

CONCEPT MAP

Probability & Statistics

Suggested Sequence:

- 1. Introduction to Statistics**
- 2. Descriptive Statistics**
- 3. Probability**
- 4. Discrete Probability Distributions**
- 5. Normal Probability Distributions**
- 6. Confidence Intervals**
- 7. Hypothesis Testing with One Sample**
- 8. Correlation and Regression**
- 9. Chi-Square Tests and the F-Distribution**

Key Concepts:

- Population & Sample
- Parameter & Statistics
- Descriptive vs inferential statistics
- Qualitative vs Quantitative data
- Four levels of measurement
- Collecting data and designing an experiment

Probability & Statistics

CSO'S: P.S.5.1

Estimated Number of Days to Complete: 9 Days

Enduring Understanding:

Chapter 1 introduces students to the basic goals of probability and statistics.

Essential Question(s):

- How do you distinguish between a population and a sample?
- How do you design an experiment?

Key Vocabulary:

- Population
- Sample
- Parameter
- Statistics
- Descriptive Statistics
- Inferential Statistics
- Qualitative Statistics
- Quantitative Statistics
- Nominal
- Ordinal
- Interval
- Ratio
- Biased Sample

Key Concepts:

- Frequency Distributions and Graphs
- Stem and Leaf and Scatterplots
- Mean, Median, Mode, Range
- Standard Deviation
- Empirical Rule & Chebychev's Theorem

Descriptive Statistics

CSO's: P.S.5.2, P.S.5.5, P.S.5.6,
P.S.5.7, P.S.5.8

Estimated Number of Days to
Complete: 9 days

Enduring Understanding:

In Chapter 2 students will learn ways to organize and describe data sets.

Essential Question(s):

- How do you construct a frequency distribution?
- How do you use and interpret stem and leaf plots ?
- How do you measure central tendency & variation?

Key Vocabulary:

- Stem and Leaf Plots
- Frequency Distribution
- Measures of Central Tendency
- Mean
- Median
- Mode
- Range
- Standard Deviation

Probability

Key Concepts:

- Basic Concepts of Probability and Counting
- Conditional Probability and Multiplication Rule
- Addition Rule
- Additional Topics in Probability

CSO's: P.S.5.3, P.S.5.4

Estimated Number of Days to Complete: 9 Days

Enduring Understanding:

In Chapter 3 students will learn how to determine the probability an event will occur.

Essential Question(s):

- How do you conduct a probability experiment?
- What is conditional probability?
- How do you determine if 2 events are mutually exclusive?

Key Vocabulary:

- Probability
- Sample Space
- Event
- Outcome
- Independent Event
- Dependent Event
- Multiplication Rule
- Permutations
- Combinations
- Mutually Exclusive Events
- Factorial

Key Concepts:

- Probability Distributions
- Binomial Distributions
- Geometric Distributions
- Poisson Distribution
- Discrete Probability Distributions

Discrete Probability Distributions

CSO's: P.S.5.5, P.S.5.7

Estimated Number of Days to Complete:
9 Days

Enduring Understanding:

In Chapter 4 students will learn to create probability distributions.

Essential Question(s):

- How do you construct a discrete probability distribution and its graph?
- How do you find binomial probability?
- How do you use the geometric distribution?

Key Vocabulary:

- Probability Distribution
- Geometric Distribution
- Binomial Probability
- Discrete
- Continuous
- Standard Deviation
- Poisson Distribution

Key Concepts:

- * Introduction to Normal Distributions and Standard Deviations
- * Finding Probabilities using Normal Distribution
- * Sampling using Distributions and the Central Limit Theorem
- * Normal Approximations to Binomial Distributions

Normal Probability Distributions

CSOs: A2.2.2, A2.2.8

Estimated Number of Days to Complete:
9 Days.

Enduring Understanding:

In Chapter 5 students will learn how to recognize a normal (bell shape) distribution.

Essential Question(s):

- How do you interpret normal probability distribution graphs?
- How do you find normal probability distributions?
- How do you find a t-score?

- **Vocabulary:**
- Standard Normal Distribution
- Bell Shape Curve
- Mean
- Standard Deviation
- Normal Curve
- Inflection Point
- Z-Score
- Sampling Distribution
- Central Limit Theorem

Key Concepts:

- Confidence Intervals for the Mean (large samples)
- Confidence Intervals for the Mean (small samples)
- Confidence Intervals for Population Proportions
- Confidence Intervals for Variance & Standard Deviation

Confidence Intervals

CSO's: P.S.5.8, P.S.5.10, P.S.5.12

Estimated Number of Days to Complete:
9 Days.

Enduring Understanding:

In Chapter 6 students will learn important techniques of statistical inference to estimate the value of a parameter.

Essential Question(s):

- How do you construct an interval estimate?
- How do you make a meaningful point estimate and a margin of error?

Key Vocabulary:

- Interval Estimate
- Level of Confidence
- Point Estimate
- Margin of Error
- C-Confidence Interval
- Chi-Square Distribution

Key Concepts:

- Introduction to Hypothesis Testing
- Hypothesis Testing for the Mean (Large Samples)
- Hypothesis Testing for the Mean (Small Samples)
- Hypothesis Testing for Proportions
- Hypothesis Testing for Variance and Standard Deviation

Hypothesis Testing with One Sample

**CSO's: P.S.5.8, P.S.5.9, P.S.5.10,
P.S.5.12**

Estimated Number of Days to Complete:
9 Days.

Enduring Understanding:

In Chapter 7 students will learn how to test a claim about a parameter.

Essential Question(s):

- How do you state a null hypothesis and an alternative hypothesis?
- How do you make and interpret a decision based on the results of a statistical test?
- How do you write a claim for a hypothesis test?

Key Vocabulary:

- Null hypothesis
- Alternate hypothesis
- Level of Significance
- Rejection Region

Correlation & Regression

Key Concepts:

- Correlation
- Linear Regression
- Measures of Regression and Prediction Intervals
- Multiple Regression

CSO's: P.S.5.10, P.S.5.11, P.S.5.13

Estimated Number of Days to Complete:
9 Days.

Enduring Understanding:

In Chapter 9, students will learn how to describe and test the significance of relationships between two variables with data as ordered pairs.

Essential Question(s):

- How do you distinguish between correlation and causation?
- How do you find a correlation coefficient?
- How do you test a population correlation coefficient?

Key Vocabulary:

- Linear Correlation
- Independent/ dependent variable
- Correlation coefficient
- T-test
- Test statistics
- Standardized test statistic
- Regression line
- Coefficient of determination
- Standard error of estimates
- Multiple Regression Equation

Key Concepts:

- Goodness of Fit
- Independence
- Comparing of Variances
- Analysis of Variance

Chi Square Test and the F-Distribution

CSO's: P.S.5.12, P.S.5.14

Estimated Number of Days to Complete:
9 Days.

Enduring Understanding:

In Chapter 10 students will learn how to test a hypothesis basing decisions on sample statistics and their distributions.

Essential Question(s):

- How do you use a Chi-Square goodness of fit test?
- How do you calculate the chi-square test statistic?

Key Vocabulary:

- Contingency Table
- Chi-Square Independence Test
- F-Distribution
- Analysis of Variance
- Chi-Square Values

