

Mathematics Grade 7 focuses on four critical areas:

(1) Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. Students graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope. They distinguish proportional relationships from other relationships.

(2) Students develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percent as different representations of rational numbers. Students extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers. They use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

(3) Students continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects. In preparation for work on congruence and similarity in Grade 8 they reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions, and they gain familiarity with the relationships between angles formed by intersecting lines. Students work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections. They solve real world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.

(4) Students build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. They begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.

Math 7 – YEAR-AT-A-GLANCE 2015 – 2016

Content		
	Core Standard and Objective	Correlated Assignments
Quarter 1 Math 7	<p>The Number System 7.NS D2 Cluster1: Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers. 7.NS.1: Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram. 7.NS.1.a: Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged. 7.NS.1.b: Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 are additive inverses. Interpret sums of rational numbers by describing real-world contexts. 7.NS.1.c: Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. 7.NS.1.d: Apply properties of operations as strategies to add and subtract rational numbers. 7.NS.2.a: Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts. 7.NS.2.b: Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with nonzero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real world contexts. 7.NS.2.c: Apply properties of operations as strategies to multiply and divide rational numbers. 7.NS.2.d: Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats. 7.NS.3: Solve real-world and mathematical problems involving the four operations with rational numbers.</p> <p>Expressions and Equations 7.EE D3 Clusters 1-4 Use properties of operations to generate equivalent expressions. 7.EE.1: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. 7.EE.4: Use variables to represent quantities in a real-world or mathematical problem, and construct simple <u>equations</u> and inequalities to solve problems by reasoning about the quantities. 7.EE.4.a: Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? 7.EE.4b: Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$ where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. <i>For example: As a salesperson, you are paid \$50 per week plus \$3 per sale. This week you want to make at least \$100. Write an inequality for the number of sales you need to make, and describe the solutions.</i></p>	<p>Chapter 4: Adding Subtracting Integers & Rational Numbers (~ 2 Weeks) Lesson 4-1 Rational Numbers, Opposites and Absolute Values (1 Day) Lesson 4-2 Adding Integers (2 Days) Lesson 4-3 Adding Rational Numbers (2 Days) Lesson 4-4 Subtracting Integers (2 Days) Lesson 4-5 Subtracting Rational Numbers (1 Day) Lesson 4-6 Distance on a Number Line (1 Day) Lesson 4-7 Problem Solving (Embedded) Topic Review (2 Days) Topic Assessment (1 Day)</p> <p>Chapter 5: Multiplying & Dividing Rational (~ 2 Weeks) Lesson 5-1 Multiplying Integers (2 Days) Lesson 5-2 Multiplying Rational Numbers (2 Days) Lesson 5-3 Dividing Integers (1 Day) Lesson 5-4 Dividing Rational Numbers (1 Day) Lesson 5-5 Operations on Rational Numbers - Order of Operations (1 Day) - Distributive Property (1 Day) Lesson 5-6 Problem Solving (Embedded) Topic Review (1 Day) Topic 1 Assessment (1 Day)</p> <p>Chapter 7: Simplifying Expressions (~ 2 weeks) Lesson 7-1 Expanding Algebraic Expressions (2 Days) Lesson 7-2 Factoring Algebraic Expressions (2 Days) Lesson 7-3 Adding Algebraic Expressions (1 Day) Lesson 7-4 Subtracting Algebraic Expressions (1 Day) Lesson 7-5 Problem Solving (Embedded) Topic Review (1 day) Topic Assessment (1 Day)</p>

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Quarter 1 Math 7		<p>Chapter 8: Solving Equations (~ 2 weeks) Lesson 8-1 Solving Simple Equations (2 Days) Lesson 8-2 Writing Two-Step Equations (1 Day) Lesson 8-3 Solving Two-Step Equations (2 Days) Lesson 8-4 Solving Using the Distributive Property (2 Days) Lesson 8-5 Problem Solving (Embedded) Topic Review (1 Day) Topic Assessment (1 Day)</p> <p>Chapter 9: Solving Inequalities (~ 2 weeks) Introduction/Review of Inequalities Basics & Graphing (1 Day) Lesson 9-1 Solving Inequalities Using Addition or Subtraction (1 Day) Lesson 9-2 Solving Inequalities Using Multiplication and Division (2 Days) Lesson 9-3 Solving Two-Step Inequalities (2 Days) Lesson 9-4 Solving Multi-Step Inequalities (1 Day) Lesson 9-5 Problem Solving (Embedded) Topic Review (2 Days) Topic Assessment (1 Day)</p>

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Quarter 2 Math 7	<p>The Number System 7.NS.2d: Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in zeros or eventually repeats.</p> <p>Ratios and Proportional Relationships D1 Cluster1: Analyze proportional relationships and use them to solve real-world and mathematical problems. 7.RP.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. <i>For example, if a person walks $\frac{1}{2}$ mile in $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $\frac{1/2}{1/4}$ miles per hour, equivalently 2 miles per hour.</i> 7.RP.2: Recognize and represent proportional relationships between quantities 7.RP.2.a: Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graph in on a coordinate plane and observing whether the graph is a straight line through the origin. 7.RP.2.b: Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 7.RP.2.c: Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as $t = pn$ 7.RP.2.d: Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0,0)$ and $(1,r)$ where r is the unit rate. 7.RP.3: Use proportional relationships to solve multistep ratio and percent problems.</p> <p>Geometry 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 7.G.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.</p> <p>Equations and Expressions 7.EE D3 Clusters 4 Use properties of operations to generate equivalent expressions 7.EE.2: Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. <i>For example, $a + 0.05a = 1.05a$ means that "increase by 5%" is the same as "multiply by 1.05."</i> 7.EE.3: Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between form as as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. <i>For example: If a woman making \$25 an hour gets a 10% raise, she will make an additional $\frac{1}{10}$ of her salary and hour, or \$2.50, for a new salary of \$27.50. If you want to place a towel bar $9\frac{3}{4}$ inches long in the center of a door that is $27\frac{1}{2}$ inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.</i> 7.EE.4: Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.</p>	<p>Chapter 1: Ratios & Rates (~ 2 Weeks) Lesson 1-1 Equivalent Ratios (1 Day) Lesson 1-2 Unit Rates (2 Days) Lesson 1-3 Complex Ratios (2 Days) Lesson 1-4 Unit Rates with Fractions (1 Day) Lesson 1-5 Problem Solving (Embedded) Topic Review (2 Days) Topic Assessment (1 Day)</p> <p>Chapter 2: Proportional Relationships (~ 2 Weeks) Lesson 2-1 Proportional Relationship and Tables (1.5 Days) Lesson 2-2 Proportional Relationships and Graphs (1.5 Days) Lesson 2-3 Constant of Proportionality (1 Day) Lesson 2-4 Proportional Relationships and Equations (2 Days) Lesson 2-5 Maps and Scale Drawings (2 Days) Lesson 2-6 Problem Solving (Embedded) Topic Review (1 Day) Topic Assessment (1 Day)</p> <p>Chapters 3 & 6 Using the Percent Equation & Fraction, Decimal, Percent Relationships (~5 Weeks) Lesson 6-1 Repeating Decimals (1 Day) Lesson 6-2 Terminating Decimals (1 Day) Converting Decimals to Fractions (1 Day) Converting Fractions to Percent (1 Day) Converting Percent to Fractions (1 Day) Converting Decimals and Percent (1 Day) Conversion Review (2 Days) Fractions, Decimals, Percent Assessment (1 Day) Lesson 3-1 The Percent Equation (2 Days) Lesson 3-2 Using the Percent Equation (2 Days) Lesson 3-3 Simple Interest (2 Days) Lesson 3-4 Compound Interest (Optional) Lesson 3-5 Percent Increase and Decrease (2 Days) Lesson 3-6 Markups and Markdowns (2 Days) Lesson 6-3 Percent Greater than 100 (2 Days) Lesson 6-4 Percent Less than 1 Topic Review (1 Day)</p>

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Quarter 3 Math 7	<p>Geometry 7.G Draw, construct, and describe geometrical figures and describe the relationships between them. 7.G.2: Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. 7.G.5: Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and use them to solve simple equations for an unknown angle in a figure.</p> <p>7.G.1: Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. 7.G.4: Know the formulas for the area and circumference of a circle and solve problems; give an informal derivation of the relationship between the circumference and area of a circle.</p> <p>7.G.6: Solve real-world and mathematical problems involving area, volume and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</p> <p>7.G.3: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.</p>	<p>Chapter 10: Angle Measures (~ 2 Weeks) Lesson 10-1 Measuring Angles (2 Days) Lesson 10-2 Adjacent Angles (1 Day) Lesson 10-3 Complementary Angles (1 Day) Lesson 10-4 Supplementary Angles (1 Day) Lesson 10-5 Vertical Angles (1 Day) Lesson 10-6 Problem Solving (1 Day) Topic Review (2 Days) Topic Assessment (1 Day)</p> <p>Chapter 11: Circle Geometry (~2 Weeks) Lesson 11-1 Center, Diameter, and Radius (2 Days) Lesson 11-2 Circumference of a Circle (2 Days) Lesson 11-3 Area of a Circle (2 Days) Lesson 11-4 Relating Circumference & Area of a Circle (2 Days) Lesson 11-5 Problem Solving (Embedded) Topic Review (1 Day) Topic Assessment (1 Day)</p> <p>Chapter 12: Triangles & 2-D Slices (1-2 Weeks) Lesson 12-1 Review of Triangle Types & 2-D Figures (1 Day) Lesson 12-2 Drawing Triangles Given Condition 1 - Triangle Inequality (1.5 Days) Lesson 12-3 Drawing Triangles Given Condition 2 - Triangle Congruence (1.5 Days) Lesson 12-4: 2-D Slices of Rectangular Prisms (1 Day) Lesson 12-5: 2-D Slices of Rectangular Pyramids (1 Day) Lesson 12-6 Problem Solving (Embedded) Topic Review (1 Day) Topic Assessment (1 Day)</p> <p>Chapter 13: Surface Area & Volume of Solids (1-2 Weeks) Introduction/Review of Solids & Nets (1 Day) Lesson 13-1 Surface Area of Right Prisms (1.5 Days) Lesson 13-2 Volume of Right Prisms (1.5 Days) Lesson 13-3 Surface Area of Right Pyramids (1 Day) Lesson 13-4 Volume of Right Pyramids (1 Day) Lesson 13-5 Problem Solving (Embedded) Topic Review (1 Day) Topic Assessment (1 Day)</p>

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Quarter 4 Math 7	<p>Statistics and Probability 7.SP Use random sampling to draw inferences about a population.</p> <p>7.SP.1: Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.</p> <p>7.SP.2: Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.</p> <p>Draw informal comparative inferences about two populations.</p> <p>7.SP.3: Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.</p> <p>7.SP.4: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book. Investigate chance processes and develop, use, and evaluate probability models.</p> <p>7.SP.5: Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.</p> <p>7.SP.6: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.</p> <p>7.SP.7: Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.</p> <p>7.SP.7.a: Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.</p> <p>7.SP.7.b: Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</p> <p>7.SP.8: Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.</p> <p>7.SP.8.a: Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.</p> <p>7.SP.b: Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., “rolling double sixes”), identify the outcomes in the sample space which compose the event.</p> <p>7.SP.c: Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?</p>	<p>Chapter 14: Population Sampling & Chapter 15: Statistics (3-4 Weeks)</p> <p>Lesson 14-1 Populations and Samples (1 Day)</p> <p>Lesson 14-2 Estimating a Population (1 Day)</p> <p>Lesson 14-3 Convenience Sample (1 Day)</p> <p>Lesson 14-4 Systematic Sampling (1 Day)</p> <p>Lesson 14-5 Simple Random Sampling (1 Day)</p> <p>Lesson 14-6 Comparing Sampling Methods (2 Days)</p> <p>Lesson 14-7 Problem Solving (Embedded)</p> <p>Lesson 15-1 Statistical Measure (2 Days)</p> <p>Lesson 15-2 Multiple Populations and Inferences (1 Day)</p> <p>Lesson 15-3 Using Measure of Centers (1 Day)</p> <p>Lesson 15-4 Using Measure of Variability (2 Days)</p> <p>Lesson 15-5 Exploring Overlap in Data Sets (2 Days)</p> <p>Lesson 15-6 Problem Solving (Embedded)</p> <p>Chapters 14 & 15 Review (1 Day)</p> <p>Chapters 14 & 15 Assessment (1 Day)</p> <p>Chapter 16: Probability of Simple Events (~ 2 Weeks)</p> <p>Lesson 16-1 Likelihood and Probability (2 Days)</p> <p>Lesson 16-2 Sample Space (1 Day)</p> <p>Lesson 16-3 Relative Frequency and Experimental Probability (2 Days)</p> <p>16-4 Theoretical Probability (2 Days)</p> <p>16-5 Probability Models (1 Day)</p> <p>16-6 Problem Solving (Embedded)</p> <p>Topic Review (1 Day)</p> <p>Topic Assessment (1 Day)</p> <p>Chapter 17: Probability of Compound Events (~ 2 Weeks)</p> <p>Lesson 17-1 Compound Events (2 Days)</p> <p>Lesson 17-2 Sample Space (1 Day)</p> <p>Lesson 17-3 Counting Outcomes (1 Day)</p> <p>17-4 Finding Theoretical Probabilities (1 Day)</p> <p>17-5 Simulation With Random Numbers (1 Day)</p> <p>17-6 Finding Probabilities by Simulation (1 Day)</p> <p>17-7 Problem Solving (Embedded)</p> <p>Topic Review (1 Day)</p> <p>Topic Assessment (1 Day)</p>