

## Summarizing & Comparing Data Sets Unit Plan

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### Content Objectives:

- M.1HS.RBQ.1- Choose and interpret the scale and origin in graphs and data displays
- M.1HS.RBQ.2- Define appropriate quantities for the purpose of descriptive modeling
- M.1HS.RBQ.3- Choose a level of accuracy appropriate to limitations on measurement when reporting quantities
- M.1HS.RBQ.6- Create equations in two or more variable to represent relationship between quantities
- M.1HS.LER.12- Write a function that describes a relationship between two quantities
- M.1HS.DST.1- Represent data with plots on real number line (dot plots, histograms, and box plots)
- M.1HS.DST.2- Use statistics appropriate to the shape of data distribution to compare center and spread of two or more different data sets
- M.1HS.DST.3- Interpret differences in shape, center, and spread in the context of data sets, accounting for possible effects of extreme data points
- M.1HS.DST.5- Represent data on two quantitative variables on a scatter plot and describe how the variables are related
- M.1HS.DST.6- Interpret the slope and the intercept of a linear model in the context of data
- M.1HS.DST.7- Compute (using technology) and interpret the correlation coefficient of a linear fit
- M.1HS.DST.8- Distinguish between correlations and causation

## Differentiating Instruction Outline

### Differentiating Content

Readiness	Interest	Learning Process
<p>Identify Key Terms through Concept Attainment: Normal, Skewed, Outliers, Correlated Data</p> <p>Venn Diagrams: Dot plots, Histograms, &amp; Box plots Interquartile range &amp; standard deviation</p> <p>Charts: Comparing Mean, Mode, Median Finding Standard Deviation</p> <p>Relate quartiles to median</p> <p>Concept Maps: Normal data, Skewed data, Pearson Correlation Coefficient</p> <p>Graph paper to graph lines in correlations</p> <p>Flow Chart: Normal &amp; Skewed Data to Appropriate Measure of Center &amp; Dispersion</p>	<p>Use test grades of classes to show skewed and normal data</p> <p>Use Batting Averages and sports statistics to show correlation and measures of central tendency and dispersion</p> <p>Have students measure their own temperature with an ear thermometer to show measures of center and dispersion</p> <p>Have students measure their height and arm length to see correlation.</p> <p>Have students bring in their own data</p>	<p>Visual- Notes given on the board.</p> <p>Physical- People graph of birthday dates to see dot plot, box plot, &amp; quartiles</p>

**Differentiating Process:**

Readiness	Interests	Learning Process
<p>Scaffolding: Connect quartiles to median, bar graphs to histograms</p> <p>Flow Chart for Normal &amp; Skewed Data</p> <p>Charts to find Standard Deviation</p> <p>Worksheet for students to fill in to find Outliers</p>	<p>Provide sets of data that students can select their own sets to analyze.</p> <p>Height vs. Arm Span for Correlation</p> <p>Diastolic vs. Systolic Blood Pressure taken from students in class for correlation</p> <p>Temperatures of students to analyze for measures of center &amp; dispersion</p> <p>Remembering numbers for Histogram and correlation for increase in numbers</p> <p>Number of Objects students can pick up vs. hand span for correlation</p> <p>Student can bring in data</p>	<p>Visual- Flow Charts &amp; Venn Diagrams</p> <p>Auditory &amp; Verbal- Discussion</p> <p>Kinesthetic- Measuring Arm Lengths &amp; Height, Blood Pressure, Temperature, Object Pick Up, Number Remembrance, People dot plots, box plots, histograms</p> <p>Logical- Venn Diagrams &amp; Flow Charts</p> <p>Interpersonal &amp; Intrapersonal- Analyze Mistakes made. Group Activity for Correlation</p>

## Differentiating Product:

Readiness	Interests	Learning Process
Journal- Concept Questions, Student Questions, & Concepts Learned  Oral Presentation of Group Work & Project from Tic Tac Toe Chooses  Provide computers and statistics books that include data sets for students to select their own data sets to analyze	Students select data.  Students demonstrate content in Tic Tac Toe Project by creating graphs, books, songs, skits, making videos, writing paragraphs, or making a presentation.	Timeline given for projects.  Tic Tac Toe Project includes choices for visual, spatial, auditory, musical, verbal, linguistic, kinesthetic, interpersonal, and intrapersonal learners.

## Activities:

1. Have students use birthdates 1 to 31 to create a person dot plot.
2. Use students' number of pets to create a frequency table and histogram. Students' siblings can be used for a second example. Point out concepts of class width and boundaries.
3. Use concept attainment to show normal and skewed data. Put examples of normal data in a dot plot under a yes column and skewed data in a no column and ask students to decide the difference. Allow for think time. Ask students who think they know the difference to put up an example in the correct column. Allow about five students to do this. Only say it should be in the other column if they put it in the wrong column. Have students pair up to decide what the difference is. Then, have them share with the class. Put up examples if the class misunderstands.
4. Use past test data to show normal and skewed data. Talk about outliers and how they are far away from the other data. Talk about measures of the center: mean, mode, median. Introduce quartiles as finding the medians of the data once it has been separated by the median. Introduce interquartile range and the formula for finding outliers. Determine if there are any true outliers. Use statistics applets to connect mean, mode, and median with histogram. [http://www.bbn-school.org/us/math/ap\\_stats/applets/applets.html](http://www.bbn-school.org/us/math/ap_stats/applets/applets.html)
5. Have students take temperatures with ear thermometers and compare our measures of center with 98.6 degrees. Talk about reasons how values could be different. Display the data in box

plots, histograms, and box plots to see if the data is normal or skewed. Introduce standard deviation. Have students put the data in charts to keep it organized to find it.

6. Use sports data to show measures of center and dispersion along with box plots.
7. Have students create a Venn Diagram comparing dot plots, box plots, and histograms.
8. Have students create a Venn Diagram comparing interquartile range and standard deviation.
9. Have students fill in a chart comparing mean, mode, and median.
10. Have students make concept maps for normal and skewed data.
11. Discuss which measure of center and dispersion best represents skewed and normal data. Have students fill in the flow chart.
12. Have students discover correlated data through concept attainment see activity number 3.
13. Have students measure their arm length vs. height to look for correlation. Have students plot the data.
14. Have students take their blood pressure and look for a correlation between systolic and diastolic data. Plot the data.
15. Show students how to use a graphing calculator to get correlation coefficients and measures of center and dispersion.
16. Have students pick up as many cheerios as they can and look for a correlation between that and their hand span.
17. Have students do the number hunt and look for a correlation between number of trials vs. their highest number found.
18. Have students make a concept attainment map of Pearson correlation coefficient.
19. Have students do book problems as needed.
20. Have students complete Tic Tac Toe Project. Tell students they can use data sets from those you have compiled or get them online. Suggest <http://mathforum.org/workshops/sum96/datalikbrary/data.set6.html> and <http://data.bls.gov>

21. Have students take post Test.