Curriculum Map

Content Area: Statistics and Probability

	Content	Skills	Benchmarks	Assessments	Essential Questions
February	• Organizing Data • Averages and Variation	• Basic statistics vocabulary • (Population, samples, random sampling) • Graphs (bar, parents, circle graphs, time plot, histogram, stem and leaf) • Measures of Central Tendency: Mean, Median, Mode	• **S3.1.1** Know the meanings of a sample from a population and a census of a population, and distinguish between sample statistics and population parameters. • **S3.1.2** Identify possible sources of bias in data collection and sampling methods and simple experiments; describe how such bias can be reduced and controlled by random sampling; explain the impact of such bias on conclusions made from analysis of the data; and know the effect of replication on the precision of estimates. **S3.1.3** Distinguish between an observational study and an experimental study, and identify, in context, the conclusions that can be drawn from each. • **S1.1.1** Construct and interpret dot plots, histograms, relative frequency histograms, bar graphs, basic control charts, and box plots with appropriate labels and scales; determine which kinds of plots are appropriate for different types of data; compare data sets and interpret differences based on graphs and summary statistics. • **S1.1.2** Given a distribution of a variable in a data set, describe its shape, including symmetry or skewness, and state how the shape is related to measures of center (mean and median) and measures of variation (range and standard deviation) with particular attention to the effects of outliers on these measures. • **S1.2.1** Calculate and interpret measures of center including: mean, median, and mode; explain uses, advantages and disadvantages of each measure given a particular set of data and its context. • **S3.1.4** Design simple experiments or investigations to collect data to answer questions of interest; interpret and present results. • **S3.1.5** Understand methods of sampling, including random sampling, stratified sampling, and convenience samples, and be able to determine, in context, the advantages and disadvantages of each.	• Quiz 1.1-1.2 • Collins writing type 3: Circle Graph • Quiz 1.3-1.4 • Collins writing type 3: Histogram • Chapter 1 Test • Chapter 1 Project • Quiz 2.1-2.2	• What is the desired population? • How do you know when enough data is collected? • How do the graphs differ? • What do the measures of central tendencies explain?
March	• Averages and Variation • Regression and Correlation	• Coefficient of variation • Percentiles • Box and whiskers • Paired data, scatter diagrams, linear regression	• **S1.2.2** Estimate the position of the mean, median, and mode in both symmetrical and skewed distributions, and from a frequency distribution or histogram. **S1.1.2** Given a distribution of a variable in a data set, describe its shape, including symmetry or skewness, and state how the shape is related to measures of center (mean and median) and measures of variation (range and standard deviation) with particular attention to the effects of outliers on these measures. • **S1.2.3** Compute and interpret measures of variation, including percentiles, quartiles, interquartile range, variance, and standard deviation. • **S1.3.3** Know and use the fact that about 68%, 95%, and 99.7% of the data lie within one, two, and three standard deviations of the mean, respectively in a normal distribution.	• Collins writing type 2: Correlation Coefficient • Chapter 2 Test • Quiz 3.1-3.2	• What does variation tell us about the data? • How is data divided? • How does the least-square-line help us predict?
April	• Regression and Correlation • Elementary Probability Theory	• The Linear Correlation Coefficient • Probability • Probability Rules • Trees and Counting	**S2.1.1** Construct a scatterplot for a bivariate data set with appropriate labels and scales. • **S2.1.2** Given a scatterplot, identify patterns, clusters, and outliers. Recognize no correlation, weak correlation, and strong correlation. • **S2.1.3** Estimate and interpret Pearson's correlation coefficient for a scatterplot of a bivariate data set. Recognize that correlation measures the strength of linear	• Collins writing type 2: Describe Data • Collins writing type 2: Best/Least	• How can we find the total outcomes? • How do probability and odds differ? • How do combinations and permutations differ?

	• The Binomial Probability Distribution	Techniques • Random Variables and Probability distributions • Binomial probabilities	association. • **S2.1.4** Differentiate between correlation and causation. Know that a strong correlation does not imply a cause-and-effect relationship. Recognize the role of lurking variables in correlation. • **S2.2.1** For bivariate data that appear to form a linear pattern, find the least squares regression line by estimating visually and by calculating the equation of the regression line. Interpret the slope of the equation for a regression line. • **S2.2.2** Use the equation of the least squares regression line to make appropriate predictions. • **S4.1.1** Understand and construct sample spaces in simple situations. • **S4.1.2** Define mutually exclusive events, independent events, dependent events, compound events, complementary events and conditional probabilities; and use the definitions to compute probabilities. • **S4.2.1** Compute probabilities of events using tree diagrams, formulas for combinations and permutations, Venn diagrams, or other counting techniques. **S4.2.2** Apply probability concepts to practical situations, in such settings as finance, health, ecology, or epidemiology, to make informed decisions.	Square Lines • Chapter 3 Test • Collins writing type 2: Probability • Quiz 4.1-4.2 • Collins writing type 3: Permutation/Combination • Quiz 4.3 • Chapter 4 Test	• What are some examples of probability in the real world?
May	• The Binomial Probability Distribution • Normal Distribution Curve	• Mean and standard deviation of binomial distributions • Graphs of Normal distributions • Standard Units and Areas under Standard Normal Distribution • Areas under any Normal Curve • Normal Approximation to the Binomial Distribution • Review and final exams	• **S1.1.2** Given a distribution of a variable in a data set, describe its shape, including symmetry or skewness, and state how the shape is related to measures of center (mean and median) and measures of variation (range and standard deviation) with particular attention to the effects of outliers on these measures. • **S4.1.3** Design and carry out an appropriate simulation using random digits to estimate answers to questions about probability; estimate probabilities using results of a simulation; compare results of simulations to theoretical probabilities.	• Quiz 5.1-5.2 • Collins writing type 2: Probability Distribution • Chapter 5 Test	• How can we find probability from an experiment? • What does the normal distribution determine?
June	• Normal Distribution	• Nothing - senior level class lets out at the end of May	• **S1.3.1** Explain the concept of distribution and the relationship between summary statistics for a data set and parameters of a distribution. • **S1.3.2** Describe characteristics of the normal distribution, including its shape and the relationships among its mean, median, and mode. • **S1.3.4** Calculate *z*-scores, use *z*-scores to recognize outliers, and use *z*-scores to make informed decisions.	• Quiz 6.1-6.2 • Chapter 6 Test • Semester Exam	• What does the normal probability distribution describe?