Probability and Statistics CP Curriculum

Prerequisite: Algebra I, Algebra II, Geometry, and Pre-Calculus CP : The purpose of this course is to introduce students to the major concepts and tools for collecting, analyzing, and drawing conclusions from data. The course will expose students to the four broad conceptual themes: (1) exploring data – describing patterns and departures from patterns, (2) sampling and experimentation – planning and conducting a study, (3) anticipating patterns – exploring random phenomena using probability and simulation, and (4) statistical inference – estimating population parameters and testing hypotheses.

Introduction to Statistics
This unit establishes the foundation to statistics. Topics that will be covered include an overview of statistics, data classification, and experimental design.

Descriptive Statistics
In this unit, students will construct frequency distributions and histograms, graph and interpret quantitative data, calculate measures of central tendencies, find measures of variation, and calculate measures of positions.

Probability
This unit covers the basic concepts of probability and expands to conditional probability and the multiplication rule, the addition rule, and the counting principles.

Discrete Probability Distributions
This in this unit, students will construct probability distributions, binomial distributions, identify characteristics of geometric and poisson settings, and find the probabilities of binomial, geometric, and poisson distributions.

Normal Probability Distributions
In this unit, students will understand the properties of a Normal distribution by estimating the mean and standard deviation of a Normal curve, use z-scores to find p-values, use x-values to calculate z-scores to find p-values, use probabilities to find z-scores and x-values, and understand the central limit theorem.

Confidence Intervals
In this unit, students will find critical z-scores, construct confidence intervals for z-scores, t-scores, proportions and use them to make decisions, finding margin of error for z-scores, t-scores, and proportions, finding critical t-scores.

Hypothesis Testing with One Sample
In this unit, student will learn the foundation to hypothesis testing, hypothesis testing of large samples, small samples, proportions.

Hypothesis Testing with Two Sample
In this unit, students will conduct a hypothesis test and confidence interval for the difference between means in large, small, dependent, and the proportion settings.

Correlation and Regression
In this unit, students will understand the properties of correlation, linear regression, and non-linear models just as exponential models.

Chi-Square and the F-Distribution
In this unit, students will calculate expected values, conduct a chi-square GOF test, conduct a chi-square test for independence, conduct a one-way ANOVA test.

Nonparametric Tests

In this unit, students will use The Sign Test, The Wilcoxen Test, The Kruskal-Wallis Test, and Rank Correlation

CI/Hypothesis Testing for Variance and Standard Deviation

In this section, students will find critical values and create confidence intervals for the variance and standard deviation, conduct a hypothesis test for the variance and standard deviation, conduct a hypothesis test for the difference in variance and standard deviation between two samples