

**WARREN COUNTY SCHOOL DISTRICT**

PLANNED INSTRUCTION

**COURSE DESCRIPTION**

**Course Title:** Statistics  
**Course Number:** 00282  
**Course Prerequisites:** Completion of Algebra 1 CP, Algebra 2 CP, and Geometry CP with an average of 75%.

**Course Description:** This is an introductory statistics course and covers methods of summarizing data, descriptive statistics, probability and probability distributions, sampling distributions, the central limit theorem, hypothesis testing, analysis of variance, and regression analysis.

**Suggested Grade Level:** Grades 11-12

**Length of Course:** Two Semesters

**Units of Credit:** 1

**PDE Certification and Staffing Policies and Guidelines (CSPG) Required Teacher Certifications:**

CSPG #50 Mathematics

To find the CSPG information, go to [CSPG](#)

**Certification verified by the WCSD Human Resources Department:**  Yes  No

**WCSD STUDENT DATA SYSTEM INFORMATION**

**Course Level:** Academic

**Mark Types:** Check all that apply.

F – Final Average  MP – Marking Period  EXM – Final Exam

**GPA Type:**  GPAEL-GPA Elementary  GPAML-GPA for Middle Level  NHS-National Honor Society

UGPA-Non-Weighted Grade Point Average  GPA-Weighted Grade Point Average

**State Course Code:** 02205

To find the State Course Code, go to [State Course Code](#), download the Excel file for SCED, click on SCED 6.0 tab, and chose the correct code that corresponds with the course.

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**TEXTBOOKS AND SUPPLEMENTAL MATERIALS**

**Board Approved Textbooks, Software, and Materials:**

**Title:** Elementary Statistics-Picturing the World, 7<sup>th</sup> edition  
**Publisher:** Pearson  
**ISBN #:** 978-0-13-468341-6  
**Copyright Date:** 2019  
**WCSD Board Approval Date:** 6/29/2020

**Supplemental Materials:** [Click or tap here to enter text.](#)

**Curriculum Document**

**WCSD Board Approval:**

**Date Finalized:** 6/5/2020  
**Date Approved:** 6/29/2020  
**Implementation Year:** 2020-2021

**SPECIAL EDUCATION, 504, and GIFTED REQUIREMENTS**

The teacher shall make appropriate modifications to instruction and assessment based on a student's Individual Education Plan (IEP), Chapter 15 Section 504 Plan (504), and/or Gifted Individual Education Plan (GIEP).

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**SCOPE AND SEQUENCE OF CONTENT, CONCEPTS, AND SKILLS**

<b>Performance Indicator</b>	<b>PA Core Standard and/or Eligible Content</b>	<b>Month Taught and Assessed for Mastery</b>
Define statistics	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Distinguish between population and a sample between parameter and a statistics	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Distinguish between descriptive statistics and inferential statistics	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Distinguish between qualitative data and quantitative data	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Classify data with respect to four levels of measurement: nominal, ordinal, interval, and ratio.	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Design a statistical study and how to distinguish between an observational study and an experiment	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Collect data by using a survey or a simulation	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Design an experiment	S-IC.1., S-IC.2, S-IC.3	September Choose an item.
Create a sample using random sampling, simple random sampling, stratified sampling, cluster sampling, and systematic sampling and how to identify a biased sample	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Construct a frequency distribution including limits, midpoints, relative frequencies, cumulative frequencies and boundaries	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Construct frequency histograms, frequency polygons, relative frequency histograms, and ogives	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Graph and interpret quantitative data sets using stem-and-leaf plots and dot plots	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Graph and interpret qualitative data sets using pie charts and Pareto charts	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Graph and interpret paired data sets using scatter plots and time series charts	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Find the mean, median, and mode of a population of a sample.	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Find a weighted mean of a data set, and how to estimate the sample of mean grouped data	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Describe the shape of a distribution as symmetric, uniform, or skewed and how to compare the mean and median for each	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Find the range of a data set, and how to find the variance and standard deviation of a population of a sample	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Use the Empirical Rule and Chebyshev's Theorem to interpret standard deviation	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Estimate the sample standard deviation for grouped data	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Find the first, second and third quartiles of a data set, how to find the interquartile range of a data set, and how to represent a data set graphically using a box-and-whisker plot	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Interpret other fractals such as percentiles and how to find percentiles for a specific data entry	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October

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Find and interpret the standard score (z score)	S-IC.4, S-IC.6, S-ID.2, S-ID.3, S-ID.5, S-ID.6	September October
Identify the sample space of a probability experiment and how to identify simple events	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Use the Fundamental Counting Principle to find the number of ways two or more events can occur	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Distinguish among classical probability, empirical probability and subjective probability	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Find the probability of the complement of an event and how to use a tree diagram and the Fundamental Counting Principle to find probabilities	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Find the probability of an event given that another event has occurred	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Distinguish between independent and dependent events	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Use the Multiplication Rule to find the probability of two or more events occurring in sequence and to find conditional probabilities	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Determine whether two events are mutually exclusive	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Use the Addition Rule to find the probability of two events	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Find the number of ways a group of objects can be arranged in order and the number of ways to choose several objects from a group without regard to order	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Use counting principles to find probabilities	S-CP.0, S-CP.5, S-CP.6, S-CP.7, S-CP.8, S-MD.5a	October November
Distinguish between discrete random variables and continuous random variables	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Construct and graph a discrete probability distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Determine whether a distribution is a probability distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find the mean, variance, and standard deviation of a discrete probability distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find the expected value of a discrete probability distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Determine whether a probability experiment is a binomial experiment	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find binomial probability experiment is a binomial experiment	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December

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Find the binomial probabilities using the binomial probability formula, a binomial probability table and technology	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Construct and graph a binomial distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find the mean, variance and standard deviation of a binomial probability distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find the probabilities using geometric distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Find the probabilities using Poisson distribution	S-CP.2, S-CP.3, S-CP.4, S-MD.6, S-MD.7, S-MD.5b	November December
Interpret graphs of normal probability distributions	S-ID.4	January February
Find areas under the standard normal curve	S-ID.4	January February
Find probabilities for normally distributed variables using a table and technology	S-ID.4	January February
Find a z score given the area under the normal curve	S-ID.4	January February
Transform a z score to an x value	S-ID.4	January February
Find a specific data value of a normal distribution given the probability	S-ID.4	January February
Find sampling distributions and verify their properties	S-ID.4	January February
How to interpret the Central Limit Theorem	S-ID.4	January February
Apply the Central Limit Theorem	S-ID.4	January February
Determine when a normal distribution can approximate a binomial distribution	S-ID.4	January February
Find the continuity correction	S-ID.4	January February
Use a normal distribution to approximate binomial probabilities	S-ID.4	January February
Find a point estimate and margin of error	S-IC.1, S-IC.4	February March
Construct and interpret confidence intervals for a population mean when standard deviation is known	S-IC.1, S-IC.4	February March
Determine the minimum sample size requirement when estimating a population mean	S-IC.1, S-IC.4	February March
Interpret the t distribution and use a t distribution table	S-IC.1, S-IC.4	February March
Construct and interpret confidence intervals for population mean when standard deviation is not known	S-IC.1, S-IC.4	February March
Find a point estimate for a population proportion	S-IC.1, S-IC.4	February March
Construct and interpret confidence intervals for a population proportion	S-IC.1, S-IC.4	February March
Determine the minimum sample size required when estimating a population proportion	S-IC.1, S-IC.4	February March

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Interpret the chi-square distribution and use a chi-square distribution table	S-IC.1, S-IC.4	February March
Construct interpret confidence intervals for population variance and standard deviation	S-IC.1, S-IC.4	February March
State a null hypothesis and alternative hypothesis	S-IC.5, S-IC.6, S-IC.4	March April
Identify type I and type II errors	S-IC.5, S-IC.6, S-IC.4	March April
Know whether to use a one-tailed or a two tailed statistical test and find a P-value	S-IC.5, S-IC.6, S-IC.4	March April
Use P values for a z test for a mean when standard deviation is known	S-IC.5, S-IC.6, S-IC.4	March April
Find critical values and rejection and rejection regions in the standard normal distribution	S-IC.5, S-IC.6, S-IC.4	March April
Use rejection regions for a z test for a mean when standard deviation is known	S-IC.5, S-IC.6, S-IC.4	March April
Find critical values in a t distribution	S-IC.5, S-IC.6, S-IC.4	March April
Use the t test to test a mean when standard deviation is not known	S-IC.5, S-IC.6, S-IC.4	March April
Use technology to find P values and use them with a t test to test a mean when standard deviation is not known	S-IC.5, S-IC.6, S-IC.4	March April
Use the z test to test a population proportion p	S-IC.5, S-IC.6, S-IC.4	March April
Find the critical values of a chi-square test	S-IC.5, S-IC.6, S-IC.4	March April
Use the chi-square test to test a variance or a standard deviation	S-IC.5, S-IC.6, S-IC.4	March April
Determine whether two samples are independent or dependent	S-IC.3, S-IC.4, S-IC.5	April May
Perform a two-sample z-test for the difference between two means and using independent samples with standard deviations known	S-IC.3, S-IC.4, S-IC.5	April May
Perform a two-sample t-test for the difference between two means and using independent samples with standard deviations unknown	S-IC.3, S-IC.4, S-IC.5	April May
Perform a t-test to test the mean of the differences for a population of paired data	S-IC.3, S-IC.4, S-IC.5	April May
Perform a two-sample z-test for the difference between two population proportions.	S-IC.3, S-IC.4, S-IC.5	April May
Construct a scatter plot and find a correlation coefficient	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Test a population correlation coefficient using a table and perform a hypothesis test for a population correlation coefficient	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Find the equation of a regression line	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Predict y-values using the regression equation	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Find and interpret the coefficient of determination	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Find and interpret the standard of error of estimate for a regression line	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Construct and interpret a prediction interval for y	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
Use technology to find and interpret a multiple regression equation, the standard error of estimate and the coefficient of determination	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.

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Use a multiple regression equation to predict y-values	S-ID.6, S-ID.8, S-ID.9, S-ID.7	May Choose an item.
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**ASSESSMENTS**

**PSSA Academic Standards, Assessment Anchors, and Eligible Content:** The teacher must be knowledgeable of the PDE Academic Standards, Assessment Anchors, and Eligible Content and incorporate them regularly into planned instruction.

**Formative Assessments:** The teacher will utilize a variety of assessment methods to conduct in-process evaluations of student learning.

**Effective formative assessments for this course include:** Suggested but not limited to: bell ringers, cooperative learning, exit tickets, observations, written work, oral response, self-evaluation homework, projects, and quizzes.

**Summative Assessments:** The teacher will utilize a variety of assessment methods to evaluate student learning at the end of an instructional task, lesson, and/or unit.

**Effective summative assessments for this course include:** Suggested but not limited to: Performance assessments, unit tests, chapter tests and projects.