7th Grade Syllabus

2017-2018

Power Words: analyze, compare, compute, determine, different/difference, estimate/ estimation, evaluate, solve

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| **Critical Area**: The Number System (Critical Area 2) |
| **Time Frame**: August 24 – September 29 |
| **Content Focus (Big Idea)**: *Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers*   * Adding and subtracting rational numbers * Utilize the additive inverse, p-q = p + (-q) * Multiply and divide rational numbers * Convert a rational number to a decimal using long division * Solve real-world and mathematical problems involving the four operations with rational numbers |
| **Learning Targets (I Can…):**   * I can solve problems involving addition of rational numbers * I can solve problems involving subtraction of rational numbers * I can solve problems involving multiplication of rational numbers * I can solve problems involving division of rational numbers * I can explain the meaning of the sum, difference, product, or quotient of rational numbers in a real-world problem * I can describe real-world situations where the sum of the values is zero |
| **Vocabulary**:  Common Core: absolute value, additive inverses, Associative Property of Addition, Associative Property of Multiplication, Commutative Property of Addition, convert, decimal, distributive property, divide/division, divisor, fraction, horizontal, integers, long division, number line, operation, product, quotient, rational number, signed number, vertical  Additional: associative, common factor, composite numbers, greatest common divisor, infinite, interquartile range, inverse operation, irrational numbers, least common multiple, multiplicative inverses |
| **Standards**  **7.NS.A.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  a) describe situations in which opposite quantities combine to make 0. For example a hydrogen atom has a 0 charge because two constituents are oppositely charged  b) Understand p + q as the number located a distance absolute value 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.  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 differences, and apply this principle in real-world contexts  d) Apply properties of operations as strategies to add and subtract rational numbers  **7.NS.A2** Apply and extend previous understandings of multiplication and division of fractions to multiply and divide rational numbers  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.  b) Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero 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.  c) Apply properties of operations as strategies to multiply and divide rational numbers  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.A3** Solve real-world and mathematical problems involving the four operations with rational numbers |
| **Example With Faith Infusion**  1.Use different parish-related activities to analyze budgets and incomes such as the school cafeteria |
| **Resources**:   * Chapter 2 |

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| **Critical Area**: Expressions and Equations (Critical Area 3) |
| **Time Frame**: October 2 – November 3 |
| **Content Focus (Big Idea)**: *Use properties of operations to generate equivalent expressions; Solve real-life and mathematical problems using numerical and algebraic expressions and equations*   * Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. * Rewriting expressions in word form * 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. (Percent of) * Using variables to write and solve expressions, equations, and inequalities |
| **Learning Targets (I Can…):**   * I can write equivalent number sentences * I can write expressions in different forms and explain how each provides new information about the problem * I can use properties to simplify and expand expressions with rational numbers * I can apply properties of operations and check reasonableness of answers * I can write and solve an equations to determine an unknown value * I can write and solve an inequalities to determine an unknown value |
| **Vocabulary**:  Common Core: coefficient, computation, convert, equation, expression, factor, inequality, operation, positive, rational number, solution set, variable  Additional: algebra, algebraic equation, binomial, constant, cube root, function, linear equation, negative exponent, positive linear relationship, square numbers, square root, standard form, substitution, |
| **Standards**  **7.EE.A1** Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.  **7.EE.A2** 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. For example, a + 0.05a = 1.05a means that “increase by 5%” is the same as “multiply by 1.05”  **7.EE.B3** 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 forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: if a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 ¾ inches long in the center of a door that is 27 ½ 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.  **7.EE.B4** 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  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?  b) 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. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions. |
| **Example With Faith Infusion**  1. Calculate the percent of increase in St. Maximilian Kolbe’s publications as his popularity and wisdom became apparent to the world  2. By increasing the altar’s length 10%, how does this affect the surface area and volume of the altar? How does this relate to the cost of replacing the altar? |
| **Resources**:   * Chapter 1 and Chapter 3 (Properties) * Chapter 3 * 8th Grade Book |

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| **Critical Area**: Ratios and Proportional Relationships (Critical Area 1) |
| **Time Frame**: November 6 – December 20 |
| **Content Focus (Big Idea):** *Analyze proportional relationships and use them to solve real-world and mathematical problems.*   * Compute unit rates associated with ratios of fractions including ratios of lengths, areas, and other quantities measured in like or different units. * Proportions – determine whether two examples are proportionate using a table or graph, represent proportions in an equation, graph a proportional relationship * Use proportional relationships to solve multistep ratio and percent problems.   - Simple interest  - Tax  - Markups  - Markdowns  - Gratuities and commissions  - Fees  - Percent increase and decrease  - Percent error. |
| **Learning Targets (I Can…):**   * I can determine if two quantities are proportional in graphs * I can determine if two quantities are proportional in tables * I can determine if two quantities are proportional in equations * I can determine the unit rate, using like or different units in real-world and mathematical problems * I can solve multistep ratio and percent problems using proportional reasoning including calculating tax * I can solve multistep ratio and percent problems using proportional reasoning including calculating markup and markdowns * I can solve multistep ratio and percent problems using proportional reasoning including calculating commission * I can solve multistep ratio and percent problems using proportional reasoning including calculating percent increase and decrease * I can solve multistep ratio and percent problems using proportional reasoning including calculating percent of a number * I can identify the unit rate in tables * I can identify the unit rate in graphs * I can identify the unit rate in equations * I can explain the proportional relationship of a specific point on a graph |
| **Vocabulary**:  Common Core: Commission, equivalent ratio, gratuities, interest, markups, markdowns, percent, percent decrease, percent error, percent increase, proportional relationship, rate, ratio, simple interest, tax, unit rate  Additional: annual, bill, compound interest, proportion, proportional, similar figures, slope |
| **Standards**  **7.RP.A.1** Compute unit rates associated with ratios of fractions including ratios of lengths, areas, and other quantities measured in like or different units. For example, if a person walks ½ mile in each ¼ hour, compute the unit rate as the complex fraction ½ / ¼ miles per hour, equivalently 2 miles per hour.  **7.RP.A.2** Recognize and represent proportional relationships between quantities.  a) Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.  b) Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships  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.  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.A.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups, markdowns, gratuities and commissions, fees, percent increase and decrease, percent error. |
| **Example With Faith Infusion**  1. Develop and use proportions to solve everyday issues of church related activities (i.e. hosts needed per mass, parishioner attendance, etc.) |
| **Resources**:   * Chapter 6 and 8th grade book |

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| **Critical Area**: Geometry (Critical Area 4) |
| **Time Frame**: January 4 – February 3 |
| **Content Focus (Big Idea)**: *Draw, construct, and describe geometrical figures and describe the relationship between them; Solve real-life and mathematical problems involving angle measure, area, surface area, and volume*   * 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. * Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. * Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. * Area and circumference of circles * Supplementary, complementary, vertical, and adjacent angles * Area, volume, and surface area of 2 and 3 dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. |
| **Learning Targets (I Can…):**   * I can solve problems by drawing scale figures using scale factor * I can determine the length of sides of scale figures using scale factor * I can draw a triangle when given measurements, and decide how many different triangles it is possible to create * I can name the 2-D figure that results from slicing a 3-D figure * I can recite and use the formulas for circumference to determine the radius, diameter, circumference, or area and explain their relationship * I can recite and use the formula for area of a circle to determine the radius, diameter, circumference, or area and explain their relationship * I can use angle relationships to write and solve equations for missing angle measures * I can determine the area of 2-D figures made from triangles, quadrilaterals and circles * I can determine the surface area of 3-D figures made from cubes and right prisms * I can determine the volume of 3-D figures made from cubes and right prisms |
| **Vocabulary**:  Common Core: 2-dimensional figure, 3-dimensional, adjacent angle, angle, area of a circle, area of a polygon, area of a quadrilateral, area of a triangle, circumference, complementary angles, cube, formula, geometric figure, polygon, prism, protractor, pyramid, quadrilateral, rectangular prism, right prism, right rectangular prism, scale drawing (or model), supplementary angles, surface area, vertical angle, volume  Additional: center, chord, circumscribed, collinear, coordinate system, cosine, cross-section, diagonal, diameter, equilateral, equilateral triangle, isosceles triangle, midpoint formula, pi, parallelogram, perimeter, polynomial, radius, rhombus, right angle, right triangle, scalene triangle, similar figures, symmetry, tessellation, vector |
| **Standards**  **7.G.A1** 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.A2** 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.A3** Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.  **7.G.B4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation and the relationship between the circumference and the area of a circle.  **7.G.B5** Use facts about supplementary, complementary, vertical, and adjacent angles in multi-step problems and write and solve simple equations for an unknown angle in a figure.  **7.G.B6** 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. |
| **Example With Faith Infusion**  1. Compare circumference and area of the Eucharistic hosts to the priest’s Consecration hosts |
| **Resources**:   * Chapter 11 |

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| **Critical Area**: Statistics and Probability (Critical Area 5) |
| **Time Frame**: February 5 – March 9 |
| **Content Focus (Big Idea)**: *Use random sampling to draw inferences about a population; Draw informal comparative inferences about two populations; Investigate chance processes and develop, use, and evaluate probability models.*   * Understanding statistics, population, samples, and random * Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples of the same size to gauge the variation in estimates or prediction. * Measures of center and variability * 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 ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. * 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 200 times, but probably not exactly 200 times. * Find probability of simple and compound events using lists, tables, tree diagrams, and simulations while also understanding the sample space |
| **Learning Targets (I Can…):**   * I can determine when a sample from a population is valid * I can make generalizations about a population from a random sample * I can make comparison statements about two data sets and their graphs * I can compare two data sets using mean or median * I can determine probability as a value between 0 and 1 and explain what that value means * I can compare experimental and theoretical probability for an event * I can use the experimental probability for a small sample to predict the probability of larger events * I can find probabilities for events using area models * I can find probabilities for events using tree diagrams * I can find probabilities for events using organized lists * I can find probabilities for events using tables * I can create a probability model and use it to determine the probability of the event |
| **Vocabulary**:  Common Core: approximate, compound events, data, inferences, mean, mean absolute deviation, measure of variation, outcome, population, prediction, probability, random sample, relative frequency, representative sample, sample space, statistics, survey  Additional: experimental probability, measures of central tendency, median, mode, statistical variability, |
| **Standards**  **7.SP.A1** 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.  **7.SP.A2** Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples of the same size to gauge the variation in estimates or prediction. 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.  **7.SP.B3** Informally assess the degree of visual overlap of two numerical data distributions with similar variability’s, 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.  **7.SP.B4** 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.  **7.SP.C5** 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 ½ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.  **7.SP.C6** 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 200 times, but probably not exactly 200 times.  **7.Sp.C7** 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  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.  b) Develop a probability model 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?  **7.SP.C8** Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.  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  b) Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (rolling double sixes) identify the outcomes in the sample space which compose the event  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? |
| **Example With Faith Infusion**  1. Gather sample data to analyze the number of students that continue to Catholic high schools, and further to see what colleges they attend  2. Using the liturgical calendar, develop chances of a random day being a Holy Day, a patron saint day, a curriculum-related saint day, vestment colors, etc. |
| **Resources**:   * Chapter 8 sections 6-9 * Chapter 8 Section 2 * Chapter 9 and 8th grade book |