Diocese of Boise Math Curriculum – 7th grade

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
How do we compute fractions?	***Numbers, Operations and Algebraic Thinking*** Solve problems using the four operations Use properties of multiplication and division Explain and use factors and multiples Analyze patterns and relationships	**Mastered Skills** • Write exponents in expanded form • Identify Roman Numerals **Mastered Skills** • Divide multi-digit numbers **Reviewed Skills** • Use distributive property to express a sum of two whole numbers 1-100 with a common factor as a multiple of a sum of two whole numbers with no common factor (i.e. express 36+8 as 4(9+2)) **Mastered Skills** • Find the greatest common factor of two whole numbers less than or equal to 100 • Find the least common multiple of two whole numbers less than or equal to 12 **Introduced Skills** • Write arithmetic and geometric sequences both recursively and with an explicit formula **Reviewed Skills** • Form ordered pairs consisting of corresponding terms from two patterns and graph the ordered pairs on a coordinate plane • Identify apparent features of a pattern without a given rule	**RIT 225-245 & Above** • 5 – frame • Transitive • Algebraic expression • Sum of measures • Substitution • Scalene • Isosceles • Scale factor • Reflexive • Real number • Central tendencies • Pi • Partial product • Factorization • Net • Least common denominator • Least common multiple • Midpoint • Interior angle • Exterior angel • Frequency table • Exponents • Expanded form • Expanded notation • Equilateral	1. Make sense of problems and persevere in solving them 2. Reason abstractly and quantitatively 3. Construct viable arguments and critique the reasoning of others 4. Model with mathematics 5. Use appropriate tools strategically 6. Attend to precision 7. Look for and make sense of structure

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Operations and Algebraic Thinking Demonstrate an understanding of ration concepts and use ration reasoning to solve problems	**Introduced Skills** • Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams and verbal descriptions of proportional • Represent proportional relationships by equations • 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 • Use proportional relationships to solve multistep ratio and percent problems • While focusing on proportions graph proportional relationships interpreting the unit rate as the slope of the graph • Apply proportional reasoning to solve problems involving scale and indirect measurement **Reviewed Skills** • Explain the concept of a unit rate a/b associated with a ratio a:b with b☐0. • Use rate language in the context of a ratio relationship (i.e. "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger") • Use tables to compare ratios and unit rates • Solve unit rate problems including those involving unit pricing and constant speed. • Solve problems involving finding the whole, given a part and the percent • Convert and transform units appropriately when multiplying or dividing quantities • Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units • Recognize and represent proportional relationships between quantities • Decide whether two quantities are in a proportional relationship (i.e. test for equivalent ratios)	• Cubic • Congruent • Computer • Arc • Outlier • Algebra • Geometry	8. Look for and express regularity in repeated reasoning **RESOURCES:** Visuals Ruler Graph paper Text Khan Academy Calculator **ASSESSMENT:** • Class discussion • Questioning techniques • Exit ticket • Quiz • Performance tasks • Learning logs • Math journals • Think-pair-share • Chapter test • Standardized test

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Operations and Algebraic Thinking Apply and extend previous understanding of numbers to the system of rational numbers	**Introduced Skills** • Use rational approximations of irrational numbers to compare the size of irrational numbers • Locate irrational numbers approximately on a number line, diagram and estimate the value of the numbers • Simplify rational expressions **Reviewed Skills** • Apply and extend previous understandings to add and subtract rational numbers • Know that numbers that are not rational are called irrational • Explain and informally that every number has a decimal expansion • Convert a rational number into a repeating decimal and vice versa **Mastered Skills** • Explain that positive and negative numbers are used together to describe quantities having opposite directions of values • Use positive and negative numbers to represent quantities in real-world contexts explaining the meaning of 0 in each situation • Use a rational number as a point on the number line • Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line • Recognize that the opposite of the opposite of a number is the number itself • Write, interpret and explain statements of order for rational numbers in real-world contexts (i.e. write $-3°C > -7°C$ to express the fact that $-3°C$ is warmer than $-7°C$) • Describe situations in which opposite quantities combine to make 0.		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Operations and Algebraic Thinking Apply and extend previous understanding of arithmetic to algebraic expressions	**Introduced Skills** • Apply properties of operations to expressions with rational coefficients • Explain 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 • Solve multi-step real-life problems posed with positive and negative rational numbers in any form • Solve word problems using equations and inequalities with rational numbers • Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach **Reviewed Skills** • Apply the properties of operations to generate equivalent expressions • Identify when two expressions are equivalent • Apply properties of operations to calculate with numbers in any form by converting between forms and assessing the reasonableness of answers using mental computation and estimation strategies • Construct simple equations and inequalities to solve problems • Write and evaluate numerical expressions involving whole-number exponents • Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient) while viewing one or more parts of an expression as a single entity • Evaluate expressions with specific values of their variables		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Operations and Algebraic Thinking Reason about and solve one-variable equations and inequalities	**Mastered Skills** • Write, read and evaluate expressions in which letters stand for numbers • Perform arithmetic operations including those involving whole number exponents in the conventional order when there are no parentheses to specify a particular order **Introduced Skills** • Graph the solution set of the inequality and interpret it in the context of the problem **Reviewed Skills** • Explain solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? • Use substitution to determine whether a given number in a specified set makes an equation or inequality true • Use variables to represent numbers and write expressions when solving a real-world problem, and solve • Explain that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set • Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world problem • Recognize and represent in a number line diagram that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions • Use variables to represent numbers and write expressions when solving a real-world problem, and solve • Explain that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Operations and Algebraic Thinking Work with radicals and integer exponents Analyze and solve linear equations and pairs of simultaneous linear equations. Define, evaluate and compare functions. Introduced Skills	**Introduced Skills** • Perform operations with numbers expressed in scientific notation • Interpret scientific notation that has been generated by technology • Simplify radical expressions **Reviewed Skills** • Evaluate square roots of small perfect squares and cube roots of small perfect cubes • Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities (scientific notation) • Use scientific notation and appropriate units for measurements of very large or very small quantities **Reviewed Skills** • Solve linear equations with one variable **Introduced Skills** • Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable • Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation • Explain that a function is a rule that assigns to each input exactly one output • Compare properties of two functions each represented in a different way • Interpret the equation y=mx+b as defining a linear function whose graph is a straight line • Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Numbers, Operations Base Ten Explain and use the place value system Use place value understanding and properties of operations to do arithmetic *Numbers and Operations - Fractions* Develop understanding of fractions as numbers Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers	**Mastered Skills** • Use whole-number exponents to denote powers of 10 • Read, write and compare decimals to thousandths using base-ten numbers, number names and expanded form **Mastered Skills** • Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations and/or the relationship between multiplication and division • Add, subtract, multiply and divide multi-digit decimals • Illustrate and explain the calculation of a problem by using equations, rectangular arrays and/or area models • Add, subtract, multiply and divide decimals to hundredths using concrete models or drawings and strategies based on place value, properties of operations and/or the relationship between addition and subtraction **Mastered Skills** • Convert between improper fractions and mixed numbers • Compare two fractions with different numerators and different denominators and justify the conclusions **Reviewed Skills** • Interpret multiplication as scaling (resizing) • Explain why multiplying a given number by a fraction greater than 1 results in a product greater than the given number and why multiplying a given number by a fraction less than 1 results in a product smaller than the given number • Compute quotients of fractions • Demonstrate the use of reciprocals in dividing fractions		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Numbers and Operations - Fractions Compare decimal, fractions and percent notations	**Mastered Skills** • Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators • Multiply a fraction by a whole number or by a fraction • Describe a fraction a/b as a multiple of 1/b • Solve word problems involving multiplication of a fraction by a whole number • Use a fraction model or story to represent a problem using fractions. • Interpret a fraction as division of the numerator by the denominator • Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers • Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions • Solve problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions • Solve word problems involving addition and subtraction of fractions referring to the same whole, having like denominators and unlike denominators **Introduced Skills** • Find simple interest **Reviewed Skills** • Find the percent of a number including percent of change • Convert between percent, decimals and fractions **Mastered Skills** • Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100 (i.e. express 3/10 as 30/100 and add 3/10+4/100=34/100 • Compare two decimals to hundredths by reasoning about their size by using the symbols <, >, or = and justify the		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Measure-ment and Data *Measure and estimate lengths* Solve problems using measurement **Geometric Measurement** Explain and use geometric measurements	**Introduced Skills** • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities **Reviewed Skills** • Use conversions to solve multi-step real world problems • Apply the area and perimeter formulas for rectangles in real world and mathematical problems (i.e. find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor) **Mastered Skills** • Convert among different-sized standard measurement units within a given measurement system • Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit (i.e. express the length of a 4 ft. snake as 48 in.) • Generate a conversion table • Measure and estimate liquid volumes and masses of objects using grams (g), kilograms (kg) and liters (l) • Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec, degrees **Introduced Skills** • Find volumes of solid (3D) figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts • Solve real-world problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Geometric Measurement **OBJECTIVE B5.1** *Explain and use geometric measurements*	**Reviewed Skills** • Give an informal derivation of the relationship between the circumference and area of a circle • Apply the formulas V=lwh and V=bh to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems • Know the formulas for the area and circumference of a circle and use them to solve problems • Solve addition and subtraction problems to find unknown angles on a diagram in real world • Use facts about supplementary, complementary, vertical and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure • Recognize volume as an attribute of solid figures • Describe and use concepts of volume measurement • Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. • Apply the formulas V = l x w x h and V = b x h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems • Find the missing measurement in triangles and quadrilaterals • Find the areas of complex figures • Solve real-world problems involving perimeters of polygons		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Geometric Measure-ment **Geometry** Analyze, compare, create, classify and compose shapes	**Mastered Skills** • Solve real world problems involving volume • Find the perimeter of a polygon given the side lengths, an unknown side length, same perimeters and different areas, and same area and different perimeter • Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b+c is the sum of a x b and a x c • Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or • Recognize angle measure as additive • Measure volumes by counting unit cubes using cubic cm, in, ft and improvised unites • Relate volume to the operations of multiplication and addition with three dimensional figures **Introduced Skills** • Solve problems involving scale drawings of geometric figures (i.e. compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale) • Draw geometric shapes with given conditions • Describe the two-dimensional figures that result from slicing three-dimensional figures **Reviewed Skills** • Represent three-dimensional figures using nets made up of rectangles and triangles • Use nets to find the surface area of figures in the context of solving real-world and mathematical problems • Classify two-dimensional figures in a hierarchy based on properties **Mastered Skills** • Identify line-symmetric figures and draw lines of symmetry		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Geometry Graph points on the coordinate plane to solve real-world and mathematical problems	**Introduced Skills** • Graph equations on coordinate axes with labels and scales **Reviewed Skills** • Draw polygons in the coordinate plane given coordinates for the vertices • Use coordinates to find the length of a side joining points with the same first coordinate or the same second coordinate in the context of solving real-world and mathematical problems • Solve real-world problems by graphing points in all four quadrants of the coordinate plane • While graphing points, include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate • Explain that the first number in a coordinate indicates how far to travel from the origin in the direction of one axis and the second number indicates how far to travel in the direction of the second axis • Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane • Interpret coordinate values of points in the context of the situation **Mastered Skills** • Use a pair of perpendicular number lines (axes) to define a coordinate system with the intersection of the lines (origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers (coordinates)		
	Explain and apply the Pythagorean Theorem	**Introduced Skills** • Explain a proof of the Pythagorean Theorem and its converse • Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three-dimensions		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Statistics and Probability Develop understanding of statistical variability Summarize and describe statistical data	**Introduced Skills** • Show that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread and overall shape • Explain that a measure of variation describes how its values vary with a single number **Reviewed Skills** • Solve a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers • Explain that a measure of center for a numerical data set summarizes all of its values with a single number • Demonstrate that statistics can be used to gain information about a population by examining a sample of the population • Explain that generalizations about a population from a sample are valid only if the sample is representative of the population • Explain that random sampling trends to produce representative samples and support valid inferences • 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 predictions **Introduced Skills** • Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities • Use measures of center and variability for numerical data from random samples to draw informal comparative • Demonstrate that the probability of a compound event is the fraction of the outcomes in the sample space for which the event occurs • Design and use a simulation to generate frequencies for compound events • Choose and interpret the scale and the origin in graphs and data displays • permutations and combinations to find the possible number of outcomes in a given situation		

ESSENTIAL QUESTIONS	DOMAINS AND OBJECTIVES	7th GRADE MATH SKILLS	VOCABULARY	PRACTICES, RESOURCES & ASSESSMENT
	Statistics and Probability Summarize and describe statistical data	**Reviewed Skills** • Display numerical data in plots on a number line, including dot plots, histograms and box plots • Summarize numerical data sets in relation to their context (i.e. report the number of observations; describe the nature of the attribute under investigation; give quantitative measure of center and variability, describe the overall pattern and deviations, relate choice of measure to the data distribution) • Demonstrate that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring • Approximate the probability of a chance event by collecting data on the chance process that produces it and observing itslong-run relative frequency (i.e. figure out the probability of an event and test it) • Develop a probability model and use it to find probabilities of events • Compare probabilities from a model of observed frequencies • Develop a uniform probability model by assigning equal probability to al outcomes and use the model to determine probabilities of events (i.e. probability of rolling a die, each has the same chance with a chance of rolling a 2 or 3) • Develop a probability model by observing frequencies in data generated from a chance process • Find probabilities of compound events using organized lists, tables, tree diagrams and simulation • Explain the difference between theoretical and experimental probability		