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ABSTRACT

This document consists of a sample curriculum model for grade 7 mathematics based on the 1998 Arkansas State Mathematics Framework. The document is divided into five sections: (1) Number Sense, Properties, and Operations; (2) Geometry and Spatial Sense; (3) Measurement; (4) Data Analysis, Statistics, and Probability; and (5) Patterns, Algebra, and Function. Within each section, the standards are exemplified and articulated by benchmarks, suggested assessments, and possible strategies and activities for teaching the standard. (MM)

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SAMPLE CURRICULUM MODEL

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1

Grade 7

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based on the 1998 Arkansas State Mathematics Framework
Arkansas Department of Education, 1998

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Grade Level_7_
NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.1 Identify numerical patterns (e.g., prime numbers, squares, exponents) and verify results (e.g., by continuing the pattern).	Students will identify numerical patterns with one variable such as cubic numbers (e.g., find the next three numbers in this pattern: 1, 8, 27, 64, ___, ___, ___) and positive and negative integers.	. Teacher made test . State-wide tests . Perform-ance . Writing	. Students are given colored blocks. They start with one block. The students then build a bigger cubic structure using the fewest blocks (8). The students continue this sequence for the next two cubic structures (27 and 64). The students record the total number of blocks for each cubic structure. The students determine the pattern for the number of blocks required to continue the same shape but change the size in the specified manner. The pattern is recorded in writing as well as symbolically.

Grade Level_7_
NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.2 Expand number sense through the use of mental computation, calculators/ technology, and written and verbal communication (e.g., powers of ten, factoring, greatest common factors, least common multiples).	Students will expand number sense by: mentally multiplying and dividing by powers of ten up to 10^6; using compatible numbers for estimating quotients (e.g., 248 ÷ 63 is approximately equal to 240 ÷ 60 = 4); rounding to the nearest hundred-thousandth in a decimal based on the context of the problem; mentally estimating the sums and differences of mixed numbers; mentally computing the sum, difference, product, and /or quotient of integers; choosing the appropriate problem solving strategy (including but not limited to estimation, mental computation, paper and pencil, calculators/technology) (e.g., multiply and/or divide large numbers by converting them to scientific notation before completing the designated operation); oral and/or written communication of reasoning of computations; use a scoring guide to perform self-evaluation.	. Teacher made test . State-wide test . Writing . Perfor-mance	. Read: The Sneaky Square and 113 Other Math Activities for Kids by Richard M. Sharp and Seymour Metzner. . Students use a thermometer (model of a number line) as a visual model to learn the concept of adding and subtracting integers. They visualize a thermometer/number line to mentally compute the sum and difference of integers. A picture of their rationale is recorded in their math journal.

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.3 Represent numbers and operations in a variety of equivalent forms (including models, tree diagrams, and symbols).	Students will: represent numbers in exponential notation (e.g., $24 = 2^3 \times 3$); represent a quantity using mixed numbers and decimals; represent multiplication using parentheses and "dot"; represent a multi-digit number using scientific notation (e.g., $43000 = 4.3 \times 10^4$ or $0.0043 = 4.3 \times 10^{-3}$); represent a quantity using various operations (e.g., The quantity 6 can be represented as $2 + 4$ or $(2)(3)$ or $12 \div 2$ or $12 - 6$); compare integers.	. Teacher made test . State-wide tests . Perform-ance . Writing	. Students are given play money. They are instructed to represent the amount in the traditional format (decimals) and in a fractional format. Example: Students display the amount of 5 dollars and 25 cents. They represent the amount in the traditional format as $5.25 and in a fractional format 5 1/4 dollars. Thus representing decimals as fractions.
SLE NPO.1.4 Consistently demonstrate competence with rational number computations (add, subtract, multiply, and divide) with and without manipulatives and technology.	Students will: add, subtract, and multiply decimals, fractions, and mixed numbers; use manipulatives, pictures, and technology to develop the symbolic concepts of addition, subtraction, multiplication, and division of positive and negative integers.	. Teacher made test . State-wide tests . Demon-stration . Perfor-mance	. Students determine how to adjust a recipe if the number of people being served changes. For example: A recipe requires 1/3 cup of sugar and feeds 4. How much sugar would be required in a recipe which would feed 2?

Grade Level 7

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.1.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.1.5 Communicate knowledge of elementary number theory concepts (e.g., primes, factors, multiples, divisibility rules) through classroom interaction and written responses (e.g., tests, journals).	Students will communicate knowledge of: divisibility rules for 4 and 9; place value to the nearest hundred thousandth in a decimal; exponents; scientific notation; operations of integers through classroom interaction (e.g., performance assessments, response to verbal questions, etc.) and written responses (e.g., response to open-ended questions, journals, etc.); use a scoring guide to perform self-evaluations.	. Teacher made test . Writing . Exhibition . State-wide tests	. Students investigate and derive the rules for multiplying integers. They model with two-colored counters or cubes multiplying a positive integer by a negative integer. For example, 3x(-2) means 3 groups of (-2) or (-2)x3 is the same as 3x(-2). (-2) could be represented as 2 red counters (red meaning negative). 3 groups of 2 red counters is 6 red counters or (-6). This is extended to model a negative integer multiplied by a negative integer. For example: (-2)x(-4) Consider the following pattern: 2x(-4)= (-8); 1x(-4)=(-4); 0x(-4)=0; (continue the pattern adding 4 to each product) (-1)x(-4)=4; (-2)X(-4)=8
SLE NPO.1.6 Identify, with/without the aid of technology, irrational numbers and locate irrational numbers relative to other numbers (e.g., the square root of 2 is between 1 and 2, pi is between 3 and 4).	N/A		N/A

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.1 Use estimation to check the reasonableness of computation in application problems.	Students will use estimation techniques (i.e., compatible numbers, rounding, etc.) to check the reasonablenes of computed answers on comsumer-type problems (e.g., computing amount of sales tax, discounts, simple interest, unit price of an item, and percent increase or decrease).	. Teacher made test . State-wide test . Perform-ance . Writing	. Extend NPO.1.4 to have the students estimate the amount of each ingredient needed for the adjusted recipe before actual calculation takes place.
SLE NPO.2.2 Develop strategies for comparing quantities using ratios and proportions (e.g., fractions, rates, unit rates, percents, scales) with use of manipulatives and technology.	Students will determine equivalent ratios, change a ratio to a unit rate to determine the lowest price/unit, increase a recipe using proportions, write and solve a proportion to: find the missing length of a side on similar geometric figures and scale drawings; change fractions to percents; to find a percent of a number; to find what percent one number is of another with the use of manipulatives and technology.	. Teacher observation . State-wide test . Teacher-made test . Demon-stration	. See NPO.1.4 and NPO.2.1

Grade Level 7

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.3 Determine the most appropriate notational representation of a number for the given problem (e.g., fractions vs. decimals, scientific notation).	Students will determine the most appropriate notational representation of a number for the given problem (e.g., scientific notation, exponential notation, rounding to significant digit, etc.)	. Teacher made test . Writing . Performance . State-wide test	. Extend NPO.1.4 to have the students determine the most appropriate notational representation of the amount of ingredients needed in the recipe.
SLE NPO.2.4 Explain the relationship of numbers in one- and two-dimensional graphs (e.g., number lines and coordinate graphs), with and without appropriate technology such as graphing calculators.	Students will explain the relationship of numbers on number lines (integers), coordinate graphs with positive and negative numbers with and without appropriate technology such as graphing calculators.	. Teacher made test . Demonstration . Writing . State-wide test	. Students use the temperature probe of a CBL (Calculator Based Laboratory) to measure the changing temperature of water in a glass after ice and rock salt are added to the water. The temperature change will be displayed on a coordinate graph with time as the other axis. Students explain (verbally and in writing) the relationship of time and temperature as shown on the graph.

Grade Level 7

NUMBER SENSE, PROPERTIES, AND OPERATIONS

Standard NPO.2.0	Benchmarks	Assessments	Strategies/Activities
SLE NPO.2.5 Communicate using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., integers, whole, rational, irrational, natural/counting, etc.).	Students will communicate in written or verbal form using appropriate vocabulary as it relates to the real number system in real-world situations (e.g., whole, natural/counting, rational, integers, etc.); use a scoring guide to perform self-evaluations.	. Teacher made test . State-wide tests . Writing . Portfolio	. See NPO.2.4 and GS.2.2 . Extend NPO.1.2, NPO.1.4 to have students write about their findings in their math journal.

Grade Level 7
GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.1 Identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (from points to *polyhedra*) with physical materials.	Students will identify, draw, classify, and compare geometric figures and their relationships in one, two, and three dimensions (e.g., angles, triangles by number of sides and angles, polygons by sides and angles including regular polygons, circles, cylinder, cone, etc.) with physical materials.	. Teacher made test . State-wide test . Performance . Writing	. Given polygon tiles (cutouts of polygons), students sort the tiles in three different ways. The students present their groupings in an organized manner, such as using a Venn diagram or chart or as a journal entry. As an extension have the students form subgroups in each group. For example: polygons to quadrilaterals to different types of quadrilaterals. . Students construct a mobile representing the relationship of the various quadrilaterals.

Grade Level 7

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.2 Apply geometric properties and formulas (e.g., triangles have 180 degrees, opposite sides of rectangles are equal, Pythagorean theorem) to solve problems with and without appropriate technologies..	Students will apply geometric properties and formulas (e.g., area of a rectangle, triangle, trapezoid, characteristics of triangles, formula for the sum of the interior angles of a polygon, area of a circle, etc.) to solve problems with and without appropriate technologies.	. Teacher made test . State-wide test . Demon-stration . Writing	. Students develop the formula for the sum of interior angles of a polygon using polygon tiles or cutouts. For example: Students trace the polygons and measure each angle. They calculate the sum of the measured angles for each polygon. The data is recorded in a chart showing number of sides and the sum of the interior angles. Students identify and verbalize/write the pattern (using words, formulas, and/or equations), then verify by predicting the sum of the angles in another polygon using the pattern. They measure the angles and add them.

Grade Level 7

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.3 Make predictions based on transformations of geometric figures in problem-solving situations (e.g., compare 2 pictures and determine what changes were made, i.e. flip, slide, rotation).	Students will make predictions based on transformations of geometric figures in problem-solving situations (e.g., develop a secret code using transformations of each letter of the alphabet such as rotating and reflecting each letter to serve as a symbol in the code, reflection and symmetry of objects, etc.)	. Teacher made test . Log . Exhibition . Statewide test	. Students are given a portion of a stain-glassed window design. They complete the design using transformations of the given portion. The completed design is then exhibited.
SLE GS.1.4 Establish and apply geometric relationships through informal reasoning (e.g., estimate angle measures).	Students will establish and apply geometric relationships through informal reasoning (e.g., estimate the sum of interior angles in a polygon).	. Teacher observation . Teacher made test . Demonstration . Statewide test	. Students predict whether a polygon will tesselate based on its interior angles. The students test their predictions and develop a rule for polygons that tesselate.

Grade Level 7

GEOMETRY AND SPATIAL SENSE

Standard GS.1.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.1.5 Visualize, model, and represent 3 dimensional objects (e.g., cube models, base plans/nets, building plans, isometric dot paper sketches) to develop and implement problem-solving strategies and verify solutions.	Students will visualize, model and represent 3 dimensional objects (e.g., using a 2 dimensional drawing to develop a 3 dimensional model) to develop and implement problem-solving strategies and verify solutions.	. Teacher made test . State-wide test . Exhibit-ion . Project	. Students draw the floor plan of a house and construct the outside of the house using the floor plan as the base.

Grade Level 7

GEOMETRY AND SPATIAL SENSE

Standard GS.2.0	Benchmarks	Assessments	Strategies/Activities
SLE GS.2.1 Construct geometric models to solve problems (e.g., comparing bridge supports: cylindrical vs. rectangular).	Students will construct geometric models to solve problems (e.g., determining the largest floor plan for a model home).	. Teacher made test . State-wide test . Exhibit-ion . Demon-stration	. Extend GS.1.5 to have students remodel the interior of the house without changing the outside of the structure.
SLE GS.2.2 Investigate geometric properties and use them to describe and explain situations in society and nature (e.g., why doors are rectangular, why honeycombs are hexagonal, why trusses are triangular).	Students will investigate geometric properties of polygons and use them to describe and explain situations in society and nature (e.g., Why was the Pentagon built as a five-sided building? Why do bees build their comb hexagonally? Why are cylinders used as columns?).	. Teacher made test . State-wide test . Writing . Project	. Students investigate and determine what shaped lots for a given plot of land is the best in order to maintain the maximum area in each lot and the maximum number of lots. Written results are explained also through pictures. For example: would triangular, rectangular, or square-shaped lots yield the most number of lots in a 2 acre plot of land with each lot having an area of at least 1,000 square yards?

Grade Level 7
MEASUREMENT

Standard M.1.0	Benchmarks	Assessments	Strategies/Activities
SLE M.1.1 Use estimation to check the reasonableness of measurements obtained from use of various instruments (including angle measures).	**Students will estimate before calculating surface area and angle measures to check for reasonableness of measures obtained from using various measuring instruments.**	. Teacher observation . State-wide test . Perform-ance . Teacher made test	. Extend GS.1.2 to have the students estimate the angle measure of an interior angle in the polygon before measuring.
SLE M.1.2 Estimate, calculate, and compare the one, two, and three dimensional features of objects in metric, customary and non-standard units of measure.	**Students will estimate, calculate and compare the area and surface area of two and three dimensional objects in metric and customary units of measure.**	. Teacher observation . Teacher made test . Demon-stration . State-wide test	. Extend GS.2.2 to give the dimensions of the plot of land in metric and customary units and to have the students estimate the maximum area of each lot and the maximum number of lots.

Grade Level 7
MEASUREMENT

Standard M.1.0	Benchmarks	Assessments	Strategies/Activities
SLE M.1.3 Convert from one measurement to another within the same system (customary or metric).	Students will convert capacity/volume measurements (e.g., liters to kiloliters, tablespoons to fluid ounces to cups), linear measurements (e.g., millimeters to centimeters to decimeters to meters to kilometers, inches to feet to yard to mile), and weight/mass measurements (e.g., grams to kilograms, pounds to tons) within the same system.	. State-wide tests . Perfor-mance . Teacher made tests . Observ-ations	. Extend GS.2.1 to have the students convert the measurements of the rooms within the same system. For example: Students calculate the square footage of each room, but must buy carpet by the square yard, thus a conversion is needed.

Grade Level 7
MEASUREMENT

Standard M.2.0	Benchmarks	Assessments	Strategies/Activities
SLE M.2.1 Select appropriate units and tools (metric, customary and non-standard) to measure to the required degree of accuracy.	Students will choose the appropriate measuring tools and units (metric and customary) to measure capacity, length, weight, and mass to the required degree of accuracy.	. State-wide test . Demon-stration . Project . Teacher-made test	. Extend GS.2.2 to allow the students to choose the appropriate measuring tool and unit to measure to the required degree of accuracy.

Grade Level 7
MEASUREMENT

Standard M.3.0	Benchmarks	Assessments	Strategies/Activities
SLE M.3.1 Develop and use procedures to solve measurement problems using one, two, and three dimensions.	Students will develop and use strategies to determine the surface area of three dimensional objects.	. Teacher made test . State-wide test . Demon-stration . Writing	. Extend GS.1.5 to have the students find the surface area of the outside of the structure. The students find the surface area in whatever method they choose. The method is then recorded and justified in their math journals.
SLE M.3.2 Using manipulatives and technology, develop the concepts of rate of change (mph, interest, tax rates, commissions, utility rates) and indirect measurements (heights of an object, width of a river).	Students will use manipulatives and technology to develop the concepts of rate of change (e.g., speed, unit prices, population rates, miles per gallon) and indirect measurements that can be determined by ratio and proportion.	. Teacher observation . Teacher made test . State-wide test . Perform-ance	. Students determine a method of calculating miles per gallon. For homework, they calculate the miles per gallon for a family member's vehicle. The next day the findings are recorded in an organized manner for comparison.

Grade Level 7
MEASUREMENT

Standard M.3.0	Benchmarks	Assessments	Strategies/Activities
SLE M.3.3 Construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations.	**Students will construct scale drawings (using various tools) and/or build 3-D models to represent real-world problems and situations (e.g., cost and square footage of a home).**	. Teacher made test . State-wide test . Project . Exhibit-ion	. See GS.2.1

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.1.0	Benchmarks	Assessments	Strategies/Activities
SLE DSP.1.1 Actively and systematically collect, organize and describe data using technology when appropriate.	Students will actively and systematically collect, organize and describe data using technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheet) when appropriate.	. Teacher made test . Perform-ance . State-wide test . Writing	. See NPO.2.4 . Students measure the heart rate of their classmates after exercising. Students organize the information in a user friendly method.
SLE DSP.1.2 Construct, read and interpret tables, charts and graphs (including stem-and-leaf, histogram, bar graph, pie graph, box and whiskers, line graph, scatter plots) with and without technology.	Students will construct, read and interpret tables, charts, box-and-whiskers graphs, circle graphs, line graphs, stem-and-leaf plots, scatter plots and histograms with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, etc.) and appropriate computer software (e.g., spreadsheets).	. State-wide test . Project . Writing . Demon-stration	. See NPO.2.4 . Extend DSP.1.1 to have students construct a box-and-whiskers graph of the collected data. Students interpret the data and record the interpretation in their math journals.

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.1.0	Benchmarks	Assessments	Strategies/Activities
SLE DSP.1.3 Based on analysis of central tendencies (mean, median, mode, range) make predictions and inferences (e.g., interpolate from within graphs and extrapolate by extending graphs) from the data set with and without technology.	Based on analysis of central tendencies (mean, median, mode, range) students will make predictions and inferences (e.g., line of best fit and reporting of appropriate central tendencies for certain situations) from the data set with and without appropriate technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).	. Teacher made test . Demonstration . Statewide test . Writing	. Extend DSP.1.1 and DSP.1.2 to have the students calculate and analyze the central tendencies (mean, median, mode, range) and make further predictions and inferences using the gained information. . Read: <u>What Do You Mean by "Average"? Means, Medians, and Modes</u> by Elizabeth James and Carol Barkin.

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.2.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.2.1 Conduct experiments or simulations, with and without technology, to model situations and construct *sample spaces.*	Students will conduct experiments or simulations, with and without technology, to model situations (e.g.,surveying a group for prediction purposes) and construct *sample spaces.*	. Log/ journal . Performance . Project	. Students conduct a "blind fold" test. They choose two brands of an item, such as two brands of popcorn. They place an amount of each brand into two separate containers that are labeled "A" and "B". The students blindfold fellow school mates. They have them taste test the samples and identify the preferred sample. They compile and post the results of their test. They infer the outcome of a larger sampling group. The process and results are forwarded to the manufacturer of the preferred product.
SLE DSP.2.2 Make predictions based on experimental and theoretical probabilities.	Students will make predictions based on experimental and theoretical probabilities (e.g., designing spinners with certain probability).	. Teacher observation . State-wide test . Writing . Teacher made test	. Students design spinners with specified probabilities. The spinners are tested and revised if needed. The rationale is recorded.

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.2.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.2.3 Use a probability model for comparing experimental results with theoretical expectations.	Students will use a probability model (an activity that simulates the use of probability) for comparing experimental results with theoretical expectations (e.g., theoretical probability of landing on a certain outcome after spinning a spinner divided into 3 equal parts is 1/3, but the experimental results may vary).	. State-wide tests . Exhibit-ion . Obser-vations . Writing	. See DSP.2.2
SLE DSP.2.4 Interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.	Students will interpret experimental and theoretical probabilities to determine whether outcomes are equally likely or biased.	. State-wide test . Writing . Teacher made test	. Students are divided into teams of three. Each team is given a pair of dice. Student A gets a point if the rolled dice total 1 through 4. Student B gets a point if the rolled dice total 5 through 8 and Student C receives a point for total 9-12. The students test the fairness of the game. The process for determining the fairness and the rationale for the drawn conclusion are recorded and discussed.

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.3.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.3.1 Evaluate arguments that are based on statistical data.	Students will evaluate arguments that are based on statistical data (e.g., advertisements).	. State-wide tests . Writing . Teacher made test . Perfor-mance	. See DSP.1.3, DSP.2.1, and DSP.2.4
SLE DSP.3.2 Make inferences and convincing arguments based on statistics with and without technology.	Students will make inferences and convincing arguments based on statistics (e.g., develop own advertisements) with and without technology (e.g., graphing calculators with and without computer linkage, CBL, and computer software including spreadsheets).	. Teacher observation . State-wide test . Teacher made test . Demon-stration	. See DSP.3.1

Grade Level 7

DATA ANALYSIS, STATISTICS AND PROBABILITY

Standard DSP.3.0	Benchmarks	Assessment	Strategies/Activities
SLE DSP.3.3 Model the use of probability and statistical methods in decision making using technology presentation materials (e.g., LCD, graphing calculators, spreadsheets, etc.).	Students will model the use of probability and statistical methods in decision making using technology presentation materials (e.g., graphing calculators, spreadsheets, etc).	. State-wide tests . Project . Demon-stration . Exhibi-tion	. See DSP.3.1

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.1.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.1.1 Represent arithmetic as algebra (change 25 = __ + 13 to 25 = m + 13).	Students will represent the whole-number properties (e.g., identity, commutative, associative, etc.) in algebraic form.	. Teacher made tests . State-wide test . Demon-stration . Perfor-mance	. Students write an equation to describe a situation. The students manipulate the situation, thus manipulating the equation, to model the whole-number properties. For example: Movable folding chairs in a school auditorium can be arranged in rows (r) with an aisle down the middle. The number of columns across one side of the auditorium is represented as (a) and the number of columns across the other side of the auditorium is represented as (b). Write an equation for the total number of chairs (c), in the auditorium. The equation should tell how (c) is related to (r), (a), and (b). One equation may be: ar+br=c. By swapping the number of columns on each side of the auditorium, the new equation may be br+ar=c, thus showing the commutative property. The students record the moves and equations labeled with the properties in their math journal.

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.1.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.1.2 Through the use of manipulatives and computer technology, develop the concepts of variables, expressions, and equations (algebra tiles, two color counters, graphing calculators, balance scale model, etc.).	Students will use manipulatives and computer technology (e.g., algebra tiles, two color counters, graphing calculators, balance scale model, etc.) to develop the concepts of variables, expressions, and equations.	. Teacher observation . Log . State-wide test . Demon-stration	. See PAF.1.1

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.1.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.1.3 Analyze and represent (through calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear, exponential, and quadratic patterns).	Students will analyze and represent (with and without calculator use) situations and number patterns with tables, graphs, and equations (e.g., identifying linear and exponential patterns).	. Teacher observation . State-wide test . Demon-stration . Exhibit-ion	. Extend NPO.1.1 to have the students analyze and represent the pattern with a table. . See DSP.1.1, DSP.1.2, DSP.2.1, and PAF.1.1
SLE PAF.1.4 Summarize and pose problems/situations relating to the algebraic relationships, patterns, and functions, discovered through explorations.	Students will summarize and pose problems/situations relating to algebraic relationships (e.g., linear equations), patterns, and functions discovered through explorations.	. Teacher made test . State-wide test . Writing . Portfolio	. Extend PAF.1.1 to have the students pose an alternate situation that could be represented algebraically. The alternate situation and the verification of it's suitability is recorded in their math journals.

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.1 Conduct informal investigations (with technology) for analyzing, representing, interpreting, and generalizing functional relationships (e.g., distance and time) to develop explanations or predictions about outcomes of actual situations.	Students will conduct informal investigations (with appropriate handheld technology and/or computer) to develop explanations (e.g., describe the relationship between distance and time) or predictions about outcomes represented by collected data on a coordinate graph.	. State-wide tests . Perfor-mance . Writing . Project	. See NPO.2.4 and M.3.2
SLE PAF.2.2 Identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from graphs, tables, words, and expressions).	Students will identify variables and relationships and translate them into mathematical statements or other mathematics representations to construct a model (e.g., converting from tables, words, and expressions).	. Teacher made test . State-wide test . Exhibit-ion . Writing	. Students are given a situation. They use a table to model the situation. They translate the situation into words. (For example, a pyramid has a square base with the area of 144 squared feet. The next layer up has an area of 121 squared feet. The next layer up has an area of 100 squared feet. The students construct a model of the pattern and translate it into words. They keep a log of their work. They determine the area of 3 more layers up and record their process and results in their log.

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTION

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.3 Write and solve equations and inequalities (using manipulatives and technology).	Students will write and solve linear equations and linear inequalities (using manipulatives and appropriate technology).	. Teacher observation . State-wide test . Teacher made tests . Perfor-mance	. Students use an algebra balance to solve linear inequalities. For example: the inequality $x+2<7$ is represented on the balance. Students substitute quantities for x that would make the inequality true. Students then graph the inequality on the graphing calculator to show the set of values for x that would make the inequality true.
SLE PAF.2.4 Communicate in written and verbal form a verification of the solution and the process used to obtain the solution.	Students will communicate in written (e.g., journals, open-ended assessments, etc.) and verbal forms the justification of the solution and the process used to obtain the solution (e.g., "How do you know your solution is the best choice?"); use a scoring guide to perform self-evaluations.	. State-wide test . Demon-stration . Writing . Portfolio	. See PAF.1.1, PAF.1.4, PAF.2.2, and PAF.2.5 . Extend PAF.2.3 to have students record the process used to solve the inequalities.

Grade Level 7

PATTERNS, ALGEBRA AND FUNCTIONS

Standard PAF.2.0	Benchmarks	Assessments	Strategies/Activities
SLE PAF.2.5 Use a calculator to display, to determine, and to make inferences from linear relationships in slope-intercept form.	Students will use manipulatives and/or handheld technology to make inferencesfrom linear relationships in slope-intercept form concerning dependent and independent variables.	. Teacher observation . State-wide tests . Demon-stration . Teacher made test	. Students use a graphing calculator to investigate the effects of changing the slope and the y-intercept in an equation written in slope-intercept form. For example: Students graph the equation y=x on the calculator. They rewrite the equation by adding a y-intercept and graphing the new equation. The equation continues to be changed either by changing the slope or the y-intercept. After each change the new equation is graphed. Students record their findings in their math journals.

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