

**Overview**

After learning the meaning of mean, median, mode and range, students will be able to accurately find each of these landmarks using the set of data in a given month of the *Minnesota Weatherguide Environment™ Calendar*, and graph the information in the form of a line plot.

**Standards/Benchmarks \***

- Demonstrate mastery of multiplication and division basic facts; multiply multi-digit numbers; solve real-world and mathematical problems using arithmetic. Math (4.1.1.5)
- Collect, organize, display and interpret data, including data collected over a period of time and data represented by fractions and decimals. Math (4.4.1.1)
- Measure temperature, volume, weight and length using appropriate tools and units. Science (4.2.1.1.1)

**Background**

On the *Minnesota Weatherguide Environment™ Calendar*, each date contains a Normal maximum and minimum temperature. Normal temperatures are averages that are computed over a 30-year period.

**The Activity****Day 1****Definitions**

1. Challenge students to line up in order according to height without talking. This should take between 5 and ten minutes. Give them minimal help.
2. Once students are lined up in tallest-smallest order, tell them that they have created a set of data out of themselves. Assume that each one of them represents a value or number on a thermometer.
3. Ask the tallest class member to step forward. Tell the class that this person represents the maximum value in our set of data, in this case the greatest height represents the hottest temperature.
4. Ask the shortest class member to step forward. Tell the class that this person represents the minimum value in our set of data, in this case, this person is the coolest.
5. While both the hottest (tallest) and the coolest (shortest) person in the class are in front of the rest of the class at either end of the line, explain that the difference, represented here by the distance between the two, is called the range.
6. Count in from each end of the line to determine the person in the middle. Explain that this person represents the median (helpful

**Time:**

Day 1 - 1 hr.  
Day 2 - 2 hr.

**Skills:**

Recording  
Data collecting  
Drawing  
Interpreting

**Vocabulary:**

mean  
median  
mode  
range  
landmarks  
maximum  
minimum  
distribution  
normal temperature

**Materials Needed:**

- *Minnesota Weatherguide Environment™ Calendar*
- Whiteboard or overhead projector
- Math Notebooks
- Graph paper

memorization hint: think medium=middle.

7. Ask the two people on the ends of the line to each look toward the middle to try to determine if there is a spot in the line where several people are about the same height (it may help for you, the teacher to also look from a head-on point of view). This clump of students represents the mode, the most common height (helpful memorization hint: listen for the 'o' sounds in mode and most).

8. Mean is the most commonly used type of average. Demonstrate how to find the mean (actually the arithmetic mean) of a set of numbers, add the numbers in the set and divide the sum by the number of items in the set.

9. Students sit on the floor forming a large teaching circle.

10. Show students the *Minnesota Weatherguide Environment™ Calendar*. Point out the information on each day of each month, making note of the high and low temperatures. Using the data from the current month, ask a student to read aloud the high and low temperatures for the first day of the current month while you record it on the whiteboard. The student should then pass the calendar to the left so the next person can read the high and low temperatures for the next day of the month as you record. This should continue until the entire month's data is recorded.

11. Have the class help you put these numbers in order (two sets of data: record high; record low). They should write this down in their math notebook.

12. Together, determine the maximum, minimum, range, mean, median, and mode of the data.

## Day 2

### Graphing the Data

1. Pass out graph paper. Using the data recorded on Day 1 from the *Minnesota Weatherguide Environment™ Calendar* demonstrate how to set up line plot, including labels for both axis. The X axis should be labeled "Temperature" and the Y axis should be labeled "Number of Days."

EXAMPLE:



2. Pair students in partners and have them work together to plot the data for either the record high or record low temperature data, recorded on day one in their math notebooks. Be sure that some partnerships graph the high temps and some graph the low temps. Have them work together to try to determine the maximum, minimum, mean, median, mode and range for the graphed data.

3. Bring students together to discuss the findings of the statistical distributions (landmarks) for each set of data (record high and record low temps for the current month).

### Questions for Discussion

· In what kinds of real life situations would these statistical distributions be useful? Another word for mean is average and we use averages all the time...batting averages, average test scores, expectations for average time spent on homework, etc. Generate a list of real-life situations that include a mean, or average.

· Why do we use the term landmark when referring to certain numbers in a set of data? A landmark is an object or feature that stands out and these numbers stand out in a set of data because they are important.

· What other kinds of landmarks are there? Landmarks are useful when trying to find a place, or when giving someone directions to a place. "Turn right at the water tower," or "If you get to the giant oak tree you've gone too far."

## Extensions

· To extend the lesson, record the temperature at the same time of day for a given amount of time (a week, two weeks, etc.) then order and graph that set of data.

## Resources

*Minnesota Weatherguide Environment™ Calendar*

## \*Minnesota Academic Standards

### Standards Met

Subject	Code	Standard	Benchmark
Math	4.1.1.5.	Demonstrate mastery of multiplication and division basic facts; multiply multi-digit numbers; solve real-world and mathematical problems using arithmetic.	Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of technology, and the context of the problem to assess the reasonableness of results.
	4.4.1.1.	Collect, organize, display and interpret data, including data collected over a period of time and data represented by fractions and decimals.	Use tables, bar graphs, timelines and Venn diagrams to display data sets. The data may include fractions or decimals. Understand that spreadsheet tables and graphs can be used to display data.
Science	4.2.1.1.1	Objects have observable properties that can be measured	Measure temperature, volume, weight and length using appropriate tools and units.