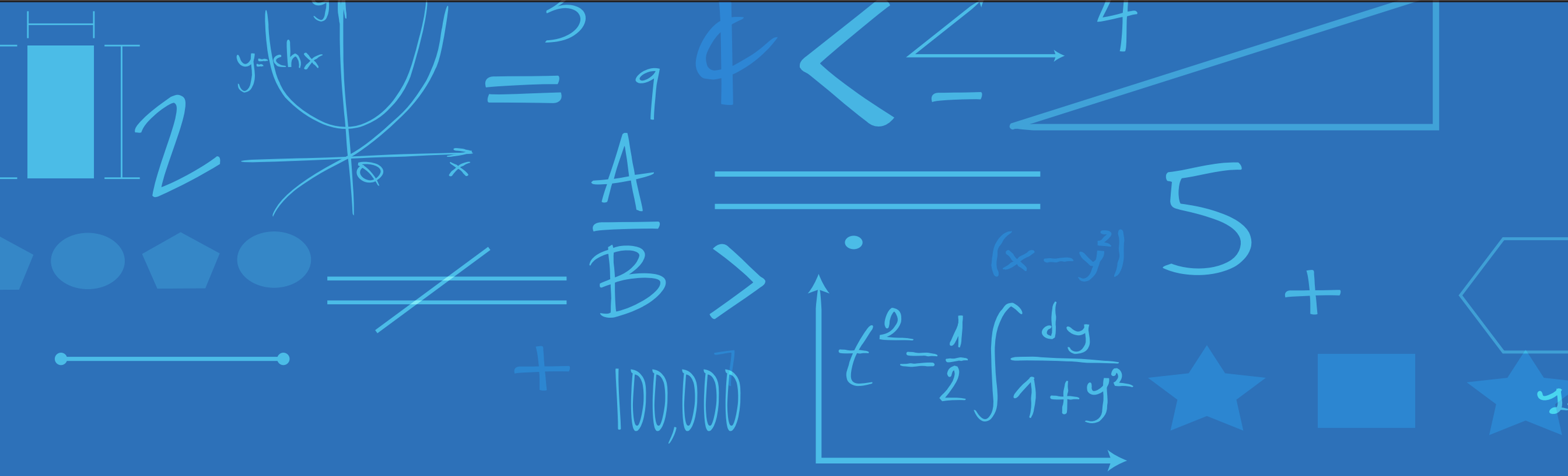

Mathematics TEKS

VERTICAL ALIGNMENT CHART

GRADES 3 - 8, STATISTICS

Texas Education Agency

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
(1) Mathematical process standards. The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:							
(A) apply mathematics to problems arising in everyday life, society, and the workplace;							
(B) use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;							
(C) select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;							
(D) communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;							
(E) create and use representations to organize, record, and communicate mathematical ideas;							
(F) analyze mathematical relationships to connect and communicate mathematical ideas; and							
(G) display, explain, or justify mathematical ideas and arguments using precise mathematical language in written or oral communication.							

***Disclaimer**: As the content TEKS are mathematical concepts, they can serve more than one purpose. A standard may be a stepping stone to several standards at a higher level. In these different capacities, the standards may or may not have a different standard building both to and from them as listed in other documents.*

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
							(2) Statistical process sampling and experimentation. The student applies mathematical processes to apply understandings about statistical studies, surveys, and experiments to design and conduct a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:
							(A) compare and contrast the benefits of different sampling techniques, including random sampling and convenience sampling methods.
							(B) distinguish among observational studies, surveys, and experiments.
							(C) analyze generalizations made from observational studies, surveys, and experiments.
							(D) distinguish between sample statistics and population parameters.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
							(2) Statistical process sampling and experimentation. The student applies mathematical processes to apply understandings about statistical studies, surveys, and experiments to design and conduct a study and use graphical, numerical, and analytical techniques to communicate the results of the study. The student is expected to:
							(E) formulate a meaningful question, determine the data needed to answer the question, gather the appropriate data, analyze the data, and draw reasonable conclusions.
							(F) communicate methods used, analyses conducted, and conclusions drawn for a data-analysis project through the use of one or more of the following: a written report, a visual display, an oral report, or a multi-media presentation.
							(G) critically analyze published findings for appropriateness of study design implemented, sampling methods used, or the statistics applied.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
			(13) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:				(3) Variability. The student applies the mathematical process standards when describing and modeling variability. The student is expected to:
							(A) distinguish between mathematical models and statistical models.
							(B) construct a statistical model to describe variability around the structure of a mathematical model for a given situation.
			(B) distinguish between situations that yield data with and without variability.				(C) distinguish among different sources of variability, including measurement, natural, induced, and sampling variability.
							(D) describe and model variability using population and sampling distributions.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
(8) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:	(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:	(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:	(12) Measurement and data. The student applies mathematical process standards to use numerical, or graphical representations to analyze problems. The student is expected to:				(4) Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:
							(A) distinguish between categorical and quantitative data.
(A) summarize a data set with multiple categories using a frequency table, dot plot, pictograph, or bar graph with scaled intervals.	(A) represent data on a frequency table, dot plot, or stem-and-leaf plot marked with whole numbers and fractions.	(A) represent categorical data with bar graphs or frequency tables and numerical data, including data sets of measurements in fractions or decimals, with dot plots or stem-and-leaf plots.	(A) represent numeric data graphically, including dot plots, stem-and-leaf plots, histograms, and box plots.				
			(13) Measurement and data. The student applies mathematical process standards to use numerical or graphical representations to solve problems. The student is expected to:				(B) represent and summarize data and justify the representation.
(B) solve one- and two-step problems using categorical data represented with a frequency table, dot plot, pictograph, or bar graph with scaled intervals.	(B) solve one- and two-step problems using data in whole number, decimal, and fraction form in a frequency table, dot plot, or stem-and-leaf plot.	(C) solve one- and two step-problems using data from a frequency table, dot plot, bar graph, stem-and-leaf plot, or scatterplot.	(A) interpret numeric data summarized in dot plots, stem-and-leaf plots, histograms, and box plots.				

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
				(12) Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:		(4) Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:
				(B) use data from a random sample to make inferences about a population.	(C) simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected.		(C) analyze the distribution characteristics of quantitative data, including determining the possible existence and impact of outliers.
				(C) compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.			
				(6) Proportionality. The student applies mathematical standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:			
				(G) solve problems using data represented in bar graphs, dot plots, and circle graphs, including part-to-whole and part-to-part comparisons and equivalents.			(D) compare and contrast different graphical or visual representations given the same data set.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
			(12) Measurement and data. The student applies mathematical process standards to use numerical, or graphical representations to analyze problems. The student is expected to:	(12) Measurement and data. The student applies mathematical process standards to use statistical representations to analyze data. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:		(4) Categorical and quantitative data. The student applies the mathematical process standards to represent and analyze both categorical and quantitative data. The student is expected to:
			(B) use the graphical representation of numeric data to describe the center, spread, and shape of the data distribution.	(A) compare two groups of numeric data using comparative dot plots or box plots by comparing their shapes, centers, and spreads.			(E) compare and contrast meaningful information derived from summary statistics given a data set.
			(C) summarize numeric data with numerical summaries, including the mean and median (measures of center) and the range and interquartile range (IQR) (measures of spread), and use these summaries to describe the center, spread, and shape of the data distribution.	(C) compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations.	(B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points.		
			(D) summarize categorical data with numerical and graphical summaries, including the mode, the percent of values in each category (relative frequency table), and the percent bar graph, and use these summaries to describe the data.				(F) analyze categorical data, including determining marginal and conditional distributions, using two-way tables.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
				(6) Proportionality. The student applies mathematical standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:		**Geometry** (13) Probability. The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:	(5) Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:
						(B) determine probability based on area to solve contextual problems.	A) determine probabilities, including the use of a two-way table.
				(C) make predictions and determine solutions using experimental data for simple and compound events.		(C) identify whether two events are independent and compute the probability of the two events occurring together with or without replacement.	
				(D) make predictions and determine solutions using theoretical probability for simple and compound events.		(D) apply conditional probability in contextual problems.	
						(E) apply independence in contextual problems.	
				(E) find the probabilities of a simple event and its complement and describe the relationship between the two.		(D) apply conditional probability in contextual problems.	
				(I) determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces.			(B) describe the relationship between theoretical and empirical probabilities using the Law of Large Numbers.
				(A) represent sample spaces for simple and compound events using lists and tree diagrams.		(A) develop strategies to use permutations and combinations to solve contextual problems.	(C) construct a distribution based on a technology-generated simulation or collected samples for a discrete random variable.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
				(6) Proportionality. The student applies mathematical standards to use probability and statistics to describe or solve problems involving proportional relationships. The student is expected to:	(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:		(5) Probability and random variables. The student applies the mathematical process standards to connect probability and statistics. The student is expected to:
				(B) select and use different simulations to represent simple and compound events with and without technology.			(D) compare statistical measures such as sample mean and standard deviation from a technology-simulated sampling distribution to the theoretical sampling distribution.
				(F) use data from a random sample to make inferences about a population.			
				(H) solve problems using qualitative and quantitative predictions and comparisons from simple experiments.			
					(B) determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points.		

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
							(6) Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:
							(A) explain how a sample statistic and a confidence level are used in the construction of a confidence interval.
							(B) explain how changes in the sample size, confidence level, and standard deviation affect the margin of error of a confidence interval.
							(C) calculate a confidence interval for the mean of a normally distributed population with a known standard deviation.
							(D) calculate a confidence interval for a population proportion.
							(E) interpret confidence intervals for a population parameter, including confidence intervals from media or statistical reports.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
							(6) Inference. The student applies the mathematical process standards to make inferences and justify conclusions from statistical studies. The student is expected to:
							(F) explain how a sample statistic provides evidence against a claim about a population parameter when using a hypothesis test.
							(G) construct null and alternative hypothesis statements about a population parameter.
							(H) explain the meaning of the *p*-value in relation to the significance level in providing evidence to reject or fail to reject the null hypothesis in the context of the situation.
							(I) interpret the results of a hypothesis test using technology-generated results such as large sample tests for proportion, mean, difference between two proportions, and difference between two independent means.
							(J) describe the potential impact of Type I and Type II Errors.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
		(9) Data analysis. The student applies mathematical process standards to solve problems by collecting, organizing, displaying, and interpreting data. The student is expected to:			(11) Measurement and data. The student applies mathematical process standards to use statistical procedures to describe data. The student is expected to:	**Algebra I** (4) Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:	(7) Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:
		(B) represent discrete pair data on a scatterplot.			(A) construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data.	(A) calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association.	(A) analyze scatterplots for patterns, linearity, outliers, and influential points.
					(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:	(C) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	
					(C) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation.		
					(D) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions.		(B) transform a linear parent function to determine a line of best fit.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
						Algebra I (3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	(7) Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:
						(E) determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, $f(bx)$ for specific values of a, b, c, and d.	(B) transform a linear parent function to determine a line of best fit.
					(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:	**Algebra I** (4) Linear functions, equations, and inequalities. The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real-world data. The student is expected to:	
					(D) use a trend line that approximates the linear relationship between bivariate sets of data to make predictions.	(C) write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems.	(C) compare different linear models for the same set of data to determine best fit, including discussions about error.
							(D) compare different methods for determining best fit, including median-median and absolute value.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Other HS Courses	Statistics
					(5) Proportionality. The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions. The student is expected to:		(7) Bivariate data. The student applies the mathematical process standards to analyze relationships among bivariate quantitative data. The student is expected to:
					(C) contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation.		(E) describe the relationship between influential points and lines of best fit using dynamic graphing technology.
					(4) Proportionality. The student applies mathematical process standards to explain proportional and non-proportional relationships involving slope. The student is expected to:	**Algebra I** (3) Linear functions, equations, and inequalities. The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations. The student is expected to:	
					(C) use data from a table or graph to determine the rate of change or slope and *y*-intercept in mathematical and real-world problems.	(C) graph linear functions on the coordinate plane and identify key features, including *x*-intercept, *y*-intercept, zero, and slope, in mathematical and real-world problems	(F) identify and interpret the reasonableness of attributes of lines of best fit within the context, including slope and *y*-intercept.