

## **Maps and Modes, Finding a Mean Home on the Range!**

By Julie Kilcullen, 5<sup>th</sup> Grade

**Objective:** Students will be able to analyze data and information from various maps and charts to generate and solve problems dealing with mode, median, and range questions.

### **TEKS:§111.17. Mathematics, Grade 5.**

(5.3) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, and divides to solve meaningful problems.

The student is expected to:

(A) use addition and subtraction to solve problems involving whole numbers and decimals;

(5.5) **Patterns, relationships, and algebraic thinking.** The student makes generalizations based on observed patterns and relationships.

The student is expected to:

(A) describe the relationship between sets of data in graphic organizers such as lists, tables, charts, and diagrams; and

(5.6) **Patterns, relationships, and algebraic thinking.** The student describes relationships mathematically.

The student is expected to select from and use diagrams and equations such as  $y = 5 + 3$  to represent meaningful problem situations.

(5.10) **Measurement.** The student applies measurement concepts involving length (including perimeter), area, capacity/volume, and weight/mass to solve problems.

The student is expected to:

(A) perform simple conversions within the same measurement system (SI (metric) or customary);

(C) select and use appropriate units and formulas to measure length, perimeter, area, and volume.

(5.13) **Probability and statistics.** The student solves problems by collecting, organizing, displaying, and interpreting sets of data.

The student is expected to:

- (B) describe characteristics of data presented in tables and graphs including median, mode, and range; and
- (C) graph a given set of data using an appropriate graphical representation such as a picture or line graph.

(5.14) **Underlying processes and mathematical tools.** The student applies Grade 5 mathematics to solve problems connected to everyday experiences and activities in and outside of school.

The student is expected to:

- (A) identify the mathematics in everyday situations;
- (B) solve problems that incorporate understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- (C) select or develop an appropriate problem-solving plan or strategy, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and
- (D) use tools such as real objects, manipulatives, and technology to solve problems.

(5.15) **Underlying processes and mathematical tools.** The student communicates about Grade 5 mathematics using informal language.

The student is expected to:

- (B) relate informal language to mathematical language and symbols.

(5.16) **Underlying processes and mathematical tools.** The student uses logical reasoning.

**Focus:** Students will be shown a map of Nacogdoches County from the 1800's. The teacher will instruct the students to write in their journal as to what they believe the map represents. The teacher will then call on students at random to share their responses. If there are no accurate guesses the teacher will reveal the true nature of the map. The teacher will then lead a whole class discussion on the types of information that can be

discovered from reading a map. Students will be told that there are various types of maps for different types of information: rainfall, population, elevation, mileage etc.

**Lesson:** The teacher will do a mini- lesson reviewing the concept of mode, median, mean, and range. Teacher will hold a brief Q&A to assure understanding. The students will be broken into small groups to work together on this project. The teacher will distribute a variety of maps from the *Texas Tides* site to each group. Once the maps are passed out, the students will be invited to study the maps and brainstorm ideas about which data and maps they would like to use for their assignment. After brainstorming, students will then be instructed to collect the data from their map and decide how they want to represent their information. Students must choose an appropriate graph for the information, for example: a pie chart, bar graph, line graph etc. Students will then be asked to perform the calculations for mode, median, mean, and range from their data. The teacher will interact with each group to monitor for challenges and progress. Once the calculations are completed, each group will be given a poster board and instructed to design a poster that represents their data. The poster must include the following:

- 1.) The map used to collect the data.
- 2.) An appropriate graph that represents the data.
- 3.) Calculations showing mode, median, mean, and range for the data.
- 4.) All group member's names.
- 5.) Correct grammar and spelling.

The teacher will monitor the progress of each individual group and facilitate problem solving for challenges faced by the groups. When all the posters are completed the class will come together in large group. Each group will make a small presentation of their poster and work to the class. After each group has presented their project, the posters will be displayed in the classroom.

**Assessment:** Each student will select a poster from which to collect data. Then individually generate at least five potential test questions from the data found on the poster they selected. All questions must include the following:

- 1.) All questions must be grade level appropriate.
- 2.) All questions must have 4 answer choices.
- 3.) All questions must have a correct answer. (No trick questions.)
- 4.) All questions must have a correct complete example.
- 5.) All work must be the original work of the student. (No using workbook questions.)

**Extensions:**

**Social Studies:** Students will be invited to investigate the history of cartography. They may choose to write a biography of an individual who made great contributions in this field, or they may choose to design a modern day map using data of their own choice. Students may also choose to do plaster relief maps representing historical data of their choice.

**Language Arts:** Make maps that an explorer or an adventurer might of used, and write the story from the map's point of view.

**Resources:**

**East Texas Research Center**

**Sawdust Empire Collection:**

**Images:**

P 90 T-176

P 90 T-177

P 90 T-173

P 90 T-150

P 90 T-193

P 90 T-150

P 90 T-205

P90 S-28

P90 S-137

[Libweb.sfasu.edu/etrc/collect/photos/afriam/afriam.htm](http://Libweb.sfasu.edu/etrc/collect/photos/afriam/afriam.htm)

*Texas Tides* Map Collection

Map # 45 Nacogdoches County 1834/1837

Map #48 Nacogdoches County 1912

Map # 54 1959 Streets

Map# 55 1955 Streets

**Texas State Library and Archives Commission**

[www.tsl.state.tx.us/arc/maps/index](http://www.tsl.state.tx.us/arc/maps/index)

**Texas General Land Office**

[www.glo.state.tx.us/archives/mapscol](http://www.glo.state.tx.us/archives/mapscol)

**The Portal to Texas History**

[texashistory.unt.edu/permalink/meta-pt-6578:9](http://texashistory.unt.edu/permalink/meta-pt-6578:9)

A Gazetteer of Texas by Henry Gannett

Pgs. 9-14