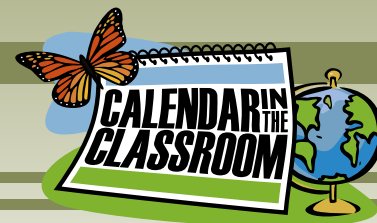




Graphing Max-Min Temperatures



Overview

Using the *Minnesota Weatherguide Environment™ Calendar* students will collect and analyze annual temperature data so that they will understand and be able to describe patterns in numbers and graphs. The students will use stem-and-leaf plots to organize data; find landmarks; and draw conclusions.

Standards/Benchmarks *

- Use appropriate tools and techniques in gathering, analyzing and interpreting data. Science (5.1.3.4.1)
- Create and use rules, tables, spreadsheets and graphs to describe patterns of change and solve problems. Math (5.2.1.1)
- Know and use the definitions of the mean, median and range of a set of data. Math (5.4.1.1)

Background

Definition of Stem-and-Leaf Plot: Stem-and-Leaf plot is a method of organizing numerical data in order of place value. The 'ones digit' and the 'tens digit and greater' of each data item is separated as leaves and stems respectively.

Below is a Stem-and-Leaf Plot of these data points:

63, 35, 22, 58, 26, 27, 31, 33, 65, 44, 46, 57, 59, 61, 42, 64, 67.

The range is 22 to 67. Data in order is: 22, 26, 27, 31, 33, 35, 42, 44, 46, 57, 58, 59, 61, 63, 64, 65, 67.

There is no "1" stem because there are no data points between 10-19. See Resources for more information and examples.

Example of a Stem-and-Leaf Plot:

Stem	Leaf
2	2 6 7
3	1 3 5
4	2 4 6
5	7 8 9
6	1 3 4 5 7

The Activity

1. Pass out or show the *Minnesota Weatherguide Environment™ Calendars* to groups of four students. Within each group, pairs will be assigned to maximum temperatures or minimum temperatures. Have students collect the assigned data from the monthly normals located below each monthly picture. Clarify that these maximums and minimums are the monthly averages. Each pair of students should have 12 numbers recorded.
2. Review stem-and-leaf plot graphs—see background information for a brief review.

Time:

75 minutes

Skills:

Team building
Interpreting
Predicting
Drawing conclusions
Recording

Vocabulary:

stem-and-leaf plot,
landmarks
minimum
maximum
range
mode
median

Materials Needed:

- *Minnesota Weatherguide Environment™ Calendar*
- pencil
- paper
- calculator
- bulletin or white board

3. Have students create a stem-and-leaf plot with the maximum and minimum temperature data they have collected.
4. Once the graph has been created they should calculate the landmarks: minimum, maximum, range, mode, and median. Record the landmarks below the stem-and-leaf plot.
5. Have the students post their finished plot and landmarks on the front board or on a bulletin board. Divide the finished products into the two groups under the categories maximum and minimum temperatures.
6. As a class, analyze the landmark results. (Check accuracy of results and allow groups to make corrections if needed).

Questions for Discussion

(Answers will vary from year to year based on the data.)

- What is our highest monthly temperature?
- What month would you predict to have the highest temperature?
- What is our lowest monthly temperature?
- What month would you predict to have the lowest temperature?
- What does this data tell us about Minnesota weather?
- Do you think next year we will have similar results in Minnesota?

Have students create stem-and-leaf plots for other data—monthly normal for precipitation (see extensions).

Extensions

- Create a stem-and-leaf plot and find the landmarks with the monthly normal for precipitation. (Note: Discussion will need to occur on how to handle decimal numbers.)
- Have students determine landmarks for the year.
- Save the student plots and landmarks data to use for comparison in future years.
- For further practice, assign a month to each pair of students and have them create a stem-and-leaf and find landmarks based on the max/min temperatures of each.

Resources

- Examples and explanations of Stem and Leaf Plots can be found at the following websites:
<http://www.purplemath.com/modules/stemleaf.htm>
- This site also shows a “box & whiskers” plot, which you could use as an extension:
<http://www.mathplanet.com/education/pre-algebra/probability-and-statistic/stem-and-leaf-plots-and-box-and-whiskers-plot>
- For a video demonstration/explanation see:
http://www.mathplayground.com/howto_stemleaf.html
- *Minnesota Weatherguide Environment™ Calendar*

* Minnesota State Academic Standards

Standards Met	Subject	Code	Standard	Benchmark
	Science	5.1.3.4.1.	Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	Use appropriate tools and techniques in gathering, analyzing and interpreting data.
		5.2.1.1.	Recognize and represent patterns of change; use patterns, tables, graphs and rules to solve real-world and mathematical problems.	Create and use rules, tables, spreadsheets and graphs to describe patterns of change and solve problems.
	Math	5.4.1.1.	Display and interpret data; determine mean, median and range.	Know and use the definitions of the mean, median and range of a set of data. Know how to use a spreadsheet to find the mean, median and range of a data set. Understand that the mean is a “leveling out” of data