
Coal City Unit District #1
AP Statistics
Math Curriculum

MA.APS:1 Students will describe, organize, and represent one variable data in a variety of ways. (ID.2, ID.3, IC.1, IC.3)

- MA.APS:1-1 Classify variables as categorical or quantitative.
- MA.APS:1-2 Construct and use bar graphs, mosaic plots, and pie charts for categorical data to interpret associations.
- MA.APS:1-3 Compare distributions of categorical data using bar graphs.
- MA.APS:1-4 Calculate marginal, joint relative, and conditional relative frequencies from a two-way table.
- MA.APS:1-5 Construct and interpret dotplots, stemplots, and histograms of quantitative data.
- MA.APS:1-6 Describe the shape, center, and variability of a distribution and identify outliers.
- MA.APS:1-7 Compare distributions of quantitative data using dotplots, stemplots, and histograms.
- MA.APS:1-8 Find the mean and standard deviation for data in a frequency table.
- MA.APS:1-9 Find the percentile of a particular score given all the scores.
- MA.APS:1-10 Calculate measures of center (mean, median) for a distribution of quantitative data.
- MA.APS:1-11 Calculate and interpret measures of variability (range, standard deviation, Interquartile Range) for a distribution of quantitative data.
- MA.APS:1-12 Explain how outliers and skewness affect measures of center and variability.
- MA.APS:1-13 Identify outliers in quantitative data using the 1.5 x IQR rule.
- MA.APS:1-14 Construct and interpret boxplots of quantitative data.
- MA.APS:1-15 Use boxplots and numerical summaries to compare distributions of quantitative data.
- MA.APS:1-16 Find and interpret the percentile of an individual value within a distribution of data as well as estimate percentiles and individual values using a cumulative frequency graph.
- MA.APS:1-17 Find and interpret the standardized score (z-score) of an individual within a distribution of data.
- MA.APS:1-18 Identify relative locations of the mean and median of a distribution from a density curve.
- MA.APS:1-19 Use the empirical rule to estimate the proportion of values in a specified interval, or the value that corresponds to a given percentile in a Normal distribution.
- MA.APS:1-20 Determine whether a distribution of data is approximately Normal from graphical and numerical evidence.

MA.APS:2 Students will describe, organize, and model two variable data. (ID.2, ID.3, IC.1, IC.3)

- MA.APS:2-1 Determine if a variable is an explanatory or response variable.
- MA.APS:2-2 Construct and interpret a scatterplot, describing the direction, form, and strength of relationship between two quantitative variables.
- MA.APS:2-3 Interpret the correlation coefficient and indicate how correlation is influenced by unusual points.
- MA.APS:2-4 Make predictions using regressions lines, being mindful of extrapolation.
- MA.APS:2-5 Calculate and interpret a residual.
- MA.APS:2-6 Determine the equation of a least squares regression line using technology or computer output and interpret the slope and y-intercept.
- MA.APS:2-7 Construct and interpret residual plots to assess whether a regression model is appropriate.
- MA.APS:2-8 Interpret the standard deviation of the residual and r^2 and assess how well a least-squares regression line models the relationship between two quantitative variables.
- MA.APS:2-9 Find the slope and y-intercept of the least-squares regression line from the means and standard deviations of x and y and their correlation.
- MA.APS:2-10 Determine which of several models, including transformations using powers, roots, or logarithms, does a better job of describing the relationship between two quantitative variables.

MA.APS:3 Students will calculate probabilities. (CP.2, CP.3, CP.5, CP.6, CP.7, CP.8, CP.9, MD.1, MD. 2, MD.3, MD.4, MD.5)

- MA.APS:3-1 Calculate probabilities using the complement rule for mutually exclusive events.
- MA.APS:3-2 Calculate probabilities using the general addition rule.
- MA.APS:3-3 Calculate probabilities using the general multiplication rule.
- MA.APS:3-4 Use a two-way table, Venn diagram, or tree diagram to model a random process and calculate the probabilities involving two events.
- MA.APS:3-5 Determine whether two events are independent.

MA.APS:4 Students will work with random variables and probability distributions. (ID.4)

- MA.APS:4-1 Use the probability distribution of a discrete random variable to calculate the probability of an event.
- MA.APS:4-2 Construct a histogram displaying the probability distribution of a discrete random variable and describe its shape.
- MA.APS:4-3 Calculate and interpret the mean (expected value) and standard deviation of a discrete random variable.
- MA.APS:4-4 Use the probability distribution of a continuous random variable, uniform or normal, to calculate the probability of an event.
- MA.APS:4-5 Describe the effect of adding/subtracting a constant or multiplying/dividing by a constant on the probability distribution of a random variable.
- MA.APS:4-6 Calculate the mean and standard deviation of the sum or difference of random variables.
- MA.APS:4-7 Find probabilities involving the sum or difference of independent normal random variables.

MA.APS:5 Students will work with binomial and geometric random variables. (MD.1)

- MA.APS:5-1 Determine if an experiment meets the conditions for a binomial experiment.
- MA.APS:5-2 Calculate and interpret probabilities involving binomial distributions.
- MA.APS:5-3 Calculate and interpret the mean and standard deviation of a binomial random variable.
- MA.APS:5-4 When appropriate, use the normal approximation to the binomial distribution to calculate probabilities.
- MA.APS:5-5 Calculate and interpret probabilities involving geometric random variables.
- MA.APS:5-6 Calculate and interpret the mean and standard deviation of a geometric distribution.

MA.APS:6 Students will work with sampling distributions. (IC.4, IC.5, IC.6)

- MA.APS:6-1 Distinguish between a parameter and a statistic.
- MA.APS:6-2 Create a sampling distribution using all possible samples from a small population.
- MA.APS:6-3 Distinguish among the distribution of a population, the distribution of a sample, and the sampling distribution of a statistic.
- MA.APS:6-4 Describe the relationship between sample size and the variability of a statistic.
- MA.APS:6-5 Determine if a sampling distribution is approximately normal ($\hat{p}$, $\hat{p}_1 - \hat{p}_2$, $\bar{x}$, $\bar{x}_1 - \bar{x}_2$).
- MA.APS:6-6 Calculate and interpret the mean and standard deviation of the sampling distribution of a sample proportion $\hat{p}$ or difference in sample proportions $\hat{p}_1 - \hat{p}_2$.
- MA.APS:6-7 Calculate and interpret the mean and standard deviation of the sampling distribution of a sample mean $\bar{x}$ or $\bar{x}_1 - \bar{x}_2$.
- MA.APS:6-8 If appropriate, use a normal distribution to calculate probabilities involving $\hat{p}$ or $\hat{p}_1 - \hat{p}_2$.
- MA.APS:6-9 If appropriate, use a normal distribution to calculate probabilities involving $\bar{x}$ or $\bar{x}_1 - \bar{x}_2$.

MA.APS:7 Students will make inferences for categorical and quantitative data (IC.4, IC.5, IC.6)

- MA.APS:7-1 Identify an appropriate point estimator and calculate the value of a point estimate.
- MA.APS:7-2 Interpret a confidence interval in context.
- MA.APS:7-3 Determine the point estimate and margin of error from a confidence interval.
- MA.APS:7-4 Describe how the sample size and confidence level affect the margin of error.
- MA.APS:7-5 Construct and interpret confidence intervals for a population proportion or mean and for the difference of two population proportions or means given data from two independent samples, checking for appropriate conditions.
- MA.APS:7-6 Determine the sample size required to obtain a $C\%$ confidence interval for a population proportion with a specified margin of error.
- MA.APS:7-7 Construct and interpret a confidence interval for the slope β of the true population regression line.
- MA.APS:7-8 State appropriate hypotheses for a significance test about a population parameter, p or μ .
- MA.APS:7-9 Interpret a p -value in context.
- MA.APS:7-10 Make an appropriate conclusion for a significance test.
- MA.APS:7-11 Interpret Type I and Type II errors and power in context.
- MA.APS:7-12 Perform a significance test about a population proportion or mean and difference between population proportions or means, checking for appropriate conditions.
- MA.APS:7-13 Determine when it is appropriate to use paired t procedures versus two-sample t procedures.
- MA.APS:7-14 Perform a chi-square test for goodness of fit, checking for appropriate conditions.
- MA.APS:7-15 Perform a chi-square test for homogeneity, checking for appropriate conditions.
- MA.APS:7-16 Perform a chi-square test for independence, checking for appropriate conditions.
- MA.APS:7-17 Perform a significance test about the slope β of the true population regression line.