

**GED 2002 Teachers' Handbook of Lesson Plans**

<p><b>Content Area</b> Mathematics</p>	<p><b>Lesson Topic/Theme</b> Basic Statistics – Finding the Middle Number</p>	<p><b>Correlation to Math Framework</b> 05.01/05.07</p>	<p><b>Lesson Number - 45</b></p>
<p><b>Title: How Many Ways Can You Find the Middle?</b> <b>Objectives/Learner Outcomes</b></p> <p>At the end of this lesson, the learner will be able to:</p> <ul style="list-style-type: none"> <li>• Define mean, median, and mode</li> <li>• Calculate the mean, median, and mode for a given set of numbers</li> </ul>		<p><b>Materials/Resources/Internet Sites/Handouts/Worksheets</b></p> <ul style="list-style-type: none"> <li>• Chart paper/white board</li> <li>• Markers</li> <li>• Small stackable blocks (such as Legos™)</li> <li>• Double-sided worksheet: <ul style="list-style-type: none"> <li>▪ Handout #1: <b>Mode, Median, and Mean</b></li> <li>▪ Handout #2: <b>Block Experiment</b></li> </ul> </li> </ul>	
<p><b>Pre-Requisite Knowledge</b></p> <p>The learner should be able to:</p> <ul style="list-style-type: none"> <li>• Complete basic addition, subtraction, multiplication, and division problems with whole numbers and decimals</li> <li>• Order a set of numbers from least to greatest</li> </ul>		<p><b>Key Words</b></p> <ul style="list-style-type: none"> <li>• Number (or data) set</li> <li>• Mean</li> <li>• Median</li> <li>• Mode</li> </ul>	
<p><b>Anticipatory Set/Introduction</b></p> <p><b>Say:</b> Today, we are going to talk about how to find the middle of a set of numbers.</p> <p><b>Ask:</b> Can you name a set of numbers in which someone would like to know the middle? (If the class gets stuck, you may say “I might like to know the middle height for everyone in class tonight.”) Possible answers could include such things as: the heights or weights of people, test scores, sports scores for a certain team, gasoline prices, etc.</p>			
<p><b>Preview Questions for Lesson</b></p> <ol style="list-style-type: none"> <li>1. How can you write a list of numbers in order?</li> <li>2. Do you think there are a few different ways to find the middle of something?</li> <li>3. Who has heard of the term “mean”? (Be sure to stress that it’s “mean” in the math-sense, not “mean” as in not being nice.)</li> <li>4. Who has heard of the term “median”?</li> <li>5. Who has heard the term “mode”?</li> </ol>			

### Instructional Outline

**Say:** Sometimes, it's important to know what number lies in the middle of a set of numbers. There are three ways to measure the middle. They are called: the mean, the median, and the mode. Let's look at a number set. (Write a short number set on the chalkboard or chart paper. The number set can be as simple as: 2, 10, 2, 11, 9, 2, 3.) It will be very helpful to first write this list in order.

**Ask:** Who would like to write this list in order from least to greatest? (Have students either speak the list in order or write it in order.)

**Say:** We will start with the mode first. Which number shows up the MOST? (Emphasize the long "o" sound.) This is the mode. (Emphasize the long "o" sound in this word.) Repeat after me, mode (emphasizing the long "o" sound) sounds like most (emphasizing the long "o" sound). (Repeat the sentence another 2 or 3 times.)

**Handout:** *Mode, Median, and Mean* worksheet. Allow students to work in pairs to find the mode for examples 1, 2, and 3.

**Discuss:** Ask the class what the mode was for the first example. If one person volunteers, ask the class if they agree with the answer. Have a class member describe what he/she did to find the mode.

**Ask:** What do you think would be the mode for this set? (Write on the board or chart paper a short set that will have two modes. An example could be: 2, 2, 2, 4, 5, 5, 5, 9. The answer is both 2 and 9.)

**Discuss:** It is ok to have more than one mode if both numbers occur more than the others. (Give more examples if needed.)

**Say:** Now we will go on to the median. Imagine you're driving down the highway and you see a car on the median (emphasize that word). Where would that car be? (Students should answer that the car would be on the middle part of the highway, possibly saying on the grass that separates each section of the road.) The median of a number set is just like the median of a highway – it's the number in the middle. Just like before, it's very important that you first write the number set in order from least to greatest. Let's look at an example. (Use the example from the previous exercise.) The number set is already in order. To find which number lies in the middle, we're going to use the "thumb trick." Does everyone have the number set written in order? Complete this exercise on the chalkboard or chart paper while students follow along. Put your thumbs over the numbers on each end of the list (the least and greatest numbers). Our list has gotten smaller. Let's do this again. Move your thumbs over the next set of numbers on the ends of the list. Our list is even smaller. Move your thumbs in one more time. How many numbers are showing now? (Answer: only 1.) This is the median of our original list.

Allow students to work in pairs again to find the median of the number sets on the worksheet. Discuss the findings and how students arrived at the answer.

**Say:** Sometimes, we might have two numbers that end up in the middle. (Write a short set on the board, such as 1, 3, 5, 8.) Have a student come up to demonstrate the "thumb trick."

**Say:** Notice that after \_\_\_\_ (student's name) puts his/her thumbs over the numbers on the end, there are two numbers left in the center. If we did the thumb trick again, we'd be left with nothing in the center.

**Ask:** If we want to find the middle of what we have left, what should we do? (Answer: Find the middle of those two numbers and average them.)

**Say:** We can find the middle of the two numbers that are left over by adding them up and dividing them by 2.

**Ask:** When that's done, what is the median for that list? (Answer: 4)

**Say:** Now we will go on to the mean.

**Ask:** Who knows another name for the mean of a number set? (Answer: average)

**Ask:** How do you find the average? (Answer: Add up all the numbers and divide by the number of entries.)

**Say:** Let's find the mean of this number set. (Refer back to the first number set written on the board or chart paper. Point to the number set that's already written in order. Proceed to have students tell you how to find the mean.)

Allow students to work in pairs to find the mean for the number sets on the worksheets. Discuss the findings as a class. At this point, the mode, median, and mean should be done for all three number sets on the worksheet.

### **Process/Activities**

Divide the class into small groups of three to four students each. Provide each group with a bag into which you have placed five stacks of Legos™. Stacks should already be made and can range from two Legos™ to five Legos™. All bags should contain the same stack heights.

**Say:** Each group has received a bag with different stacks of blocks. Take the stacks out of the bag and place them standing upright your desk. As a group, you will find the mode, mean, and median for the number of blocks in each stack. You can flip your worksheet over and record your work there.

**Ask:** What should be done before you try to find the mode, median, or mean? (Answer: Put the stacks in order from least to greatest.)

**Say:** As you work together, be sure to talk about what you're doing.

Walk around the room to monitor progress and to keep each group on-task. Have volunteers share their answers and explanations.

### **Product/Evaluation/Summary**

**Ask:** Before you try to find the mode, median, or mean, what should you do to your list of numbers? (Answer: Write it in order.)

**Ask:** What word is the name for the number that occurs most often in a list? (Answer: mode)

**Ask:** What is another word for the average of a list of numbers? (Answer: mean)

**Ask:** How do you find the mean or average? (Answer: Add up all the numbers and divide by the number of entries.)

**Ask:** The median is the \_\_\_\_\_ in a list of numbers. (Answer: middle)

<b>Teaching to Different Types of Learners</b>			
	<b>Visual</b>	<b>Auditory</b>	<b>Kinesthetic/Tactile</b>
<b>Learning Activity</b>	Provide written directions, charts, and worksheets to students.	Incorporate activities that allow students to work together and discuss what they have done. Have students repeat answers or directions to you.	Students can draw pictures to reflect the numbers (i.e., instead of writing "2", they may choose to draw two circles or boxes to represent the number). Students can be given blocks, coins, pencils or other types of manipulatives to use.
<b>Special Differentiation Strategies</b>	Use an overhead transparency to visually show the correct answers for the block activity rather than just providing the answers verbally. When providing directions orally, have them in writing as well.	Check for understanding by asking questions when giving directions or assignments in writing.	Show students representations of mean, median, and mode using blocks. Pictures can also be drawn instead of using blocks.
<b>Evaluation</b>	Allow learners to write their answers instead of saying them aloud.	Allow students to orally report what they have learned.	Allow students to use the blocks or other manipulatives to demonstrate their understanding of mean, median, and mode.
<b>The Family and Adult Literacy Connection</b>		<b>ESE/ESOL Accommodations</b>	
<p>If students have school-aged children, have them complete an additional example from the <b>Mode, Median, and Mean</b> worksheet. Students can also replicate the block activity with their children, allowing children to create the stacks of blocks.</p> <p>Students can connect mean, median, and mode to the real world by looking for examples presented in newspapers or magazines. Instructors can facilitate this by having examples ready to show to their students (such as reports talking about median income levels, the average price of gas in an area, etc.).</p>		<p>Partner students with a peer buddy who can facilitate discussion and model tasks. Allow for non-verbal responses such as pointing, nodding, or showing numbers on fingers.</p>	

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**Mode, Median, and Mean**

Number Set #1: 10, 6, 10, 8, 7

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

Number Set #2: 1, 5, 3, 3, 1, 3, 7

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

Number Set #3: \$5, \$10, \$20, \$2, \$20, \$20

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

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**Block Experiment**

What is the height of the first stack of blocks? \_\_\_\_\_

What is the height of the second stack of blocks? \_\_\_\_\_

What is the height of the third stack of blocks? \_\_\_\_\_

What is the height of the fourth stack of blocks? \_\_\_\_\_

What is the height of the fifth stack of blocks? \_\_\_\_\_

Write this list in order from least to greatest:

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What is the mode?

What is the median?

What is the mean?