Grade Level	6	**Content Area**	Mathematics
Course Title (grades 9-12 Only)	NA		
Expected Prior Knowledge *The knowledge/skills mastered earlier in the year foundational to the mastery of the required Standard in the current sample.*	The students have learned that statistics are numerical data relating to an aggregate of individuals and that data are the numbers produced in response to a statistical question. The students have learned how to recognize a statistical question as one that anticipates the variability in the data related to the question and accounts for it in the answers. The students have practiced designing survey questions that anticipate variability by providing a variety of possible specific anticipated answers.		
Alignment to Program of Instruction *Briefly outline methods of instruction found in this sequence of lessons that align to the Program of Instruction described in A.3.*	Students work both collaboratively and independently to achieve a thorough Common Core Standards-based understanding in order to apply mathematics knowledge to real world situations. Instruction encourages accuracy, precision, and problem solving skills as students learn the basic principles of mathematics reasoning.		
Standard Number and Description *List the Number* and full description for the Required Standard or Science Performance Objective listed in section A.6.*	**6.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.		
Materials/Resources Needed	Lesson 1: data set of 9 responses to a statistical question, dry erase markers, math textbook, Lesson 2: dry erase markers, ruler, binder paper Lesson 3 previous lesson's results, math textbook, binder paper		

* ***Standard Number****: For English Language Arts (Reading and Writing), use Grade, Strand, Standard (e.g., 3.RI.2). For K-8 Math, use Grade, Domain, Standard (e.g., 6.EE.7). For HS Math, use Conceptual Category-Domain, Standard (e.g., A-REI.6). For Science, use Grade, Strand, Concept, PO (e.g., 4.1.3.1).*

Lesson (add as needed)	Instructional Strategies The teacher will:	Student Activities The students will:
1	**Review**: Pose these questions: What are statistics? What are data? What is a statistical question? What is not a statistical question? What is important to remember when designing a statistical question? **Introduction**: Discuss sample data set of 9 responses to a statistical question on the board: "How many pets do you have?" Ask why it is easier to define the median is easier with an odd number of responses. Ask how to define the median with an even number of responses. **Vocabulary**: Explain that each student will pick one vocabulary word from a hat. Each word is a term that describes the distribution of data (numerical answers to a statistical question). Words include center, mean, median, mode, spread, range and overall shape. Students will use textbook, glossary, dictionary or internet to quickly define and understand the meaning of their chosen word. Inform students they will present/define their word to the class relative to the sample data set question on the board. **Demonstration**: Select a word from hat (non-vocabulary word) and demonstrate where and how to find the definition. Model the activity by briefly presenting an accurate and concise definition the word selected (modeling). **Wrap Up**: Ask questions of students to check for understanding of vocabulary words after presentations.	**Review**: Respond when called on to answer review questions. **Introduction**: Discuss the question on the board, responses, and resulting data. Explain why it is easier to define the median with an odd number of responses and how to find the median with an even number of responses. **Interaction**: 1. Select word from hat. 2. Work independently to prepare for presentation. 3. Present their vocabulary word as it relates to understanding the distribution of data. 4. Audience will take notes on each student's presentation. **Wrap Up**: Ask clarifying questions. **Independent Practice**: Complete a worksheet that has distribution graphs for data sets. Decide if the numbers associated with the graph represent center or spread (range). Identify mean, median, or mode. Accurately describe the shape distribution.

2	**Review**: Group students in pairs or groups of three. Ask students questions that review vocabulary: center, mean, median, mode, spread, range and shape of data. **Introduction**: Inform the class that as groups they will write a statistical question that they will ask to ten other students in class. For example, "How old are you?" They will use the data (number of students who are 9, 10, 11, etc.) they collect to describe the center (mean, median, mode), spread (range), sketch a dot plot and the overall shape of the distribution. **Demonstration**: Write examples and counter examples of statistical questions on the white board. Review steps for sketching a dot plot. **Wrap Up**: After groups share results, ask the following question: Did any group pose a statistical question that could not be analyzed by its center, range or shape? (The answer is no, because all data gathered from statistical questions can be analyzed in this manner.)	**Review**: Respond to vocabulary review questions. **Demonstration**: Identify which questions are counter examples that would not work for this lesson and which questions would work. **Interaction**: 1. In groups, write a statistical question. 2. Share question with the class and receive feedback. Is this a statistical question or not? If not, adjust the question so that it is. 3. Describe the data they collected in the following manner: a. By its center: Use mean, media and mode to describe data. The mean is the average number of the data. The median is the middle value or, if there is an even number of data values, it is an average of the two middle values. The mode is the number that occurs most often in the data, and is particularly useful when students must identify favorites or the most popular. b. By its spread: Students may use the range, which is the highest value minus the lowest value. The spread may also be described as the values being close to the center or far apart. c. By its shape: Students may sketch a dot plot to describe the shape of the data and to show the frequency of the data points. **Wrap Up**: Share results with the class.

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<td>Review: Discuss results of data analysis lesson. Present work done by students describing data from yesterday’s lesson and ask questions requiring student responses relative to center, mean, median, mode, spread, range and shape.
Introduction: Inform students they will be working on independent practice in their math textbooks. Students will describe data relative to its center, spread and shape from a series of number tables and dot plots. The number tables and dot plots represent answers to statistical questions. Assign number of problems and time allotted. Respond to student questions before starting practice.

Wrap Up: Ask for student produced responses to independent practice. Provide feedback to any incorrect answers. Check for understanding based on responses and conclude when appropriate to move on to assessment.</td>
<td>Review: Respond to questions.

Introduction: Ask any questions relative to assigned independent work.

Independent Practice: Work in math text books on assigned pages, describing data relative to its center, spread and shape from a series of number tables and dot plots. The number tables and dot plots represent answers to statistical questions.
Example: “How many TV’s do you have in your house”
<table>
<tr><td>Potential Responses</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td># Of Responses For Each</td><td>1</td><td>1</td><td>3</td><td>3</td><td>1</td><td>1</td></tr>
</table>
What are the mean, median, mode, range and shape of this data set?</td>
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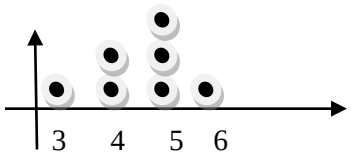
Summative Assessment Items:

1. Find the mean of the following data set: 8 12 6 9 5
    A. 8
    B. 9
    C. 12
    D. 6
2. Find the median of the following data set: 23 18 67 32 54 41 70 11 56 33 41 58
    A. 33
    B. 40
    C. 41
    D. 44
3. Find the mode(s) of the following data set: 51 58 54 58 51 57 55 58 51 54
    A. 57 and 58
    B. 51 and 58
    C. 51 and 57
    D. 54 and 55
4. Find the range if the greatest number from a data set is 24 and the least is -2
    A. 22
    B. 26
    C. 28
    D. -12
5. Draw a dot plot for the following data set 5 4 5 3 4 5 6

Answer Key: Each correct answer is awarded 1 point, and no partial credit is available. A score of 4/5 demonstrates mastery.

1. A: 8
2. C: 41
3. B: 51 and 58
4. B: 26
5. Sample Answer: