

Curriculum Development Overview
Unit Planning for High School Mathematics

Unit Title	Statistics Lie – Find out how		Length of Unit	5 weeks
Focusing Lens(es)	Communication	Standards and Grade Level Expectations Addressed in this Unit	MA10-GR.HS-S.1-GLE.2 MA10-GR.HS-S.3-GLE.1	
Inquiry Questions (Engaging-Debatable):	<ul style="list-style-type: none"> • Most people who die of lung cancer have an ashtray at home. Do ashtrays cause cancer? • What makes a statistic believable? What makes a statistic accurate? Is there a difference between the two? • What makes data meaningful or actionable? 3.1.IQ.1 			
Unit Strands	Number and Quantity: Quantities Statistics and Probability: Interpreting Categorical and Quantitative Data			
Concepts	Shape, center, spread, comparison, data, representations, correlation, causation, communicate, difference, findings, two-way frequency tables, categorical, association, outliers, statistical measures, correlations coefficients, linear, predictions, slope, y-intercept, standard deviation			

Generalizations My students will Understand that...	Guiding Questions	
	Factual	Conceptual
Knowledge of shape, center and spread facilitates comparison of two sets of data. (MA10-GR.HS-S.3-GLE.2-EO.a.ii)	What is difference between mean and median? What is the relationship between the two in skewed data? What do plots with the same mean but different standard deviations look like? How can you use technology to find center and spread for a set of data? What can be inferred about two sets of data with large differences in measures of spread?	Why is mean by itself not a complete summary of a set of data? How can summary statistics or data displays be accurate but misleading? Why is it important to analyze the spread of data?
The analysis of a variety of data representations helps determine the appropriate measures of center and spread to describe a set of data. (MA10-GR.HS-S.3-GLE.1-EO.a.i)	What is the best way to display data? How does your choice of how to display data affect what information other people will understand?	When would median be a more appropriate measure of center than mean? How can summary statistics or data displays be accurate but misleading? (MA10-GR.HS-S.3-GLE.1-IQ.3)
Correlation does not imply causation. (MA10-GR.HS-S.3-GLE.1-EO.c.iii)	What is the difference between correlation and causation?	How can the results of a statistical investigation be used to support an argument? (MA10-GR.HS-S.3-GLE.1-IQ.1)
Mathematicians consider the influence of outliers when selecting and interpreting statistical measures. (MA10-GR.HS-S.3-GLE.1-EO.a.iii)	What is an outlier?	Why do outliers affect some measures of center more than others? Why do outliers affect some measures of spread more than others?

Curriculum Development Overview
Unit Planning for High School Mathematics

Correlation coefficients can determine the usefulness of linear models for describing data and making predictions. (MA10-GR.HS-S.3-GLE.1-EO.c.ii)	<p>What is a correlation coefficient?</p> <p>Where do I find correlation coefficient on the graphing calculator?</p> <p>What are residuals and how do I calculate them?</p> <p>How do I determine if I have a strong or weak linear correlation?</p> <p>How do you quantify the strength of a correlation?</p>	<p>Why is important to know the strength of a correlation for a set of data?</p> <p>Why does correlation not imply a causal relationship?</p> <p>Why is a linear model not always the best choice for all data sets?</p>
Mathematicians focus on slope and the y-intercept when interpreting a linear model in the context of the data. (MA10-GR.HS-S.3-GLE.1-EO.c.i)	What do the slope and intercept of a linear model mean?	Why does the slope and y-intercept help interpret linear models?
Two-way frequency tables provide the necessary structure to make conclusions about the association of categorical variables. (MA10-GR.HS-S.3-GLE.1-EO.b.i)	<p>What is categorical data?</p> <p>What does joint, marginal and conditional frequency mean?</p>	Why is it appropriate to use a two-way frequency table with categorical data?

Key Knowledge and Skills: My students will...	<i>What students will know and be able to do are so closely linked in the concept-based discipline of mathematics. Therefore, in the mathematics samples what students should know and do are combined.</i>
<ul style="list-style-type: none"> • Represent data with plots on the real number line (dot plots, histograms, and box plots). (MA10-GR.HS-S.3-GLE.1-EO.1.a.i) • Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. (MA10-GR.HS-S.3-GLE.1-EO.a.ii) • Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). (MA10-GR.HS-S.3-GLE.1-EO.a.iii) • Summarize categorical data for two categories in two-way frequency tables; interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies) and recognize possible associations and trends in the data. (MA10-GR.HS-S.3-GLE.1-EO.b.i) • Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. (MA10-GR.HS-S.3-GLE.1-EO.b.ii) • Fit a function to the data; use functions fitted to data to solve problems in the context of the data. (MA10-GR.HS-S.3-GLE.1-EO.b.ii.1) • Informally assess the fit of a function by plotting and analyzing residuals. (MA10-GR.HS-S.3-GLE.1-EO.b.ii.2) • Fit a linear function for a scatter plot that suggests a linear association. (MA10-GR.HS-S.3-GLE.1-EO.b.ii.3) • Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (MA10-GR.HS-S.3-GLE.1-EO.c.1) • Compute (using technology) and interpret the correlation coefficient of a linear fit. (MA10-GR.HS-S.3-GLE.1-EO.c.ii) • Distinguish between correlation and causation. (MA10-GR.HS-S.3-GLE.1-EO.c.iii) • Define appropriate quantities for the purpose of descriptive modeling. (MA10-GR.HS-S.1-GLE.2-EO.a.ii) • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (MA10-GR.HS-S.1-GLE.2-EO.a.iii) 	

**Curriculum Development Overview
Unit Planning for High School Mathematics**

<p>Critical Language: includes the Academic and Technical vocabulary, semantics, and discourse which are particular to and necessary for accessing a given discipline. EXAMPLE: A student in Language Arts can demonstrate the ability to apply and comprehend critical language through the following statement: <i>“Mark Twain exposes the hypocrisy of slavery through the use of satire.”</i></p>	
<p>A student in _____ can demonstrate the ability to apply and comprehend critical language through the following statement(s):</p>	<p><i>Correlation does not imply causation. Statistics can sometimes be misleading.</i></p>
<p>Academic Vocabulary:</p>	<p>Represent, quantities, fit, assess, accuracy, recognize, trends, interpret, shape, center, spread, comparison, data, representations, communicate, difference, findings, predictions</p>
<p>Technical Vocabulary:</p>	<p>Variables, scatter plot, relative frequency; joint, marginal, and conditional frequencies; mean, median, interquartile range, standard deviation, dot plot, histogram, box plot, correlation, causation, two-way frequency tables, categorical, association, outliers, statistical measures, correlations coefficients, linear, slope, y-intercept, skewed distribution</p>