Katherine Crunk
January 30, 2008
Subject: Math

Title: Interpreting Mean, Median, and Mode

Michigan Curriculum Framework: Math III Data Analysis and Statistics.

- Content Standard 2: Students examine data and describe characteristics of a distribution, relate data to the situation from which they arose, and use data to answer questions convincingly and persuasively.
    - Benchmark: 2ms: describe the shape of a data distribution and identify the center, the spread & outliers, characteristics of distribution.

GLCE D.AN.05.03 Given a set of data, find & interpret the mean (using the concept of fair share) & mode.

Objectives:

► Given a set of data students will find the mean, median, and mode
►Students will interpret the mean, median, and mode.

Materials:

►31 Data Dilemma sheets
►One group size white board, markers, and eraser for each group
►31 Mike's Test Scores, Birthday Party Guests, and School Flower Garden
►Copy of newspaper or magazine article that quotes statistics as mean or median.

Procedure:

Introduction: Students have learned how to calculate the mean, median, and mode. For a warm up, they will use this knowledge to find a set of data allowing them to think about what they have learned and use it in a different way. In small groups, students will work together solve a DATA DILEMMA problem.
►Each group will receive a different problem. **Each set of data should have five values** but some are missing.
►Students are to use the mean, median, and mode (which are given) to find the missing values.
►Next, each group should explain how they decided on this set of data and how they used the given information.

Inform the students of the day's goal. We will be looking at how changing the data set affects the mean and median. We will also be working on interpreting the mean, median, and mode in a data set.

Guided practice:
Work together on Mike's Test Scores and Birthday Party Guests using the overhead.
►First organize the data and then find the mean, median, and mode.

►Secondly, plot the data, mean, median, and mode on a line plot. Make sure the students understand that the median is not affected by the values of the data only the relative position of the data. However, every change in the values of the data affects the mean.
►Answer the questions together making sure they understand the concepts.

Independent Practice: School Flower Garden
Monitor the students as they work on School Flower Garden to check for understanding. Help as needed. They are to organize the data and place on a line plot just as before in whole group.

Closure: Show newspaper article or magazine article that states statistics with mean or median. Ask the students "Why do you think the authors of those articles chose to cite those particular measures of center?" (NCTM 2004) Minimum response expected would be that because other ones might not state something desirable for what they wanted people to know.

Checking for Understanding/ Evaluation: Monitor the students during dependent and independent practice. During dependent practice do not just show. The students have been working on finding the mean, median, and mode. While working on these sheets together solicit answers and solutions from the students. The teacher should only fill in the information that the students are unable to answer.
To evaluate the objectives, collect "School Flower Garden" to check to see if the students were able to

1) find the mean, median and mode
2) interpret the mean, median, and mode in a given set of data.

Behavior Expectations: Students will follow small group procedures and classroom procedures as posted. Additionally, students will be supportive of other students as they share responses (no put-downs or laughing.)

Management Techniques: Table managers will collect and distribute materials to their groups.

References:

National Council of Teachers of Mathematics. (2004). Principles and standards for school mathematics. http://standards.nctm.org/document/eexamples/chap6/6.6 /index.htm.

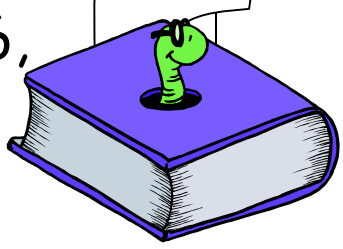
Probability, Statistics, & Graphing. Instructional fair. pg. 13, 17

Data Analysis. McGraw-Hill. Pg 7

DATA DILEMMA

Oops, a bookworm has eaten part of your work. The data needs to be fixed before you turn it in to the teacher. Luckily, the mean, median, and mode are still readable and some of the data values still are there. In addition, you know that each data set has five values and the data values are whole number listed in numerical order. Find the missing data values.

DATA	MEAN	MEDIAN	MODE
1) 2, 6, 6,	6	6	6
2) 3, 7,	8	9	9
3) 1,	4	3	1, 3
4) 9,	14	15	18
5) 0,	2	2	none
6) 5, 8	9	10	10
7) 0, 8,	7	8	8
8) 1, 2,	5	3	none
9) 2, 3,	3	3	3
10) 4, 6,	10	10	15
11) 0, 4,	11	10	10
12) 2, 6,	12	14	14



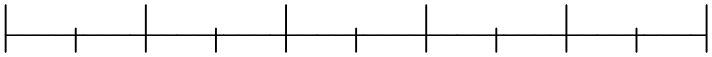
Adapted from Data Analysis: McGraw-Hill pg 7

Mikes Test Scores

Mike wondered what grade would probably be on his report card. He used the grades he received on tests to try to figure it out.

Mikes math test scores were 76, 85, 70, 90, 70, 90, 70, and 89.

Help Mike out. Organize this data on a line plot.



What was his mean score?

What was his median score?

What was his mode score?

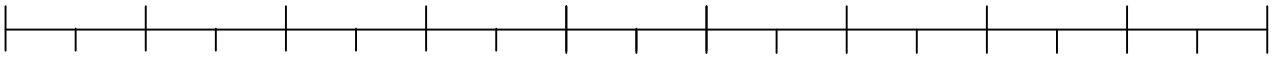
Which score (mean, median, mode) do you think he would like to see on his report card? Why?

If the two 90 scores were 100 scores instead, how would the median be affected? How would the mean be affected?

Little Susie is turning three years old. Her mother needs to decide what to serve at the birthday party to satisfy the guests. There is a wide range of ages and not everyone will want to eat the same type of foods.

The ages of the guests are 87, 58, 50, 61, 3, 3, 35, 31, 28, 16, and 68.

Organize the data on a line plot.



What is the mean age?_____

What is the median age? _____

What is the mode? _____

Based on the mean age, what should the mother serve steak or macaroni and cheese?

_____

Based on the mode, what should be served?_____

Why do you think the mean is higher than the median?

_____

_____

Predict: What would happen to the mean and median if two 3-year olds, one 13 year old, and one 6-year old joined the party?

_____

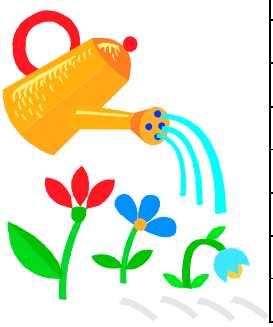
_____

Adapted from Probability, Statistics, & Graphing. Instructional Fair Inc., Pg 13

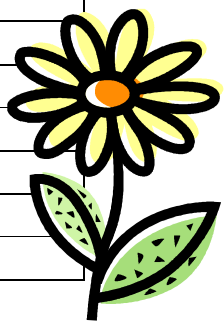
School Flower Garden

Ms. Botanical's class is interested in growing a flower garden for the whole school to enjoy. To collect data on flower preferences, they surveyed all 435 students in the school. They noted the results below.

Favorite Flowers



Types of Flower	Number of Votes
Black –eyed Susans	54
Lavender	62
Irises	32
Tulips	78
Hollyhocks	7
Daffodils	54
Daisies	84

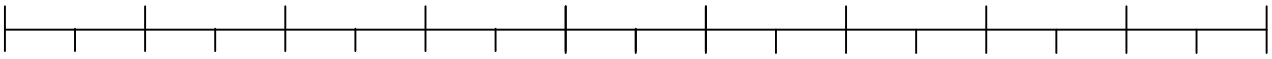


Make a graph of the flower votes in order of least to greatest.

1) Based on the data, which five flowers should they plant?

2) Which flower should definitely not be planted?

3) Organize the vote data on a line plot. Mark the mean and median once you calculate them.



5) What is the mean?

6) What is the mode?

7) What is the median?

8) If we changed the 84 votes to 184 votes, would it change the median? Why?

Adapted from Probability, Statistics, & Graphing. Instructional Fair Inc., Pg 17