

**CORRELATION**  
of  
**the Understanding Numeration PLUS & Understanding Math PLUS programs**  
with  
**New York State Math Core Curriculum Standards**  
**Grade Eight**  
**October 2007**

**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
<b>A</b>	<b>10</b>
<b>B</b>	<b>20</b>
<b>C</b>	<b>100</b>
<b>D</b>	<b>1000</b>

Lesson .. 250 lessons are sequenced to build understanding of concepts.

A detailed Lesson Synopsis on the website [www.neufeldmath.com](http://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](http://www.neufeldmath.com)

## Problem Solving Strand

Students will build new mathematical knowledge through problem solving.  
 Students will solve problems that arise in mathematics and in other contexts.  
 Students will apply and adapt a variety of appropriate strategies to solve problems.  
 Students will monitor and reflect on the process of mathematical problem solving.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.PS.1 Use a variety of strategies to understand new mathematical content and to develop more efficient methods	
8.PS.2 Construct appropriate extensions to problem situations	
8.PS.3 Understand and demonstrate how written symbols represent mathematical ideas  8.PS.4 Observe patterns and formulate generalizations	<u>Understanding Algebra</u> <b>Topic 4. Patterns, Formulas, Substitution</b> Expressions, Terms, Variables Definitions Summary Patterns to Formulas Example... Hockey Standings Example... Counting Money Example... Angles in a Polygon Substitution is... Math Scrabble Scrabble 1, 2, 3 Challenge Substitution Examples Examples 1, 2, 3, 4
8.PS.5 Make conjectures from generalizations	
8.PS.6 Represent problem situations verbally, numerically, algebraically, and graphically	<u>Understanding Algebra</u> <u>Understanding Equations</u> <u>Understanding Graphing</u> <b>ALL SECTIONS</b>
8.PS.7 Understand that there is no one right way to solve mathematical problems but that different methods have advantages and disadvantages	
8.PS.8 Understand how to break a complex problem into simpler parts or use a similar problem type to solve a problem	

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.PS.9 Work backwards from a solution	
8.PS.10 Use proportionality to model problems	<b><u>Understanding Percent</u></b> <b>Topic 4. Ratios and Proportions</b> What is a Proportion? Proportions Example 1 Example 2 – Lemonade Example 3 – Marble Example 4 – Trout Example 5 – Tree Height Example 6 – Map Example 7 – Scale Drawing
8.PS.11 Work in collaboration with others to solve problems	
8.PS.12 Interpret solutions within the given constraints of a problem	
8.PS.13 Set expectations and limits for possible solutions	
8.PS.14 Determine information required to solve the problem	
8.PS.15 Choose methods for obtaining required information	
8.PS.16 Justify solution methods through logical argument	
8.PS.17 Evaluate the efficiency of different representations of a problem	

## Reasoning and Proof Strand

Students will recognize reasoning and proof as fundamental aspects of mathematics.  
Students will make and investigate mathematical conjectures.  
Students will develop and evaluate mathematical arguments and proofs.  
Students will select and use various types of reasoning and methods of proof.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.RP.1 Recognize that mathematical ideas can be supported by a variety of strategies	
8.RP.2 Use mathematical strategies to reach a conclusion	
8.RP.3 Evaluate conjectures by distinguishing relevant from irrelevant information to reach a conclusion or make appropriate estimates	
8.RP.4 Provide supportive arguments for conjectures	
8.RP.5 Develop, verify, and explain an argument, using appropriate mathematical ideas and language	
8.RP.6 Support an argument by using a systematic approach to test more than one case	
8.RP.7 Devise ways to verify results or use counterexamples to refute incorrect statements	
8.RP.8 Apply inductive reasoning in making and supporting mathematical conjectures	

**Communication Strand**

Students will organize and consolidate their mathematical thinking through communication  
 Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.  
 Students will analyze and evaluate the mathematical thinking and strategies of others.  
 Students will use the language of mathematics to express mathematical ideas precisely.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.CM.2 Provide an organized argument which explains rationale for strategy selection	
8.CM.3 Organize and accurately label work	
8.CM.4 Share organized mathematical ideas through the manipulation of objects, numerical tables, drawings, pictures, charts, graphs, tables, diagrams, models and symbols in written and verbal form	<u>Understanding Algebra</u> <u>Understanding Graphing</u> <b>ALL SECTIONS</b>
8.CM.5 Answer clarifying questions from others	
8.CM.6 Analyze mathematical solutions shared by others	
8.CM.7 Compare strategies used and solutions found by others in relation to their own work	
8.CM.8 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others	
8.CM.9 Increase their use of mathematical vocabulary and language when communicating with others  8.CM.10 Use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale  8.CM.11 Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical writing	<u>Understanding Math PLUS</u> <b>ALL SECTIONS</b>

**Connections Strand**

Students will recognize and use connections among mathematical ideas.

Students will understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

Students will recognize and apply mathematics in contexts outside of mathematics.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.CN.1 Understand and make connections among multiple representations of the same mathematical idea	
8.CN.2 Recognize connections between subsets of mathematical ideas	
8.CN.3 Connect and apply a variety of strategies to solve problems 8.CN.4 Model situations mathematically, using representations to draw conclusions and formulate new situations	<b><u>Understanding Equations</u> Topic 5. Problem Solving ALL SECTIONS</b>
8.CN.5 Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics	
8.CN.6 Recognize and provide examples of the presence of mathematics in their daily lives	
8.CN.7 Apply mathematical ideas to problem situations that develop outside of mathematics	
8.CN.8 Investigate the presence of mathematics in careers and areas of interest	
8.CN.9 Recognize and apply mathematics to other disciplines, areas of interest, and societal issues	

## Representation Strand

Students will create and use representations to organize, record, and communicate mathematical ideas.

Students will select, apply, and translate among mathematical representations to solve problems.

Students will use representations to model and interpret physical, social, and mathematical phenomena.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.R.1 Use physical objects, drawings, charts, tables, graphs, symbols, equations, or objects created using technology as representations	<b><u>Understanding Algebra</u> <u>Understanding Equations</u> <u>Understanding Graphing</u> ALL SECTIONS</b>
8.R.2 Explain, describe, and defend mathematical ideas using representations	
8.R.3 Recognize, compare, and use an array of representational forms	
8.R.4 Explain how different representations express the same relationship	
8.R.5 Use standard and non-standard representations with accuracy and detail	
8.R.6 Use representations to explore problem situations	<b><u>Understanding Equations</u> Topic 5. Problem Solving ALL SECTIONS</b>
8.R.7 Investigate relationships between different representations and their impact on a given problem	
8.R.8 Use representation as a tool for exploring and understanding mathematical ideas	
8.R.9 Use mathematics to show and understand physical phenomena (e.g., make and interpret scale drawings of figures or scale models of objects)	<b><u>Understanding Measurement and Geometry</u></b>
8.R.10 Use mathematics to show and understand social phenomena (e.g., determine profit from sale of yearbooks)	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.R.11 Use mathematics to show and understand mathematical phenomena (e.g., use tables, graphs, and equations to show a pattern underlying a function)	<u>Understanding Algebra</u> <u>Understanding Equations</u> <u>Understanding Graphing</u> <b>ALL SECTIONS</b>

### Number Sense and Operations Strand

Students will understand meanings of operations and procedures, and how they relate to one another.  
Students will compute accurately and make reasonable estimates.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.N.1 Develop and apply the laws of exponents for multiplication and division	<u>Understanding Exponents</u> <b>Topic 3. The Exponent Rules</b> Multiplication of Powers with the Same Base Expanding the Exponents The Pattern In General Division of Powers with the Same Base Expanding the Exponents The Pattern In General
8.N.2 Evaluate expressions with integral exponents	
8.N.3 Read, write, and identify percents less than 1% and greater than 100%	<u>Understanding Percent</u> <b>Topic 6. Problem Involving Percent</b> Percents Greater than 100% Number Problem Order Problem Percents Less than 1% Number Problem Pencil Problem

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.N.4 Apply percents to: Tax Percent increase/decrease Simple interest Sale price Commission Interest rates Gratuities	<b><u>Understanding Percent</u></b> <b>Topic 3. Fraction/Decimal to Percent</b> Percent Change Percent Increase Percent Decrease Percent Increase or Decrease  <b>Topic 7. Percent in Business</b> Sales Tax Bicycle Question Coat Question Restaurant Tipping Discount Football Sale What Can I Afford? Which is Cheaper? Competitor's Discount Commission Car Salesman Real Estate Car Dealerships Simple Interest What is it? Complete the Table Bank Interest Credit Card Bill
8.N.5 Estimate a percent of quantity, given an application	<b><u>Understanding Percent</u></b> <b>Topic 5. Percent of a Number</b> The Bouncing Ball Grades What if? Calculate Pass or Fail? Practice Questions Topic Test
8.N.6 Justify the reasonableness of answers using estimation	

## Algebra Strand

Students will represent and analyze algebraically a wide variety of problem solving situations.

Students will perform algebraic procedures accurately.

Students will recognize, use, and represent algebraically patterns, relations, and functions.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.A.1 Translate verbal sentences into algebraic inequalities	<b><u>Understanding Equations</u></b> <b>Topic 7. Solving Inequalities</b> Solving Inequalities Examples 1, 2, 3, 4, 5, 6 Solving Compound Inequalities Examples 1, 2
8.A.2 Write verbal expressions that match given mathematical expressions	<b><u>Understanding Algebra</u></b> <b>Topic 4. Patterns, Formulas, Substitution</b> Expressions, Terms, Variables Definitions Summary Patterns to Formulas Example... Hockey Standings Example... Counting Money Example... Angles in a Polygon Substitution is... Math Scrabble Scrabble 1, 2, 3 Challenge Substitution Examples Examples 1, 2, 3, 4 Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.A.3 Describe a situation involving relationships that matches a given graph	<p><b><u>Understanding Graphing</u></b>  <b>Topic 2. Statistics</b>  Presenting Data  Stem-and-Leaf Diagram  Example 1... Ages of Fans  Example 2... Heights of Students  Bar Graph  Example 1... Energy  Example 2... Lengths of Rivers  Histogram  Example 1... Heights of Students  Example 2... Roll a Die  Line Graph  Example 1... Life Expectancy  Example 2... Software Profits  Circle or Pie Graphs  Example 1... Radio Station  Example 2... Health Survey</p>
8.A.4 Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship	<p><b><u>Understanding Graphing</u></b>  <b>Topic 6. Linear Relations</b>  In This Topic  What is a Linear Relation?  Graphs of Linear Relations  Concept  Examples 1, 2, 3, 4, 5, 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</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.A.5 Use physical models to perform operations with polynomials  8.A.6 Multiply and divide monomials	<b>Understanding Algebra</b> <b>Topic 7. Multiplying Expressions</b> Recall Tile Concepts Multiplying Monomials Like Terms With Tiles Without Tiles Multiplying Monomials and Polynomials With Tiles... Examples 1, 2, 3, 4 Without Tiles
8.A.7 Add and subtract polynomials (integer coefficients)	<b>Understanding Algebra</b> 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  <b>Topic 6. Subtracting Expressions</b> 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 Practice Questions with Tiles Practice Questions without Tiles

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.A.8 Multiply a binomial by a monomial or a binomial (integer coefficients)	<u>Understanding Algebra</u> <b>Topic 7. Multiplying Expressions</b> Multiplying Binomials With Tiles... Examples 1, 2 Without Tiles Pattern Examples... True or False Examples 1, 2, 3
8.A.9 Divide a polynomial by a monomial (integer coefficients) <i>Note: The degree of the denominator is less than or equal to the degree of the numerator for all variables.</i>	
8.A.10 Factor algebraic expressions using the GCF	<u>Understanding Algebra</u> <b>Topic 8. Factoring Expressions</b> Common Factoring With Tiles Examples 1, 2 – Methods 1, 2 Without Tiles GCF Examples 1, 2
8.A.11 Factor a trinomial in the form $ax^2 + bx + c$ ; $a=1$ and $c$ having no more than three sets of factors	<u>Understanding Algebra</u> <b>Topic 8. Factoring Expressions</b> Factoring Trinomials With Tiles - Examples 1, 2 The Pattern Without Tiles – Examples 1, 2, 3, 4
8.A.12 Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines	<u>Understanding Measurement and Geometry</u> <b>Topic 6. Angles and Polygons</b> Angles in Polygons Methods 1, 2 Exterior Angles in a Polygon Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>8.A.13 Solve multi-step inequalities and graph the solution set on a number line</p> <p>8.A.14 Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number)</p>	<p><b><u>Understanding Equations</u></b>  <b>Topic 7. Solving Inequalities</b>  Solving Inequalities  Examples 1, 2, 3, 4, 5, 6  Solving Compound Inequalities  Examples 1, 2  Graphing Linear Inequalities in Two Variables  Concepts 1, 2  Examples 1, 2, 3</p>
<p>8.A.15 Understand that numerical information can be represented in multiple ways: arithmetically, algebraically, and graphically</p>	<p><b><u>Understanding Algebra</u></b>  <b><u>Understanding Graphing</u></b>  <b><u>Understanding Whole Numbers and Integers</u></b>  <b>ALL SECTIONS</b></p>
<p>8.A.16 Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 6. Linear Relations</b>  In This Topic  What is a Linear Relation?  Graphs of Linear Relations  Concept  Examples 1, 2, 3, 4, 5, 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</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>8.A.17 Define and use correct terminology when referring to function (domain and range)</p> <p>8.A.18 Determine if a relation is a function</p> <p>8.A.19 Interpret multiple representations using equation, table of values, and graph</p>	<p><b><u>Understanding Graphing</u></b></p> <p><b>Topic 6. Relations, Equations, and Functions</b></p> <p>In This Topic</p> <p>Relations</p> <p>What is a Relation?</p> <p>Domain and Range</p> <p>Example 1 – Triangles</p> <p>Example 2 – Tiles, Part 1</p> <p>Example 3 – Tiles, Part 2</p> <p>Example 4 – Running</p> <p>Example 5 – Hit the Ball</p> <p>Functions</p> <p>What is a Function? – Examples 1, 2, 3</p> <p>Vertical Line Test</p> <p>Examples 1, 2, 3</p> <p>Function Notation</p> <p>Examples 1, 2</p> <p>Patterns to Words to Equations</p> <p>Examples 1, 2, 3, 4</p> <p>Practice Questions</p>

## Geometry Strand

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.  
 Students will identify and justify geometric relationships, formally and informally.  
 Students will apply transformations and symmetry to analyze problem solving situations.  
 Students will apply coordinate geometry to analyze problem solving situations.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
8.G.0 Construct the following, using a straight edge and compass: Segment congruent to a segment Angle congruent to an angle Perpendicular bisector Angle bisector	<u><b>Understanding Measurement and Geometry</b></u> <b>Topic 7. Constructions</b> Before You Begin In This Topic Perpendicular Bisector Circumcircle Centroid Angle Bisector Incircle Perpendicular from Point on Line Perpendicular from Point off the Line
8.G.1 Identify pairs of vertical angles as congruent	
8.G.2 Identify pairs of supplementary and complementary angles  8.G.3 Calculate the missing angle in a supplementary or complementary pair  8.G.4 Determine angle pair relationships when given two parallel lines cut by a transversal  8.G.5 Calculate the missing angle measurements when given two parallel lines cut by a transversal  8.G.6 Calculate the missing angle measurements when given two intersecting lines and an angle	<u><b>Understanding Measurement and Geometry</b></u> Parallel Lines Example with Parallel Lines Examples 1, 2 Angles in Triangles Exploration An Explanation Exterior Angles – Example Angles in Polygons Methods 1, 2 Exterior Angles in a Polygon Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>8.G.7 Describe and identify transformations in the plane, using proper function notation (rotations, reflections, translations, and dilations)</p> <p>8.G.8 Draw the image of a figure under rotations of 90 and 180 degrees</p> <p>8.G.9 Draw the image of a figure under a reflection over a given line</p> <p>8.G.10 Draw the image of a figure under a translation</p> <p>8.G.11 Draw the image of a figure under a dilation</p> <p>8.G.12 Identify the properties preserved and not preserved under a reflection, rotation, translation, and dilation</p>	<p><b><u>Understanding Graphing</u></b></p> <p><b>Topic 4. Transformations</b></p> <p>Translations – An Introduction Slide #1, #2, #3, #4</p> <p>Reflections - An Introduction Flip #1, #2, #3</p> <p>Rotations - An Introduction Turn #1, #2, #3, #4, #5</p> <p>The Transformation Machine Examples 1, 2, 3, 4, 5</p> <p>Line of Symmetry - An Introduction Introduction Examples 1, 2, 3, 4</p> <p>Symmetry Match Puzzle 1, 2</p> <p>Tessellations Introduction Examples Examples 1, 2, 3, 4, 5</p> <p>Tangrams Introduction Examples 1, 2, 3</p> <p>Translations Object to Image We Say We Write Reflection Mapping Rule Examples Examples 1, 2, 3</p> <p>Rotations Object to Image We Say We Write Rotation Mapping Rule Examples Examples 1, 2</p> <p>Dilatations Object to Image We Say</p>

## Measurement Strand

Students will determine what can be measured and how, using appropriate methods and formulas.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
8.M.1 Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems <i>Note: Also allow Fahrenheit to Celsius and vice versa.</i>	<b><u>Understanding Measurement and Geometry</u></b> <b>Topic 1. An Introduction to Measurement</b> Converting Between Metric Units My Body Rudy's Run Practice Questions