CORRELATION
of
the 10 UNDERSTANDING MATH PLUS PROGRAMS
with
Arkansas Mathematics Curriculum Framework

Grade 8

Note: a. The Understanding Math PLUS series of programs consist of 10 programs written for Kindergarten to 10th Grade.

The 10 programs are:

Understanding Fractions
Understanding Probability
Understanding Exponents
Understanding Algebra
Understanding Numeration
Understanding Measurement and Geometry
Understanding Whole Numbers and Integers
Understanding Percent
Understanding Equations
Understanding Graphing

Note: b. The Understanding Numeration software for K to 3 is set up so that the teacher selects items in the following order:
Concept .. from 5 concepts .. Counting, Comparing & Ordering, Place Value, Operations and Problem Solving.
Skill .. chosen from the list of specific learning expectations
Level .. indicates the levels of development for Kindergarten to 3rd grade.

Level	Upper Range of Number
A	10
B	20
C	100
D	1000

Lesson .. 250 lessons are sequenced to build understanding of concepts.
A detailed Lesson Synopsis on the website www.neufeldmath.com to assist the teacher by stating the lesson contents but also by giving lesson suggestions.
Worksheet .. off computer worksheets are selected from the CD by a code.

Note: c. The remaining 9 Understanding Math programs for 4th to 10th grade are set up so that they can be used in a variety of teaching and learning environments ranging from a teacher centered approach with 1 computer to a student centered lab approach. The lessons can also be used in remediation, tutorial, intervention, resource, fast-tracking.
Each topic has:
..an interactive concept introduction, usually with a variety of graphic approaches.
..a number of particular examples
..practice questions with random questions but particular feedback
..a topic test with random questions and tracking
..off computer worksheets selected from the website .. www.neufeldmath.com

Strand: Number and Operations
Standard 1 Number Sense:
Students shall understand numbers, ways of representing numbers, relationships among numbers and number systems

Standard	Understanding Math PLUS Program and Lesson
NO.1.8.1 **Read, write, compare and solve problems, with and without appropriate *technology*, including numbers less than 1 in *scientific notation*** **NO.1.8.2** **Convert between *scientific notation* and standard *notation*, including numbers from zero to one.**	**MAT+ <u>Understanding Exponents</u>** **Topic 4: Scientific Notation** Scientific Notation for Small Numbers Introduction Chart The Steps Examples 1. Number Question 2. Park Question 3. Sun Question 4. Kitchen Question
NO.1.8.3 **Compare and order *real numbers* including *irrational numbers* and find their approximate location on a number line (Use *technology* when appropriate)**	
NO.1.8.4 **Understand and justify classifications of numbers in the *real number* system**	

Strand: Number and Operations
Standard 2: Properties of Number Operations
Students shall understand meanings of operations and how they relate to one another

Standard	Understanding Math PLUS Program and Lesson
NO.2.8.1 **Apply the addition, subtraction, multiplication and division properties of equality to two-step *equations***	**MAT+ <u>Understanding Equations</u>** **Topic 3: Solving Two-step Equations** Our Problem Concepts – Examples with Tiles Examples 1 through 4 Concepts – Examples without Tiles Practice Questions; Topic Test
NO.2.8.2 **Understand and apply the *inverse* and *identity* properties**	
NO.2.8.3 **Use *inverse* relationships (addition and subtraction, multiplication and division, squaring and *square roots*) in problem solving situations**	**MAT+ <u>Understanding Equations</u>** **Topic 5: Word Problems** Perimeter Problem with Diagram

	Money Problem with Chart Age Problem with Chart Buying CDs Meat Mixture Coffee Mixture Rate of Work Summary: Problem Solving Using Equations Practice Questions; Topic Test
NO.2.8.4 **Apply rules (conventions) for *order of operations* to *rational numbers***	**MAT+ <u>Understanding Whole Numbers and Integers</u>** **Topic 9: Order of Operations** Word Problems Shipping Babysitting Garbage Practice Questions; Topic Test
NO.2.8.5 **Model and develop addition, subtraction, multiplication and division of *rational numbers* Ex. -8½ + 2¾**	**MAT+ <u>Understanding Fractions</u>** **Topic 8: Adding Fractions** The Lowest Common Denominator Examples 1,2 Word Problems Alexander's Friends Eating Candy Goal Scoring Taking a Walk Fraction Card Game Magic Square Practice Questions; Topic Test **Topic 9: Subtracting Fractions** Subtracting Fractions on a Number Line Examples 1, 2 The Lowest Common Denominator Examples 1,2 Word Problems Pedro and Alex Race Washing the Cars Planting a Garden Practice Questions; Topic Test **Topic 10: Multiplying Fractions** A Summary The Meaning of "OF"

	Order in Multiplying Examples 1,2 Multiplying Fractions with Large Numbers Examples 1,2 Practice Questions; Topic Test **Topic 14: Dividing Fractions** Understanding Division Examples with Diagrams Soda Pop Ice Cream Shapes 1 & 2 Patterns from Examples Another Explanation Examples 1 & 2 Examples without Diagrams Numerical Examples 1,2 Central High School Practice Questions; Topic Test

Strand: Number and Operations
Standard 3: Numerical Operations and Estimation
Students shall compute fluently and make reasonable estimates

Standard	Understanding Math PLUS Program and Lesson
NO.3.8.1 **Compute, with and without appropriate *technology*, with *rational numbers* in multi-step problems**	**MAT+ Understanding Fractions** **Topic 8: Adding Fractions** **Topic 9: Subtracting Fractions** **Topic 10: Multiplying Fractions** **Topic 14: Dividing Fractions** ***PROBLEMS SECTIONS***
NO.3.8.2 **Solve, with and without appropriate *technology*, multi-step problems using a variety of methods and tools (i.e. objects, mental computation, paper and pencil)**	**MAT+ Understanding Equations** **Topic 5: Word Problems** Perimeter Problem with Diagram Money Problem with Chart Age Problem with Chart Buying CDs Meat Mixture Coffee Mixture Rate of Work Summary: Problem Solving Using Equations Practice Questions; Topic Test

NO.3.8.3 **Use *estimation* to solve problems involving *rational numbers*; including *ratio*, *proportion*, *percent* (increase or decrease) then judge the reasonableness of solutions**	**MAT+ <u>Understanding Percent</u>** **Topic 4: Ratios and Proportions** Ratios and Your Body Golden Ratios Measuring Your Body Practice Questions; Topic Test **MAT+ <u>Understanding Percent</u>** **Topic 3: Fraction/Decimal to Percent** Percent Change Percent Increase Percent Decrease Percent Increase or Decrease
NO.3.8.4 **Apply factorization to find *LCM* and *GCF* of *algebraic expressions*** **Ex.** **$4x^2 y^3$** **$6xy^2$** ***GCF*=$2xy^2$** ***LCM*=$12x^2y^3$**	**MAT+ <u>Understanding Algebra</u>** **Topic 3: Patterns, Patterns, Patterns** Common Factors/GCF Examples 1,2
NO.3.8.5 **Calculate and find approximations of *square roots* with appropriate *technology***	**MAT+ <u>Understanding Exponents</u>** **Topic 5: Square Root** Squaring Numbers Square Roots Radical Signs Square Roots of Negative Numbers Examples Questions 1. Radicals First 2. The Four Equations 3. Lawn Question 4. Make a Square
NO.3.8.6 **Solve, with and without *technology*, real world *percent* problems including *percent* of increase or decrease**	**MAT+ <u>Understanding Percent</u>** **Topic 3: Fraction/Decimal to Percent** Percent Change Percent Increase Percent Decrease Percent Increase or Decrease

Strand: Algebra
Standard 4: Patterns, Relations and Functions
Students shall recognize, describe, and develop patterns, relations and functions

Standard	Understanding Math PLUS Program and Lesson
A.4.8.1 **Find the nth term in a *pattern* or a *function* table** **A.4.8.2** **Using real world situations, describe *patterns* in words, tables, pictures, and symbolic representations**	**MAT+ Understanding Algebra** **Topic 3: Patterns, Patterns, Patterns** Geometric Patterns Examples 1, 2, 3, 4, 5, 6, 7, 8 Number Patterns Examples 1, 2, 3, 4, 5, 6 Number and Geometric Patterns
A.4.8.3 **Interpret and represent a two oper*ation* *function* as an *algebraic equation*** **Ex. y = 2x + 1**	
A.4.8.4 **Use tables, graphs, and *equations* to identify *independent/dependent variables (input/output)***	

Strand: Algebra
Standard 5: Algebraic Representations
Students shall represent and analyze mathematical situations and structures using algebraic symbols

A.5.8.1 **Solve and graph two-step *equations* and *inequalities* with one *variable* and verify the reasonableness of the result with real world application with and without *technology***	**MAT+ Understanding Equations** **Topic 7: Solving Inequalities** Inequality on the Number Line Examples 1-4 Solving Inequalities Examples 1-6 Graphing Linear Inequalities in Two Variables Concepts 1,2 Examples 1,2,3 Solving Systems of Linear Inequalities by Graphing Examples 1,2
A.5.8.2 **Solve and graph *linear equations* (in the form y=*m*x+*b*)**	**MAT+ Understanding Graphing** **Topic 8: Equation of a Straight Line** Graph y = mx+b Examples 1,2,3,4 Patterns to Summary Examples 5,6,7 Slope y-intercept Equation

	Concept Examples 1,2,3,4
A.5.8.3 **Translate sentences into *algebraic equations* and *inequalities* and combine like terms within *polynomials***	**MAT+ <u>Understanding Algebra</u>** **Topic 5: Adding Expressions** Our Problem Adding Expressions with X and Y Tiles Examples 1,2,3 Adding Expressions with X-Squared Tiles Examples 1,2,3 Adding Expressions without Tiles Examples 1,2 Practice Questions with Tiles Practice Questions without Tiles Topic Test **Topic 6: Subtracting Expressions** Our Problem Subtracting Expressions with X and Y Tiles Concept Examples 1,2 Subtracting Expressions with X-squared Tiles Examples 1,2 Subtracting Expressions without Tiles
A.5.8.4 **Write and evaluate *algebraic expressions* using *rational numbers***	

Strand: Algebra
Standard 6: Algebraic Models
Students shall develop and apply mathematical models to represent and understand quantitative relationships

Standard	Understanding Math PLUS Program and Lesson
A.6.8.1 **Describe, with and without appropriate *technology*, the relationship between the graph of a line and its equation, including being able to explain the meaning of slope as a constant rate of change (rise/run) and *y-intercept* in real world problems**	**MAT+ <u>Understanding Graphing</u>** **Topic 7: Slope of a Line** Formula **Topic 8: Equation of a Straight Line** Slope – Point Form of the Equation Example 1: Solutions 1,2 Example 2 : Solution 1,2,3,4 Special Cases Example 1 – Zero Slope Example 2 – Undefined

A.6.8.2 **Represent, with and without appropriate *technology*, *linear* relationships concretely, using tables, graphs and *equations.***	**MAT+ <u>Understanding Graphing</u>** **Topic 6: Linear Relations** In This Topic What is a Linear Relation? Graphs of Linear Relations Concept Examples 1 through 6 The Taxi Example – Setup Equation – Graph Equation The Elastic Example – Setup Equation – Graph Equation Lightning Example – Setup Equation – Graph Equation Line of Best Fit Examples 1, 2 Practice Questions; Topic Test
A.6.8.3 **Differentiate between *independent/dependent variables* given a *linear relationship* in context**	
A.6.8.4 **Represent, with and without appropriate *technology*, simple exponential and/or quadratic *functions* using verbal descriptions, tables, graphs and formulas and translate among these representations**	**MAT+ <u>Understanding Graphing</u>** **Topic 9: Quadratic Functions** Introductory Examples Examples 1,2 Summary Examples 1,2 Definitions Parabolas Quadratic Functions

Strand: Algebra
Standard 7: Analysis of Change
Students shall analyze change in various contexts

Standard	Understanding Math PLUS Program and Lesson
A.7.8.1 **Use, with and without *technology*, graphs of real-life situations to describe the relationships and analyze change including graphs of change (cost per minute) and graphs of accumulation (total cost)**	

Strand: Geometry
Standard 8: Geometric Properties
Students shall analyze characteristics and properties of 2 and 3 dimensional geometric shapes and develop mathematical arguments about geometric relationships

Standard	Understanding Math PLUS Program and Lesson
G.8.8.1 **Form generalizations and validate conclusions about properties of geometric shapes** **G.8.8.2** **Make, with and without appropriate *technology*, and test *conjectures* about characteristics and properties between *two-dimensional* figures and *three-dimensional* objects** **Ex. circle vs. cylinder, square vs. *cube***	**MAT+ <u>Understanding Measurement and Geometry</u>** **Topic 2: Perimeter and Area of Polygons** Polygons…What Are They? Concept A Triangle is A Quadrilateral is A Pentagon is A Hexagon is An Octagon is Classify Polygons **Topic 4: Solids: Volume and Surface Area** Classifying Solids A Solid is… Recall Polygons A Polyhedron is… A Prism is… Some Special Pyramids A Cylinder is… A Cone is… Platonic Solids
G.8.8.3 **Determine appropriate application of geometric ideas and relationships, such as *congruence*, similarity, and the *Pythagorean theorem*, with and without appropriate *technology***	**MAT+ <u>Understanding Exponents</u>** **Topic 6: Pythagorean Theorem** In This Topic The Right Triangle Math or Magic? Introduction Omar's Rope Trick #1, #2 Our Rope Trick Squares on a Grid Examples 1-4 Squares on the Sides of a Right Triangle Triangles 1,2,3 The Pythagorean Theorem The Pattern In General Theorem

Strand: Geometry
Standard 9: Transformation of Shapes
Students shall apply transformations and the use of symmetry to analyze mathematical situations

Standard	Understanding Math PLUS Program and Lesson
G.9.8.1 **Determine a *transformation's line* of *symmetry* and compare the properties of the figure and its *transformation*** **G.9.8.2** **Draw the results of *translations* and *reflection*s about the x- and y-axis and *rotations* of objects about the origin**	**MAT+ Understanding Graphing** **Topic 4: Transformations** Line of Symmetry – An Introduction Introduction Examples 1 through 6 Symmetry Match Puzzle 1,2 Translations Object to Image We Say, We Write Translation Mapping Rule Examples Reflections Object to Image We Say, We Write Reflection Mapping Rule Examples Rotations Object to Image We Say, We Write Rotation Mapping Rule Examples

Strand: Geometry
Standard 10: Coordinate Geometry
Students shall specify locations and describe spatial relationships using coordinate geometry and other representational systems

Standard	Understanding Math PLUS Program and Lesson
G.10.8.1 **Use coordinate geometry to explore the links between geometric and algebraic representations of problems (lengths of segments/distance between points, *slope/perpendicular-parallel lines*)**	**MAT+ Understanding Measurement and Geometry** **Topic 7: Constructions** Perpendicular from Point on Line Perpendicular from Point off Line **MAT+ Understanding Graphing** **Topic 7: Slope of a Line** Parallel Lines Examples 1,2,3 Perpendicular Lines

	Examples 1,2,3

Strand: Geometry
Standard 11: Visualization and Geometric Models
Students shall use visualization, spatial reasoning and geometric modeling

Standard	Understanding Math PLUS Program and Lesson
G.11.8.1 **Using isometric dot paper interpret and draw different views of buildings**	**MAT+ Understanding Measurement and Geometry** **Topic 8 : Projective Geometry** An Introduction Toothpicks on Isometric Dot Paper Toothpicks to Cube The Views Using Isometric Grid Paper Orthographic Projections: Introduction

Strand: Measurement
Standard 12: Physical Attributes
Students shall use attributes and tools of measurement to describe and compare mathematical and real-world objects

Standard	Understanding Math PLUS Program and Lesson
M.12.8.1 **Understand, select and use, with and without appropriate *technology*, the appropriate units and tools to measure angles, *perimeter*, *area*, *surface area* and *volume* to solve real world problems**	**MAT+ Understanding Measurement and Geometry** **Topic 2: Perimeter and Area of Polygons** Problems Section Length of Fence Area of a Wall The Tablecloth **Topic 3: The Circle** Area of a Circle Recall Area Area Exploration #1, #2 Example 1 – Wheel Example 2 – Pizza Example 3 – The Semi-circle Example 4 – The Dog's Run Example 5 – The Hockey Rink Practice Questions; Topic Test **Topic 4: Solids: Volume and Surface Area** Practice Questions; Topic Test

M.12.8.2 **Describe and apply equivalent measures using a variety of units within the same system of measurement**	

Strand: Measurement
Standard 13: Systems of Measurement
Students shall identify and use units, systems and processes of measurement

Standard	Understanding Math PLUS Program and Lesson
M.13.8.1 **Draw and apply measurement skills with *fluency* to appropriate levels of precision**	**MAT+ Understanding Measurement and Geometry** **Topic 1: An Introduction to Measurement** Calculating Distances Using Centimeters Examples 1, 2, 3, 4, 5, 6 Using Inches Examples 1, 2, 3, 4, 5, 6
M.13.8.2 **Solve problems involving *volume* and *surface area* of *pyramids*, *cones* and composite figures, with and without appropriate *technology***	**MAT+ Understanding Measurement and Geometry** **Topic 4: Solids: Volume and Surface Area** Surface Area of a Solid The Concept Surface Area of a Pyramid Surface Area of a Cylinder Volume of a Solid The Concept Volume of a Prism: Examples 1, 2 Volume of a Cylinder Volume of a Pyramid Volume of a Cone
M.13.8.3 **Apply proportional reasoning to solve problems involving indirect measurements, scale drawings or rates**	**MAT+ Understanding Measurement and Geometry** **Topic 1: An Introduction to Measurement** Scale Centimeters Example 1, 2, 3 Inches Examples 1, 2, 3
M.13.8.4 **Find the distance between two points on a *coordinate plane* using with the *Pythagorean theorem***	**MAT+ Understanding Exponents** **Topic 6: Pythagorean Theorem** Example Questions Example 1 – Pole Example Example 2 – Tower Example

	Example 3 – Walking Example Example 4 – Lake Example Example 5 – Geometric Example Practice Questions; Topic Test
M.13.8.5 **Estimate and compute the *area* of irregular *two-dimensional* shapes**	**MAT+ <u>Understanding Measurement and Geometry</u>** **Topic 2: Perimeter and Area of Polygons** Problems Section Length of Fence Area of a Wall The Tablecloth

Strand: Data Analysis and Probability
Standard 14: Data Representation
Students shall formulate questions that can be addressed with data and collect, organize and display

Standard	Understanding Math PLUS Program and Lesson
DAP.14.8.1 **Design and conduct investigations which include** **• adequate number of trials** **• unbiased sampling** **• accurate measurement** **• record-keeping**	
DAP.14.8.2 **Explain which types of display are appropriate for various data sets (*scatter plot* for relationship between two variants and *line of best fit*)** **DAP.14.8.3** **Interpret or solve real world problems using data from charts, *line plots, stem-and leaf plots, double-bar graphs, line graphs, box-and whisker plots, scatter plots, frequency tables or double line graphs***	**MAT+ <u>Understanding Graphing</u>** **Topic 2: Statistics** Presenting Data Stem-and-Leaf Diagram Examples 1 & 2 Bar Graph Examples 1 & 2 Histogram Examples 1 & 2 Line Graph Examples 1 & 2 Circle or Pie Graph Examples 1 & 2 Scatter Plot Examples 1 & 2 Box and Whisker Plots Concepts Examples 1, 2

Strand: Data Analysis and Probability
Standard 15: Data Analysis
Students shall select and use appropriate statistical methods to analyze data

Standard	Understanding Math PLUS Program and Lesson
DAP.15.8.1 **Compare and contrast the reliability of data sets with different size populations** **Ex. 40/80 vs. 40/800**	
DAP.15.8.2 **Analyze, with and without appropriate *technology*,** **graphs by comparing measures of *central tendencies* and *measures of spread*** **DAP.15.8.3** **Given at least one of the measures of *central tendency* create a data set**	**MAT+ <u>Understanding Graphing</u>** **Topic 2: Statistics** Measures of Central Tendency Introduction The Mean Average The Median Average The Mode Summary Another Example Adding Data Points
DAP.15.8.4 **Describe how the inclusion of *outliers* affects those measures**	

Strand: Data Analysis and Probability
Standard 16: Inferences and Predictions
Students shall develop and evaluate inferences and predictions that are based on data

Standard	Understanding Math PLUS Program and Lesson
DAP.16.8.1 **Use observations about differences between sets of data to make *conjectures* about the populations from which the data was taken**	**MAT+ <u>Understanding Graphing</u>** **Topic 2: Statistics** Data…What is it? Examples of Data Example 1 – Fast Food Earnings Example 2 – Infant's Walk Example 3- Canada and U.S. Forecast Example 4 – King of the Strike Out Example 5 – U.S. Stake in India Example 6 – Allergy Troubles A Summary: Examples Statistics…What is it? Collecting Data Throw a Die

	Throw 2 Dice Voting Primary Data – Gathering Methods Secondary Data – Gathering Methods

Strand: Data Analysis and Probability
Standard 17: Probability
Students shall understand and apply basic concepts of probability

Standard	Understanding Math PLUS Program and Lesson
DAP.17.8.1 **Compute, with and without appropriate *technology*, probabilities of compound events, using organized lists, *tree diagrams* and *logic grid***	**MAT+ Understanding Probability** **Topic 1 : An Introduction to Probability** Tree Diagrams Meals Socks
DAP.17.8.2 **Make predictions based on *theoretical probabilities*, design and conduct an experiment to test the predictions, compare actual results to predict results, and explain differences** **Ex. suggested materials for simulations are: polyhedra die, random number table, and *technology***	**MAT+ Understanding Probability** **Topic 4: Binomial Probabilities** What are they? Flipping a Coin…Once Flipping a Coin…Twice Flipping a Coin…Three Times Summary Practice Questions; Topic Test