

Correlation of the Understanding Math 2008© Programs With the Ohio's Academic Content Standards for Mathematics Grade Nine

The programs are designed for use in a variety of teaching and learning environments ranging from a teacher-centered approach with one computer to a student-centered lab approach. The lessons may also be used in remediation, tutorials, intervention, resource, and fast-tracking.

Organization of the Understanding Math 2008© Programs

The Understanding Math 2008© series of programs consists of the following nine programs written for fourth to tenth grade:

Understanding Whole Numbers and Integers
Understanding Measurement and Geometry
Understanding Fractions
Understanding Graphing
Understanding Percent

Understanding Equations
Understanding Probability
Understanding Algebra
Understanding Exponents

Each program contains several sections with several topics. Every topic has the following:

- 1) an interactive concept introduction, usually with a variety of graphic approaches;
- 2) a number of particular examples;
- 3) practice questions with random questions, but specific feedback;
- 4) a topic test with random questions and tracking;
- 5) on-line worksheets selected from our website (www.neufeldmath.com).

Teachers may also search for specific topics using our search engine at <http://www.corr.neufeldmath.com>.

The Academic Content Standards have been correlated to the Understanding Math 2008©. The location of each standard is listed below:

Number, Number Sense and Operations Standard	
Number and Number Systems	(pages 3 - 4)
Meaning of Operations	(pages 4 - 4)
Computation and Estimation	(pages 5 - 5)
Measurement Standard	
Measurement Units	(pages 5 - 5)
Use Measurement Techniques and Tools	(pages 6 - 7)
Geometry and Spatial Sense Standard	
Characteristics and Properties	(pages 7 - 8)
Visualization and Geometric Models	(pages 8 - 8)
Patterns, Functions and Algebra Standard	
Use Patterns, Relations and Functions	(pages 8 - 11)
Use Algebraic Representations	(pages 11 - 15)
Analyze Change	(pages 15 - 16)
Data Analysis and Probability Standard	
Data Collection	(pages 16 - 16)
Statistical Methods	(pages 17 - 17)
Probability	(pages 18 - 19)

Standards that are ***not included*** in the current Understanding Math 2008© programs are noted as *not yet correlated*.

For lesson planning purposes, there is space in the chart for notes, material lists, links, resources etc.



**Ohio's Academic Content Standards for Mathematics
Correlated to Understanding Math 2008 ©
Grade Nine**

Grade Nine... Number, Number Sense and Operations Standard

Number and Number Systems

1. Identify and justify whether properties (closure, identity, inverse, commutative and associative) hold for a given set and operations; e.g., even integers and multiplication.

Understanding Whole Numbers and Integers 2008

Notes

Section 3: Multiplying and Dividing Whole Numbers

Commutative Property	$5 \times 1 = 1 \times 5$
	$5 \times 2 = 2 \times 5$
	$5 \times 3 = 3 \times 5$
Associative Property	$4 \times 3 = 3 \times 4$
	Example 1
	Example 2

Understanding Whole Numbers and Integers 2008

Notes

Section 7: Multiplying Integers

Order of Multiplication	Explanation 1
	Explanation 2- The Multiplication Table
	Explanation 2- Example 1
	Explanation 2- Example 2
	Explanation 2- Example 3
Negative Integers x Positive Integers	Method 1
Example Questions	Example 3
	Example 4
	Example 5

Understanding Whole Numbers and Integers 2008

Notes

Section 9: Order of Operations

Order in Addition - Whole Numbers	Trial 1
	Trial 2
	Conclusion
	Example 1
	Example 2



Order in Addition - Integers	Trial 1 Trial 2 Conclusion Example 1 Example 2
Order in Multiplication - Whole Numbers	Trial 1 Trial 2 Conclusion Example 1 Example 2
Order in Multiplication - Integers	Trial 1 Trial 2 Conclusion Example 1 Example 2

2. Compare, order and determine equivalent forms for rational and irrational numbers.

<p>Understanding Fractions 2008</p> <p>Section 3: Equivalent Fractions</p> <ul style="list-style-type: none"> Equivalent Fractions on a Number Line Comparison of Fractions Equivalent Fractions in a Multiplication Table Equivalent Fractions... The Pattern 	Notes
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Meaning of Operations

3. Explain the effects of operations such as multiplication or division, and of computing powers and roots on the magnitude of quantities.

Not yet correlated

Computation and Estimation

4. Demonstrate fluency in computations using real numbers.

Understanding Algebra 2008

Section 4: Patterns, Formulas, Substitution

Substitution is... Math Scrabble 1

Scrabble 1

Scrabble 2

Scrabble 3

Challenge

Notes

5. Estimate the solutions for problem situations involving square and cube roots.

Understanding Exponents 2008

Section 5 : Square Root

Estimating Square Roots

Example 1

Example 2

Estimating Square Roots on the Number Line

Notes

Grade Nine... Measurement Standard

Measurement Units

1. Convert rates within the same measurement system; e.g., miles per hour to feet per second; kilometers per hour to meters per second.

Understanding Fractions 2008

Section 7: Ratios and Proportions

Rate and Unit Rate

The Best?- Example 3

Notes

Understanding Graphing 2008

Section 1: Reading And Sketching Graphs

Graphs With a Scale

Example 10... Rate

Example 11... Villeneuve

Notes

Understanding Percent 2008

Section 4: Ratios and Proportions

Rates and Unit Rate

The Best?- Example 3

Notes



Use Measurement Techniques and Tools

2. Use unit analysis to check computations involving measurement.

Understanding Fractions 2008

Notes

Section 7: Ratios and Proportions

Rate and Unit Rate

Concept

Examples

The Best?- Example 1

The Best?- Example 2

The Best?- Example 3

Understanding Graphing 2008

Notes

Section 1: Reading And Sketching Graphs

Graphs With a Scale

Example 10... Rate

Example 11... Villeneuve

Example 12... Volume and Time

Understanding Percent 2008

Notes

Section 4: Ratios and Proportions

Rates and Unit Rate

Concept

Examples

The Best?- Example 1

The Best?- Example 2

The Best?- Example 3

3. Use the ratio of lengths in similar two-dimensional figures or three-dimensional objects to calculate the ratio of their areas or volumes respectively.

Understanding Measurement and Geometry 2008

Notes

Section 9: Ratios for Areas and Volumes

In This Topic

Ratios

Introduction

Area

Volume

Practice Questions

10 questions (randomly generated)

4. Use scale drawings and right triangle trigonometry to solve problems that include unknown distances and angle measures.

Understanding Fractions 2008

Notes

Section 7: Ratios and Proportions

Proportions

Example 5 - Tree Height

Example 6 - Map

Example 7 - Scale Drawing



5. Solve problems involving unit conversion for situations involving distances, areas, volumes and rates within the same measurement system.

Understanding Fractions 2008

Notes

Section 7: Ratios and Proportions

Rate and Unit Rate

Concept

Examples

The Best?- Example 1

The Best?- Example 2

The Best?- Example 3

Understanding Graphing 2008

Notes

Section 1: Reading And Sketching Graphs

Graphs With a Scale

Example 10... Rate

Example 11... Villeneuve

Example 12... Volume and Time

Understanding Percent 2008

Notes

Section 4: Ratios and Proportions

Rates and Unit Rate

Concept

Examples

The Best?- Example 1

The Best?- Example 2

The Best?- Example 3

Grade Nine... Geometry and Spatial Sense Standard

Characteristics and Properties

1. Define the basic trigonometric ratios in right triangles: sine, cosine and tangent.

Not yet correlated

2. Apply proportions and right triangle trigonometric ratios to solve problems involving missing lengths and angle measures in similar figures.

Not yet correlated



Visualization and Geometric Models

3. Analyze two-dimensional figures in a coordinate plane; e.g., use slope and distance formulas to show that a quadrilateral is a parallelogram.

Not yet correlated

Grade Nine... Patterns, Functions and Algebra Standard

Use Patterns, Relations and Functions

1. Define function with ordered pairs in which each domain element is assigned exactly one range element.

Understanding Graphing 2008

Section 5 : Relations, Equations and Functions

Functions

What is a Function?

Example 1

Example 2

Example 3

Vertical Line Test

Example 2

Example 3

Notes

2. Generalize patterns using functions or relationships (linear, quadratic and exponential), and freely translate among tabular, graphical and symbolic representations.

Understanding Algebra 2008

Section 3: Patterns, Patterns, Patterns

Number Patterns

Example 1

Example 2

Example 3

Example 4

Example 5

Example 6

Patterns to Formulas

Example 1

Example 2

Example 3

Example 4

Example 5

Notes



Understanding Algebra 2008**Notes****Section 4: Patterns, Formulas, Substitution**

Patterns... Squares - Perimeter and Area

Patterns... Toothpicks

Introduction

Exploration

To Formula- Pattern 1

To Formula- Pattern 2

To Formula- Pattern 3

To Formula- Pattern 4

Summary

Patterns... Counting Money

The Pattern... Method 1

The Pattern... Method 2

The Pattern... In General

Summary

Patterns... Angles in a Polygon

The Pattern

Summary

Patterns... The Bridge

Introduction

Exploration

To Formula- Pattern 1

To Formula- Pattern 2

To Formula- Pattern 3

Summary

Patterns... Magic Billiard Table

Investigation #1

Investigation #2

Investigation #3

The Formula

Patterns... Tower of Hanoi

Introduction

Exploration

To Formula

Summary

3. Describe problem situations (linear, quadratic and exponential) by using tabular, graphical and symbolic representations.

Understanding Graphing 2008**Notes****Section 6: Linear Relations**

The Taxi Example

Setup Equations

Graph Equations

The Elastic Example

Setup Equations

Graph

Lightning Example

Setup Equations

Graph

Baseball Example

Setup Equations

Graph



<p>Understanding Graphing 2008 Section 8: Equation of a Straight Line Word Problems-Applications</p>	<p>The Taxi - Case 1- Task 1: Find the Equation The Taxi - Case 1- Task 2: Graph the Equation The Taxi - Case 1- Task 3: Interpret the Equation The Taxi - Case 2- Task 1: Find the Equation The Taxi - Case 2- Task 2: Graph the Equation The Taxi - Case 2- Task 3: Interpret the Equation The Taxi - Summary The Walker The Basketball Food</p>	<p>Notes</p>
<p>Understanding Graphing 2008 Section 9: Quadratic Function Maximize Cage Area</p>	<p>By Trial and Error Use Quadratic Function Graph Conclusions Summary</p>	<p>Notes</p>
<p>Understanding Exponents 2008 Section 3: Exponent Rules A Power with a NEGATIVE Exponent</p>	<p>Method - Bacteria Doubling</p>	<p>Notes</p>
<p>4. Demonstrate the relationship among zeros of a function, roots of equations, and solutions of equations graphically and in words.</p>		
<p>Understanding Graphing 2008 Section 9: Quadratic Function Intercepts of a Quadratic Function</p>	<p>Graphing - Method 1: Graphing - Method 1:</p>	<p>Notes</p>
<p>5. Describe and compare characteristics of the following families of functions: linear, quadratic and exponential functions; e.g., general shape, number of roots, domain, range, rate of change, maximum or minimum.</p>		
<p>Understanding Graphing 2008 Section 5 : Relations, Equations and Functions Relations Functions</p>	<p>Domain and Range What is a Function?</p>	<p>Notes</p>
<p>Understanding Graphing 2008 Section 6: Linear Relations What is a Linear Relation?</p>		<p>Notes</p>



<p>Understanding Graphing 2008 Section 9: Quadratic Function</p> <p>Introductory Examples</p> <p>Definitions</p>	<p>Example 1 Example 2 Summary- Example 1 Summary- Example 2 Parabolas Quadratic Functions</p>	<p>Notes</p>
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Use Algebraic Representations

6. Write and use equivalent forms of equations and inequalities in problem situations; e.g., changing a linear equation to the slopeintercept form.

<p>Understanding Graphing 2008 Section 8: Equation of a Straight Line</p> <p>Examples to Summarize</p> <p>Word Problems-Applications</p>	<p>The Basketball</p>	<p>Notes</p>
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7. Use formulas to solve problems involving exponential growth and decay.

<p>Understanding Percent 2008 Section 7: Percent in Business</p> <p>Compound Interest</p>	<p>What is it? Complete the Table Formula Spreadsheet Interest Calculator Bank Interest Car Depreciation Mortgage</p>	<p>Notes</p>
<p>Understanding Exponents 2008 Section 1: The Meaning of Exponents</p> <p>Introduction... Bacteria Doubling</p> <p>Introduction... Paper Folding</p>	<p>Experiment Pattern</p>	<p>Notes</p>
<p>Understanding Exponents 2008 Section 3: Exponent Rules</p> <p>A Power with a NEGATIVE Exponent</p>	<p>Method - Bacteria Doubling</p>	<p>Notes</p>



8. Find linear equations that represent lines that pass through a given set of ordered pairs, and find linear equations that represent lines parallel or perpendicular to a given line through a specific point.

Understanding Graphing 2008		Notes
Section 8: Equation of a Straight Line		
Parallel and Perpendicular Lines	Concept 1 Concept 2 Example 1 Example 2 Example 3 Example 4	
Slope-Point Form of the Equation	Example 1- Solution 1 Example 1- Solution 2 Example 2- Solution 1 Example 2- Solution 2 Example 2- Solution 3 Example 2- Solution 4	
Examples to Summarize		

9. Solve and interpret the meaning of 2 by 2 systems of linear equations graphically, by substitution and by elimination, with and without technology.

Understanding Equations 2008		Notes
Section 6: Solving Linear Systems		
About This Topic		
The Meaning of a Linear System		
The Meaning of Solving a Linear System		
Solving a Linear System by Graphing	Example 1: Intersecting Lines Example 2: Intersecting Lines Example 3: Intersecting Lines Involving Fractions Example 4: Intersecting Lines Involving Fractions Example 5: Parallel Lines Example 6: Coincidental Lines	
Solving a Linear System by Substitution	Example 1: Intersecting Lines Example 2: Intersecting Lines Example 3: Intersecting Lines Involving Fractions Example 4: Intersecting Lines Involving Fractions Example 5: Parallel Lines Example 6: Coincidental Lines	
Solving a Linear System by Elimination	Example 1: Intersecting Lines Example 2: Intersecting Lines Example 3: Intersecting Lines Involving Fractions Example 4: Intersecting Lines Involving Fractions Example 5: Parallel Lines Example 6: Coincidental Lines	



Solving a Linear System by Comparison	Example 1: Intersecting Lines Example 2: Intersecting Lines Example 3: Intersecting Lines Involving Fractions Example 4: Intersecting Lines Involving Fractions Example 5: Parallel Lines Example 6: Coincidental Lines	
10. Solve quadratic equations with real roots by factoring, graphing, using the quadratic formula and with technology.		
Understanding Graphing 2008 Section 9: Quadratic Function Intercepts of a Quadratic Function		Notes Graphing - Method 1: Graphing - Method 1: Graphing - Method 2: Factoring (If Possible) Graphing - Method 2: Factoring (If Possible) Graphing - Method 3: Using the Quadratic Formula Graphing - Method 3: Using the Quadratic Formula
11. Add, subtract, multiply and divide monomials and polynomials (division of polynomials by monomials only).		
Understanding Algebra 2008 Section 5: Adding Expressions Our Problem Adding Expressions with X and Y Tiles Adding Expressions with X-Squared Tiles Adding Expressions without Tiles Practice Questions With Tiles Practice Questions Without Tiles		Notes Example 1 Example 2 Example 3 Example 1 Example 2 Example 3 Example 1 Example 2 3 questions (randomly generated) 10 questions (randomly generated)
Understanding Algebra 2008 Section 6: Subtracting Expressions Our Problem Subtracting Expressions With X and Y Tiles Subtracting Expressions With X-Squared Tiles		Notes Concept Example 1 Example 2 Example 1 Example 2



Subtracting Expressions Without Tiles	
Practice Questions With Tiles	3 questions (randomly generated)
Practice Questions Without Tiles	10 questions (randomly generated)

Understanding Algebra 2008

Notes

Section 7: Multiplying Expressions

Our Problem	
Recall Tile Concept	
Multiplying Monomials	Powers- Concept Powers- Example 1 Powers- Example 2 Powers- Example 3 Powers- Example 4 With Tiles- Example 1 With Tiles- Example 2 With Tiles- Example 3 Without Tiles
Multiplying Monomials and Binomials	With Tiles- Example 1 With Tiles- Example 2 With Tiles- Example 3 With Tiles- Example 4 Without Tiles

Understanding Algebra 2008

Notes

Section 9: Dividing Expressions

Dividing a Monomial by a Monomial	Example 1 Example 2 Example 3 Example 4
Dividing a Polynomial by a Monomial	Concept Example 1 Example 2 Example 3

12. Simplify rational expressions by eliminating common factors and applying properties of integer exponents.

Understanding Algebra 2008

Notes

Section 8: Factoring Expressions

Our Problem	
Common Factoring	With Tiles- Example 1 - Method 1 With Tiles- Example 1 - Method 2 With Tiles- Example 1 - Method 1 With Tiles- Example 2 - Method 2



Factoring Trinomials	Without Tiles- Greatest Common Factor Without Tiles- Example 1 Without Tiles- Example 2 With Tiles- Example 1 With Tiles- Example 2 The Pattern Without Tiles- Example 1 Without Tiles- Example 2 Without Tiles- Example 3 Without Tiles- Example 4
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Analyze Change

13. Model and solve problems involving direct and inverse variation using proportional reasoning.

Not yet correlated

14. Describe the relationship between slope and the graph of a direct variation and inverse variation.

Not yet correlated

15. Describe how a change in the value of a constant in a linear or quadratic equation affects the related graphs.

Understanding Graphing 2008

Section 8: Equation of a Straight Line

Exercise: Slope, Y-intercept

Concept
 Example 1
 Example 2
 Example 3
 Example 4

Notes

Understanding Graphing 2008

Section 9: Quadratic Function

The Role of a

The Plan
 a = 1,2,3
 a = -1,-2,-3
 Parabolas with the Same Width
 Summary

Notes



The Role of c

Completing the Square to Find Role of b

The Plan
Increase c
Summary
Example 1
Example 2
Example 3
Example 4
Summary and Patterns
In General

Grade Nine... Data Analysis and Probability Standard

Data Collection

1. Classify data as univariate (single variable) or bivariate (two variables) and as quantitative (measurement) or qualitative (categorical) data.

Not yet correlated

2. Create a scatterplot for a set of bivariate data, sketch the line of best fit, and interpret the slope of the line of best fit.

Understanding Graphing 2008

Section 2: Statistics

Presenting Data

Scatter Plot- Example 1... The T-Shirt Tailor
Scatter Plot- Example 2... Matching

Notes

Understanding Graphing 2008

Section 6: Linear Relations

Line of Best Fit

Example 1
Example 2

Notes

Understanding Graphing 2008

Section 7: Slope of a Line

Formula

Notes



Statistical Methods

3. Analyze and interpret frequency distributions based on spread, symmetry, skewness, clusters and outliers.

Understanding Graphing 2008

Notes

Section 2: Statistics

Measures of Central Tendency

Introduction
The Mean Average
The Median Average
The Mode
Summary

Box and Whisker Plot

Another Example
Adding Data Points
Concepts
Example 1: Math Marks
Example 2: Income in 1998

4. Describe and compare various types of studies (survey, observation, experiment), and identify possible misuses of statistical data.

Understanding Graphing 2008

Notes

Section 2: Statistics

Statistics... What is it?

Collecting Data

Throw A Die
Throw 2 Dice
Voting
Primary Data-Gathering Methods
Secondary Data-Gathering Methods
Example 1
Example 2

Misleading Statistics

5. Describe characteristics and limitations of sampling methods, and analyze the effects of random versus biased sampling; e.g., determine and justify whether the sample is likely to be representative of the population.

Not yet correlated

6. Make inferences about relationships in bivariate data, and recognize the difference between evidence of relationship (correlation) and causation.

Not yet correlated



Probability

7. Use counting techniques and the Fundamental Counting principle to determine the total number of possible outcomes for mathematical situations.

Understanding Probability 2008

Notes

Section 1: Introduction to Probability

Possible Outcomes

What Are They?

1. Coins
2. Pick 1 Ball
3. Pick 2 Balls
4. Eye Test
5. Travel

8. Describe, create and analyze a sample space and use it to calculate probability.

Understanding Probability 2008

Notes

Section 2: What's the Chance

Probability

What is it

- Introduction 1
- Introduction 2

Probability Examples

1. Coin Toss
2. Picking 1 Ball
3. Picking 2 Balls
4. Spinner #1
5. Spinner #2
6. The Bag
7. Travel Example
8. Number Example
9. Rabbit Example
10. Mailing Letters
11. Forest
12. Ahmed's Maze

9. Identify situations involving independent and dependent events, and explain differences between, and common misconceptions about, probabilities associated with those events.

Understanding Probability 2008

Notes

Section 7: Independent Events

In This Topic

What Are They

Examples

1. Toss 2 Coins
2. Replacing Marbles

Probability

1. Coin and Die
2. Balls



Patterns and Summary	3. Letter Tiles 1. Summary 2. Spinner 3. Cards	
Practice Questions	5 questions (randomly generated)	
Understanding Probability 2008 Section 8: Dependent Events		Notes
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. Keep the First Flower	
Patterns and Summary	1. Summary 2. Money 3. Socks 4. Names	
Practice Questions	5 questions (randomly generated)	
10. Use theoretical and experimental probability, including simulations or random numbers, to estimate probabilities and to solve problems dealing with uncertainty; e.g., compound events, independent events, simple dependent events.		
Understanding Probability 2008 Section 2: What's the Chance		Notes
Experimental Probability	Introduction Example 1 Example 2	
Understanding Probability 2008 Section 3: Dice Probabilities		Notes
Roll One Die	Your Experiment Computer's Experiment Theoretical Probability Patterns Summary	
Roll Two Dice	Your Experiment Computer's Experiment Patterns Summary	
Practice Questions	5 questions (randomly generated)	

