

Title:	Measures of Central Tendency
Grade(s):	5
Subject(s):	Mathematics, Technology Education, English Language Arts
Author:	ICAC Team
Overview:	Students will collect data (such as, the number of siblings each person has) from among their group members and calculate the mean, median, and mode for each data set. Each group will organize their data in a Microsoft Word table, then analyze and compose a description of their results.
Content Standards:	<p>MA (5) 14. Analyze data collected from a survey or experiment to distinguish between what the data show and what might account for the results.</p> <p>TC (3-5) 2. Use various technology applications, including word processing and multimedia software.</p> <p>TC (3-5) 9. Use technology tools to organize, interpret, and display data.</p> <p>TC (3-5) 10. Use digital environments to collaborate and communicate.</p> <p>TC (3-5) 11. Use digital tools to analyze authentic problems.</p> <p>ELA (5) 8. Express meaning through writing varied sentence structure, detailed paragraphs, and multi-paragraph compositions in an organized manner.</p>
Local/National Standards:	
Primary Learning Objectives:	<p>Students will:</p> <ul style="list-style-type: none"> • Collect data from their group members and accurately record the data on the "Group Data Sheet" (attached); • Use paper, pencil, and the Calculator to correctly calculate mean, median, and mode for each category of data; • Organize their calculations using a table in Microsoft Word; • Analyze the data as a group and describe their conclusions in a typed paragraph.
Additional Learning Objectives:	Students will learn to present data from research findings.
Approximate Duration of Lesson:	45 minutes
Materials and Equipment:	Pencil, Paper, "Group Data Sheet" (one copy per group and one transparent copy for overhead)
Technology Resources Needed:	Calculator, Microsoft Word, Overhead

**Background/
Preparation:
Procedures/
Activities:**

Students should have previous experience with mean, median, and mode.

Step 1 *Introduction & Review:*

Display a copy of the "Group Data Sheet" on the overhead, ELMO projector, or Promethean Board. Introduce the topic of mean, median and mode by collecting in-class data and recording it on the sheet.

Ask five students how many siblings they have. Record their answers on the overhead copy of the Group Data Sheet. As way of review, guide students through calculating mean, median, and mode on the overhead.

Mean is the average of a set of numbers, found by adding up the numbers and dividing the total by how many numbers there are.

Ex: $1+7+4+3+7=22$; $22\div 5=4.4$

Median is the number in the middle of a set of numbers when in numerical order.

Ex: 1,3,4,7,7 Median is 4

Mode is the number that occurs most often in the set of numbers. (Tip: Put the numbers in order first).

Ex: 1,3,4,7,7 Mode is 7

Step 2 *Gathering & Calculating Data:*

Divide students into groups of five. Each group should have one "Group Data Sheet." You may wish to divide duties by having each person handle a certain question (Person 1 is in charge of Question 1, etc.)

Instruct students to gather the information as listed on the Data Sheet (Age; No. of Sisters; No. of Brothers; No. of Pets). Students may include additional categories they are interested in, per teacher approval.

After collecting data, students may use the **Calculator** to find the mean, median, and mode and then record the answers on the bottom half of the Data Sheet.

Access the **Calculator** by clicking:

-Start

-All Programs

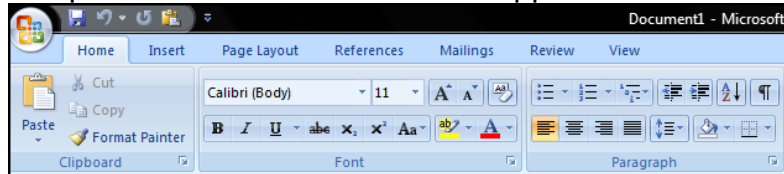
-Accessories

-Calculator

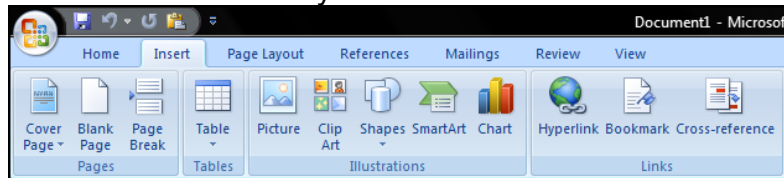
Step 3 *Creating a Table:*

If needed, review with students how to open **Microsoft Word** and create a table.

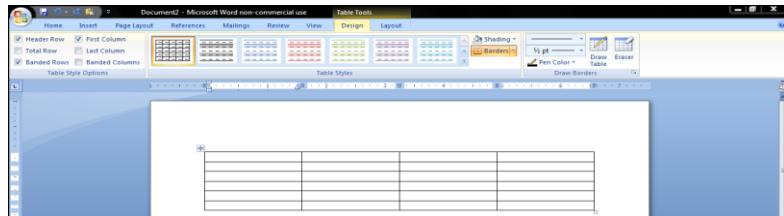
a. Open Word and this screen will appear:



b. Next, click the tab labeled “Insert”, then click on “Table” as indicated by the arrow:



c. Then, highlight the number of cells desired, in this case 6x4. Your 6x4 table will appear on the screen, as shown below:



d. Add the titles to the table, as shown below:

Question	Mean	Median	Mode
Age			
Number of sisters			
Number of brothers			
Number of pets			

e. Insert the calculated mean, median, and mode from the Data Sheet. The table provides an organizational tool for analyzing data.

Step 4 *Analyzing Data:*

In a whole group discussion, ask students to look carefully at their organized data. Ask questions such as:

"Are your median and mode usually the same? Why do you think that is?"

"Are your mean and median usually very close? Do you have any categories where mean and median are very different? Why is that?" (Here, you may introduce concepts such as skewing; one group member may have a lot of pets, which drives the mean up).

After the discussion, have the group write a paragraph describing their data. An example may be:

The mean for sisters in our group is 4. The mean for brothers in our group is 2. The reason why brothers are lower is because everyone in the group has a sister, and only two people have brothers.

Attachments:	Rubric; Group Data Sheet
Assessment Strategies:	See rubric.
Extension:	Students may find the mean for larger data groups; for example, collect data on the number of students who bring their lunch each day during one week. At the end of the week, calculate the mean and see if it reflects each day or if it has been skewed.
Remediation:	Practice calculating mean, median, and mode with a set of numbers. Then, see what happens when just one number is changed in the set. Set A: 3,8,4,2,1 (Mean: 3.6, Median: 4, Mode: None) Set B: 3,8,4,2,8 (Mean: 5, Median: 4, Mode: 8)

Assessment Rubric for Measures of Central Tendency

Score:	1	2	3	4
Participation	No participation in the activity.	Some participation, but didn't work well with the group.	Participated for most of the project and contributed to the experiment.	Outstanding group worker.
Table	Didn't create a table at all, or wasn't accurate at all.	Created a table, but had more than two errors.	Created an accurate table with only one or two errors.	Created a 100% accurate table.
Essay-Content	Didn't write an essay, or did but had substantial errors.	Wrote an essay, but only had a few accurate observations.	Wrote an essay that contained one or two data analysis error.	100% accurate essay concerning mechanics and data analysis.
Grammar	Didn't write an essay, or did but had substantial grammatical errors.	Wrote an essay, but had more than 5 grammatical errors.	Wrote an essay that contained less than 5 grammatical errors.	100% error free.

Group Data Sheet

Name	1. Age	2. Number of Sisters	3. Number of Brothers	4. Number of Pets	5.

1. Age:

Mean _____

Median _____

Mode _____

2. Number of Sisters:

Mean _____

Median _____

Mode _____

3. Number of Brothers:

Mean _____

Median _____

Mode _____

4. Number of Pets:

Mean _____

Median _____

Mode _____

5. _____

Mean _____

Median _____

Mode _____