



Statistics - Unit A - Introduction to Single Variable Statistics

Unit Focus

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.

Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer	
Common Core Mathematics: 9-12 - Represent data with plots on the real number line (dot plots, histograms, and box plots). (CCSS.MATH.CONTENT.HSS.ID.A.1) - 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. (CCSS.MATH.CONTENT.HSS.ID.A.2) - Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). (CCSS.MATH.CONTENT.HSS.ID.A.3) - 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. (CCSS.MATH.CONTENT.HSS.ID.A.4) - Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. (CCSS.MATH.CONTENT.HSS.ID.C.7) - Compute (using technology) and interpret the correlation coefficient of a linear fit. (CCSS.MATH.CONTENT.HSS.ID.C.8) - Distinguish between correlation and causation. (CCSS.MATH.CONTENT.HSS.ID.C.9) - Construct viable arguments and critique the reasoning of others. (CCSS.MATH.MP.3) - Use appropriate tools strategically. (CCSS.MATH.MP.5) - Look for and make use of structure. (CCSS.MATH.MP.7)	<i>Students will be able to independently use their learning to...</i> T1 Represent, summarize, and interpret patterns in data T2 Use appropriate tools/methods to make mathematical concepts more concrete and accessible T3 Communicate effectively using appropriate vocabulary and format (verbally, symbolically, numerically, and graphically)	
	Meaning	
	Understanding(s)	Essential Question(s)
	<i>Students will understand that...</i> U1 statistics can be used to describe data using graphs and numerical summaries. U2 statisticians ask questions and attempt to answer them using scientific procedures. U3 data is gathered through a variety of methods, some more valid than others. U4 good samples reveal information about a population. U5 statistics can be used to identify trends and make predictions.	<i>Students will keep considering...</i> Q1 As consumers of information, how do we analyze the validity and reliability of statistics? Q2 How does technology help to create meaning out of the data? Q3 How can I best communicate to an audience what the statistics say?
	Acquisition of Knowledge and Skill	
	Knowledge	Skill(s)
	<i>Students will know...</i> K1 How to describe a distribution using center, shape, and spread K2 Statistics do not lie but people can bend the truth using statistics	<i>Students will be skilled at...</i> S1 Interpreting graphs and charts S2 Creating a 5 number summary and displaying it in a box plot

Stage 1: Desired Results - Key Understandings

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- Analyzing: Examining information/data/ evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)

K3 The impact of outliers
K4 The difference between a sample and a statistic
K5 The empirical rule (68-95-99.7)
K6 The area under the normal curve is 1
K7 Understanding that correlational data do not imply cause and effect.
K8 The direction, form, and strength of the overall pattern of a scatterplot
K9 What the slope b and the intercept a mean in a equation $y = ax + b$ of a straight line.
K10 The limitations of a prediction outside the range of available data
K11 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

S3 Using graphing calculators to calculate single variable statistics
S4 Using graphing calculators to create meaningful displays
S5 Identify the best measure to use (mean or median) to describe central tendency
S6 Identifying misleading statistics and displays
S7 Using statistical models to make predictions and understanding the limitations of the model.
S8 Recognizing the shape of Normal curves and estimate by eye both the mean and the standard deviation from such a curve.
S9 Judging whether it is appropriate to use correlation to describe the relationship between two quantities
S10 Using a regression line, given on a graph or as an equation, to predict y for a given x
S11 Using a residual plot to examine how well a regression line fits the data
S12 Assessing the strength of statistical evidence for a claim of causation, especially when experimentation is not possible