

MATHEMATICS VERTICAL ARTICULATION TOOL (MVAT)
2016 Mathematics Standards of Learning – Probability and Statistics
Kindergarten-Algebra II Progression

All K-8 Mathematics SOL for the Probability and Statistics strand are represented in this document. All End-of-Course Mathematics SOL are **NOT** represented.
 KEY TO COLORED BOXES: **ES** = K-5 Prior Knowledge Concepts; **MS** = 6-8 Prior Knowledge Concepts; **HS** = 9-12 Prior Knowledge Concepts; N/A = No Concepts Listed

Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Related to Algebra 1	Related to Algebra 2	Measures of Central Tendency
					<u>5.17a</u>						given a practical context, will describe mean, median, and mode as measures of center.
					<u>5.17b</u>						given a practical context, will describe mean as fair share.
					<u>5.17c</u>						given a practical context, will describe the range of a set of data as a measure of spread.
					<u>5.17d</u>						given a practical context, will determine the mean, median, mode, and range of a set of data.
						<u>6.11a</u>					represent the mean of a data set graphically as the balance point.
						<u>6.11b</u>					determine the effect on measures of center when a single value of a data set is added, removed, or changed.
										<u>AII.10</u>	represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.
										<u>AII.11a</u>	identify and describe properties of a normal distribution.
										<u>AII.11b</u>	interpret and compare z-scores for normally distributed data.
										<u>AII.11c</u>	apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve.
										<u>AII.12</u>	compute and distinguish between permutations and combinations.

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K-8 Cross-Strand Connections – Measures of Central Tendency

Number and Number Sense Connections

Computation and Estimation Connections

4.4d - create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication, and single-step practical problems involving division with whole numbers.

5.7 - simplify whole number numerical expressions using the order of operations.

Measurement and Geometry Connections

Patterns, Functions, and Algebra Connections

6.12a - represent a proportional relationship between two quantities, including those arising from practical situations

6.12b - determine the unit rate of a proportional relationship and use it to find a missing value in a ratio table

6.12d - make connections between and among representations of a proportional relationship between two quantities

7.10e - make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs.

6.12c - determine whether a proportional relationship exists between two quantities

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Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Related to Algebra 1	Related to Algebra 2	Outcomes and Probability
		<u>2.14</u>									use data from probability experiments to predict outcomes when the experiment is repeated.
			<u>3.14</u>								investigate and describe the concept of probability as a measurement of chance and list possible outcomes for a single event.
				<u>4.13a</u>							determine the likelihood of an outcome of a simple event.
				<u>4.13b</u>							represent probability as a number between 0 and 1, inclusive.
				<u>4.13c</u>							create a model or practical problem to represent a given probability.
					<u>5.15</u>						determine the probability of an outcome by constructing a sample space or using the Fundamental (Basic) Counting Principle.
							<u>7.8a</u>				determine the theoretical and experimental probabilities of an event.
							<u>7.8b</u>				investigate and describe the difference between the experimental probability and theoretical probability of an event.
								<u>8.11a</u>			compare and contrast the probability of independent and dependent events
								<u>8.11b</u>			determine probabilities for independent and dependent events.

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K-8 Cross-Strand Connections – Outcomes and Probability

Number and Number Sense Connections

- 3.2a** - Name and write fractions and mixed numbers represented by a model
- 3.2b** - Represent fractions and mixed numbers with models and symbols
- 4.2a** - Compare and order fractions and mixed numbers, with and without models
- 4.2c** - Identify the division statement that represents a fraction, with models and in context
- 5.2b** - Compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least
- 6.2b** - Compare and order positive rational numbers
- 7.1c** - Compare and order rational numbers
- 7.2** - Solve practical problems involving operations with rational numbers
- 8.1** - Compare and order real numbers

Computation and Estimation Connections

- 5.6b** - Solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models
- 6.5a** - Multiply and divide fractions and mixed numbers
- 6.5b** - Solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of fractions and mixed numbers

Measurement and Geometry Connections

Patterns, Functions, and Algebra Connections

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Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Related to Algebra 1	Related to Algebra 2	Data Representation and Interpretation
<u>K.11a</u>											collect, organize, and represent data.
<u>K.11b</u>											read and interpret data in object graphs, picture graphs, and tables.
	<u>1.12a</u>										collect, organize, and represent various forms of data using tables, picture graphs, and object graphs.
	<u>1.12b</u>										read and interpret data displayed in object graphs, picture graphs, and tables, using the vocabulary <i>more, less, fewer, greater than, less than, and equal to</i> .
		<u>2.15a</u>									collect, organize, and represent data in pictographs and bar graphs.
		<u>2.15b</u>									read and interpret data represented in pictographs and bar graphs.
			<u>3.15a</u>								collect, organize, and represent data in pictographs or bar graphs.
			<u>3.15b</u>								read and interpret data represented in pictographs and bar graphs.
				<u>4.14a</u>							collect, organize, and represent data in bar graphs and line graphs.
				<u>4.14b</u>							interpret data represented in bar graphs and line graphs.
				<u>4.14c</u>							compare two different representations of the same data.
					<u>5.16a</u>						given a practical problem, will represent data in line plots and stem-and-leaf plots.
					<u>5.16b</u>						given a practical problem, will interpret data represented in line plots and stem-and-leaf plots.
					<u>5.16c</u>						given a practical problem, will compare data represented in a line plot with the same data represented in a stem-and-leaf plot.
						<u>6.10a</u>					given a practical problem, will represent data in a circle graph.
						<u>6.10b</u>					given a practical problem, will make observations and inferences about data represented in a circle graph.

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						6.10c					given a practical problem, will compare circle graphs with the same data represented in bar graphs, pictographs, and line plots.
							7.9a				given data in a practical situation, will represent data in a histogram.
							7.9b				given data in a practical situation, will make observations and inferences about data represented in a histogram.
							7.9c				given data in a practical situation, will compare histograms with the same data represented in stem-and-leaf plots, line plots, and circle graphs.
								8.12a			represent numerical data in boxplots.
								8.12b			make observations and inferences about data represented in boxplots.
								8.12c			compare and analyze two data sets using boxplots.
								8.13a			represent data in scatterplots.
								8.13b			make observations about data represented in scatterplots.
								8.13c			use a drawing to estimate the line of best fit for data represented in a scatterplot.
									A.9		collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of linear and quadratic functions.
										AIL.9	collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of quadratic and exponential functions.

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K-8 Cross-Strand Connections – Data Representation and Interpretation

Number and Number Sense Connections

- K.2a** - Compare and describe one set as having more, fewer, or the same number of objects as the other set(s)
K.2b - Compare and order sets from least to greatest and greatest to least
1.2b - Compare two numbers between 0 and 110 represented pictorially or with concrete objects, using the words *greater than*, *less than* or *equal to*
1.2c - Order three or fewer sets from least to greatest and greatest to least
2.1c - Compare and order whole numbers between 0 and 999
3.1c - Compare and order whole numbers, each 9,999 or less
4.1b - Compare and order whole numbers expressed through millions
4.3a - Read, write, represent, and identify decimals expressed through thousandths
4.3c - Compare and order decimals
5.2b - Compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least
6.2b - Compare and order positive rational numbers
6.4 - Recognize and represent patterns with whole number exponents and perfect squares
7.1c - Compare and order rational numbers
8.1 - Compare and order real numbers

Computation and Estimation Connections

Measurement and Geometry Connections

- 6.8a** - Identify the components of the coordinate plane

Patterns, Functions, and Algebra Connections

- 6.12a** - Represent a proportional relationship between two quantities, including those arising from practical situations
6.12c - Determine whether a proportional relationship exists between two quantities
6.12d - Make connections between and among representations of a proportional relationship between two quantities using verbal descriptions, ratio tables, and graphs
7.10a - Determine the slope, m , as rate of change in a proportional relationship between two quantities and write an equation in the form $y = mx$ to represent the relationship
7.10e - Make connections between and among representations of a proportional or additive relationship between two quantities using verbal descriptions, tables, equations, and graphs
8.16a - Recognize and describe the graph of a linear function with a slope that is positive, negative, or zero
8.16d - Graph a linear function given the equation $y = mx + b$ form
8.16e - Make connections between and among representations of a linear function using verbal descriptions, tables, equations, and graphs

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