



The following are a list of essential standards for this course and a brief map of where they will be addressed.

Standard	Quarter 1	Quarter 2	Quarter 3	Quarter 4
S-ID.1: Represent data with plots on the real number line	X			
S-ID.2: Comparing center and spread of two+ data sets	X			
S-ID.3: Interpret differences in shape, center, and spread in data sets, investigate outliers	X			
S-ID.4: Use mean and standard deviation to fit it to normal distribution and estimate population percentages	X			
S-ID.5: Summarize categorical data in two-way frequency tables			X	
S-ID.6: Represent data on two quantitative variables on a scatterplot			X	X
S-ID.7: Interpret the slope and intercept of a linear model				X
S-ID.8: Compute and interpret the correlation coefficient of a linear fit				X
S-ID.9: Distinguish between correlation and causation				X
S-IC.1: Statistics as a process to make inferences based on samples	X			
S-IC.2: Decide if model is consistent with results		X		
S-IC.3: Recognize purpose and difference between surveys, experiments, and studies	X			
S-IC.4: Use sample survey data to estimate a population mean or proportion		X		

Standard	Quarter 1	Quarter 2	Quarter 3	Quarter 4
S-IC.5: Use randomized experiment data to compare parameters		X	X	
S-IC.6: Evaluate reports based on data			X	
S-CP.1: Describe events as subsets of a sample space		X		
S-CP.4: Construct and interpret two-way frequency tables of data			X	
S-CP.7: Apply the Addition Rule $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$		X		
S-CP.8: Apply the general Multiplication Rule $P(A \text{ and } B) = P(A) P(B A) = P(B) P(A B)$		X		

Quarter 1 : Unit 1 Collecting Data and Drawing Conclusions (End Sept 25)	Learning Goals: Introduction to key ideas and vocabulary of statistics Discover different types of data, how data is compared, and what conclusions can be drawn from data Explore experimental design
Essential Questions	What can statistics help us do? What are the different types of variables? How can data be presented? What is the difference between random sampling and random assignment? What are the components of a well-designed experiment?
Content Objectives	SWBAT <ul style="list-style-type: none"> Identify the variables in a study and be able to classify them Construct and interpret bar graphs and dotplots Identify the population and sample, parameter, and statistic in a study Identify sampling bias and potentially confounding variables in a study Explain the importance of random sampling Identify the features of a well-designed experiment
Standards	S-ID.1, S-IC.1, & S-IC.3
Tier II Vocabulary	Data; vary; predictions; research; solution; distributions; consistency; population; sample; representative; bias; random; quantitative; categorical; tendency; lurking; confounding; blindness; generalizing
Tier III Vocabulary	Statistics; binary; observational unit; parameter; placebo effect
Assessments CIA: 10/26- 10/30/15 Data Meeting: 11/9/15	Summative Assessments: Formative Assessments: Common Prompts: Lab 1 Friend or Foe? Exercise 5-35 pg 95 Rubrics: Grading:
21st Century Learning Expectations	Academic: Effective communication, evaluate information, solve problems, collaborate, support claims, use technology Social: Act with persistence when facing challenging tasks, responsible and respectful behavior, goal setting Civic: Utilize networking skills and engage inclusively with others
RETELL Strategies	7-step Vocab; posted word walls; Think Aloud; Partner Reading; Write Around
Texts/Resources	<u>Workshop Statistics</u> , <i>Rossmann and Chance</i>
Notes:	

Quarter 1 : Unit 2 Summarizing Data (End Oct 23)	Learning Goals: Explore ways that data is presented, summarized, and compared Investigate measures of center and measures of spread
Essential Questions	Why do people talk about means and medians? How can data be summarized? How reliable is the data?
Content Objectives	SWBAT <ul style="list-style-type: none"> • Construct and interpret a two-way table • Describing the distribution of a quantitative variable • Identify advantages and disadvantages of several types of graphs • Calculate and interpret mean and median of a data set • Calculate and interpret interquartile ranges, standard deviations, and z-scores of a data set • Construct and interpret boxplots
Standards	S-ID.2, S-ID.1, S-ID.3, & S-ID.4
Tier II Vocabulary	Relative risk; independent; association; outliers; spread; center; shape; skew; median; mean; resistant; standardization
Tier III Vocabulary	Two-way table; segmented bar graph; conditional distributions; Simpson's paradox; standard deviation; z score
Assessments CIA: 10/26- 10/30/15 Data Meeting: 11/9/15	Summative Assessments: Formative Assessments: Common Prompts: Lab 2 Is Yawning Contagious? Lab 3 Memorizing Letters Rubrics: Grading:
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Notes:	

Quarter 2 : Unit 3 Randomness in Data (End Dec 4)	Learning Goals: Explore the meaning of Probability Investigate Normal Distributions Perform calculations on sample proportions and sample means
Essential Questions	What is the benefit of introducing randomness? How does identifying the outcomes as a normal distribution help analyze data? How do sample proportions vary from sample to sample? Why study a sample mean?
Content Objectives	SWBAT <ul style="list-style-type: none"> • Explain the meaning of the probability of a random event • Use simulation analysis and sample space to produce probabilities • Perform calculations of probabilities and percentiles from a normal distribution • Describe the principle of sampling variability • Describe a sample proportion or a sample mean and identify when the Central Limit Theorem applies • Perform and interpret calculations related to statistical significance
Standards	S-CP.1, S-CP.7, S-CP.8, S-IC.4, S-IC.5
Tier II Vocabulary	Probability; distribution; frequency; simulation; expected; equally likely; percentiles; sampling
Tier III Vocabulary	Sample space; empirical estimate; normal distribution; statistical significance
Assessments Midterms: 1/19- 1/22/16 Data Meeting: 2/1/16	Summative Assessments: Formative Assessments: Common Prompts: Lab 4 Rock-Paper-Scissors Rubrics: Grading:
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Notes:	

Quarter 2 : Unit 4 Inference from Data: Principles (End Jan 14)	Learning Goals: Calculate confidence intervals Conduct tests of significance Explore the relationships between intervals and tests
Essential Questions	What value lies in calculating a confidence interval? Why conduct a test of significance? How sure does one need to be to draw a conclusion? How are intervals and tests related?
Content Objectives	SWBAT <ul style="list-style-type: none"> • Calculate and interpret a confidence interval for a population proportion • Identify null and alternative hypotheses of a claim • Calculate and interpret test statistics • Describe what a significance test reveals about a confidence interval and vice versa • Estimate a population mean • Investigate the t-distribution and understand the difference between that and a normal distribution • Conduct all aspects of a t-test
Standards	S-IC.4
Tier II Vocabulary	Margin-of-error; duality; power
Tier III Vocabulary	Confidence interval; standard error; significance level; test decision
Assessments Midterms: 1/19- 1/22/16 Data Meeting: 2/1/16	Summative Assessments: Formative Assessments: Common Prompts: Lab 5 Sleepless Nights Rubrics: Grading:
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Quarter 3 : Unit 5 Inference from Data: Conclusions (End Mar 4)	Learning Goals: Expand techniques to compare two populations or groups Explore matched-pair design
Essential Questions	What is a significant difference? What is the difference between two samples drawn independently and the matched pairs design? What should be considered when making inferences?
Content Objectives	SWBAT <ul style="list-style-type: none"> • Compare two groups and determine whether they differ significantly • Compare two sample means from results of independent random samples • Identify data as paired, independent, or randomized • Conduct and interpret paired t-test and paired t-interval
Standards	S-IC.5, S-CP.4 & S-ID.5
Tier II Vocabulary	Raw data; paired; magnitude; scope
Tier III Vocabulary	Conditional proportions; binary response variable; z-test; z-interval; t-test; t-interval
Assessments CIA: 4/4-4/8/16 Data Meeting: 4/25/16	Summative Assessments: Formative Assessments: Common Prompts: Lab 6 Comparison Shopping Rubrics: Grading:
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Notes:	

Quarter 3 : Unit 6 Inferences with Categorical Data (End Apr 1)	Learning Goals: Expand techniques to work with categorical data Explore chi-square tests to determine consistency between sample data and hypothesized models
Essential Questions	How is the study of categorical variables different than quantitative? Why is it important to assess whether sample data conform to a hypothesized model? When should the chi-square tests be applied?
Content Objectives	SWBAT <ul style="list-style-type: none"> Identify questions that can be addressed with chi-square goodness-of-fit tests Conduct and interpret chi-square goodness-of-fit tests Identify scenarios that can be addressed with chi-square test for two-way tables Conduct and interpret chi-square tests for two-way tables
Standards	S-ID.6
Tier II Vocabulary	Technical conditions; inference technique
Tier III Vocabulary	Chi-square distribution; expected count
Assessments CIA: 4/4-4/8/16 Data Meeting: 4/25/16	Summative Assessments: Formative Assessments: Common Prompts: Rubrics: Grading:
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Quarter 4 : Unit 7 Relationships in Data	Learning Goals: Summarize data and study graphical methods for displaying results when both explanatory and response variables are quantitative Study correlation coefficient to describe the relationship between variables Use a least squares line to generalize findings
Essential Questions	How is analyzing bivariate quantitative data different? When can interpreting graphs be a useful skill? When a scatterplot reveals a strong association, what could prevent a cause-and -effect conclusion?
Content Objectives	SWBAT <ul style="list-style-type: none"> Identify aspects of the variable relationship from a scatterplot Apply properties of correlation coefficient as a measure of association between two variables Use a least squares line to make predictions Conduct significance tests and produce confidence intervals about a population slope coefficient
Standards	S-ID.6, S-ID.7, S-ID.8
Tier II Vocabulary	Association; direction; strength; form; slope; residual; regression line; influential; transformation; descriptively; inferentially
Tier III Vocabulary	Correlation coefficient; fitted value; least squares regression
Assessments Finals: 6/7-6/10/16*	Summative Assessments: Formative Assessments: Common Prompts: Lab 7 Backpack Weighing You Down? Rubrics: Grading:
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Notes:	*Dates may be adjusted according to inclement weather cancellations