



LINCOLN-WOODSTOCK COOPERATIVE SCHOOL DISTRICT COURSE SYLLABUS

Course Name: AP Statistics

Length: Full Year

Teacher: Jessica Halm

Course Description: This is a first course in statistics and probability. Analysis of single and bivariate data, algebraic and graphical analysis, sample statistics, probability, probability distributions, sample variability, sample distributions, the Central Limit Theorem, estimation and hypothesis testing, correlation and regression are covered. Emphasis is on applications throughout the course.

Competencies or Standards Assessed:

After completing Unit 1, the student will be able to:

1. Distinguish between the following: population and a sample, a parameter and a statistic, qualitative and quantitative data.
2. Classify data as nominal, ordinal, interval, and ratio.
3. Recognize various methods of data collection and sampling techniques.
4. Construct, label, and analyze bar charts, pie charts, stem and leaf plots, dot plots, frequency distributions, and histograms, given a set of sample data.
5. Compute sample statistics including: mean, median, mode, range, variance, and standard deviation.
6. Compute and interpret quartiles, percentiles, and z-scores.
7. Construct and interpret box and whisker plots and scatter diagrams.
8. Interpret standard deviation using Empirical Rule and Chebyshev's Theorem

After completing Unit 2, the student will be able to:

9. Define a *sample space* for the purpose of probability calculations.
10. Distinguish among classical, empirical, and subjective probability.
11. Apply the *addition* and *multiplication* rules for sample spaces.
12. Construct *Venn diagrams* for analyzing subsets of a population.
13. Determine the independence/dependence of events as well as mutually exclusive/not mutually exclusive events.
14. Determine conditional probabilities for defined sample spaces.
15. Use the Fundamental Counting Principle, permutations, and combinations to determine probabilities of events.
16. Distinguish between discrete and continuous random variables
17. Determine if a distribution is a probability distribution
18. Construct discrete and binomial probability distributions and determine the associated mean, variance, and standard deviation.

After completing Unit 3, the student will be able to:

19. Find areas under a normal curve and interpret to find probabilities for random variables.
20. Calculate and interpret z-scores
21. Find probabilities for normally distributed variables.
22. Depict sampling distributions in terms of mean and standard error.

23. Apply the Central Limit Theorem.
24. Use the normal distribution to approximate the binomial distribution.

After completing Unit 4, the student will be able to:

25. Estimate population parameters from sample statistics by calculating confidence intervals for the following: population mean, proportion, variance, or standard deviation.
26. Conduct hypothesis tests using the classical and p-value approach for the following: mean-large samples, mean-small samples, variance, and standard deviation.

After completing Unit 5, the student will be able to:

27. Calculate and interpret correlation coefficient.
28. Compute equation of the “Line of Best Fit” (Regression Line) and use it to predict y-values.
29. Find and interpret coefficient of determination and standard error of estimate for a regression line.

Anchor Texts or Major Curriculum:

Text: The Practice of Statistics; 6th Edition, Starnes and Tabor.
 Calculator Requirement: A TI-84 will be supplied to the student.

Course Outline (major units of study):

Unit Title	Essential Question or Overarching Understanding
Unit 1: Exploring One-Variable Data and Collecting Data	Why do people collect data? How can we display the results of univariate data? What is the difference between categorical and quantitative data? How can we minimize bias when collecting and interpreting data?
Unit 2: Probability, Random Variables, and Probability Distributions	How can we use basic probability rules to interpret the likelihood of an outlier?
Unit 3: Inference for Categorical Data: Proportions	What is the empirical rule, and how can we use it to determine the likelihood of a given outcome or range of outcomes?
Unit 4: Inference for Quantitative Data: Means	How do we estimate population parameters from sample statistics by calculating confidence intervals for the following: population mean, proportion, variance, or standard deviation?
Unit 5: Regression Analysis	What is the correlation coefficient, and what does the R^2 value tell us about the percent of variation in one variable that can be explained by the variability in the other? How can we use regression analysis to predict the



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	outcomes for a given independent variable? How can we use standard error to determine whether the difference between two datasets is significant?
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Portrait of a Learner

Independent Learner

I make thoughtful plans and do my best to reach personal goals using feedback to work through challenges.

Responsible Collaborator

I work with others to achieve shared goals by listening actively, contributing ideas, and managing conflict.

Critical Thinker

I analyze information, ask thoughtful questions, and apply reasoning skills to solve problems and make decisions.

Effective Communicator

I express ideas clearly, adapting strategies based on the audience, setting, and/or purpose.

Global Citizen

I show that I care and take responsibility by helping in my community and the world around me.

Additional Classroom Expectations:

Homework (Formatives):

- assigned daily Monday-Thursday via Google Classroom
- accounts for 20% of your overall grade each quarter
- checked and graded based on visually apparent effort OR by randomly selected problem submission
- Students who have fallen behind due to absences, etc., should use the weekends to get caught up

Quizzes, Tests, Written Summaries, Presentations, and Projects (Summatives):

- account for 80% of the overall grade each quarter
- Individual quiz and test responses will be evaluated based on the above rubric
- presentations, written summaries, and projects have their own separate evaluation rubric
- Traditional tests/quizzes are open notes
- may be corrected for an improved grade (see "Corrections" below)

Summative Corrections:

- Resubmit the original summative, with corrections attached to the front
- Corrections must be made for ***each and every problem/portion for which the student lost points***
- Complete corrections are consistent with a “4” on the above rubric
- notes, classmate, and/or teacher assistance may be used for corrections
- Corrections are due no later than 1 week after the summative is graded and returned to the student

Equipment:

- writing utensil, straightedge, textbook, and preferred note-taking system.
- TI-89 graphing calculators are available for short and long-term loan, course dependent.