

**CORRELATION**  
of  
the Understanding Numeration PLUS & Understanding Math PLUS programs  
with  
New York State Math Core Curriculum Standards  
Integrated Algebra  
November 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
A.PS.1 Use a variety of problem solving strategies to understand new mathematical content	<u>Understanding Equations</u> Topic 5. Problem Solving
A.PS.2 Recognize and understand equivalent representations of a problem situation or a mathematical concept	
A.PS.3 Observe and explain patterns to formulate generalizations and conjectures	<u>Understanding Algebra</u> Topic
A.PS.4 Use multiple representations to represent and explain problem situations (e.g., verbally, numerically, algebraically, graphically)  A.PS.5 Choose an effective approach to solve a problem from a variety of strategies (numeric, graphic, algebraic)  A.PS.6 Use a variety of strategies to extend solution methods to other problems  A.PS.8 Determine information required to solve a problem, choose methods for obtaining the information, and define parameters for acceptable solutions	<u>Understanding Equations</u> Topic 5. Problem Solving
A.PS.7 Work in collaboration with others to propose, critique, evaluate, and value alternative approaches to problem solving	
A.PS.9 Interpret solutions within the given constraints of a problem	
A.PS.10 Evaluate the relative efficiency of different representations and solution methods 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.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.RP.1 Recognize that mathematical ideas can be supported by a variety of strategies	
A.RP.2 Use mathematical strategies to reach a conclusion and provide supportive arguments for a conjecture	
A.RP.3 Recognize when an approximation is more appropriate than an exact answer	
A.RP.4 Develop, verify, and explain an argument, using appropriate mathematical ideas and language	<u>Understanding Math PLUS</u> <b>ALL TOPICS</b>
A.RP.5 Construct logical arguments that verify claims or counterexamples that refute them	
A.RP.6 Present correct mathematical arguments in a variety of forms	
A.RP.7 Evaluate written arguments for validity	
A.RP.8 Support an argument by using a systematic approach to test more than one case	
A.RP.9 Devise ways to verify results or use counterexamples to refute incorrect statements	
A.RP.10 Extend specific results to more general cases	
A.RP.11 Use a Venn diagram to support a logical argument	
A.RP.12 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
A.CM.1 Communicate verbally and in writing a correct, complete, coherent, and clear design (outline) and explanation for the steps used in solving a problem	
A.CM.2 Use mathematical representations to communicate with appropriate accuracy, including numerical tables, formulas, functions, equations, charts, graphs, Venn diagrams, and other diagrams	<u>Understanding Math PLUS</u> <b>ALL TOPICS</b>
A.CM.3 Present organized mathematical ideas with the use of appropriate standard notations, including the use of symbols and other representations when sharing an idea in verbal and written form	
A.CM.4 Explain relationships among different representations of a problem	
A.CM.5 Communicate logical arguments clearly, showing why a result makes sense and why the reasoning is valid	
A.CM.6 Support or reject arguments or questions raised by others about the correctness of mathematical work	
A.CM.7 Read and listen for logical understanding of mathematical thinking shared by other students	
A.CM.8 Reflect on strategies of others in relation to one's own strategy	
A.CM.9 Formulate mathematical questions that elicit, extend, or challenge strategies, solutions, and/or conjectures of others	
A.CM.10 Use correct mathematical language in developing mathematical questions that elicit, extend, or challenge other students' conjectures	
A.CM.11 Represent word problems using standard mathematical notation	<u>Understanding Equations</u> <b>Topic 5. Problem Solving</b>
A.CM.12 Understand and use appropriate language, representations, and terminology when describing objects, relationships, mathematical solutions, and rationale	
A.CM.13 Draw conclusions about mathematical ideas through decoding, comprehension, and interpretation of mathematical visuals, symbols, and technical writing	

**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>
A.CN.1 Understand and make connections among multiple representations of the same mathematical idea	
A.CN.2 Understand the corresponding procedures for similar problems or mathematical concepts	
A.CN.3 Model situations mathematically, using representations to draw conclusions and formulate new situations	<b><u>Understanding Algebra</u></b> <b>Topic</b>
A.CN.4 Understand how concepts, procedures, and mathematical results in one area of mathematics can be used to solve problems in other areas of mathematics	<b><u>Understanding Math PLUS</u></b> <b>ALL TOPICS</b>
A.CN.5 Understand how quantitative models connect to various physical models and representations	
A.CN.6 Recognize and apply mathematics to situations in the outside world	
A.CN.7 Recognize and apply mathematical ideas to problem situations that develop outside of mathematics	
A.CN.8 Develop an appreciation for the historical development of mathematics	

**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>
A.R.1 Use physical objects, diagrams, charts, tables, graphs, symbols, equations, or objects created using technology as representations of mathematical concepts	<b><u>Understanding Math PLUS</u></b> <b>ALL TOPICS</b>
A.R.2 Recognize, compare, and use an array of representational forms	
A.R.3 Use representation as a tool for exploring and understanding mathematical ideas	
A.R.4 Select appropriate representations to solve problem situations	
A.R.5 Investigate relationships between different representations and their impact on a given problem	
A.R.6 Use mathematics to show and understand physical phenomena (e.g., find the height of a building if a ladder of a given length forms a given angle of elevation with the ground)	<b><u>Understanding Measurement and Geometry</u></b> <b>ALL SECTIONS</b>
A.R.7 Use mathematics to show and understand social phenomena (e.g., determine profit from student and adult ticket sales)	
A.R.8 Use mathematics to show and understand mathematical phenomena (e.g., compare the graphs of the functions represented by the equations $y = x^2$ and $y = -x^2$ )	<b><u>Understanding Graphing</u></b> <b>Topic 9 - parabola</b>

## Number Sense and Operations Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems. Students will understand meanings of operations and procedures, and how they relate to one another.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.N.1 Identify and apply the properties of real numbers (closure, commutative, associative, distributive, identity, inverse) <i>Note: Students do not need to identify groups and fields, but students should be engaged in the ideas</i>	
A.N.2 Simplify radical terms (no variable in the radicand)	<b><u>Understanding Exponents</u></b> <b>Topic 5. Square Roots</b> Radical Signs Square Roots of Negative Numbers Example Questions 1. Radicals First 2. The Four Equations 3. Lawn Question 4. Make a Square
A.N.3 Perform the four arithmetic operations using like and unlike radical terms and express the result in simplest form	<b><u>Understanding Exponents</u></b> <b>Topic 3. The Exponent Rules</b> Raising a Power to an Exponent Expanding the Exponents The Pattern In General Raising a Product to an Exponent Expanding the Exponents In General A Power with Exponent 0 Explanation with $b$ ; Explanation with $a$ Summary A Power with a NEGATIVE Exponent Method 1: Explanation with $b$ Method 2: Explanation with $k$ Method 3: Bacteria Doubling Summary Summary of Exponent Rules Powers with Rational Bases Examples 1, 2, 3 In General Example Questions Examples 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.N.4 Understand and use scientific notation to compute products and quotients of numbers	<p><b><u>Understanding Exponents</u></b>  <b>Topic 4. Scientific Notation</b>  Scientific Notation for Small Numbers  Introduction  Chart  The Steps  Examples  1. Number Question  2. Park Question  3. Sun Question  4. Kitchen Question  Practice Questions</p>
A.N.5 Solve algebraic problems arising from situations that involve fractions, decimals, percents (decrease/increase and discount), and proportionality/direct variation	<p><b><u>Understanding Percent</u></b>  <b>Topic 3. Fraction/Decimal to Percent</b>  Percent Change  Percent Increase  Percent Decrease  Percent Increase or Decrease</p> <p><b>Topic 4. Ratios and Proportions</b>  Proportions  Example 1  Example 2 – Lemonade  Example 3 – Marbles  Example 4 – Trout  Example 5 – Tree Height  Example 6 – Map  Example 7 – Scale Drawing</p> <p><b>Topic 7. Percent in Business</b>  Discount  Football Sale  What Can I Afford?  Which is Cheaper?  Competitor’s Discount</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.N.6 Evaluate expressions involving factorial(s), absolute value(s), and exponential expression(s)	<p><b><u>Understanding Equations</u></b>  <b>Topic 8. Solving Absolute Value Equations</b>            Absolute Value... What is it?            Concept            Examples 1, 2            Summary            Absolute Value Equations in 1 Variable            Examples 1, 2</p>
<p>A.N.7 Determine the number of possible events, using counting techniques or the Fundamental Principle of Counting</p> <p>A.N.8 Determine the number of possible arrangements (permutations) of a list of items</p>	<p><b><u>Understanding Probability</u></b>  <b>Topic 2. What's the Chance?</b>            The Probability Scale            Examples            Summary            Follow Up            Soccer Example            Experimental Probability            Introduction            Examples 1, 2            Practice Questions            Topic Test</p> <p><b>Topic 3. Dice Probability</b>            Roll One Die            Your Experiment            Computer's Experiment            Theoretical Experiment            Patterns            Summary            Roll Two Dice            Your Experiment            Computer's Experiment            Theoretical Experiment            Patterns            Summary            Practice Questions</p>

## Algebra Strand

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

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
A.A.1 Translate a quantitative verbal phrase into an algebraic expression  A.A.2 Write a verbal expression that matches a given mathematical expression	<b><u>Understanding Algebra</u></b> <b>Topic 4. Patterns, Formulas, Substitution</b> 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 Topic Test
A.A.3 Distinguish the difference between an algebraic expression and an algebraic equation	
A.A.4 Translate verbal sentences into mathematical equations or inequalities  A.A.5 Write algebraic equations or inequalities that represent a situation	<b><u>Understanding Equations</u></b> <b>Topic 7. Solving Inequalities</b> Comparing Integers The Integer Line Example 1... Greater Than; Example 2... Less Than Explanation Example 3... Greater Than; Example 4... Less Than Greater Than or Less Than Inequalities What Are They? Inequality vs. Equation Summary of Relationships Inequality on the Number Line Examples 1, 2, 3, 4 Solving Inequalities Examples 1, 2, 3, 4, 5, 6

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.A.6 Analyze and solve verbal problems whose solution requires solving a linear equation in one variable or linear inequality in one variable</p> <p>A.A.7 Analyze and solve verbal problems whose solution requires solving systems of linear equations in two variables</p>	<p><b><u>Understanding Equations</u></b>  <b>Topic 7. Solving Inequalities</b>            Graphing Linear Inequalities in Two Variables            Concepts 1, 2            Examples 1, 2, 3</p>
<p>A.A.8 Analyze and solve verbal problems that involve quadratic equations</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 9. Quadratic Functions</b>            Introductory Examples            Examples 1, 2            Summary Examples 1, 2            Definitions            Parabolas            Quadratic Functions            The Role of <math>a</math>            The Plan: <math>a = 1, 2, 3</math>  <math>a = -1, -2, -3</math>            Parabolas with the Same Width            Summary            The Role of <math>c</math>            The Plan: Increase <math>c</math>            Summary            The Role of <math>b</math>            Examples 1, 2, 3, 4            Summary and Pattern            In General</p>
<p>A.A.9 Analyze and solve verbal problems that involve exponential growth and decay</p>	<p><b><u>Understanding Exponents</u></b>  <b>Topic 1. The Meaning of Exponents</b>            Introduction... The Money Game            Money Grab Game Show            Graphs – Game Show Results            Graphs – Comparing the Two Results            Introduction... Bacteria Doubling            Introduction... Paper Folding            Experiment            Pattern</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.A.10 Solve systems of two linear equations in two variables algebraically (See A.G.7)	<u>Understanding Equations</u> <b>Topic 7. Solving Inequalities</b> Solving Compound Inequalities Examples 1, 2 Graphing Linear Inequalities in Two Variables Concepts 1, 2 Examples 1, 2, 3
A.A.11 Solve a system of one linear and one quadratic equation in two variables, where only factoring is required <i>Note: The quadratic equation should represent a parabola and the solution(s) should be integers.</i>	<u>Understanding Graphing</u> <b>Topic 9. Quadratic Functions</b> Intercepts of a Quadratic Function Method 1: Graphing... Examples 1, 2 Method 2: Factoring (If Possible)... Examples 1, 2 Method 3: Using the Quadratic Formula... Examples 1, 2
A.A.12 Multiply and divide monomial expressions with a common base, using the properties of exponents <i>Note: Use integral exponents only.</i>	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.A.13 Add, subtract, and multiply monomials and polynomials	<p><b><u>Understanding Algebra</u></b></p> <p><b>Topic 5. Adding Expressions</b>  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</p> <p><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  Topic Test</p> <p><b>Topic 7. Multiplying Expressions</b>  Our Problem  Recall Tile Concepts  Multiplying Monomials  Like Terms  With Tiles  Without Tiles  Multiplying Monomials and Polynomials  With Tiles... Examples 1, 2, 3, 4  Without Tiles</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.A.14 Divide a polynomial by a monomial or binomial, where the quotient has no remainder	<u>Understanding Algebra</u> <b>Topic 9. Dividing Expressions</b> Dividing a Monomial by a Monomial Examples 1, 2, 3, 4 Dividing a Polynomial by a Monomial Concept Examples 1, 2, 3 Summary Dividing a Polynomial by a Binomial Examples 1... Methods 1 Examples 1... Methods 2... Long Division Examples 2 Examples 3... Methods 1 Examples 3... Methods 2... Long Division Examples 4... Methods 1 Examples 4... Methods 2... Long Division
A.A.15 Find values of a variable for which an algebraic fraction is undefined	
A.A.16 Simplify fractions with polynomials in the numerator and denominator by factoring both and renaming them to lowest terms	<u>Understanding Algebra</u> <b>Topic 8. Factoring Expressions</b> Our Problem Common Factoring With Tiles Examples 1, 2 – Methods 1, 2 Without Tiles GCF Examples 1, 2
A.A.17 Add or subtract fractional expressions with monomial or like binomial denominators	
A.A.18 Multiply and divide algebraic fractions and express the product or quotient in simplest form	
A.A.19 Identify and factor the difference of two perfect squares	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.A.20 Factor algebraic expressions completely, including trinomials with a lead coefficient of one (after factoring a GCF)	<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 Difference of Squares Examples 1, 2, 3, 4 Factoring by Grouping – Concept Examples 1, 2, 3, 4, 5 Summary Examples 1, 2, 3, 4
A.A.21 Determine whether a given value is a solution to a given linear equation in one variable or linear inequality in one variable  A.A.22 Solve all types of linear equations in one variable  A.A.24 Solve linear inequalities in one variable  A.A.25 Solve equations involving fractional expressions <i>Note: Expressions which result in linear equations in one variable.</i>  A.A.24 Solve linear inequalities in one variable  A.A.25 Solve equations involving fractional expressions <i>Note: Expressions which result in linear equations in one variable.</i>	<u>Understanding Equations</u> <b>Topic 7. Solving Inequalities</b> Graphing Linear Inequalities in Two Variables Concepts 1, 2 Examples 1, 2, 3 Solving Systems of Examples 1, 2
A.A.23 Solve literal equations for a given variable	<u>Understanding Equations</u> <b>Topic 4. Solving Multi-Step Equations</b> Literal Equations What Are They? How do you solve them? Why Solve the Literal Equations? A Perimeter Example A Temperature Example Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.A.26 Solve algebraic proportions in one variable which result in linear or quadratic equations</p> <p>A.A.27 Understand and apply the multiplication property of zero to solve quadratic equations with integral coefficients and integral roots</p> <p>A.A.28 Understand the difference and connection between roots of a quadratic equation and factors of a quadratic expression</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 9. Quadratic Functions</b>  Intercepts of a Quadratic Function  Method 1: Graphing... Examples 1, 2  Method 2: Factoring (If Possible)... Examples 1, 2  Method 3: Using the Quadratic Formula... Examples 1, 2  Maximize Cage Area  Trial and Error  Use Quadratic Function  Graph  Conclusions  Summary  Maximize Potato Income  Trial and Error  Quadratic Function  Graph  Summary  Bob's Beach ball  Find Maximum Height  Graph Equation  Summary  Practice Questions</p>
<p>A.A.29 Use set-builder notation and/or interval notation to illustrate the elements of a set, given the elements in roster form</p>	
<p>A.A.30 Find the complement of a subset of a given set, within a given universe</p>	
<p>A.A.31 Find the intersection of sets (no more than three sets) and/or union of sets (no more than three sets)</p>	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.A.32 Explain slope as a rate of change between dependent and independent variables</p> <p>A.A.33 Determine the slope of a line, given the coordinates of two points on the line</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 7. Slope of a Line</b>  Introduction to Slope  Slope when Driving  A Ski Slope  Slope of Roof  Slope: Order, Steepness Factor, Definition  Introductory Examples  Examples 1, 2, 3, 4  Formula</p>
<p>A.A.34 Write the equation of a line, given its slope and the coordinates of a point on the line</p> <p>A.A.35 Write the equation of a line, given the coordinates of two points on the line</p> <p>A.A.37 Determine the slope of a line, given its equation in any form</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 8. Equation of a Straight Line</b>  Graph <math>y = mx + b</math>  Examples 1, 2, 3, 4  Patterns to Summary  Examples 5, 6, 7  Slope <math>y</math> - intercept Equation  Concept  Examples 1, 2, 3, 4  Slope – Point Form of the Equation  Example 1: Solutions 1, 2  Example 2: Solutions 1, 2, 3, 4  Special Cases  Example 1 – Zero Slope  Example 2 – Undefined  Example to Summarize</p>
<p>A.A.36 Write the equation of a line parallel to the <math>x</math>- or <math>y</math>-axis</p> <p>A.A.38 Determine if two lines are parallel, given their equations in any form</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 8. Equation of a Straight Line</b>  Parallel and Perpendicular Lines  Concepts 1, 2  Examples 1, 2, 3, 4</p>

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
A.A.39 Determine whether a given point is on a line, given the equation of the line	<u><b>Understanding Graphing</b></u> <b>Topic 8. Equation of a Straight Line</b> Slope – Point Form of the Equation Example 1: Solutions 1, 2 Example 2: Solutions 1, 2, 3, 4 Special Cases Example 1 – Zero Slope Example 2 – Undefined Example to Summarize
A.A.40 Determine whether a given point is in the solution set of a system of linear inequalities	<u><b>Understanding Equations</b></u> <b>Topic 7. Solving Inequalities</b> Solving Systems of Linear Inequalities by Graphing Examples 1, 2
A.A.41 Determine the vertex and axis of symmetry of a parabola, given its equation (See A.G.10 )	<u><b>Understanding Graphing</b></u> <b>Topic 9. Quadratic Functions</b> Maximize Cage Area Trial and Error Use Quadratic Function Graph Conclusions Summary Maximize Potato Income Trial and Error Quadratic Function Graph Summary Bob's Beach ball Find Maximum Height Graph Equation Summary Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.A.42 Find the sine, cosine, and tangent ratios of an angle of <i>Functions</i> a right triangle, given the lengths of the sides</p> <p>A.A.43 Determine the measure of an angle of a right triangle, given the length of any two sides of the triangle</p> <p>A.A.44 Find the measure of a side of a right triangle, given an acute angle and the length of another side</p>	
<p>A.A.45 Determine the measure of a third side of a right triangle using the Pythagorean theorem, given the lengths of any two sides</p>	<p><b>Understanding Exponents</b>  <b>Topic 6. Pythagorean Theorem</b>  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, 2, 3, 4  Squares on the Sides of a Right Triangle  Triangles 1, 2, 3  The Pythagorean Theorem  The Pattern  In General  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</p>

**Geometry Strand**

Students will use visualization and spatial reasoning to analyze characteristics and properties of geometric shapes.  
 Students will apply coordinate geometry to analyze problem-solving situations.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.G.1 Find the area and/or perimeter of figures composed of polygons and circles or sectors of a circle <i>Note: Figures may include triangles, rectangles, squares, parallelograms, rhombuses, trapezoids, circles, semi-circles, quarter-circles, and regular polygons (perimeter only).</i>	<u>Understanding Measurement and Geometry</u> <b>Topic 2. Perimeter and Area of Polygons</b>  <b>Topic 3. The Circle</b>
A.G.2 Use formulas to calculate volume and surface area of rectangular solids and cylinders	<u>Understanding Measurement and Geometry</u> <b>Topic 4. Solids...Volume and Surface Area</b>
A.G.3 Determine when a relation is a function, by examining ordered pairs and inspecting graphs of relations	<u>Understanding Graphing</u> <b>Topic 6. Relations, Equations, and Functions</b> Functions What is a Function? – Examples 1, 2, 3 Vertical Line Test Examples 1, 2, 3 Function Notation Examples 1, 2 Patterns to Words to Equations Examples 1, 2, 3, 4 Practice Questions

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.G.4 Identify and graph linear, quadratic (parabolic), absolute value, and exponential functions</p> <p>A.G.6 Graph linear inequalities</p> <p>A.G.7 Graph and solve systems of linear equations and inequalities with rational coefficients in two variables (See A.A.10)</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 9. Quadratic Functions</b>            Bob's Beach ball            Find Maximum Height            Graph Equation            Summary            Practice Questions</p> <p><b><u>Understanding Equations</u></b>  <b>Topic 7. Solving Inequalities</b>            Graphing Linear Inequalities in Two Variables            Concepts 1, 2            Examples 1, 2, 3            Solving Systems of Linear Inequalities by Graphing            Examples 1, 2</p> <p><b>Topic 8. Solving Absolute Value Equations</b>            Absolute Value... What is it?            Concept            Examples 1, 2            Summary            Absolute Value Equations in 1 Variable            Examples 1, 2            Absolute Value Inequalities in 1 Variable            Examples 1, 2</p>
<p>A.G.5 Investigate and generalize how changing the coefficients of a function affects its graph</p>	<p><b><u>Understanding Graphing</u></b>  <b>Topic 6. Relations, Equations, and Functions</b>            Functions            What is a Function? – Examples 1, 2, 3            Vertical Line Test            Examples 1, 2, 3            Function Notation            Examples 1, 2            Patterns to Words to Equations            Examples 1, 2, 3, 4            Practice Questions</p>

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.G.8 Find the roots of a parabolic function graphically <i>Note: Only quadratic equations with integral solutions.</i></p> <p>A.G.9 Solve systems of linear and quadratic equations graphically <i>Note: Only use systems of linear and quadratic equations that lead to solutions whose coordinates are integers.</i></p> <p>A.G.10 Determine the vertex and axis of symmetry of a parabola, given its graph (See A.A.41) <i>Note: The vertex will have an ordered pair of integers and the axis of symmetry will have an integral value.</i></p>	<p><b><u>Understanding Graphing</u></b></p> <p><b>Topic 9. Quadratic Functions</b></p> <p>The Role of <math>a</math> The Plan: <math>a = 1, 2, 3</math> <math>a = -1, -2, -3</math></p> <p>Parabolas with the Same Width Summary</p> <p>The Role of <math>c</math> The Plan: Increase <math>c</math> Summary</p> <p>The Role of <math>b</math> Examples 1, 2, 3, 4 Summary and Pattern In General</p> <p>Intercepts of a Quadratic Function Method 1: Graphing... Examples 1, 2 Method 2: Factoring (If Possible)... Examples 1, 2 Method 3: Using the Quadratic Formula... Examples 1, 2</p> <p>Maximize Cage Area Trial and Error Use Quadratic Function Graph Conclusions Summary</p> <p>Maximize Potato Income Trial and Error Quadratic Function Graph Summary</p> <p>Bob's Beach ball Find Maximum Height Graph Equation Summary Practice Questions</p>

**Measurement Strand**

Students will determine what can be measured and how, using appropriate methods and formulas.  
 Students will understand that all measurement contains error and be able to determine its significance.

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.M.1 Calculate rates using appropriate units (e.g., rate of a <i>Measurement</i> space ship versus the rate of a snail)	<p><b><u>Understanding Equations</u></b>  <b>Topic 5. Problem Solving</b>            Rate of Work</p> <p><b><u>Understanding Graphing</u></b>  <b>Topic 1. Reading and Sketching Graphs</b>            Graphs with a Scale            Concept... Distance and Time            Example 10... Rate</p>
A.M.2 Solve problems involving conversions within measurement systems, given the relationship between the units	<p><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</p>
A.M.3 Calculate the relative error in measuring square and cubic units, when there is an error in the linear measure	

## Statistics and Probability Strand

Students will collect, organize, display, and analyze data.  
Students will make predictions that are based upon data analysis.  
Students will understand and apply concepts of probability.

<b>Strand</b>	<b>Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons</b>
A.S.1 Categorize data as qualitative or quantitative	
A.S.2 Determine whether the data to be analyzed is univariate or bivariate	
A.S.3 Determine when collected data or display of data may be biased	<b><u>Understanding Graphing</u></b> <b>Topic 2. Statistics</b> Collecting Data Throw a Die Throw 2 Dice Voting Primary Data - Gathering Methods Secondary Data - Gathering Methods

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.S.4 Compare and contrast the appropriateness of different measures of central tendency for a given data set</p> <p>A.S.5 Construct a histogram, cumulative frequency histogram, and a box and-whisker plot, given a set of data</p> <p>A.S.6 Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot</p> <p>A.S.7 Create a scatter plot of bivariate data</p> <p>A.S.8 Construct manually a reasonable line of best fit for a scatter plot and determine the equation of that line</p> <p>A.S.9 Analyze and interpret a frequency distribution table or histogram, a cumulative frequency distribution table or histogram, or a box-and-whisker plot</p>	<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  Scatter Plot  Example 1... The T-Shirt Tailor  Example 2... Matching  Measures of Central Tendency  Introduction  The Mean Average  The Median average  The Mode  Summary  Another Example  Adding Data Points  Box and Whisker Plots  Concepts  Examples 1, 2</p>
<p>A.S.10 Evaluate published reports and graphs that are based on data by considering: experimental design, appropriateness of the data analysis, and the soundness of the conclusions</p>	
<p>A.S.11 Find the percentile rank of an item in a data set and identify the point values for first, second, and third quartiles</p>	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
A.S.12 Identify the relationship between the independent and dependent variables from a scatter plot (positive, negative, or none)	<b><u>Understanding Graphing</u></b> <b>Topic 2. Statistics</b> Scatter Plot Example 1... The T-Shirt Tailor Example 2... Matching
A.S.13 Understand the difference between correlation and causation	
A.S.14 Identify variables that might have a correlation but not a causal relationship	
A.S.15 Identify and describe sources of bias and its effect, drawing conclusions from data	
A.S.16 Recognize how linear transformations of one-variable data affect the data's mean, median, mode, and range	
A.S.17 Use a reasonable line of best fit to make a prediction involving interpolation or extrapolation	
A.S.18 Know the definition of conditional probability and use it to solve for probabilities in finite sample spaces	
A.S.19 Determine the number of elements in a sample space and the number of favorable events	
<p>A.S.20 Calculate the probability of an event and its complement</p> <p>A.S.22 Determine, based on calculated probability of a set of events, if:</p> <ul style="list-style-type: none"> <li>○ some or all are equally likely to occur</li> <li>○ one is more likely to occur than another</li> <li>○ whether or not an event is certain to happen or not to happen</li> </ul>	<b><u>Understanding Probability</u></b> <b>Topic 2. What's the Chance?</b> The Probability Scale Examples Summary Follow Up Soccer Example Experimental Probability Introduction Examples 1, 2 Practice Questions Topic Test
A.S.21 Determine empirical probabilities based on specific sample data	

Strand	Neufeld Learning Systems Inc. <u>Understanding Math PLUS</u> Lessons
<p>A.S.23 Calculate the probability of:</p> <ul style="list-style-type: none"> <li>○ a series of independent events</li> <li>○ a series of dependent events</li> <li>○ two mutually exclusive events two events that are not mutually exclusive</li> </ul>	<p><b><u>Understanding Probability</u></b>  <b>Topic 7. Independent Events</b>  In This Topic  What Are They?  Examples  1. Toss Two Coins  2. Replacing Marbles  Probability  1. Coin and Die  2. Balls  3. Letter Tiles  Patterns and Summary  1. Summary  2. Spinner  3. Cards  Practice Questions  Topic Test</p> <p><b>Topic 8. Dependent Events</b>  In This Topic  What Are They?  Independent Events  Dependent Events  Examples  1. Keep the First Marble  2. Choose the Flowers  Probability  1. Keep the First Ball  2. Keep the First Tile  3. Plant the First Flower  Patterns and Summary  1. Summary  2. Money  3. Socks  4. Names  Practice Questions  Topic Test</p>