

Unit A - Introduction to Single Variable Statistics

Overview

Unit A begins with an overview of statistics and how they impact our lives. Students will examine univariate and bivariate data and make sense out of it using statistical methods and displays. Graphing calculators are used throughout the course.

21st Century Capacities: Analyzing

Stage 1 - Desired Results

<p>ESTABLISHED GOALS/ STANDARDS</p> <p>MP3 Construct viable arguments and critique the reasoning of others MP5 Use appropriate tools strategically MP7 Look for and make use of structure</p> <p>Summarize, represent, and interpret data on a single count or measurement variable</p> <p>CCSS.MATH.CONTENT.HSS.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).</p> <p>CCSS.MATH.CONTENT.HSS.ID.A.2 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.</p> <p>CCSS.MATH.CONTENT.HSS.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center; background-color: #D3D3D3;">Transfer:</td> </tr> <tr> <td colspan="2" style="padding: 5px;"><i>Students will be able to independently use their learning in new situations to...</i></td> </tr> <tr> <td colspan="2" style="padding: 5px;"> <ol style="list-style-type: none"> 1. Represent, summarize, and interpret patterns in data (Analyzing) 2. Use appropriate tools/methods to make mathematical concepts more concrete and accessible 3. Communicate effectively using appropriate vocabulary and format (verbally, symbolically, numerically, and graphically) </td> </tr> <tr> <td colspan="2" style="text-align: center; background-color: #D3D3D3;">Meaning:</td> </tr> <tr> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>UNDERSTANDINGS: <i>Students will understand that:</i></p> <ol style="list-style-type: none"> 1. Statistics can be used to describe data using graphs and numerical summaries. 2. Statisticians ask questions and attempt to answer them using scientific procedures. 3. Data is gathered through a variety of methods, some more valid than others. 4. Good samples reveal information about a population. 5. Statistics can be used to identify trends and make predictions. </td> <td style="width: 50%; padding: 5px; vertical-align: top;"> <p>ESSENTIAL QUESTIONS: <i>Students will explore & address these recurring questions:</i></p> <ol style="list-style-type: none"> A. As consumers of information, how do we analyze the validity and reliability of statistics? B. How does technology help to create meaning out of the data? C. How can I best communicate to an audience what the statistics say? </td> </tr> </table>	Transfer:		<i>Students will be able to independently use their learning in new situations to...</i>		<ol style="list-style-type: none"> 1. Represent, summarize, and interpret patterns in data (Analyzing) 2. Use appropriate tools/methods to make mathematical concepts more concrete and accessible 3. Communicate effectively using appropriate vocabulary and format (verbally, symbolically, numerically, and graphically) 		Meaning:		<p>UNDERSTANDINGS: <i>Students will understand that:</i></p> <ol style="list-style-type: none"> 1. Statistics can be used to describe data using graphs and numerical summaries. 2. Statisticians ask questions and attempt to answer them using scientific procedures. 3. Data is gathered through a variety of methods, some more valid than others. 4. Good samples reveal information about a population. 5. Statistics can be used to identify trends and make predictions. 	<p>ESSENTIAL QUESTIONS: <i>Students will explore & address these recurring questions:</i></p> <ol style="list-style-type: none"> A. As consumers of information, how do we analyze the validity and reliability of statistics? B. How does technology help to create meaning out of the data? C. How can I best communicate to an audience what the statistics say?
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Statistics Level 2 & 3 Curriculum

	Acquisition:	
	<i>Students will know...</i>	<i>Students will be skilled at...</i>
<p>possible effects of extreme data points (outliers).</p> <p>CCSS.MATH.CONTENT.HSS.ID.A.4 Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.</p> <p>Interpret linear models</p> <p>CCSS.MATH.CONTENT.HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.</p> <p>CCSS.MATH.CONTENT.HSS.ID.C.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.</p> <p>CCSS.MATH.CONTENT.HSS.ID.C.9 Distinguish between correlation and causation.</p>	<ol style="list-style-type: none"> 1. How to describe a distribution using center, shape, and spread 2. Statistics do not lie but people can bend the truth using statistics 3. The impact of outliers 4. The difference between a sample and a statistic 5. The empirical rule (68-95-99.7) 6. The area under the normal curve is 1 7. Understanding that correlational data do not imply cause and effect. 8. The direction, form, and strength of the overall pattern of a scatterplot 9. What the slope b and the intercept a mean in a equation $y = ax + b$ of a straight line. 10. The limitations of a prediction outside the range of available data 11. Vocabulary: categorical and quantitative variables, individuals, variables, observational and experimental studies, population, sample, census, stem plot, box plot, pie chart, dot plot, histogram, line plot, symmetry, skewness, 5-number summary, min, max, quartiles, median, mean, range, percentiles, z-scores, density curves, normal distribution, normal curve, empirical rule, scatterplots, correlation, regression, prediction, residual 	<ol style="list-style-type: none"> 1. Interpreting graphs and charts 2. creating a 5 number summary and displaying it in a box plot 3. Using graphing calculators to calculate single variable statistics 4. Using graphing calculators to create meaningful displays 5. Identify the best measure to use (mean or median) to describe central tendency 6. Identifying misleading statistics and displays 7. Using statistical models to make predictions and understanding the limitations of the model. 8. Recognizing the shape of Normal curves and estimate by eye both the mean and the standard deviation from such a curve. 9. Judging whether it is appropriate to use correlation to describe the relationship between two quantities 10. Using a regression line, given on a graph or as an equation, to predict y for a given x 11. Using a residual plot to examine how well a regression line fits the data 12. Assessing the strength of statistical evidence for a claim of causation, especially when experimentation is not possible