

## PA Core Standards For Mathematics

### 2.4 Measurement, Data and Probability PreK-12

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
Pre-K	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p>	Measureable Attributes	<p>Describe measurable attributes of objects, such as length and weight. Sort and order by one attribute.</p> <p>Compare two objects with a measureable attribute in common and describe the difference.</p>	CC.2.4.PREK.A.1		<p>Above</p> <p>Addition</p> <p>Below</p> <p>Beside</p> <p>Between</p> <p>Circle</p> <p>Cone</p> <p>Cube</p> <p>Cylinder</p> <p>Equal</p> <p>Greater than</p> <p>Length</p> <p>Less than</p> <p>Measure</p> <p>Numeral</p> <p>Rectangle</p> <p>Sphere</p> <p>Square</p> <p>Subtraction</p>
Pre-K	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p>	Object Classification and Count	Classify up to 10 objects using one attribute into categories; display the number of objects in each category; count and compare the quantities of each category.	CC.2.4.PREK.A.4		<p>Three dimensional shapes</p> <p>Triangle</p> <p>Two dimensional shapes</p> <p>Weight</p>
K	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p>	Measureable Attributes	<p>Describe measurable attributes of objects, such as length, weight, area or capacity.</p> <p>Describe several measurable</p>	CC.2.4.K.A.1		<p>Addition</p> <p>Area</p> <p>Capacity</p> <p>Circle</p> <p>Cone</p>

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	<p>and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>		<p>attributes of a single object.</p> <p>Compare two objects with a measurable attribute in common and describe the difference.</p>			<p>Corners (vertices)</p> <p>Cube</p> <p>Cylinder</p> <p>Digit</p> <p>Equal</p> <p>Greater than</p> <p>Length</p> <p>Less than</p> <p>Ones</p> <p>Place value</p> <p>Quantity</p> <p>Rectangle</p> <p>Sides</p> <p>Sphere</p> <p>Square</p> <p>Subtraction</p> <p>Tens</p> <p>Total</p> <p>Triangle</p> <p>Weight</p>
<b>K</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p>	<p>Object Classification and Count</p>	<p>Classify up to 20 objects using one attribute into categories; display the number of objects in each category; count and compare the quantities of each category and describe the difference.</p>	CC.2.4.K.A.4		
<b>1</b>	Numerical quantities, calculations, and	What does it mean to estimate or	Measurement	Order three objects by length; compare the lengths of two	CC.2.4.1.A.1		<p>Addend</p> <p>Addition</p>

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	<p>measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>		<p>objects indirectly by using a third object.</p> <p>Use standard and non-standard units of measure to express the length of an objects a whole number of length units.</p> <p>Understand that the length measurement of an object is the number of same-size length units.</p> <p>Understand that the length measurement of an object is the number of same-size length units.</p>			<p>Analog</p> <p>Circle</p> <p>Compare</p> <p>compose/</p> <p>Cone</p> <p>Counting on</p> <p>Cube</p> <p>Cylinder</p> <p>Data</p> <p>decompose</p> <p>Equal to</p> <p>Fourths</p> <p>Fractions –</p> <p>Greater than</p> <p>Half circles</p> <p>Half-hour</p> <p>Halves</p> <p>Hour</p> <p>Length</p> <p>Less than</p> <p>Making ten</p> <p>Ones</p> <p>Place value</p> <p>Quarter-circles</p> <p>Quarters</p> <p>Rectangle</p> <p>Rectangular Prism</p> <p>Square</p> <p>Subtraction</p> <p>Sum</p> <p>Tens</p>
1	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How precise do measurements and calculations need to be?</p>	Time	<p>Tell and write time in hours and half hours using analog and digital clocks.</p>	CC.2.4.1.A.2		<p>Length</p> <p>Less than</p> <p>Making ten</p> <p>Ones</p> <p>Place value</p> <p>Quarter-circles</p> <p>Quarters</p> <p>Rectangle</p> <p>Rectangular Prism</p> <p>Square</p> <p>Subtraction</p> <p>Sum</p> <p>Tens</p>
1	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>How can data be organized and</p>	Represent and Interpret Data	<p>Organize, represent, and interpret data with up to three categories. Ask and answer questions about the data.</p>	CC.2.4.1.A.4		<p>Trapezoids</p> <p>Triangle</p>

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	<p>representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>					
2	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>	Measurement	<p>Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.</p> <p>Measure the same length with different-sized units then discuss the measurement made with the smaller unit is more than the measurement made with the larger unit and vice versa.</p> <p>Estimate lengths using units of inches, feet, centimeters, and meters.</p> <p>Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.</p>	CC.2.4.2.A.1		<p>A.M.</p> <p>Addend</p> <p>Analog/digital</p> <p>Angles</p> <p>Bar graph</p> <p>Centimeter</p> <p>Compose</p> <p>Decompose</p> <p>Dime</p> <p>Dollar</p> <p>Equation</p> <p>Equivalent</p> <p>Estimate</p> <p>Even</p> <p>Expanded form</p> <p>Faces</p> <p>Feet</p> <p>Fractions – Thirds</p> <p>Hexagon</p> <p>Hundreds</p> <p>Inch</p> <p>Line plot</p> <p>Meter</p>
2	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p>	Time and Money	<p>Tell and write time from analog and digital clocks to the nearest five minutes.</p> <p>Solve word problems involving dollar bills, quarters, dimes,</p>	CC.2.4.2.A.2 CC.2.4.2.A.3		<p>Money</p> <p>Nickel</p> <p>Odd</p> <p>P.M.</p> <p>Penny</p> <p>Pentagon</p>

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		What makes a tool and/or strategy appropriate for a given task?		nickels, and pennies, using \$ and ¢ symbols appropriately.			Picture graph Place value Quadrilateral Quarter Sum
2	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	Represent and Interpret Data	<p>Make a line plot to show measurement data of the lengths of several objects to the nearest whole-number unit.</p> <p>Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in the graph.</p>	CC.2.4.2.A.4		
2	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>	Addition and Subtraction	<p>Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <p>Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, and represent whole-number sums and differences within 100 on a number line diagram.</p>	CC.2.4.2.A.6		
3	Numerical quantities, calculations, and	What does it mean to estimate or analyze numerical quantities?	Measurement	Solve problems.	CC.2.4.3.A.1 CC.2.4.3.A.5	M03.D-M.1.2.1 M03.D-M.1.2.2	Area Denominator

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	<p>measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>		<p>Make estimations.</p> <p>Determine the area of a rectangle as it relates to multiplication and addition.</p> <p>Determine perimeter or side lengths of various polygons.</p> <p>Distinguish between linear and area measurements.</p>	CC.2.4.3.A.6	<p>M03.D-M.1.2.3</p> <p>M03.D-M.3.1.1</p> <p>M03.D-M.3.1.2</p> <p>M03.D-M.4.1.1</p>	<p>Division</p> <p>Equivalent fractions</p> <p>Estimate</p> <p>Fraction</p> <p>Linear</p> <p>Liquid Volume</p> <p>Mass</p> <p>Numerator</p> <p>Pattern</p> <p>Pentagon</p> <p>Perimeter</p> <p>Pictograph</p> <p>Polygon</p> <p>Quadrilateral</p> <p>Rhombus</p> <p>Round</p> <p>Square Unit</p> <p>Tally Chart</p> <p>Temperature</p>
3	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>How precise do measurements and calculations need to be?</p>	Time	<p>Solve problems.</p> <p>Make estimations.</p> <p>Tell and write time to nearest minute.</p> <p>Calculate time intervals.</p>	CC.2.4.3.A.2	<p>M03.D-M.1.1.1</p> <p>M03.D-M.1.1.2</p>	
3	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How precise do measurements and calculations need to be?</p>	Money (Coins and Bills)	<p>Solve problems.</p> <p>Make estimations.</p> <p>Make change using combination of coins and bills.</p>	CC.2.4.3.A.3	<p>M03.D-M.1.3.1</p> <p>M03.D-M.1.3.2</p> <p>M03.D-M.1.3.3</p>	

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<b>3</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p>	Data Displays	<p>Solve problems.</p> <p>Make estimations.</p> <p>Represent and interpret data using various displays.</p>	CC.2.4.3.A.4	<p>M03.D-M.2.1.1</p> <p>M03.D-M.2.1.2</p> <p>M03.D-M.2.1.3</p> <p>M03.D-M.2.1.4</p>	
<b>4</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>	Measurement	<p>Solve problems involving measurements.</p> <p>Convert larger unit to smaller unit.</p> <p>Measure and draw angles.</p> <p>Apply area and perimeter formulas.</p>	<p>CC.2.4.4.A.1</p> <p>CC.2.4.4.A.6</p>	<p>M04.D-M.1.1.1</p> <p>M04.D-M.1.1.2</p> <p>M04.D-M.1.1.3</p> <p>M04.D-M.1.1.4</p> <p>M04.D-M.3.1.1</p> <p>M04.D-M.3.1.2</p>	<p>Acute Angle</p> <p>Angle</p> <p>Decimal</p> <p>Decimal Fraction</p> <p>Equivalence</p> <p>Factor</p> <p>Line</p> <p>Line of symmetry</p> <p>Line Segment</p> <p>Mixed Number</p> <p>Multiple</p> <p>Obtuse Triangle</p> <p>Point</p> <p>Ray</p> <p>Right Angle</p> <p>Symmetry</p> <p>Unit Fraction</p> <p>Weight</p>

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4	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	Data Displays	<p>Translate one type of data display to another.</p> <p>Represent and interpret data involving fractions.</p>	<p>CC.2.4.4.A.2</p> <p>CC.2.4.4.A.4</p>	<p>M04.D-M.2.1.3</p> <p>M04.D-M.2.1.1</p> <p>M04.D-M.2.1.2</p>	
5	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>When is it appropriate to estimate versus calculate?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>Why does “what” we measure influence “how” we measure?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p>	Measurement	Solve problems using simple conversions.	CC.2.4.5.A.1	M05.D-M.1.1.1	<p>Braces</p> <p>Brackets</p> <p>Coordinate Plane</p> <p>Cubic Units</p> <p>Decimal Place Value (through thousandths)</p> <p>Measurement Systems</p> <p>Measurement Units</p> <p>Numerical Expressions</p> <p>Order of Operations</p> <p>Origin</p> <p>Parentheses</p> <p>Scaling (resizing)</p> <p>Unit Fraction</p> <p>Volume</p> <p>X-axis</p>
5	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy</p>	Data Displays	<p>Organize and display data in order to answer questions.</p> <p>Represent and interpret data</p>	CC.2.4.5.A.2	M05.D-M.2.1.2	<p>X-coordinate</p> <p>Y-axis</p> <p>Y-coordinate</p>

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	<p>using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>		<p>using appropriate scale.</p> <p>Solve problems involving computation with fractions using information obtained from data displays.</p>	CC.2.4.5.A.4	M05.D-M.2.1.1	
5	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What makes a tool and/or strategy appropriate for a given task?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated, and/or interpreted?</p>	Volume Three-Dimensional Solids	<p>Apply concepts of volume to solve problems.</p> <p>Relate volume to multiplication and to addition.</p>	CC.2.4.5.A.4  CC.2.4.5.A.5	M05.D-M.2.1.1  M05.D-M.3.1.1 M05.D-M.3.1.2	
6	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data</p>	Data and Distributions	<p>Display data in dot plots, histograms and box-and-whisker plots.</p> <p>Determine quantitative measures of center and variability.</p> <p>Choose the appropriate measure of center and variability for a set of data.</p>	CC.2.4.6.B.1	M06.D-S.1.1.1 M06.D-S.1.1.2 M06.D-S.1.1.3 M06.D-S.1.1.4	<p>Absolute value</p> <p>Algebraic expressions</p> <p>Box and whisker plots</p> <p>Coefficient</p> <p>Compound polygon</p> <p>Dependent variable</p> <p>Distributive property</p> <p>Dot plots</p> <p>Exponent</p> <p>Greatest Common Factor</p> <p>Independent</p>

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	used to make inferences.	analysis be used to make predictions?					variable Inequality Integer Interquartile range Irregular Polygon Least Common Multiple Mean Mean absolute deviation
7	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	Data, Distributions, and Random Sampling	<p>Draw inferences about two populations based on random sampling concepts.</p> <p>Determine and approximate relative frequencies and probabilities of events.</p> <p>Draw informal comparative inferences about two populations using measures of center and measures of variability.</p>	CC.2.4.7.B.1 CC.2.4.7.B.2	M07.D-S.1.1.1 M07.D-S.1.1.2 M07.D-S.2.1.1	<p>Acute triangle</p> <p>Adjacent angles</p> <p>Alternate exterior angles</p> <p>Alternate interior angles</p> <p>Chance event</p> <p>Circumference</p> <p>Complementary angles</p> <p>Compound event</p> <p>Corresponding angles</p> <p>Data distribution</p> <p>decrease</p> <p>Equally likely</p> <p>Equilateral triangle</p> <p>Independent event</p> <p>Isosceles triangle</p> <p>Likely event</p> <p>Linear expression</p> <p>Obtuse triangle</p> <p>Outcome</p> <p>Percent increase and</p> <p>Population</p> <p>Probability</p> <p>Process of chance</p> <p>Proportion</p> <p>Random sample</p>
7	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p>	<p>What makes a tool and/or strategy appropriate for a given task?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How can data be organized and represented to provide insight into the relationship between</p>	Probability	<p>Find probabilities of independent compound events.</p> <p>Predict the approximate relative frequency given the probability.</p> <p>Find the probability of a simple event, including the probability of a simple event not occurring.</p>	CC.2.4.7.B.3	M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3	<p>Independent event</p> <p>Isosceles triangle</p> <p>Likely event</p> <p>Linear expression</p> <p>Obtuse triangle</p> <p>Outcome</p> <p>Percent increase and</p> <p>Population</p> <p>Probability</p> <p>Process of chance</p> <p>Proportion</p> <p>Random sample</p>

## PA Core Standards For Mathematics

### 2.4 Measurement, Data and Probability PreK-12

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
	<p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>quantities?</p> <p>How can probability and data analysis be used to make predictions?</p>					<p>Relative frequency</p> <p>Repeating decimal</p> <p>Scale drawing</p> <p>Scalene triangle</p>
<b>8</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>What does it mean to estimate or analyze numerical quantities?</p> <p>What makes a tool and/or strategy appropriate for a given task?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	Data and Distributions	<p>Construct, analyze, and interpret bivariate data displayed in scatter plots.</p> <p>Identify and use linear models to describe bivariate measurement data.</p> <p>Use frequencies to analyze patterns of association seen in bivariate data.</p>	<p>CC.2.4.8.B.1</p> <p>CC.2.4.8.B.2</p>	<p>M08.D-S.1.1.1</p> <p>M08.D-S.1.1.2</p> <p>M08.D-S.1.1.3</p> <p>M08.D-S.1.2.1</p>	<p>Bivariate data</p> <p>Clustering</p> <p>Coefficient</p> <p>Cone</p> <p>Congruence</p> <p>Congruent figures</p> <p>Cube root</p> <p>Cylinder</p> <p>Dilations</p> <p>Function</p> <p>Irrational number</p> <p>Line of best fit</p> <p>Linear association</p> <p>Linear equation</p> <p>Negative correlation</p> <p>Non-Linear association</p> <p>Outlier</p> <p>Perfect cube</p> <p>Perfect square</p> <p>Positive correlation</p> <p>Pythagorean theorem</p> <p>Rate of change</p> <p>Rational number</p> <p>Reflection</p> <p>Relation</p> <p>Rotation</p>

**PA Core Standards For Mathematics**  
**2.4 Measurement, Data and Probability PreK-12**

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
							Scatterplot Scientific notation Similarity Simultaneous linear equations Slope Sphere Square root Transformation Translation Two-way table y-intercept
<b>ALG 1</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Patterns exhibit relationships that can be extended, described, and generalized.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p> <p>How can patterns be used to describe relationships in mathematical situations?</p> <p>How can recognizing repetition or regularity assist in solving problems more efficiently?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	<p>Categorical and Quantitative Data</p>	<p>Analyze a set of data for a pattern, and represent the pattern with an algebraic rule and/or a graph.</p> <p>Summarize, represent, and interpret single-variable data and two-variable data.</p> <p>Use measures of dispersion to describe a set of data (range, quartiles, interquartile range).</p> <p>Analyze and/or interpret data displays and/or use them to make predictions (circle graph, line graph, bar graph, box-and-whisker plot, stem-and-leaf plot, scatter plot).</p> <p>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.</p>	<p>CC.2.4.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.4.HS.B.5</p>	<p>A1.2.3.1.1 A1.2.3.2.1 A1.2.3.2.2 A1.2.3.2.3 A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2 A1.2.2.2.1</p>	<p>Absolute Value Additive Inverse Additive Property of Equality Algorithm Arithmetic Sequence Associative Property Asymptote Bar Graph Binomial Bivariate Data Boundary Line Bounded Region Circle Graph Coefficient Commutative Property Composite Number Compound Event Compound Inequality Degree (of polynomial) Dependent Events Domain (of Relation</p>

**PA Core Standards For Mathematics**  
**2.4 Measurement, Data and Probability PreK-12**

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
<b>ALG 1</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>	Probability	<p>Calculate and/or make predictions based upon measures of central tendency.</p> <p>Apply probability to practical situations, including compound events.</p> <p>Recognize and evaluate random processes underlying statistical experiments</p> <p>Apply the rules of probability to compute probabilities of compound events in a uniform probability model.</p>	<p>CC.2.4.HS.B.4</p> <p>CC.2.4.HS.B.7</p>	A1.2.3.3.1	<p>or Function)</p> <p>Equivalent</p> <p>Exponential</p> <p>Equation</p> <p>Exponential</p> <p>Expression</p> <p>Exponential</p> <p>Function</p> <p>Exponential</p> <p>Growth/Decay</p> <p>Extrapolate</p> <p>Frequency</p> <p>Function</p> <p>Geometric</p> <p>Sequence</p> <p>Half-Plane</p> <p>Independent Events</p> <p>Independent</p> <p>Variable</p> <p>Index</p> <p>Interpolate</p> <p>Interquartile Range</p> <p>Inverse (of a Relation)</p> <p>Inverse Operation</p> <p>Maximum Value (of a Graph)</p> <p>Measure of Central Tendencies</p> <p>Measure of</p> <p>Dispersion</p> <p>Minimum Value (of a Graph)</p> <p>Multiplicative</p> <p>Inverse</p> <p>Multiplicative</p> <p>Property of Equality</p> <p>Multiplicative</p> <p>Property of Zero</p> <p>Mutually Exclusive</p> <p>Event</p>

**PA Core Standards For Mathematics**  
**2.4 Measurement, Data and Probability PreK-12**

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
							Negative Exponent Odds Outlier Point-Slope Form Polynomial Function Positive Exponents Probability of Compound Events Quadrants Quadratic Functions Quartile Radical Expression Range Rate (of Change) Relation Repeating Decimal Scatterplot Simple Event Simplest form (of an Expression) Slope-Intercept Form Standard Form (of a Linear Equation) Substitution Method Systems of Linear Equations Systems of Linear Inequalities Terminating Decimal Test Point Trinomial Unbounded Region
<b>ALG 2</b>	Numerical quantities, calculations, and measurements can be	What makes a tool and/or strategy appropriate for a given	Data	Analyze a set of data for a pattern, and represent the pattern with an algebraic	CC.2.3.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3	A2.2.1.1.1 A2.2.1.1.2 A2.2.3.1.1	Asymptote Binomial Combination

**PA Core Standards For Mathematics**  
**2.4 Measurement, Data and Probability PreK-12**

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
	<p>estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Patterns exhibit relationships that can be extended, described, and generalized.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>task?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p> <p>How precise do measurements and calculations need to be?</p> <p>How can patterns be used to describe relationships in mathematical situations?</p> <p>How can recognizing repetition or regularity assist in solving problems more efficiently?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>		<p>rule and/or a graph.</p> <p>Summarize, represent, and interpret single-variable data (including standard deviation) and two-variable data.</p> <p>Analyze and/or interpret data on a scatter plot and/or use it to make predictions (e.g., regression).</p> <p>Recognize and evaluate random processes underlying statistical experiments.</p> <p>Make inferences and justify conclusions based on sample surveys, experiments, and observational studies.</p> <p>Use the concepts of independence and conditional probability to interpret data.</p>	<p>CC.2.4.HS.B.4</p> <p>CC.2.4.HS.B.5</p> <p>CC.2.4.HS.B.6</p> <p>CC.2.4.HS.B.7</p>	A2.2.3.1.2	<p>Common Logarithm</p> <p>Complex Number System</p> <p>Compound Events</p> <p>Dependent/Independent Events</p> <p>Dilation</p> <p>Exponential</p> <p>Exponential Decay</p> <p>Exponential Function</p> <p>Exponential Growth</p> <p>Expression</p> <p>Extrema</p> <p>Geometric Sequence</p> <p>Imaginary Number</p> <p>Increasing/Decreasing Intervals</p> <p>Intercept</p> <p>Inverse of a Function</p> <p>Logarithm</p> <p>Natural Logarithm</p> <p>Negative Exponents</p> <p>Observational Study</p> <p>Outcomes</p> <p>Perfect Square</p> <p>Trinomial</p> <p>Permutation</p> <p>Polynomial</p> <p>Polynomial Identity</p>
<b>ALG 2</b>	<p>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.</p> <p>Measurement attributes</p>	<p>What makes a tool and/or strategy appropriate for a given task?</p> <p>In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted?</p>	Probability	<p>Apply the rules of probability to compute probabilities of compound events.</p> <p>Calculate probability and/or odds.</p> <p>Use combinations,</p>	<p>CC.2.4.HS.F.3</p> <p>CC.2.4.HS.F.5</p>	<p>A2.2.3.2.1</p> <p>A2.2.3.2.2</p> <p>A2.2.3.2.3</p>	<p>Probability</p> <p>Quadratic Formula</p> <p>Quadratic Function</p> <p>Radical Functions</p> <p>Rational Functions</p> <p>Reflection</p> <p>Regression Models</p> <p>Root Functions</p> <p>Sample Survey</p>

**PA Core Standards For Mathematics**  
**2.4 Measurement, Data and Probability PreK-12**

Grade	Big Idea	Essential Questions	Concepts	Competencies	Standard	Eligible Content	Vocabulary
	<p>can be quantified, and estimated using customary and non-customary units of measure.</p> <p>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.</p> <p>Data can be modeled and used to make inferences.</p>	<p>How precise do measurements and calculations need to be?</p> <p>How can data be organized and represented to provide insight into the relationship between quantities?</p> <p>How does the type of data influence the choice of display?</p> <p>How can probability and data analysis be used to make predictions?</p>		<p>permutations, and the fundamental counting principle to solve problems involving probability.</p>			<p>Scatterplot  Standard Deviation  Statistical  Experiment  Transformation  Translations  Trinomial  Unit Circle</p>