

## Standards-Based Grading System for AP Statistics/Probability and Statistics

**Academic Achievement Grade:** This grade will be calculated based on mastery of learning targets for each unit of study. Assessments are designed to measure the level of mastery of the learning targets. Assessments will fall into one of four categories:

- **Learning Target Quizzes:** These will assess the understanding of each learning target individually.
- **Unit Exams:** These will assess the understanding of all learning targets at the end of each unit.
- **Performance Tasks:** These will assess the application of concepts to various situations and may include computer projects, research projects and investigative tasks.
- **Practice AP Exams:** These will be cumulative and be given at the end of each semester. These will be scored using AP rubrics. A semester and final exam will be given and follow this AP format.

All assignments will be graded on the 0 – 4 point scale below:

| 4 (100)   | 3 (85)  | 2 (70)  | 1 (55)  | 0 (0)                    |
|---|---|---|---|--------------------------|
| The student demonstrates exceptional skills and knowledge above standard. | The student demonstrates proficiency with the standard, only making minor mistakes. | The student shows emerging progress toward meeting standard, but overall lack of understanding. | The student is making minimal progress toward meeting standard. | No evidence of Learning. |

**Standards will be 70% of your grade. Your grade for each standard will be determined as follows:**

If your test grade is lower than the average of the other assignments for that standard, your grade will be an average of the two grades.

If your test grade is higher than the average of the other assignments (showing and increase in knowledge) for that standard, you will receive the higher of the two grades.

Students will have the opportunity to prove understanding of the learning targets on multiple assessments, and the students' academic grade will change as the learning progresses. Individualized remediation will be used to ensure that each student achieves mastery of each learning target.

If a student is not pleased with their performance on an exam the student will be given the opportunity to reassess given he/she only missed two or less of the assignments/assessments leading up to the exam.

**To show retention of the standards, you will have weekly cumulative multiple-choice quizzes. This will be 20% of your grade.**

I will curve each multiple-choice quiz by adding 30% onto the percent correct up to 100%.

**Each semester you will have a semester exam and semester project. These will be 10% of your overall grade.**

## List of Standards for AP Statistics (Probability and Statistics omit standard 30 and 45-63)

### Statistical Literacy

1. I can read a statistical textbook for information.
2. I can identify and analyze statistical information from the news.
3. I can engage in appropriate discussion about statistics.

### Exploring Data

4. I can describe the complete context of data: “Who and what was measured?”, “How and where was the data collected?” and “When and why was the study performed?”
5. I can classify variables as quantitative or categorical, and identify the unit of measure when appropriate.

### Categorical Data

6. I can calculate marginal and conditional percentages in a contingency table.
7. I can create graphical displays of categorical data (bar, relative frequency & segmented bar, pie)
8. I can describe displays for categorical data in context.

### Univariate Data

9. I can create graphical displays for quantitative data. (histograms, stemplots, dotplots, box plots, and o-gives)
10. I can identify outliers using the rule of  $1.5 \cdot \text{IQR}$  below  $Q_1$  and above  $Q_3$ .
11. I can calculate measures of central tendency (mean, median).
12. I can calculate measures of spread (range, IQR, standard deviation).
13. I can select a suitable measure of center and spread for a variable based on information about its distribution.
14. I can describe the distribution of quantitative data in context with a description of shape, a numerical measure of center, and a numerical measure of spread, noting any unusual features including outliers.
15. I can compare the distributions of quantitative data in context with a description of shape, a numerical measure of center, and a numerical measure of spread, noting any unusual features including outliers.

### Normal Model

16. I can describe how adding a constant or multiplying by a constant changes the center and spread of a distribution.
17. I can find z-scores and use them to compare values within and between distributions.
18. I can use Normal models and the Empirical Rule to describe data.
19. I can find the percentage of observations falling above or below a value or between any two values in a Normal model using technology.
20. I can use the percentages from a Normal model to find parameters (values, means, and standard deviations) of the model using technology.

## **Bivariate Data**

21. I can create scatterplots with appropriate variables (explanatory/response) and scales.
22. I can describe the form, direction, strength, and unusual features of bivariate data in context.
23. I can calculate and interpret correlation coefficients.
24. I can calculate and interpret the coefficient of determination.
25. I can write the equation of a least-squares regression line from the summary statistics for each variable and the correlation between the variables, from data using technology, and from a regression output table.
26. I can interpret the slope and y-intercept of a least-squares regression line.
27. I can calculate and interpret residuals and residual plots.
28. I can describe the effect of outliers and influential points on regression analysis.
29. I can calculate and interpret predicted values using a least-squares regression line.
30. I can transform data to achieve linearity and use transformed data to determine a least-squares regression line.

## **Sampling and Experimentation**

31. I can describe a simulation so that others can repeat it.
32. I can accurately perform a simulation to estimate the likelihood of events, discuss the results, and draw conclusions about the question being investigated.
33. I can identify observational studies and experiments.
34. I can identify sampling methods: SRS, stratified, cluster, convenience, multistage, systematic, and voluntary response.
35. I can describe how to draw a random sample so that others can repeat my process.
36. I can identify and describe the effects of bias in a sample: voluntary response, over/undercoverage, nonresponse, and response.
37. I can describe the 4 principles of experimental design for an experiment (control, randomization, replication, and blocking) using appropriate terminology.
38. I can identify the subjects, factors, treatments, and response variable in an experiment.
39. I can choose an appropriate design for an experiment: completely randomized, block design, or matched pair design.
40. I can design an appropriate experiment with a description sufficient for another researcher to replicate the study with the same methods.
41. I can describe how placebos and blinding affect an experiment.

## **Probability**

42. I can use the basic definitions and rules of probability including the Complement Rule, the Addition Rule, and the Multiplication rule
43. I can find conditional probabilities.
44. I can determine and explain disjoint and independence for two events.
45. I can find the probability model for a discrete random variable.
46. I can calculate and interpret the mean (expected value) and standard deviation for random variables in context.
47. I can calculate and interpret the mean and standard deviation for combined and transformed random variables in context.
48. I can identify and calculate probabilities associated with binomial and geometric distributions.
49. I can calculate probabilities associated with Normal Distributions.

## **Statistical Inference**

50. I can explain and apply the Central Limit Theorem for sample means and sample proportions.
51. I can simulate a sampling distribution.
52. I can apply the margin of error formula (find ME for given confidence level, estimate the sample size needed to obtain a given ME, find confidence level used given known ME)
53. I can explain the meaning of confidence level.
54. I can explain the meaning of a P-value in context.
55. I can explain the concepts of Type I and Type II errors and power of the test.
56. I can identify which inference test is appropriate for a given situation.
57. I can construct and interpret a confidence interval for a sample proportion and the difference between two sample proportions.
58. I can perform and interpret tests for a sample proportion and the difference between two sample proportions.
59. I can calculate and interpret a confidence interval for a sample mean and the difference between two sample means (independent and dependent).
60. I can perform and interpret a test for a sample mean and the difference between two sample means (independent and dependent).
61. I can perform and interpret a Chi-square test for goodness of fit, homogeneity, and independence.
62. I can calculate and interpret a confidence interval for the slope of a least-square regression line.
63. I can perform and interpret a test for the slope of a least-square regression line.