| Course/Subject: Math Comprehensive | Grade Level: 6 |
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| **Textbook(s)/Materials Used:** Ready Pennsylvania Math Instruction, Practice Problem Solving, Assessment, i-Ready Diagnostic & Instruction | |
| **Month(s):** August | **Unit 0** |
| **Expressions and Equations** | |

| **Big Idea** | **Standard** | **Eligible Content** | **Essential Questions & Lesson Essential Question** | **Concepts** | **Vocabulary** | **Competencies** |
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| | | | Routine Objectives:<br><br>Use best practices during a Ready mathematics lesson. Identify and explain models or strategies used to solve problems.<br><br>Critique and compare solution strategies of others and those provided in Ready.<br><br>Use math talk practices to efficiently share and compare strategies for solving problems.<br><br>Apply math knowledge and modeling techniques to new, similar problems.<br><br>Mathematical Objectives:<br>Convert measurement from a larger unit to a smaller unit within the same system. | | Convert<br>Numerator<br>Denominator<br>Unit Fraction | |

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| | | | Solve world problems involving division of whole numbers in which the quotient is a fraction or mixed number.<br><br>Represent and solve real-world problems involving division of whole numbers by unit fractions. | | | |

| **Month(s):** September | | | **Unit 1** | | | |
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| **Ratios and Proportional Relationships** | | | | | | |
| **Big Idea** | **Standard** | **Eligible Content** | **Essential Questions & Lesson Essential Question** | **Concepts** | **Vocabulary** | **Competencies** |
| Mathematical relationships among numbers can be represented, compared, and communicated.<br><br>Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.<br><br>Numerical quantities, calculations, and measurements can be estimated | CC.2.1.6.D.1 Understand ratio concepts and use ratio reasoning to solve problems. | M06.A-R.1.1.1 Use ratio language and notation (such as 3 to 4, 3:4, ¾) to describe a ratio relationship between two quantities.<br><br>M06.A-R.1.1.2 Find the unit rate a/b associated with a ratio a:b (with b ≠ 0) and use rate language in the context | Lesson 1<br>Understand the concept of a ratio as a way of expressing relationships between quantities.<br>Write a ratio to describe the relationship between two quantities.<br>Write a ratio using three different formats: a to b, a/b, a:b Use ratio language, e.g., for every, for each.<br><br>Lesson 2<br>Use the concept of a unit rate.<br>Use rate and unit rate language.<br>Find rates and unit rates.<br><br>Lesson 3<br>Use a table to find equivalent ratios. | Ratios<br>Proportions<br>Percent | Ratio<br>Rate<br>Unit Rate<br>Equivalent Ratios<br>Unit price<br>Percent | Ratios<br>Unit Rate<br>Equivalent Ratios |

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| or analyzed by using appropriate strategies and tools.<br><br>Patterns exhibit relationships that can be extended, described, and generalized. | | of a ratio relationship.<br><br>M06.A-R.1.1.3 Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.<br><br>M06.A-R.1.1.4 Solve unit rate problems including those involving unit pricing and constant speed.<br><br>M06.A-R.1.1.5 Find a percent of a quantity as a rate per | Find missing values in equivalent ratio tables.<br>Plot the pairs of values in a table on a coordinate plane.<br>Use a table and graph to reason about equivalent ratios.<br>Use a table and graph to compare ratios.<br><br>Lesson 4<br>Solve unit rate problems about unit pricing.<br>Solve unit rate problems involving constant speed.<br>Use ratio reasoning to convert measurement units within the same system.<br><br>Lesson 5<br>Understand the percent as a rate per hundred.<br>Find a percent of a quantity as a rate per hundred.<br>Solve percent problems involving finding the whole.<br><br>How is mathematics used to quantify, compare, represent and model numbers?<br><br>How can mathematics support effective communication?<br><br>How are relationships represented mathematically?<br><br>How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? | | | |

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| | | 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percentage. | What makes a tool and/or strategy appropriate for a given task?<br><br>How can patterns be used to describe relationships in mathematical situations? | | | |

| **Month(s):** October/November | | | **Unit 2** | | | |
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| **The Number System** | | | | | | |
| **Big Idea** | **Standard** | **Eligible Content** | **Essential Questions & Lesson Essential Question** | **Concepts** | **Vocabulary** | **Competencies** |
| Mathematical relationships among numbers can be represented, compared, and communicated.<br><br>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. | CC.2.1.6.E.1 Apply and extend previous understandings of multiplication and division to divide fractions by fractions.<br><br>CC.2.1.6.E.2 Identify and choose appropriate processes to compute fluently with multi-digit numbers. | M06.A-N.1.1.1 Interpret and compute quotients and fractions (including mixed numbers), and solve word problems involving division of fractions by fractions.<br><br>M06.A-N.2.1.1 Solve problems | Lesson 6<br>Understand the meanings of division.<br>Use a model to show division of fractions.<br>Use an understanding of multiplication of fractions to explain division of fractions.<br><br>Lesson 7<br>Solve word problems using division of fractions.<br>Write an equation to solve a problem using division of fractions.<br>Write a story problem that will use division of fractions. | Number Theory Concepts<br>Operations<br>Integers<br>Other Rational Numbers | Multiplication Inverse<br>Reciprocal<br>Greatest Common Factor<br>Least Common Multiple<br>Positive Numbers<br>Negative numbers<br>Signed Numbers<br>Opposite Numbers<br>Integers<br>Absolute Value | Solve problems and compute fluently with whole numbers and decimals.<br><br>Find common multiples and factors including greatest common factor and least common multiple.<br><br>Use the distributive property to express a sum of two numbers. |

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| Mathematical relationships among numbers can be represented, compared, and communicated.<br><br>Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.<br><br>Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. | CC.2.1.6.E.3 Develop and/or apply number theory concepts to find common factors and multiples.<br><br>CC.2.1.6.E.4 Apply and extend previous understandings of numbers to the system of rational numbers. | involving operations (+, -, X, and ÷) with whole numbers, decimals through thousandths), straight computation, or word problems.<br><br>M06.A-N.2.2.1 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12.<br><br>M06.A-N.2.2.2 Apply the distributive property to express sum of two whole numbers, 1 through 100, with a common factor as a multiple of a | Lesson 7A<br>Add and subtract multi-digit whole numbers.<br>Multiply multi-digit whole numbers.<br>Solve one- and two- step problems involving whole number computation.<br><br>Lesson 8<br>Fluently divide multi-digit numbers using the standard algorithm. (4-digit by 2-digit)<br>Understand how to set up a problem based on the context of the problem.<br>Be able to interpret what the quotient represents.<br>Recognize that what is known or not known is based on the type of division needed (partitive: Total/Number of groups = size of groups; quotative or measurement: total/size of group = number of groups).<br><br>Lesson 9<br>Understand role of place value in the operations of addition and subtraction.<br>Identify when it is appropriate to use the standard algorithm.<br>Estimate sums and differences before using the standard algorithm, and use these sums and differences to check reasonableness of answers.<br>Add and subtract multi-digit decimals. | | Quadrants | Use positive and negative numbers to represent quantities in real world contexts.<br><br>Plot integers and other rational numbers on a number line and on a coordinate graph.<br><br>Interpret the opposite and absolute value of an integer as its distance from zero on a number line<br><br>Compare and order rational numbers. |

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| | | sum of two whole numbers with no common factor.<br><br>M06.A-N.2.2.2 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.<br><br>M06.A-N.3.1.1 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation | Model the operations of addition and subtraction with manipulatives, diagrams, and story contexts for multi-digit decimals.<br><br>Lesson 10:<br>Fluently multiply and divide multi-digit decimals using the standard algorithm for each operation.<br>Understand the role of place value in the operations of multiplication and division.<br>Identify when it is appropriate to use the standard algorithm.<br>Use estimation to approximate products and quotients to check for reasonableness of answers.<br>Model the operations of multiplication and division with manipulatives, diagrams, and story contexts for multi-digit decimals.<br><br>Lesson 11:<br>Understand that greatest common factor (GCF) and least common multiple (LCM) are ways to discuss number relationships in multiplication and division.<br>Use the distributive property to express a sum of two numbers with a common factor as a multiple of a sum of two whole numbers with no common factor.<br>Find the GCF of two whole numbers less than or equal to | | | |

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| | | above/below sea level, credits/debits, positive/negative electric charge).<br><br>M06.A-N.3.1.2 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., -(-3)=3; 0 is its own opposite).<br><br>M06.A-N.3.2.1 Write, interpret, and explain statements of order for rational numbers in real-world contexts.<br><br>M06.A-N.3.2.2 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a | 100 and the LCM of two whole numbers less than or equal to 12.<br>Model factorization of whole numbers 1-100.<br><br>Lesson 12<br>Relate positive and negative numbers to the real world.<br>Understand integers and other rational numbers as points on a number line.<br>Understand the sign of a number indicates its direction on the number line from zero.<br>Recognize that the opposite of an opposite of a number is the number itself; 0 is its own opposite.<br><br>Lesson 13:<br>Write, interpret and explain statements of order for rational numbers.<br>Understand absolute value of a rational number as the distance from 0 on the number line.<br>Interpret absolute value as the magnitude of the number from 0 in a real-world situation.<br>Distinguish comparisons of absolute value from statements about order.<br><br>Lesson 14<br>Identify the origin and four quadrants of the coordinate plane. Plot ordered pairs in all quadrants. | | | |

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| | | magnitude for a positive or negative quantity in a real-world situation<br><br>M06.A-N.3.1.3 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.<br><br>M06. A=N.3.2.3 Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Includ e use of coordinates and absolute value to find distances between | Use the signs of coordinates to locate points in the quadrants.<br>Recognize that if the coordinates only differ by the signs, the points are reflections across one or both axes.<br>Use coordinates and absolute values to find distances between points.<br>Solve real-world problems by graphing points in all quadrants.<br><br>How is mathematics used to quantify, compare, represent, and model numbers?<br><br>How can mathematics support effective communication?<br><br>What does it mean to estimate or analyze numerical quantities?<br><br>What makes a tool and/or strategy appropriate for a given task?<br><br>How is mathematics used to quantify, compare, represent, and model numbers?<br><br>How can mathematics support effective communication?<br><br>How are relationships represented mathematically?<br><br>How can expressions, equations and inequalities be used to quantify, solve, model | | | |

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| | | points with the same first coordinate or the same second coordinate. | and/or analyze mathematical situations?<br><br>What makes a tool and/or strategy appropriate for a given task? | | | |
| **Month(s):** December/January | | | **Unit 3** | | | |
| **Expressions and Equations** | | | | | | |
| **Big Idea** | **Standard** | **Eligible Content** | **Essential Questions & Lesson Essential Question** | **Concepts** | **Vocabulary** | **Competencies** |
| Mathematical relationships among numbers can be represented, compared, and communicated.<br><br>Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.<br><br>Patterns exhibit relationships that can be extended, described, and generalized.<br><br>Mathematical relationships | CC.2.2.6.B.1 Apply and extend previous understandings of arithmetic to algebraic expressions.<br><br>CC.2.2.6.B.2 Understand the process of solving a one-variable equation or inequality and apply to real-world and mathematical problems.<br><br>CC.2.2.6.B.3 Represent and analyze quantitative relationships between | M06.B-E.1.1.1 Write and evaluate numerical expressions involving whole-number exponents.<br><br>M06.B-E.1.1.2 Write algebraic expressions from verbal descriptions.<br><br>M06.B-E.1.1.3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, | Lesson 15<br>Write numerical expressions involving whole-number exponents.<br>Evaluate numerical expressions involving whole-number exponents.<br><br>Lesson 16<br>Write, read and evaluate variable expressions.<br>Apply the order of operations on expressions with variables, including those with exponents.<br>Translate an expression from its word form to algebraic expressions and vice versa.<br>Identify parts of expressions using appropriate mathematical vocabulary.<br><br>Lesson 17 | Algebraic Expressions<br><br>Algebraic Equations | Base<br>Exponent<br>Exponential Expression<br>Coefficient<br>Constant<br>Variable<br>Term<br>Variable Term<br>Commutative property of addition<br>Associative property of addition.<br>Distributive property<br>Like Terms<br>Equation<br>Inequality<br>Dependent Variable<br>Independent Variable | Write, identify and evaluate numerical expressions involving exponents.<br><br>Write, read and evaluate algebraic expressions.<br><br>Apply the properties of operations to generate equivalent expressions.<br><br>Represent and analyze quantitative relationships between Independent and dependent variables. |

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| among numbers can be represented, compared, and communicated.<br><br>Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations.<br><br>Patterns exhibit relationships that can be extended, described, and generalized.<br><br>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions | dependent and independent variables. | factor, quotient, coefficient, quantity).<br><br>M06.B-E.1.1.4 Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems.<br><br>M06.B-E.2.1.2 Write algebraic expressions to represent real-world or mathematical problems.<br><br>M06.B-E.1.1.5 Apply the properties of operations to generate equivalent expressions.<br><br>M06.B-E.2.1.1 Use substitution to determine whether a given number | Understand that the properties used with numbers also apply to expressions with variables.<br>Recognize and generate equivalent expressions.<br>Substitute values into expressions to prove equivalency.<br><br>Lesson 18<br>Use models to write and solve equations.<br>Use substitution to determine whether a given number in a specified set makes an equation true.<br><br>Lesson 19<br>Recognize that real-world mathematical problems can be expressed using a variable to represent an unknown.<br>Recognize that both sides of an equation are equal, and whatever operation is performed on one side of the equation must be done on the other side to maintain the equality.<br>Write and solve equation that represent real-world mathematical problems that use variables and involve non-negative rational numbers.<br><br>Lesson 20<br>Write an inequality that represents real-world mathematical problems containing a constraint or a condition ( < , > ). | | | Solve and interpret one variable equations or inequalities in real world and mathematical problems. |

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| | | in a specified set makes an equation or inequality true.<br><br>M06.B-E.2.1.3 Solve real-world and mathematical problems by writing and solving equations of the form x+p=q and px=q for cases in which p,q, and x are all non-negative rational numbers.<br><br>M06.B-E.2.1.4 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines. | Recognize that a variable can stand for an infinite number of solutions when used in inequalities.<br>Use substitution to determine whether a given number in a specified set makes an equation or inequality true.<br>Represent inequalities on a number line.<br><br>Lesson 21<br>Recognize that a change in the independent variable creates a change in the dependent variable.<br>Make a table, graph, or equation to represent a problem context.<br>Identify relationships between tables, graphs and equations.<br>Recognize when quantitative relationships between dependent and independent variables are linear.<br><br>Use models to write and solve equations.<br>Use substitution to determine whether a given number in a specified set makes an equation true.<br><br>How is mathematics used to quantify, compare, represent, and model numbers?<br><br>How are relationships represented mathematically? | | | |

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| | | M06.B-E.3.1.1 Write an equation to express the relationship between the dependent and independent variables.<br><br>M06.B-E.3.1.2 Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation. | How can mathematics support effective communication?<br><br>How can recognizing repetition or regularity assist in solving problems more efficiently?<br><br>How is mathematics used to quantify, compare, represent, and model numbers?<br><br>How can mathematics support effective communication?<br><br>How are relationships represented mathematically?<br><br>How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?<br><br>How can recognizing repetition or regularity assist in solving problems more efficiently?<br><br>How can data be organized and represented to provide insight into the relationship between quantities? | | | |
| **Month(s):** February/March | | | **Unit 4** | | | |
| **Geometry** | | | | | | |
| **<u>Big Idea</u>** | **<u>Standard</u>** | **<u>Eligible Content</u>** | **<u>Essential Questions & Lesson Essential Question</u>** | **<u>Concepts</u>** | **<u>Vocabulary</u>** | **<u>Competencies</u>** |

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| Patterns exhibit relationships that can be extended, described, and generalized.<br><br>Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization. | CC.2.3.6.A.1 Apply appropriate tools to solve real-world problems involving area, surface area, and volume. | M06.C-G.1.1.1 Determine the area of triangles and special quadrilaterals (i.e., squares, rectangles, parallelogram, rhombus, and trapezoid).<br><br>M06.C-G.1.1.2 Determine the area of irregular or compound polygons.<br><br>M06.C-G.1.1.4 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals)<br><br>M06.C-G.1.1.5 | Lesson 22:<br>Relate the area of triangles and the area of rectangles<br>Identify the relationship between bases and heights of polygons.<br>Decompose and compose polygons into rectangles and triangles to find the area.<br>Use formulas to find the areas of triangles and special quadrilaterals.<br><br>Lesson 23<br>Understand that a line segment from one coordinate pair to another represents a distance.<br>Understand that if two points have the same x or y coordinates they are on the same vertical or horizontal line.<br>Find the vertical or horizontal distance between two points on the coordinate plane.<br>Plot points in all four quadrants of the Cartesian coordinate plane.<br>Plot a polygon in the Cartesian coordinate plane with given coordinates.<br><br>Lesson 24<br>Recognize that surfaces of some three-dimensional shapes are composed of two dimensional faces (polygons).<br>Use a net to represent a 3-D figure (polyhedron).<br>Use a net and a formula to find the surface area of a | Area<br>Surface Area<br>Volume | Polygon<br>Compound polygon<br>Irregular Polygon<br>Base<br>Net<br>Surface Area<br>Triangular Prism<br>Pyramid | Determine the area of triangles, quadrilaterals, irregular polygons and compound polygons.<br><br>Calculate the area of a polygon on a plane given the coordinates of the vertices.<br><br>Find volumes of right rectangular prisms with fractional edge lengths.<br><br>Use nets to find surface area of 3 – dimensional figures. |

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| | | Represent three dimensional figures using nets made of rectangles and triangles.<br><br>M06.C-G.1.1.6 Determine the surface area of triangular and rectangular prisms (including cubes).<br><br>M06.C-G.1.1.3 Determine the volume of right rectangular prisms with fractional edge lengths. | polyhedron made up of rectangles and triangles.<br><br>Lesson 25<br>Measuring with fractional units requires relating volume to multiplication with fractions.<br>Use these formulas V=lwh and V=BH<br>Prove that the volume formula works by creating diagrams of prisms with unit fraction edge lengths and showing how unit fraction cubes pack them.<br><br>How can recognizing repetition or regularity assist in solving problems more efficiently?<br><br>How are spatial relationships, including shape and dimension, used to draw, construct, model, and represent real situations or solve problems?<br><br>How can the application of the attributes of geometric shapes support mathematical reasoning and problem solving?<br><br>How can geometric properties and theorems be used to describe, model, and analyze situations? | | | |

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| **Month(s):** April/May | **Unit 5** |
| **Statistics and Probability** | |

| **Big Idea** | **Standard** | **Eligible Content** | **Essential Questions & Lesson Essential Question** | **Concepts** | **Vocabulary** | **Competencies** |
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| Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.<br><br>Mathematical relations and functions can be modeled through multiple representations and analyzed to raise and answer questions.<br><br>Data can be modeled and used to make inferences. | CC.2.4.6.B.1 Demonstrate an understanding of statistical variability by displaying, analyzing, and summarizing distributions. | M06.D-S.1.1.4 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.<br><br>M06.D-S.1.1.2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).<br><br>M06.D-S.1.1.1 Display numerical data in plots on a number line, including line plots, histograms, | Lesson 26<br>Understand that data generated from statistical questions will vary.<br>Recognize that responses to statistical questions have variations that can be used to draw conclusions about the data set.<br>Identify the difference between a statistical and non-statistical question.<br>Create models that represent the data from statistical questions such as charts and tables.<br><br>Lesson 27<br>Understand that a data distribution can be viewed by its center (mean, median and mode), spread (range), and overall shape, and it can be analyzed by its distribution.<br>Understand that the mean, median, and mode of a set of numerical data are measures of center of that set of data.<br>Understand that the range of a set of numerical data is a measure of how the data varies.<br><br>Lesson 28<br>Create line plots, histograms, and box plots, including labeling and scaling axes appropriately. | Data Distributions | Statistical Questions<br>Cluster<br>Skewed left<br>Skewed right<br>Symmetrical graphs<br>Peak<br>Outlier<br>Mean<br>Median<br>Mode<br>Range<br>Dot plots<br>Mean absolute deviation (MAD)<br>Lower quartile<br>Upper quartile<br>Box plot<br>Interquartile Range (IQR) | Display data in dot plots, histograms and box-and whisker plots.<br><br>Determine quantitative measures of center and variability.<br><br>Choose the appropriate measure of center and variability for a set of data. |

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| | | and box-and-whisker plots.<br><br>M06.D-S.1.1.3 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered. | Know when data are best represented on line plots, histograms, or box plots.<br>Describe the overall pattern of data, determine variability, and identify striking deviations from the overall pattern.<br><br>Lesson 29:<br>Interpret a set of numerical data by noticing and describing patterns and deviations.<br>Understand mean absolute deviation (MAD)<br>Determine variability (IQR, MAD)<br><br>What does it mean to estimate or analyze numerical quantities?<br><br>What makes a tool and/or strategy appropriate for a given task?<br><br>How can data be organized and represented to provide insight into the relationship between quantities?<br><br>How does the type of data influence the choice of display?<br><br>How can probability and data analysis be used to make predictions? | | | |