

CORRELATION
of
the 10 UNDERSTANDING MATH PLUS PROGRAMS & UNDERSTANDING NUMERATION PLUS PROGRAMS
with
DELAWARE MATHEMATICS CONTENT STANDARDS

Grades 4 to 5

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 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 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

STANDARD #1

Students will develop their ability to SOLVE PROBLEMS by engaging in developmentally appropriate problem-solving opportunities in which there is a need to use various approaches to investigate and understand mathematical concepts; to formulate their own problems; to find solutions to problems from everyday situations; to develop and apply strategies to solve a wide variety of problems; and to integrate mathematical reasoning, communication and connections.

PERFORMANCE INDICATORS

Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades K-10 will be able to:

1.01 persist and solve problems from start to finish;

1.02 investigate and build their understanding of mathematical content;

1.03 formulate problems from everyday and mathematical situations;

1.04 develop and apply strategies to solve problems;

1.05 interpret results with respect to the original problem;

1.06 generalize strategies and solutions to new problem situations.

NUM+ Problem Solving

All Sections

MAT+ All Programs

STANDARD #2

Students will develop their ability to COMMUNICATE MATHEMATICALLY by solving problems in which there is a need to obtain information from the real world through reading, listening and observing; to translate this information into mathematical language and symbols; to process this information mathematically; and to present results in written, oral and visual formats.

PERFORMANCE INDICATORS

Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades K-10 will be able to:

2.01 model real-world situations using oral, written, concrete, pictorial, graphical and algebraic methods;

2.02 use reading, listening, viewing, speaking and writing to explain and develop mathematical ideas;

2.03 use mathematical notation and language to describe and discuss real-world situations;

2.04 read mathematics with understanding;

2.05 develop common understandings of mathematical ideas and use generalizations discovered through investigations to formulate definitions;

2.06 ask questions to clarify the problem situation.

NUM+ Problem Solving

All Sections

MAT+ All Programs

STANDARD #3

Students will develop their ability to REASON MATHEMATICALLY by solving problems in which there is a need to investigate significant mathematical ideas in all content areas; to justify their thinking; to reinforce and extend their logical reasoning abilities; to reflect on and clarify their own thinking; to ask questions to extend their thinking; and to construct their own learning.

PERFORMANCE INDICATORS

Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades K-10 will be able to use inductive and deductive reasoning to:

3.01 formulate and test conjectures;

3.02 draw and then justify conclusions;

3.03 construct and follow logical arguments;

3.04 use properties, models, known facts, and relationships to explain and defend their thinking.

NUM+ Problem Solving

All Sections

MAT+ All Programs

STANDARD #4

Students will develop their ability to make MATHEMATICAL CONNECTIONS by solving problems in which there is a need to view mathematics as an integrated whole and to integrate mathematics with other disciplines, while allowing the flexibility to approach problems, from within and outside mathematics, in a variety of ways.

PERFORMANCE INDICATORS

Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades K-10 will be able to:

4.01 make connections linking conceptual and procedural knowledge;

4.02 integrate mathematical problem-solving with other curricular areas;

4.03 use connections among mathematical topics;

4.04 use various representations of the same concept;

4.05 make connections from manipulative solutions to algorithmic solutions to technological solutions;

4.06 determine the reasonableness of a mathematical solution as it applies in a real-world situation.

STANDARDS #1-4 VIGNETTE GRADE 4 & 5

Please see the document found at:

http://www.doe.k12.de.us/Standards/Math/standards1_4.htm#VIGNETTE%204-5

MAT+ Understanding Whole Numbers and Integers CAN/US

Topic 2. Perimeter and Area of Polygons

Amount of Surface Area – All Sections

Standard Five	
<p>Students will develop an understanding of ESTIMATION, MEASUREMENT, and COMPUTATION by solving problems in which there is a need to measure to a required degree of accuracy by selecting appropriate tools and units; to develop computing strategies and select appropriate methods of calculation from among mental math, paper and pencil, calculators or computers; to use estimating skills to approximate an answer and to determine the reasonableness of results.</p>	
<p>PERFORMANCE INDICATORS: K-10 Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:</p>	
<p>5.40 estimate and then measure length, perimeter, time, temperature, weight/mass, capacity and area to the degree of accuracy required using standard and nonstandard units;</p>	<p>MAT+ UNDERSTANDING MEASUREMENT & GEOMETRY <u>Topic 1. An Introduction to Measurement</u> Metric and U.S.A. Measurement Systems</p> <p><u>Topic 2. Perimeter and Area of a Polygon</u> Walk Around a Polygon Joan Walks Length of a Metal Strip Find the Perimeter</p>

<p>5.41 describe the structure and the use of systems of measurement;</p>	<p>MAT+ UNDERSTANDING MEASUREMENT & GEOMETRY <u>Topic 1. An Introduction to Measurement</u> Searching for the Standard Unit Related Units for Metric Prefixes Converting Between Metric Units The Ruler Benchmarks Establishing Benchmarks</p>
<p>5.42 estimate, measure and compute the perimeter of polygons;</p>	<p>MAT+ UNDERSTANDING MEASUREMENT & GEOMETRY <u>Topic 2. Perimeter and Area of a Polygon</u> Walk Around a Polygon Joan Walks Length of a Metal Strip Find the Perimeter</p>
<p>5.43 use algorithms for addition, subtraction, multiplication and division with understanding;</p>	<p>MAT+ UNDERSTANDING WHOLE NUMBERS AND INTEGERS <u>Topic 2. Adding and Subtracting Whole Numbers</u> <i>All Sections</i></p> <p><u>Topic 3. Multiplying and Dividing Whole Numbers</u> <i>All Sections</i></p>
<p>5.44 use multiple computational procedures to add and subtract fractions and decimals, to multiply fractions, and to divide whole numbers using multi-digit divisors;</p>	<p>MAT+ UNDERSTANDING FRACTIONS <u>Topic 8. Adding Fractions</u> Pattern Blocks Hexagon 1,2,3 Summary Percent Strips Concepts 1,2 Fractions Strips</p>

Examples 1,2
Decimal Strips
Examples 1,2
The Clock
Adding Fractions on a Number Line
Lowest Common Denominator

Topic 9. Subtracting Fractions

Pattern Blocks
Hexagons 1,2,3
Summary
The Clock
Fractions Strips
Examples 1,2
Percent Strips
Concepts 1,2
Decimal Strips
Examples 1,2

Topic 10. Multiplying Fractions

Pattern Blocks
Hexagons 1,2,3
Fractions Strips
Concepts 1,2
Word Problems
A Summary

Topic 14. Addition and Subtraction of Fractions

Adding Decimals
Methods 1,2,3
Subtracting Decimals

	Methods 1,2,3
5.45 estimate, measure and compute the area of rectangles; 5.46 make estimates before measuring and computing and determine if an estimate is reasonable;	MAT+ UNDERSTANDING MEASUREMENT AND GEOMETRY <u>Topic 2. Perimeter and Area of a Polygon</u> Amount of Surface Area The Driveway – An Introduction to Area Area – Estimation Area of a Rectangle Concept Examples 1,2
5.47 round decimals as an estimation strategy;	MAT+ UNDERSTANDING FRACTIONS <u>Topic 5. Introduction to Decimals</u> Introduction to Decimals Tenths and Decimals Ones and Tenths Decimals on a Number Line Rounding Decimals Examples 1 through 5 Special Case #1, #2 Summary
5.48 determine if an estimate is more appropriate than an exact answer;	
5.49 make change by counting on and counting back.	NUM+ COUNTING

STANDARD #6	
Students will develop NUMBER SENSE by solving problems in which there is a need to	

represent and model real numbers verbally, physically and symbolically; to use operations with understanding; to explain the relationships between numbers; to apply the concept of a unit; and to determine the relative magnitude of real numbers.	
PERFORMANCE INDICATORS: K-10	
Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:	

6.40 connect physical, verbal and symbolic representations of fractions, decimals, and whole numbers;	<p>MAT+ UNDERSTANDING FRACTIONS <u>Topic 1. The Meaning of Fractions</u> Parts of a Fractions Introduce Fractions Parts of a Whole Write the Fraction Fraction of a Set</p> <p>MAT+ UNDERSTANDINGI WHOLE NUMBERS AND INTEGERS <u>Topic 1. The Meaning of Whole Numbers CAN/US</u> Seeing the Number To Ten To Hundreds To Thousands Expanded Notation To 999 To 9999</p>
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	Write as Numerals The Number Line
6.41 decompose and recompose whole numbers using all arithmetic operations;	MAT+ UNDERSTANDINGI WHOLE NUMBERS AND INTEGERS <u>Topic 2. Adding and Subtracting Numbers</u> <i>All Sections</i>
6.42 build decimal representations using base ten;	MAT+ UNDERSTANDING FRACTIONS <u>Topic 5. Introduction to Decimals</u> Tens, Ones, and Tenths Decimals on a Number Line
6.43 demonstrate the need for and the connection between decimals and fractions;	MAT+ UNDERSTANDING FRACTIONS <u>Topic 15. Fractions and Decimals</u> Compare Fractions Methods 1,2 Fractions to Decimals
6.44 demonstrate an understanding of order relations for fractions, decimals, and whole numbers using physical, verbal and symbolic representations;	MAT+ UNDERSTANDING WHOLE NUMBERS AND INTEGERS <u>Topic 9. Order of Operations</u> Order in Addition Trials 1,2 Conclusion Examples 1,2 Order in Multiplication Trials 1,2 Conclusion Examples 1,2 Why Use Order of Operations
6.45 examine the relative effect of operations on whole numbers, fractions, and decimals;	MAT+ UNDERSTANDING WHOLE NUMBERS AND INTEGERS <u>Topic 2. Adding and Subtracting Whole Numbers</u> Add...Partial Sums

Examples 1 through 6
Add...Trade First
Examples 1 through 6
Add...Right to Left
Examples 1 through 6
Subtract...Trade First
Examples 1 through 6
Subtract...Add Up
Examples 1 through 6
Subtract...Add Up to Zero
Examples 1 through 6

Topic 3. Multiplying and Dividing Whole Numbers

Multiplication Facts
Commutative Properties
The 10x10 Multiplication Table
Multiply by a Single Digit Number
Repeated Addition – Examples 1 through 4
Partial Products (Area)
Examples 1 through 6
Divide by a Single Digit Divisor
Examples 1,2

MAT+ UNDERSTANDING FRACTIONS

Topic 8. Adding Fractions

Adding Fractions on a Number Line
Examples 1,2,3

Topic 9. Subtracting Fractions

Subtracting Fractions on a Number Line
Examples 1,2,3

	<p><u>Topic 10. Multiplying Fractions</u> Pattern Blocks Fraction Strips</p> <p><u>Topic 14. Addition and Subtraction of Decimals</u> Adding Decimals Method 1 – Partial Sums Method 2 – Columns Method 3 – Right to Left Subtracting Decimals Method 1 – Right to Left Method 2 – Trade First Method 3 – Add Up Method 4 – Add Up to Zero</p>
6.46 recognize the arbitrary size of a unit and its relationship to fractional and decimal parts.	

STANDARD #7	
Students will develop an understanding of ALGEBRA by solving problems in which there is a need to progress from the concrete to the abstract using physical models, equations and graphs; to generalize number patterns; and to describe, represent and analyze relationships among variable quantities.	
PERFORMANCE INDICATORS: K-10	
Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:	

<p>7.40 solve equations using methods such as inverse operations, mental math, and guess and check;</p>	<p>MAT+ UNDERSTANDING EQUATIONS <u>Topic 1. Tiles, Balances, Equations</u> Definitions Introduction Summary Parts 1,2 The Meaning of “Solving an Equation” Solve by Systematic Trials</p>
<p>7.41 find solutions to inequalities from a given replacement set;</p>	<p>MAT+ UNDERSTANDING EQUATIONS <u>Topic 7, Solving Inequalities</u> Comparing Integers The Integer Line: Examples 1,2,3 Inequalities – What are They? Inequality vs. Equation Summary of Relationships Inequality on the Number Line Examples 1,2,3,4 Solving Inequalities Examples 1 through 6</p>
<p>7.42 use letters as variable representations.</p>	<p>MAT+ UNDERSTANDING ALGEBRA <u>Topic 4. Patterns, Formulas, Substitution</u> Expressions, Terms, Variables Definitions Summary</p>

STANDARD #8	
Students will develop SPATIAL SENSE and an understanding of GEOMETRY by solving problems in which there is a need to recognize, construct, transform, analyze properties of, and discover relationships between, geometric figures.	
PERFORMANCE INDICATORS: K-10	
Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:	
8.40 visualize, represent, and draw geometric figures (triangle, quadrilaterals, and regular polygons);	MAT+ UNDERSTANDING MEASUREMENT AND GEOMETRY <u>Topic 2. Perimeter and Area of Polygons</u> Polygons...What are They? Concept A Triangle is... A Quadrilateral is... A Pentagon is... A Hexagon is... An Octagon is...
8.41 given a net, build three dimensional figures such as a cube, rectangular prism, cylinder and square pyramid;	MAT+ UNDERSTANDING MEASUREMENT AND GEOMETRY <u>Topic 4. Solids – Volume and Surface Area</u> Classifying Solids A Solid is... Recall Polygons A Polyhedron is... A Prism is... Some Special Pyramids

	<p>A Cylinder is...</p> <p>A Cone is...</p>
8.42 manipulate and draw polygons using flips, slides and turns;	<p>MAT+ UNDERSTANDING GRAPHING</p> <p><u>Topic 4. Transformations</u></p> <p>What is a Transformation?</p> <p>Introduction to Common Transformations</p> <p>Translations – An Introduction</p> <p>Slide #1, #2, #3, #4</p> <p>Reflections – An Introduction</p> <p>Flip #1, #2, #3, #4</p> <p>Rotations – An Introduction</p> <p>Turn #1, #2, #3, #4</p>
8.43 define polygons using their attributes such as number of sides, parallel or perpendicular sides, number of vertices, and classification of angles;	<p>MAT+ UNDERSTANDING MEASUREMENT AND GEOMETRY</p> <p><u>Topic 2. Perimeter and Area of Polygons</u></p> <p>Polygons...What are They?</p> <p>Concept</p> <p>A Triangle is...</p> <p>A Quadrilateral is...</p> <p>A Pentagon is...</p> <p>A Hexagon is...</p> <p>An Octagon is...</p> <p><u>Topic 5. Angles and their Measure</u></p> <p>Angles...An Introduction</p> <p>The Degree</p> <p>Classifying Angles</p> <p>Measuring Angles</p>

<p>8.44 identify, describe, compare and classify two dimensional figures and investigate their relationships.</p>	<p>MAT+ UNDERSTANDING MEASUREMENT AND GEOMETRY <u>Topic 2. Perimeter and Area of Polygons</u> Polygons...What are They? Concept A Triangle is... A Quadrilateral is... A Pentagon is... A Hexagon is... An Octagon is...</p>
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<p>STANDARD #9</p>	
<p>Students will develop an understanding of STATISTICS AND PROBABILITY by solving problems in which there is a need to collect, appropriately represent, and interpret data; to make inferences or predictions; to present convincing arguments; and to model mathematical situations to determine the probability.</p>	
<p>PERFORMANCE INDICATORS: K-10</p>	
<p>Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:</p>	
<p>9.40 systematically collect, organize and describe data;</p>	<p>MAT+ UNDERSTANDING GRAPHING <u>Topic 2. Statistics</u> Data...What is it? Examples of Data – 1 through 6</p>

	Collecting Data
9.41 construct and describe displays of data;	MAT+ UNDERSTANDING GRAPHING <u>Topic 2. Statistics</u> An Introduction Tally Chart Pictograph Bar Graph Line Graph Presenting Data
9.42 calculate and use the mean to interpret data;	MAT+ UNDERSTANDING GRAPHING <u>Topic 2. Statistics</u> Measures of Central Tendency Introduction The Mean Average
9.43 select and use data displays such as line plots, tables, histograms, and scale pictographs; 9.44 interpret data and make convincing arguments that are based on data analysis and previous experiences;	MAT+ UNDERSTANDING GRAPHING <u>Topic 2. Statistics</u> Presenting Data Histogram Line Graph
9.45 list all possible outcomes for an experiment using a tree diagram; 9.46 find the probability of a single event based on an experiment with equally likely outcomes.	MAT+ UNDERSTANDING PROBABILITY <u>Topic 1. What's Possible</u> <i>All Sections</i>

STANDARD #10	
Students will develop an understanding of PATTERNS, RELATIONSHIPS AND FUNCTIONS by solving problems in which there is a need to recognize and extend a variety of patterns; and to analyze, represent, model and describe real-world functional relationships.	
PERFORMANCE INDICATORS: K-10	
Through the investigation of meaningful problems, individually or in cooperative groups while using appropriate technology, all students in grades 4-5, building upon the K-3 expectations, will be able to:	
10.40 recognize, analyze, create, extend and describe a wide variety of patterns;	MAT+ UNDERSTANDING ALGEBRA <u>Topic 3. Patterns, Patterns, Patterns</u> Introduction...Math is Patterns Geometric Patterns Examples 1 through 8 Number Patterns Examples 1 through 6 Number and Geometric Patterns Examples 1,2
10.41 investigate and predict the results of combining, subdividing and changing shapes;	
10.42 use tables, rules, variables, open sentences and graphs to describe patterns, functions, and other relationships;	MAT+ UNDERSTANDING ALGEBRA <u>Topic 3. Patterns, Patterns, Patterns</u> Introduction...Math is Patterns Geometric Patterns

10.43 identify patterns for explaining the concepts of computation.	Examples 1 through 8 Number Patterns Examples 1 through 6 Number and Geometric Patterns Examples 1,2
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