Packet 13: Sampling

Dear Parents/Guardians,

In Packet 13, students review statistics from grade 6 to support comparing, analyzing and predicting of sample sets. In Lesson 1, students use data summaries and graphs to compare sample sets and draw inferences. In Lesson 2, students analyze and compare data sets, utilizing the MAD score as a tool to compare data spreads while taking potential outliers into consideration. Lesson 3 ties it all together as students create a mathematical model based on proportional reasoning.

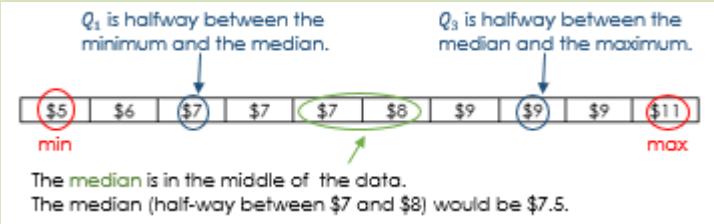
The 5-Number Summary

The 5-number summary of a data set gives the minimum, maximum, and first, second (called the median) and third quartile quantities. It is usually written in the form (*min*, *first quartile*, *median*, *third quartile*, *max*).

Example: Jan babysits for different families. Each family pays different amounts as seen below.

Family	A	B	C	D	E	F	G	H	I	J
Amount	$8	$7	$5	$7	$11	$7	$9	$6	$9	$9

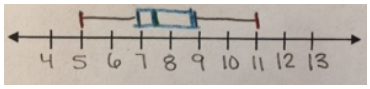
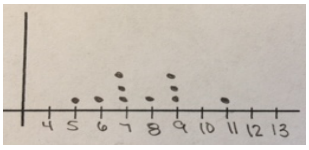
Students rewrite the data in numerical order before finding the 5 Number Summary.



The 5-number summary for this set of data is (5, 7, 7.5, 9, 11).

Box Plots and Line Plots

Two commonly used visual representations for statistics are box plots and line plots. Students will create both and use them to make predictions.

A box plot is a graphical representation of the 5-number summary set. Using the 5-number summary from above, notice the sections of the box plot are the same as the summary set (5, 7, 7.5, 9, 11).	
A dot plot, or line plot, is a graphical representation of a data set where the data values are represented by dots or marks above a number line. Using the babysitting data from above, students place a dot for every data value occurrence.	

By the end of the packet, your student should know…

How to use dot plots, box plots, and tables to understand and compare data sets
Lessons 13.1, 13.2, and 13.3

How to use measures of center and spread to compare data sets and make predictions when new data is considered
Lesson 13.2

How to use random sampling to make valid inferences about populations
Lessons 13.1 and 13.3

Additional Resources

Resource Guide (RG)
Part 2, pages 40-46

MAD Stats

The mean absolute deviation (MAD) is a measure of spread in a data set. Though used in high school statistics for standard deviation, students will use the middle school version to compare sample sets and make predictions.
Example: Using the babysitting data above, find the MAD score.
Step 1⟶Find the mean (arithmetic average) of the sample.

$$\frac{8+7+5+7+11+7+9+6+9+9}{10} = \frac{78}{10} = 7.8$$

Step 2⟶Find the distance from each data point to the mean (7.8). For example, if the amount is $8, subtract 8 – 7.8 = 0.2.

Amount	$8	$7	$5	$7	$11	$7	$9	$6	$9	$9
Distance from 7.8	0.2	0.8	2.8	0.8	3.2	0.8	1.2	1.8	1.2	1.2

Step 3⟶Find the sum of the distances.

$$0.2 + 0.8 + 2.8 + 0.8 + 3.2 + 0.8 + 1.2 + 1.8 + 1.2 + 1.2 = 14$$

Step 4⟶Divide the sum of the distances (14) by the amount of data points (10). $14 \div 10 = 1.4$. The MAD score (the average distance from the mean score) is 1.4.