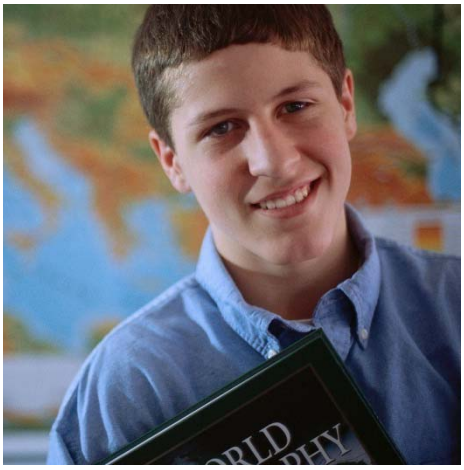
SAU29



MATH

middle school - sixth - seventh - eighth -

Curriculum Guides

Updated 2010

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Numbers and Operations	Pacing:	
ESSENTIAL QUESTIONS:			
1. Can the student perform the basic operations on rational numbers (integers, fractions, decimals)? 2. Can the student solve real world and mathematical problems involving rational number concepts? 3. Does the student demonstrate understanding of the value and order of rational numbers?			
NATIONAL STANDARDS - The Number System			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Fluently divide multi-digit numbers using the standard algorithm. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation. Find the greatest common factor of 2 whole numbers less than or equal to 100 & the least common multiple of two whole numbers less than or equal to Use the 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. For example, express 36 + 8 as 4 (9 + 2).		computer strategy multi-digit decimal algorithm factor commutative property distributive property common factor express

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Numbers and Operations	Pacing:	
ESSENTIAL QUESTIONS:			
NATIONAL STANDARDS - The Number System			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Apply and extend previous understandings of numbers to the system of rational numbers	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates. a. Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite. b. Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when 2 ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. c. Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.		positive number negative number quantity rational number axis/axes coordinate graph ordered pair quadrant ordered pair coordinate plane reflection integer

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Numbers & Operations	Pacing:	
ESSENTIAL QUESTIONS:			
NATIONAL STANDARDS - The Number System			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
	Understand ordering and absolute value of rational numbers. a. Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram. For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right. b. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write –3 oC > –7 oC to express the fact that –3 oC is warmer than –7 oC. c. Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. For example, for an account balance of –30 dollars, write |–30| = 30 to describe the size of the debt in dollars. d. Distinguish comparisons of absolute value from statements about order. For example, recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars. Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.		orientation absolute value

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Number and Operations	Pacing:	
ESSENTIAL QUESTIONS: **NATIONAL STANDARDS - The Number System**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Demonstrate problem solving.	Demonstrate problems-solving using a variety of strategies on one or more problems. a. Use technology as appropriate to solve real-world problems using previously learned strategies. b. Integrate & apply mathematics throughout the curriculum. c. Use problem-solving approaches both independently and collaboratively in a variety of mathematical contexts. d. Use calculators in appropriate computational & problem-solving situations. e. Read and write whole numbers and decimals (money, fraction form and decimal form). Mentally calculate: a. change back from 1, 5, 10, 20, 50, 100 dollars b. Simple whole number multiples c. Using benchmark percents. Make and apply appropriate estimation strategies; determine effectiveness of the estimation strategy for the situation.		multiples benchmark estimation

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Geometry	Pacing:	
ESSENTIAL QUESTIONS: 1. Does the student demonstrate mastery of concepts and vocabulary relating to geometric forms and their relationships? 2. Can the student apply concepts and vocabulary to real world and mathematical problems? 3. Can the student apply concepts and vocabulary to analyzing and creating geometric figures or models? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Solve real-world and mathematical problems involving area, surface area, and volume.	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems. Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths, and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas V = l w h and V = b h to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems. 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. Apply these techniques in the context of solving real-world and mathematical problems. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.		right triangles quadrilateral polygon rectangle prism volume edge vertices point three-dimensional surface area

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Geometry	Pacing:	
ESSENTIAL QUESTIONS:			
NATIONAL STANDARDS - Geometry			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Understanding geometric forms	Uses properties or attributes (shape, edge, vertices, faces) to identify, compare or describe three dimensional shapes (rectangular prism, triangular prism, cylinder, sphere, pyramids or cones). Describes and distinguishes between types of triangles (right, acute, obtuse, equilateral, scalene, isosceles, equiangular) and quadrilaterals (rectangles, squares, rhombi, trapezoids, parallelograms). Demonstrates understanding of congruency by predicting and describing transformational steps (tessellation: reflection, translation, rotation, degree of rotation). a. Uses line and rotational symmetry to demonstrate congruent parts within rotation of a shape. b. Tessellates a plane with a given figure and tile a plane. Demonstrates understanding of lines of symmetry on given figures. Demonstrates conceptual understanding of the perimeter of polygons, the area of quadrilaterals and triangles, and the volume of rectangular prisms by using models, formulas or by solving problems. Demonstrates understanding of circle measures, including radius, diameter, circumference. Uses units of measures appropriately and makes conversions within systems when solving problems.		property attribute shape face cylinder property pyramid cone sphere right triangle acute obtuse equilateral scalene isosceles equiangular quadrilateral square rhombi trapezoid parallogram rectangle tessellation line, rotational symmetry congruence perimeter, circumference radius, diameter

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Expressions/Equations in Alg. Thinking	Pacing:	
ESSENTIAL QUESTIONS: 1. Can the student represent quantitative relationships in an expression or equation? 2. Can the student evaluate variables in expressions and equations? 3. Can the student apply algebraic processes to real world and mathematical problems?			
NATIONAL STANDARDS - Expressions and Equations			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Apply and extend previous understandings of arithmetic to algebraic expressions.	Write and evaluate numerical expressions involving whole-number exponents. Write, read, and evaluate expressions in which letters stand for numbers. a. Write expressions that record operations with numbers and with letters standing for numbers. For example, express the calculation "Subtract y from 5" as 5 – y. b. Identify parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient); view one or more parts of an expression as a single entity. For example, describe the expression 2 (8 + 7) as a product of two factors; view (8 + 7) as both a single entity and a sum of two terms. c. Evaluate expressions at specific values of their variables. Include expressions that arise from formulas used in real-world problems. Perform arithmetic operations, including those involving whole number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). For example, use the formulas V = s3 and A = 6 s2 to find the volume and surface area of a cube with sides of length s = 1/2.		arithmetic evaluate numerical expression exponent operation calculation coefficient variable formula parenthesis Order of Operations

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Expressions and Equations	Pacing:	
ESSENTIAL QUESTIONS:			
NATIONAL STANDARDS - Expressions and Equations			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
	d. Identifies and applies a number of patterns (ex. 3,5,7,9 or 1,4,3,6) represented in models, tables, sequences, graphs or problems. Writes a rule in words or symbols for a specific relationship. e. Continue a pattern of integers & positive rational numbers. f. Uses and applies order of operations to algebraic expressions. g. Apply algebraic expression to plot points in all four quadrants of a coordinate plane. Apply the properties of operations to generate equivalent expressions. For example, apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x; apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6 (4x + 3y); apply properties of operations to y + y + y to produce the equivalent expression 3y.		model sequence relationship rule pattern plot (points)

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Expressions/Equations in Alg. Thinking	Pacing:	
ESSENTIAL QUESTIONS:			
NATIONAL STANDARDS - Expressions and Equations			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.		value substitute
Reason about and solve one-variable equations and inequalities.	Understand 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.		
one-variable equations and inequalities.	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.		
	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 nonnegative rational numbers.		solve inequality set

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Expressions/Equations in Alg. Thinking	Pacing:	
ESSENTIAL QUESTIONS: **NATIONAL STANDARDS - Expressions and Equations**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Represent and analyze quantitative relationships between dependent and independent variables.	Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams. Use variables to represent two quantities in a real-world problem that change in relationship to one another; 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. a. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.Explore rate of change in various applications (e.g., calculating slope, comparing distance vs. time, cost per unit) and problem situations.		infinite number line dependent variable independent variable slope

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Statistics and Probability	Pacing:	
ESSENTIAL QUESTIONS: 1. Does the student demonstrate an understanding of the differences in central measures as indications of the variability in data? 2. Can the student create and analyze displays of data to answer a statistical question? **NATIONAL STANDARDS - Statistics and Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Develop understanding of statistical variability.	Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, “How old am I?” is not a statistical question, but “How old are the students in my school?” is a statistical question because one anticipates variability in students’ ages.		statistics probability variability
	Understand 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.		data distribution center, measure of center
Summarize and describe distributions.	Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.		
	Display and interpret numerical data in plots and on a number line, circle graphs, line graphs, stem and leaf plots, histograms, and box and whisker plots to answer questions on the data and analyze the data on a level consistent with skills. a. Uses a variety of counting strategies to solve problems (lists, tables, tallies, models, etc.)		circle graph line graph stem and leaf plot box and whisker plot table model tally

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Statistics & Probability	Pacing:	
ESSENTIAL QUESTIONS: **NATIONAL STANDARDS - Statistics and Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Theory and Hypothesis	5. Summarize numerical data sets in relation to their context, such as by: a. Reporting the number of observations. b. Describing the nature of the attribute under investigation including how it was measured and its units of measurement. c. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations (outliers) from the overall pattern with reference to the context in which the data were gathered. d. Relating the choice of measures of center (mean, median, mode) and variability to the shape of the data distribution and the context in which the data were gathered. Determines the theoretical probability of an event in a situation where given outcomes are not equally likely (2 yellow, 3 green marbles), predict and test the theoretical probability through experiments and games.		mean, median, mode interquartile range absolute deviation outlier data distribution theoretical probability

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Ratios and Proportional Relationships	Pacing:	
ESSENTIAL QUESTIONS: 1. Does the student demonstrate an understanding of ratios as a relationship between two quantities? 2. Can the student solve real world and mathematical problems involving ratios and proportional relationships? 3. Can the student determine rate and rate of change given data on ratios? **NATIONAL STANDARDS - Ratio's and Proportional Relationships**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Understand ratio concepts and use ratio reasoning to solve problems.	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”		ratio proportion
	Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”		rate
	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.		equation
	a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.		equivalent ratio

UNIT/ORGANIZING PRINCIPLE:	Grade 6: Ratios and Proportional Relationships	Pacing:	
ESSENTIAL QUESTIONS: **NATIONAL STANDARDS - Ratios and Proportional Relationships**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
	b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.		constant rate percent whole/part convert unit transform

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Problem Solving Within the Number System	Pacing:	
ESSENTIAL QUESTIONS: Can students add, subtract, multiply and divide rational numbers and exponents? Do students understand the magnitude of numbers? Do students demonstrate understanding of rational numbers and percents? Can students solve problems involving square roots and exponents? **NATIONAL STANDARDS: - The Number System**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Add, subtract, multiply, divide rational numbers.	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers and exponents. Describe situations using opposites. Understand additive inverses. Understand that subtracting is adding the additive inverse. Apply the properties of operations for rational numbers. (Addition, subtraction, multiplication, and division) Use rational numbers in real world context. Rational numbers can be expressed as a/b, when b does not equal 0. Use long division to write a rational number as a decimal and vice versa.	(N&O)-7-3 (N&O)-7-3	rational numbers addition of fractions number properties number systems integer least common denominator least common multiple greatest common factor
Understand the magnitude of numbers.	Order, compare, and identify equivalent absolute values and scientific notation. Mentally calculate benchmark perfect squares, percents and related fractions. Add, subtract, multiply and divide exponents.	(N&O)-7-2 (N&O)-7-6 (N&O)-7-3 (N&O)-7-8	scientific notation benchmark exponent perfect square real numbers rational numbers

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Problem Solving Within the Number System	Pacing:	
ESSENTIAL QUESTIONS: Can students add, subtract, multiply and divide rational numbers and exponents? Do students understand the magnitude of numbers? Do students demonstrate understanding of rational numbers and percents? Can students solve problems involving square roots and exponents? **NATIONAL STANDARDS: - The Number System**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Demonstrate conceptual understanding of rational numbers with respect to percents.	Understand how field porperties apply to subsets of real numbers.	(N&O)-7-1	irrational numbers
	Compare same or different parts of the whole.	(N&O)-7-1	
	Understand that percents are a way of expressing multiples of a number.	(N&O)-7-1	
Solve problems involving exponents and square roots.	Understand square roots of perfect squares.	(N&O)-7-4	square root square number
	Raise numbers to whole number powers.	(N&O)-7-4	root exponent
	Determine perfect and nonperfect square numbers.		

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Geometry	Pacing:	
ESSENTIAL QUESTIONS: Can students draw, construct, and desribe goemetrical figures? Can students describe the relationships between geometric figures? Can students solve real like and mathematical problems involving angle measure, area, sruface area and volume? Can students apply concepts of similarity and congruency? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Draw, construct, and describe geometrical figures and describe the relationships between them.	Use scale drawings. * Solve problems * Compute actual lengths. Draw geometric shapes given specific conditions. *Use the characteristics of triangles *Find the sum of the interior angles of regular polygon. Draw nets of 3-D figures. Slice 3-D figures including: * right rectangular prisms and pyramids Know formulas for area and circumference of a circle.	(G&M) -7-10	scale drawing scale map scale transformation scale factor enlarging transformation shrinking transformation defining properties of shapes/figures isosceles triangle scalene triangle equilateral triangle obtuse triangle right triangle acute triangle equiangular triangle triangle sides hypotenuse polygon interior angles tetrahedron net 3-D shape cross section plane cross section circle formula pi

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Geometry	Pacing:	
ESSENTIAL QUESTIONS: Can students draw, construct, and desribe goemetrical figures? Can students describe the relationships between geometric figures? Can students solve real like and mathematical problems involving angle measure, area, sruface area and volume? Can students apply concepts of similarity and congruency? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	Write and solve equations for an unknown angle using facts about angles. Use properties of angle relationships from two or three intersecting lines or two parallel lines cut by a transversal. Find area, volume and surface area of 2 and 3-D figures including: *triangles *circles *quadrilaterals *polygons * cubes * right rectangular and triangular prisms *cylinders Use nets to find surface area.	(G&M) -7-1 (G&M) -7-6 (G&M) -7-10	circumference formula unknown variable angle bisector alternate interior angle intersecting lines plane figure perpendicular bisector complimentary angle supplementary angle central angle 3-D space volume formula volume of cylinder volume of prism volume of pyramid cubic units cubic roots perfect cubes surface area
Apply concepts of congruency.	Solve problems on coordinate plane using: *reflections *translations	(G&M) -7-4	reflections translation rotation dilation coordinate plane coordinate system

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Geometry	Pacing:	
ESSENTIAL QUESTIONS: Can students draw, construct, and desribe goemetrical figures? Can students describe the relationships between geometric figures? Can students solve real like and mathematical problems involving angle measure, area, sruface area and volume? Can students apply concepts of similarity and congruency? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Apply concepts of similarity.	Solve problems using area of polygons and circles when linear dimensions are scaled.	(G&M) -7-5	axis of symmetry coordinate geometry similarity slide transformations congruence congruent side multiple problem- solving strategies method selection

UNIT/ORGANIZING PRINCIPLE:	Expressions and Equations	Pacing:	
ESSENTIAL QUESTIONS: Can students generate equivalent expressions? Can students solve real life and mathematical problems using numerical and algebraic expressions and equations? **NATIONAL STANDARDS - Expressions and Equations**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Use properties of operations to generate equivalent expressions. Solve expressions and equations.	Apply the properties of operations to linear expressions with rational coefficients. Write expressions in different forms. Solve multi-step real-life problems by using: *positive and negative rational numbers in any form * checking for reasonableness of answers *estimation *mental computation Use variables. *Include multiple variables in an expression or equation. Construct simple equations and inequalities. * Solve word problems leading to the form px+q=r and p(x+q)=r. *Solve word problems leading to the form px+q>r or px+q<r. *Graph the solution set. * Use words and symbols to represent linear and nonlinear relationships.	(F&A)-7-4 (F&A)-7-3 (F&A)-7-1	algebraic sentence algebraic expression expansion distributive property integer algebraic expression algebraic representation combining like terms simplification substitution linear equation mathematical expression algebraic equation inequality nonlinear equation

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Ratios and Proportional Relationships	Pacing:	
ESSENTIAL QUESTIONS: Can students analyze proportional relationships to solve real- world and mathematical problems? **NATIONAL STANDARDS - Ratios and Proportional Relationships**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Analyze proportional relationships and use them to solve real-world and mathematical problems.	Calculate unit rates (ratios of fractions). Include length, area, etc. Recognize and represent proportional relationships: * use a table and/or graph * identify the constant * use equations * use coordinate points to explain the relationship (emphasize the origin and (1,r)) Determine the relationship between slope and rate of change. Distinguish between constant and varying rate of change. Solve multi-step ratio and percent problems. * interest * tax * markups and markdowns Estimate and determine reasonableness of results.	(N&O)-7-4 (F&A)-7-2 (F&A)-7-2 (N&O)-7-1 (N&O)-7-7	rate constant unit size proportion ordered pairs slope constant rate of change variable change constant ratio method selction percents above 100 percents below 1 interest tax markups markdowns tips discount depreciate

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Statistics and Probability	Pacing:	
ESSENTIAL QUESTIONS: Can students use random sampling to draw inferences about a population? Can students draw informal comparative inferences about two populations? Can students develop, use, and evaluate probability models? Can students represent data in multiply formats? Can students develop an appropriate method to collect data for a given hypothesis or question? **NATIONAL STANDARDS - Statistics & Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Use random sampling to draw inferences about a population. Draw informal comparative inferences about two populations. Develop, use, and evaluate probability models.	Create generalizations about a population based on a sample. Determine validity of a sample. Use statisitics to gain information about populations. Draw inferences. *Create questions with an unknown characteristic. * Use multiple samples to guage variation. Identify similarity and differences of two or more samples. *Calculate measures of center. *Calculate measures of variability. Understand that probability can be expressed as a number between 0 Calculate experimental and theoretical probability to find relative frequency. Design and conduct experiments to find experimental probability. * Describe discrepancies between theoretical and experimental probability. Find the probability of simple and compound events.	(DSP)-7-4	sampling selection techniques sample space sampling error large sample limited sample random sample representative sample biased sample mean median mode quartile fair chance solution probabilities theoretical probability experimental probability frequency area model table representation of probability frequency distribution/table

UNIT/ORGANIZING PRINCIPLE:	Grade 7: Statistics and Probability	Pacing:	
ESSENTIAL QUESTIONS: Can students use random sampling to draw inferences about a population? Can students draw informal comparative inferences about two populations? Can students develop, use, and evaluate probability models? Can students represent data in multiply formats? Can students develop an appropriate method to collect data for a given hypothesis or question? **NATIONAL STANDARDS - Statistics & Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Represent given data using multiple formats.	* Use area models, lists, tables, simulations and tree diagrams (uniform and non-uniform) Interpret scatter plots, and histograms. Analyze data using measures of center using: *dispersion *outliers *effect of outliers on mean, median, and mode Organize and display data using: *scatterplots *circle graphs	(DSP)-7-1 (DSP)-7-2 (DSP)-7-3	tree diagram model pictoral representation scatter plot histogram dispersion outliers percentile
Develop an appropriate method to collect data for a given question or hypothesis.	Consider limitations that could affect the outcome.	(DSP)-7-4	outcome range

UNIT/ORGANIZING PRINCIPLE:	The Number System	Pacing:	
ESSENTIAL QUESTIONS: Can students demonstrate a conceptual understanding of rational numbers using explanations, models, or other representations? Can students identify rational and irrational numbers, find rational approximations for irrational numbers, and convert repeating decimals to Can students demonstrate an understanding of the relative magnitude of numbers by ordering or comparing rational numbers and common			
NATIONAL STANDARDS - Rational and Irrational Numbers			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Demonstrate a conceptual understanding of rational numbers using explanations, models, or other representations.	Evaluate absolute values and perfect square and cube roots. Use percents as a way of describing change (percent increase/decrease), interest rates, mark-ups, or rates. Mentally calculate benchmark perfect squares and related square roots; determine the part of a number using benchmark percents and related fractions (ie: 25% of 16).	M(N&O)-8-6	absolute value interest benchmark
Know that there are numbers that are not rational, and approximate	Know that numbers that are not rational are called irrational and that every number has a decimal expansion. Show that rational numbers have a decimal expansion that will eventually repeat. Convert a repeating decimal into a rational number (ie: 0.666... = 2/3). Use rational approximations of irrational numbers to compare the size of irrational numbers and find their approximate location on a number line. Estimate the value of expressions involving irrational numbers.		rational, irrational decimal expansion repeating, terminating
Demonstrate understanding of the relative magnitude of rational and irrational numbers.	Demonstrate understanding of the relative magnitude of numbers by ordering or comparing rational numbers and common irrational numbers, and numbers with whole number or fractional bases.		relative magnitude

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Expressions and Equations	Pacing:	
ESSENTIAL QUESTIONS: Can students work with radicals and integer exponents? Can students evaluate and simplify algebraic expressions, including square roots of small perfect squares and cube roots of small perfect cubes? Can students perform operations with scientific notation? Do students understand the connections between proportional relationships, lines, and linear equations? Can students analyze and solve linear equations and pairs of simultaneous linear equations? **NATIONAL STANDARDS - Expressions and Equations**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Work with radicals and integer exponents.	Be able to operate with negative exponents.		negative exponent
	Know and apply the properties of integer exponents to generate equivalent numerical expressions (ie: 3^2 x 3^-5 = 3^-3 = 1/3^3 = 1/27).		
	Use square root and cube root symbols to represent solutions to equations of the form x^2 = p and x^3 = p., where p is a positive rational number.		square root, cube root
	Evaluate and simplify algebraic expressions, including square roots of small perfect squares and cube roots of small perfect cubes.	M(N&O)-8-4 M(N&O)-8-6 M(F&A)-8-3	algebraic expression, perfect square, perfect cube
	Use numbers expressed in the form of a single digit times an integer power of ten to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, 7 x 10^9 is more than 20 times larger than 3 x 10^8.	M(N&O)-8-2	
	Perform operations with numbers expressed in scientific notation.		scientific notation
	Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities.		
	Interpret scientific notation that has been generated by technology.		

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Expressions and Equations	Pacing:	
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CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Understand the connections between proportional relationships, lines, and linear equations.	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways: tables, graphs, equations, or problem situations. For example, compare a distance-time graph to a distance-time equation to determine which of the two moving objects has greater speed. Use similar triangles to explain why the slope, m, is the same between any two distinct points on a non-vertical line in the coordinate plane. Derive the equation y=mx for a line through the origin. Derive the equation y=mx + b for a line intercepting the vertical axis at b.	M(F&A)-8-2	proportional relationship, unit rate, slope origin slope-intercept form
Analyze and solve linear equations and pairs of simultaneous linear equations.	Solve linear equations in one variable to determine one of the following: one unique solution, infinitely many solutions (identities), or no solutions (contradictions). Solve multi-step linear equations with rational number coefficients using the commutative, associative, and distributive properties, substitution, and order of operations.		equation of a line

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Expressions and Equations	Pacing:	
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CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
	Understand that solutions to a system of two linear equations in two variables correspond to points of intersection and their graphs, because points of intersection satisfy both equations simultaneously. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve real-world and mathematical problems leading to two linear equations in two variables.		equation systems

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Geometry	Pacing:	
ESSENTIAL QUESTIONS: Can students demonstrate an understanding of congruence and similarity using physical models, transparencies or geometry software? Can students describe and use transformations of segments, lines, angles, and two-dimensional figures? Can students describe the specific relationships of angles created by transversals and parallel lines? Can students use and apply the Pythagorean Theorem to real-world situations? Can students solve real-world and mathematical problems involving surface area and volume of cylinders, cones, and spheres? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Understand congruence and similarity using physical models, transparencies or geometry software.	Verify experimentally the properties of rotations, reflections, translations, and dilations, where lines are taken to lines, line segments are taken to line segments of the same length; angles are taken to angles of the same measure; and parallel lines are taken to parallel lines. Understand that a two-dimensional figure is similar or congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. Use informal arguments to establish facts about the angle sum and exterior angles of triangles. Use informal arguments to establish facts about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.		property, rotation, reflection, translation, dilation, transformation, similar, congruent, scale factor exterior angles, sum of angles transversal

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Geometry	Pacing:	
ESSENTIAL QUESTIONS: Can students demonstrate an understanding of congruence and similarity using physical models, transparencies or geometry software? Can students describe and use transformations of segments, lines, angles, and two-dimensional figures? Can students describe the specific relationships of angles created by transversals and parallel lines? Can students use and apply the Pythagorean Theorem to real-world situations? Can students solve real-world and mathematical problems involving surface area and volume of cylinders, cones, and spheres? **NATIONAL STANDARDS - Geometry**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Understand and apply the Pythagorean Theorem.	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. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.		Pythagorean Theorem
Solve real-world and mathematical problems involving surface area and volume of cylinders, cones, and spheres.	Know and apply the formulas for the surface areas and volumes of rectangular prisms, triangular prisms, pyramids, cylinders, cones, and spheres. Apply concepts of similarity to determine the impact of scaling on the volume or surface area of three-dimensional figures when linear dimensions are multiplied by a constant factor; to determine the length of sides of similar triangles, or to solve problems involving growth or rate.	M(G&M)-8-6 M(G&M)-8-5	surface area and volume of three-dimensional shapes, square units, cubic units growth rate

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Functions	Pacing:	
ESSENTIAL QUESTIONS: Can students define, evaluate, and compare functions that are represented in different ways? Can students distinguish between linear and nonlinear functions? Can students construct and interpret functions to model relationships between two quantities? **NATIONAL STANDARDS - Functions and Algebraic Thinking**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Define, evaluate, and compare functions.	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. Compare properties of two functions, each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Interpret the equation y = mx + b as defining a linear function whose graph is a straight line. Give examples of functions that are not linear.		input/output table table representation of functions, graphic representation of function slope-intercept formula function
Use functions to model relationships between quantities.	Construct a function to model a linear relationship between two quantities; then determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values including reading these from a table or graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g. where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.		rate of change

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Statistics and Probability	Pacing:	
ESSENTIAL QUESTIONS: Can students use bivariate data to construct, interpret, and describe specific patterns found in scatter plots, including correlation and line of best fit? Can students construct and interpret box-and-whisker plot using the five-number summary? Can students use counting techniques to solve problems involving combinations and permutations? **NATIONAL STANDARDS: Statistics and Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Investigate patterns of association in bivariate data in scatter plots and two-way tables.	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns found in scatter plots such as clustering, outliers, positive or negative association (correlation), linear and nonlinear association. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line (line of best fit), and informally assess the model fit by judging the closeness of the data points to the line. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.		scatter plot, line of best fit, positive and negative correlation, outlier, clustering, interpolation, extrapolation, bivariate data, data point linear, nonlinear variables dispersion linear model, slope, intercept frequency, two-way table, relative frequency

UNIT/ORGANIZING PRINCIPLE:	Grade 8: Statistics and Probability	Pacing:	
ESSENTIAL QUESTIONS: Can students use bivariate data to construct, interpret, and describe specific patterns found in scatter plots, including correlation and line of best fit? Can students construct and interpret box-and-whisker plot using the five-number summary? Can students use counting techniques to solve problems involving combinations and permutations? **NATIONAL STANDARDS: Statistics and Probability**			
CONCEPTS/CONTENT	**LEARNING TARGETS/SKILLS**	**GLEs**	**KEY TERMINOLOGY**
Interpret and construct box-and-whisker plots.	Interpret a box-and-whisker plot to analyze the data to formulate or justify conclusions, to make predictions, or to solve problems.	M(DSP)-8-1	box-and-whisker plot, quartile, median, extremes, interquartile range, outlier
	Construct a box-and-whisker plot using the five-number summary (upper and lower extremes, median, upper and lower quartiles).	M(DSP)-8-2	
Use counting techniques to solve problems.	Use counting techniques to solve problems in context involving combinations or permutations using a variety of strategies, such as organized lists, tables, tree diagrams, models, and the Fundamental Counting Principle.	M(DSP)-8-2 M(DSP)-8-4	Fundamental Counting Principle, combination, permutation, factorial