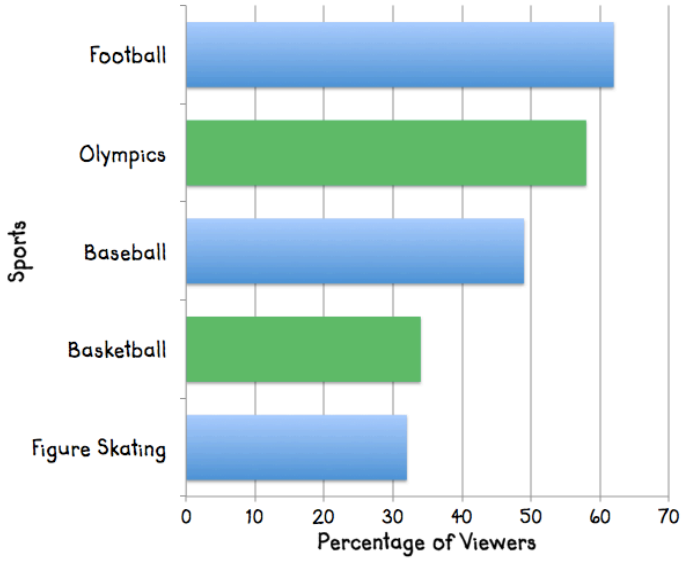
D. How many socks are in your drawer?

F. What is your favorite color?

G. How far does Savannah have to walk to reach Colin's house each day?

4. Look at each graphical display and write a question that COULD have been asked to collect the specific data.

A



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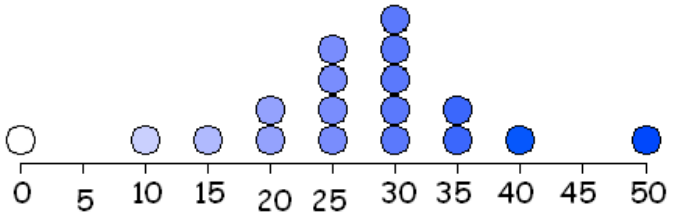
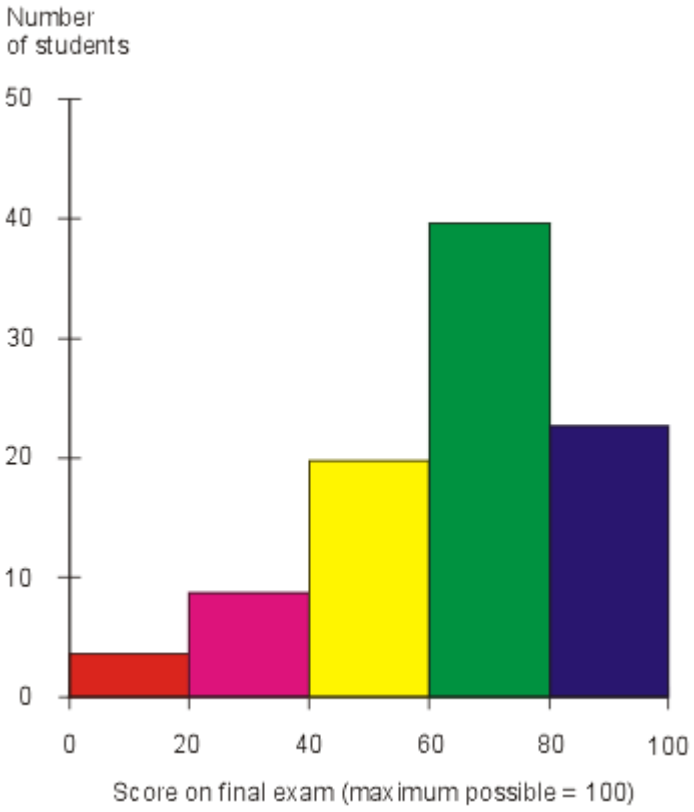


C.



D. (Mark represents any category that the student can make up)

Mark	Tally	Frequency
4	II	2
5	II	2
6	IIII	4
7	~~IIII~~	5
8	IIII	4
9	II	2
10	I	1

TASK: WHO WAS THE GREATEST YANKEE HOME RUN HITTER?

The following table lists four of the greatest New York Yankees' home run hitters with the number of homeruns each hit while a Yankee.

Adapted from : James M. Landwehr and Ann E. Watkins, Dale Seymour Publications, Mathematics, 1986, Pg. 160

Babe Ruth		Lou Gehrig		Mickey Mantle		Roger Maris	
Year	Home runs	Year	Home runs	Year	Home runs	Year	Home runs
1920	54	1923	1	1951	13	1960	39
1921	59	1924	0	1952	23	1961	61
1922	35	1925	20	1953	21	1962	33
1923	41	1926	16	1954	27	1963	23
1924	46	1927	47	1955	37	1964	26
1925	25	1928	27	1956	52	1965	8
1926	47	1929	35	1957	34	1966	13
1927	60	1930	41	1958	42		
1928	54	1931	46	1959	31		
1929	46	1932	34	1960	40		
1930	49	1933	32	1961	54		
1931	46	1934	49	1962	30		
1932	41	1935	30	1963	15		
1933	34	1936	49	1964	35		
1934	22	1937	37	1965	19		
		1938	29	1966	23		
		1939	0	1967	22		
				1968	18		

Source: Macmillan Baseball Encyclopedia, 4th edition

1. Find the mean, median, and number of observations for each player.

	Ruth	***Gehrig***	***Mantel***	***Maris***
Mean				
Median				
n				

Of the two values you computed for each player, which do you think best describes the performance of each player? Why?

2. Make a frequency table and histogram for each player. Use the intervals 0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69

3. Describe the shape of the data for all four players. What observations can you make about the four players by looking at the shape?

4. Looking at the histogram for BABE RUTH, determine the range of homeruns Babe Ruth hit while playing for the Yankees.

5. Create a dot plot using Babe Ruth's home runs.

6. Describe the similarities between Babe Ruth's histogram and Babe Ruth's dot plot. Are there any differences? Does the range change between the histogram and the dot plot?

TASK: LEARNING ABOUT BOX PLOTS KINESTHETICALLY-HOW LONG IS A MINUTE?

Do you think you can determine how long a minute is without looking at a clock? With your partner and your stop watch, you will each attempt to determine when you think a minute has passed without looking at a watch or clock. All time will be recorded in SECONDS – do not convert to minutes. You will take turns measuring and timing.

1. Within your pair decide who will be the "timer" and who will be the "guesser." The "timer" will have the stop watch and direct the "guesser" when to start. The "guesser" will attempt to tell how long a minute is without looking at a clock.

2. When instructed by teacher, the "timer" tells the "guesser" to begin. When the "guesser" believes a minute has passed, he should say, "stop" quietly. Timer - record the time that has passed to the nearest second. Do not tell your partner how much time actually passed! The "timer" needs to record the "guesser" time down on a sheet of paper.

3. Switch roles and repeat #2.

4. Share times with your partner. Write **your own** time down (in seconds) on a sheet of paper, large enough so that everyone can see it (one sheet per student).

As a class, find the median of the data by counting to the middle. Have a student put a sticky note with "Q2" where the median is. Note to class - The median is also known as Quartile 2 (Q2)

As a class, find the median of the lower half of numbers. Have a student put a sticky note with "Q1" on this place. Note to class - This is Quartile 1 (Q1), which is the median of the lower half of the data.

As a class, find the median of the upper half of numbers. Have a student put a sticky note with "Q3" on this place. Note to class - This is Quartile 3 (Q3), which is the median of the upper half of the data.

Create a human box plot or box plot using class data however the class decides. (Sticky notes and white board or using string for human box plot.)

4. From the data draw a box plot of the class's data that is the same box plot that you made with your bodies. Remember to draw the number line FIRST.

5. How many students participated in the live Box Plot? _____

6. How many students were INSIDE the box? _____ What percent is this? _____

7. Where are the other students?

8. What conclusions can you make about the each quartile?

TASK: WHERE'S WALDO?

Part 1: Creating and Describing Box Plots

How fast can you find Waldo? Collect data using the steps below to answer this question.

1. Students will work with partners.

2. Students decide who will be Student 1 (searcher) and Student 2 (timer). Students could flip a coin.

3. Give each pair a copy of "Where's Waldo?" picture side down. Students are not to touch the paper or turn it over until told.

4. Look on the board for a picture of Waldo so you will know what to look for.

STUDENT

5. When the teachers says, "GO", Student 1 (the searcher) is to turn the paper over and find Waldo as quickly as possible. Student 2 (the timer) will time how long it takes for Student 1 to find and point to Waldo. Record your time to the nearest second. Keep times in SECONDS and do not convert to minutes

Partner 1 time in seconds_____

Partner 2 time in seconds_____

Using data collected from each group fill in the chart below.

1. Fill in the chart below.

a. Record data	
b. Put the observations in least to greatest order.	
c. Identify the least number of seconds.	
d. Identify the most number of seconds.	
e. Find the median (Q2).	
f. Find the lower quartile (Q1).	
g. Find the upper quartile (Q3).	

2. Create a box plots using the data in the chart.

3. What is the attribute being measured in this task?

4. What unit is being used to measure this attribute and why?

5. Describe the spread of the data for the box plot and explain what this tells you about the data?

6. Do you think if we did the same experiment with 30 other random people, we would come up with the same conclusion? Why or why not?

Part 2: A Closer Look at Box Plots

Below is a data set of the length of times, in seconds, that it took for nine boys to find Waldo:

7 8 8 10 11 12 13 13 29

1.Write the numbers in order and circle the median.

a. About what percent of the values in a data set are below the median? How do you know this?

b. About what percent of values in a data set are above the median? How do you know this?

2. Find the Upper (Q3) and Lower (Q1) Quartiles of the box plot. Draw a small vertical line where Q1 and Q3 are on the list of numbers above.

a. About what percent of the data distribution are in each quartile?

b. About what percent of the values fall ABOVE the lower quartile?

c. About what percent of the values fall below the upper quartile?

d. The Inter-Quartile Range (IQR) is the size of the "box" of the box plot. The box contains all data between Q1 and Q3. What percent of the data fall between the upper quartile and the lower quartile?

e. Find the IQR using the values given above.

f. Why is the IQR important when using it to describe the data?

Formative Assessment Lesson: Mean, Median, Mode and Range

Source: Formative Assessment Lesson Materials from Mathematics Assessment Project
http://map.mathshell.org/materials/download.php?fileid=1360

ESSENTIAL QUESTIONS:

- How can I describe the center for a set of data?
- How can I describe the spread for a set of data?
- How can I use data to compare different groups?
- What conclusions can be drawn from data?

How can I calculate the mean, median, and range from a frequency chart?

TASK COMMENTS:

Tasks and lessons from the Mathematics Assessment Project are specifically designed to help teachers effectively formatively assess their students. The way the tasks and lessons are designed gives the teacher a clear understanding of what the students are able to do and not do. Within the lesson, teachers will find suggestions and question prompts that will help guide students towards understanding. For more information access the MAP website:
http://www.map.mathshell.org/materials/background.php?subpage=formative

The task, *Mean, Median, Mode and Range*, is a Formative Assessment Lesson (FAL) that can be found at the
website: http://map.mathshell.org/materials/lessons.php?taskid=486&subpage=concept

The FAL document provides a clear lesson design, from the opening of the lesson to the closing of the lesson.

The PDF version of the task can be found at the link below:
http://map.mathshell.org/materials/download.php?fileid=1360

STANDARDS ADDRESSED IN THIS TASK:

Develop understanding of statistical variability.
MCC6.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.
MCC6.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.
MCC6.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.

STANDARDS FOR MATHEMATICAL PRACTICE

This lesson uses all of the practices with emphasis on:

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively.
4. Model with mathematics.

Short Cycle Task: SUZI'S COMPANY

Source: Balanced Assessment Materials from Mathematics Assessment Project
http://www.map.mathshell.org/materials/download.php?fileid=1138

TASK COMMENTS:

Tasks and lessons from the Mathematics Assessment Project are specifically designed to help teachers effectively formatively assess their students. The way the tasks and lessons are designed gives the teacher a clear understanding of what the students are able to do and not do. Within the lesson, teachers will find suggestions and question prompts that will help guide students towards understanding. For more information access the MAP website:
http://www.map.mathshell.org/materials/background.php?subpage=summative

The task, *Suzi's Company*, is a Mathematics Assessment Project Assessment Task that can be found at the
website: http://www.map.mathshell.org/materials/tasks.php?taskid=383&subpage=apprentice

The PDF version of the task can be found at the link below:
http://www.map.mathshell.org/materials/download.php?fileid=1138

The scoring rubric can be found at the following link:
http://www.map.mathshell.org/materials/download.php?fileid=1139

STANDARDS ADDRESSED IN THIS TASK:

MCC6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
MCC6.SP.5. Summarize numerical data sets in relation to their context, such as by:
MCC6.SP.5.a. Reporting the number of observations.
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MCC6.SP.5.c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.
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STANDARDS FOR MATHEMATICAL PRACTICE
This task uses all of the practices with emphasis on:
3. Construct viable arguments and critique the reasoning of others.
7. Look for and make use of structure.

Short Cycle Task: Candy Bars

Source: Balanced Assessment Materials from Mathematics Assessment Project
http://www.map.mathshell.org/materials/download.php?fileid=1178

TASK COMMENTS:

Tasks and lessons from the Mathematics Assessment Project are specifically designed to help teachers effectively formatively assess their students. The way the tasks and lessons are designed gives the teacher a clear understanding of what the students are able to do and not do. Within the lesson, teachers will find suggestions and question prompts that will help guide students towards understanding. For more information access the MAP website: http://www.map.mathshell.org/materials/background.php?subpage=summative

The task, *Candy Bars*, is a Mathematics Assessment Project Assessment Task that can be found at the website: http://www.map.mathshell.org/materials/tasks.php?taskid=396&subpage=expert

The PDF version of the task can be found at the link below:
http://www.map.mathshell.org/materials/download.php?fileid=1178

The scoring rubric can be found at the following link:
http://www.map.mathshell.org/materials/download.php?fileid=1179

STANDARDS ADDRESSED IN THIS TASK:

Apply and extend previous understandings of measurement and interpreting data.

MCC6.SP.4. Display numerical data in plots on a number line, including dot plots, histograms, and box plots.
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STANDARDS FOR MATHEMATICAL PRACTICE

This task uses all of the practices with emphasis on:
1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

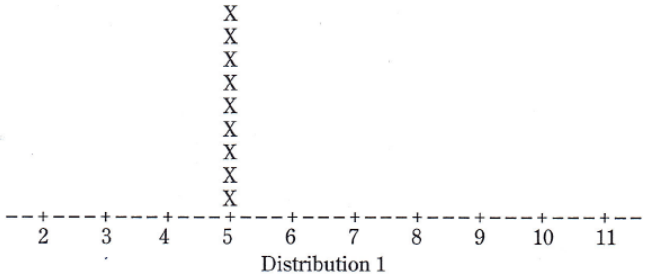
TASK: HOW MANY PEOPLE ARE IN YOUR FAMILY?

1. Working in groups of 2 or 3, create with a distribution on your number line (dot plot) that would yield a mean family size of 5. Be creative with your answer and check your answer for accuracy.

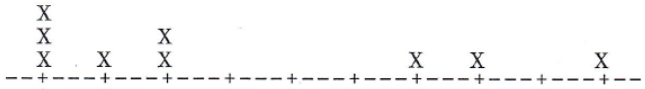
2. What method did you use to come up with 9 numbers that averaged to 5? Explain in detail.

3. Look at the different distributions displayed. Discuss the limitations of only knowing the mean family size, instead of the actual data pieces.

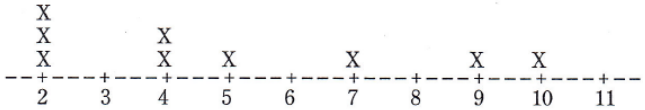
Only knowing the mean of a data set limits our knowledge on each individual piece of data in the set.
Look at the eight data sets displayed. The mean of ALL of the data sets is 5.



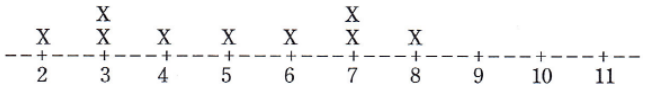
Distribution 1



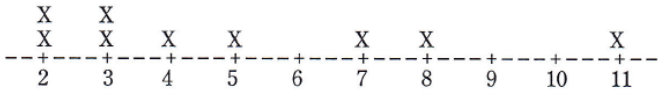
Distribution 2



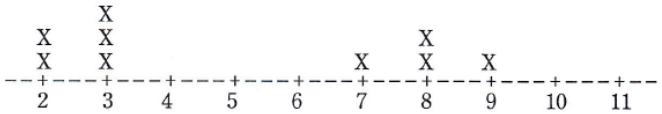
Distribution 3



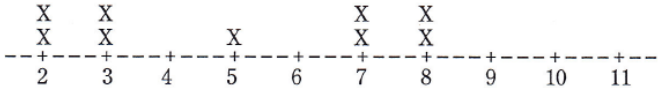
Distribution 4



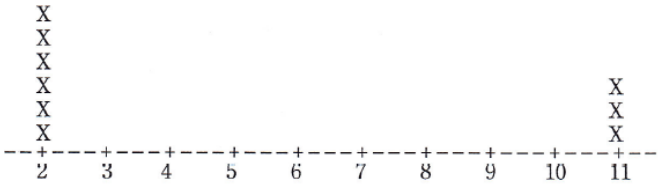
Distribution 5



Distribution 6



Distribution 7



Distribution 8

4. Looking at the data sets, which one seems to differ the least from the mean? Explain why you chose this data set.

5. Which seems to differ the most from the mean? Explain why you chose this data set.

6. With your group, put all of the data sets in order from “Differs Least” from the mean to “Differs Most” from the mean. How did you come up with this list?

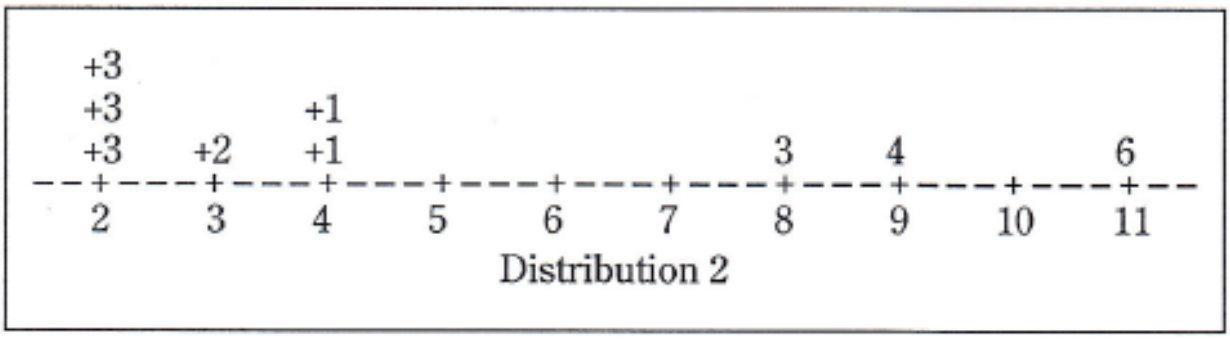
7. Share your groups order with the class.

8. As a class, decide on the "best" order for all of the data sets varying least from the mean to greatest from the mean.

The MAD

8. . One way to describe how far a value is from the mean is called the "deviation" from the mean. Look at the *distance* each value is away from zero (the absolute value of each individual data piece). Let's look at Distribution 2. Determine each value's *distance* away from zero.

$$Distance\ from\ the\ mean = |deviation\ from\ mean|$$



9. . If I were to ask you "on average" how different the data values are away from the mean, you can use the Mean Absolute Deviation to find this. Total up the distances away from the mean, and then find the "average" of these by dividing by the total number of values in the distribution.

$$MAD = \frac{Total\ Distance\ (of\ all\ values\ from\ the\ mean\ value)}{number\ of\ values\ (sample\ size)}$$

10. A small MAD means that the values do not vary much from the mean. Find the MAD of Distribution 4. First find the distances each value is from the mean. Total the distances, then divide by 9 (the number of values).

11. A large MAD means that the values vary greatly from the mean. Find the MAD of Distribution 6.

12. Find the MAD for the rest of the Distributions 1-8.

Distribution	***MAD***

13. Re-Order your distributions from the smallest MAD to the largest MAD.

14. Remember, the Mean Absolute Deviation tells you "on average" how different the data values are away from the mean. Using the MAD you found for Distribution 2, explain what the MAD means for that distribution.