

**CORRELATION  
of  
the 10 UNDERSTANDING MATH PLUS PROGRAMS  
with  
OHIO ACADEMIC CONTENT STANDARDS**

**Grade 8**

**Note: a.** The Understanding Math PLUS series of programs consist of 10 programs written for Kindergarten to 10<sup>th</sup> Grade.

**The 10 programs are:**

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

**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 3<sup>rd</sup> 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 4<sup>th</sup> to 10<sup>th</sup> 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)

## Content Standards:

### Patterns, Functions, and Algebra

#### Standard

1. Relate the various representations of a relationship; i.e., relate a table to graph, description and symbolic form.
2. Generalize patterns and sequences by describing how to find the  $n$ th term.
3. Identify functions as linear or nonlinear based on information given in a table, graph or equation.
4. Extend the uses of variables to include covariants where  $y$  depends on  $x$ .
5. Use physical models to add and subtract monomials and polynomials, and to multiply a polynomial by a monomial.

#### Understanding Math PLUS Program and Lesson

##### **MAT+ Understanding Graphing**

##### **Topic 2: Statistics**

In This Topic

An Introduction

Tally Chart

Pictograph #1, #2

Bar Graph #1, #2

Line Graph #1, #2

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

##### **MAT+ Understanding Algebra**

##### **Topic 3: Patterns, Patterns, Patterns**

Patterns to Formulas

Examples 1, 2, 3

##### **MAT+ Understanding Graphing**

##### **Topic 5: Relations, Equations, and Functions**

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

##### **MAT+ Understanding Algebra**

##### **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

Practice Questions with Tiles

##### **Topic 6: Subtracting Expressions**

Our Problem

Subtracting Expressions with X and Y Tiles

Concept

Examples 1,2

Subtracting Expressions with X-squared Tiles

**Topic 7: Multiplying Expressions**

Our Problem  
Recall Tile Concepts  
Multiplying Monomials  
Like Terms  
With Tiles  
Multiplying Monomials and Polynomials  
With Tiles... Examples 1,2,3,4

6. Describe 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 and  $y$ -intercept in real-world problems.

**MAT+ Understanding Graphing**

**Topic 7: Slope of a Line**

In This Topic  
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

**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

7. Use symbolic algebra (equations and inequalities), graphs and tables to represent situations and solve problems.

**MAT+ Understanding Equations**

**Topic 2: Solving One-Step Equations**

Our Problem  
Concepts – Examples with Tiles  
Examples 1,2,3,4  
Concepts – Examples without Tiles  
Practice Questions; Topic Test

**Topic 3: Solving Two-step Equations**

Our Problem  
Concepts – Examples with Tiles  
Examples 1 through 4  
Concepts – Examples without Tiles

**Topic 7: Solving Inequalities**

Comparing Integers  
The Integer Line  
Example 1 ...Great 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 1-4  
Solving Inequalities  
Examples 1-6  
Graphing Linear Inequalities in Two Variables  
Concepts 1,2  
Examples 1,2,3
8. Write, simplify and evaluate algebraic expressions (including formulas) to generalize situations and solve problems.
9. Solve linear equations and inequalities graphically, symbolically and using technology.
10. Solve 2 by 2 systems of linear equations graphically and by simple substitution.
11. Interpret the meaning of the solution of a 2 by 2 system of equations; i.e., point, line, no solution.
12. Solve simple quadratic equations graphically; e.g.,  $y = x^2 - 16$ .
13. Compute and interpret slope, midpoint and distance given a set of ordered pairs.
- MAT+ Understanding Algebra**  
**Topic 4: Patterns, Formulas, Substitution**  
Substitution Examples  
Examples 1,2,3,4  
Practice Questions; Topic Test
- 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
- MAT+ Understanding Equations**  
**Topic 7: Solving Inequalities**  
Solving Inequalities  
Examples 1-6  
Graphing Linear Inequalities in Two Variables  
Concepts 1,2  
Examples 1,2,3
- MAT+ Understanding Graphing**  
**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
- MAT+ Understanding Graphing**  
**Topic 9: Quadratic Functions**  
Introductory Examples  
Examples 1,2  
Summary Examples 1,2  
Definitions  
Parabolas  
Quadratic Functions  
The Role of  $a$   
The Plan:  $a = 1,2,3$ ;  $a = -1, -2, -3$   
The Role of  $b$   
Examples 1,2,3,4  
Summary and Pattern  
In General
- MAT+ Understanding Graphing**  
**Topic 7: Slope of a Line**  
Introductory Examples  
Examples 1,2,3,4

Formula  
Parallel Lines  
    Examples 1,2,3  
Perpendicular Lines  
    Examples 1,2,3  
Positive and Negative Slopes  
    Examples 1,2,3,4  
    Pattern  
Sketch Line Given Point and Slope  
    Examples 1,2,3,4

14. Differentiate and explain types of changes in mathematical relationships, such as linear vs. nonlinear, continuous vs. noncontinuous, direct variation vs. inverse variation.
15. Describe and compare how changes in an equation affects the related graphs; e.g., for a linear equation changing the coefficient of  $x$  affects the slope and changing the constant affects the intercepts.
16. Use graphing calculators or computers to analyze change; e.g., interest compounded over time as a nonlinear growth pattern.

**MAT+ Understanding Graphing**

**Topic 7: Slope of a Line**

Positive and Negative Slopes  
    Examples 1,2,3,4  
    Pattern