

## Outline for a Grade 6, 7, and 8 Workshop

August 2006

**Time Allocation:** Minimum 3 hours

**Requirements for Participants:** a Windows or Macintosh computer with the 9 Understanding Math PLUS© programs

**Requirements for the Session Leader:** a computer loaded with Understanding Math PLUS© and a projector, U. Math flyer for each participant, CD preview disk information slip for each participant, handouts, support sheet, activity package for the participants if doing a hands-on activity, and the DVD: "Integrating Understanding Math Into Your Mathematics Curriculum".

### Preparation Checklist:

- Set up computer/projector
- Prepare the workstations
- Double check that U Math has been loaded onto the computers
- Handout flyers and workshop packages

### Introduction:

1. Introduce yourself and your connection with the Understanding Math© software.
2. Have the DVD playing in the background so the participants can see the 10 programs offered by Neufeld Learning Systems.
3. Key points worth noting about the software prior to using the programs:
  - 10 programs exist from K to 10
  - History of the software: writing began in the early 90's, written to address the needs of visual learners, involves all learners, learning from concrete to abstract, used in many different situations (lab, one-on-one, teacher directed, remediation etc.)
  - UM PLUS ..based on Gr 4 to 10 NCTM guidelines
  - UN PLUS is based on K to 3 NCTM guidelines
  - This software is NOT the curriculum! Rather it is a TOOL to be used within the curriculum and delivery of expectations.
  - This is computer assisted software, not computer managed.
  - The teacher is the key to the software and having the students achieve success. UM is a tool within existing curriculum to enhance, expand and embrace existing curriculum.

## **Basic Guidelines for the 6 – 8 Workshop:**

- The package for the participants offers choices throughout the workshop. Encourage the teachers to explore where they see the need. Reinforce the concept that they are the key to success within the classroom and they know where each of their students need to be. The flexibility of this software allows students to work at their own pace and complete lessons that meet their educational needs.
- The initial portion of the workshop will be grade appropriate. As we explore the Understanding Math Plus Software, teachers need to understand the purpose of these lessons could be for reinforcement, remediation or intervention.
- Teachers will be working individually on computers and will be brought together into one large group throughout the session.
- This workshop will involve both on and off computer sections.
- We will be having many discussions throughout the workshop about how to integrate technology into a variety of classroom settings.
- Encourage participants to keep notes in their package as we complete the different lessons. Keeping notes will be helpful when teachers return to their classroom to use the software.

### **NOTE .. Support Documents on Page 2**

.. will refer to these throughout the workshop.

### **Computer Configurations.. Brief Discussion** **ALL**

\* Have a brief discussion with the teachers to see how they have computers configured in their school. If time permits, or if the audience is particularly eager, you could discuss what positives and negatives they have experienced with the different settings. Throughout the presentation it is important to make comments about how specific lessons could be used for specific computer configurations. Some of the possible configurations for schools could be:

- **Lab** – Students work all together on the same content, usually independently.
- **Centre** - A few computers in a classroom used as a centre which students will rotate through.
- **Teacher Led** - One computer for teacher-centered lessons used in conjunction with a TV or a video projector.
- **Remediation** – One student working on the computer independently or in a partnership.

**ALL TOGETHER: Introduce and Discuss**  
**Understanding Math PLUS©**

**Topic:** 3) Equivalent Fractions

- Introduction
- Pattern Blocks
- Equivalent Fractions on a Number Line
- Equivalent Fractions in a Multiplication Table
- Example Questions
- Memory Game

**While navigating through this piece of software, note the following:**

- How to navigate UM+
- Main Menu Items
- Cumulative Check
- Topic Menus
- Practice Questions – random with interaction
- Topic Tests – random with tracking
- Selecting the lesson

Specifically demonstrate the following with these series of lessons on Whole Numbers:

- Concepts taught with a variety of approaches
- Mistakes offer learning opportunities, not just the correct answer
- Students have to input the correct answer
- Students have to input words with correct spelling. If this is an issue we as teachers can decide to provide either a word wall for the entire class, or word sheets for specific students to help students overcome this possible difficulty.
- Graphics relate to content on screen.

**Worksession: On Computer**  
**Understanding Math PLUS©**

**\*\*note .. much material here ..let them choose a few lessons**

**Understanding Fractions**

**Topic:** 3) Equivalent Fractions

- Introduction
- Pattern Blocks
- Equivalent Fractions on a Number Line
- Equivalent Fractions in a Multiplication Table
- Example Questions
- Memory Game

5) Introduction to Decimals

- Introduction to Decimals
- Decimals to Tenths, Hundredths, Thousandths
- Understanding Place Value
- Comparing Decimals
- Ordering Decimals

14) Add and Subtract Decimals

- Adding – Method 3 – Ex 1 (note variety of methods)

15) Multiplication and Division of Decimals

- Recall the Basics
- Multiply by Repeated Addition.. Ex 1
- Special Case: Multiply a Decimal by a Whole Number
- Multiply by Partial Products Ex. 1
- Preliminaries to Division
- Partial Quotients- Ex 1
- Fair Sharing – Long Division – Ex 1

10) Multiplying Fractions

- Developing the Rule

11) Dividing Fractions

- Understanding Division

**Things Worth Noting:**

Note the many different approaches to teaching the same concept. The lessons on equivalent fractions work very well in centre rotations having students explore the many approaches.

### **ALL TOGETHER: Information and Discuss**

#### **Item 1: Worksheets/Outlines for every topic**

**Review the samples of worksheets on pg 4 of the participants workshop package.**

.. available at [www.neufeldmath.com](http://www.neufeldmath.com)

**Item 2: Discussion:** Gather the group together for a discussion. Pose the question, what advantages do you see with this computer technology in your mathematics classroom? If this is a stumbling block some possible lead-ins could be: remediation, multiple approaches etc. Have the participants be as specific as possible.

Then pose the question, how do you see using this with your students? Specific examples of lessons would be ideal here.

### **Information Demo: Tests and Tracking.**

**Understanding Math Plus©**

**Understanding Fractions©**

#### **Cumulative Check**

#### **Topic 3 – Equivalent Fractions**

##### Topic Test

- Take the cumulative check. Take the topic test for topic 1. (Try and get at least one answer question correct.) Show how to log in. Stress the importance of giving students their login which can be as simple as their first and last name. Encourage your teachers to record students' password as you cannot track their passwords or check if forgotten. For my students, if they take a test in the future and change their login, I do not check for their results, I simply let them know it is a zero. This makes students more accountable for their studies. Students can enter their own names and then a class can be created.
- After taking the test show the student summary sheet. These can be printed and submitted. Demonstrate how students can self correct.
- Exit the software and now play the role of the teacher. Create your own class then show the multiple levels of tracking that can be done.
- **Note the DVD – Integrating Technology Into Your Mathematics Classroom** \*\*\*Let the participants know that the DVD has video clips and more information on the tracking system when needed.

**Worksession: On Computer**  
**UNDERSTANDING MATH Plus©**  
**Understanding Fractions**

**Topic:** 7) Ratio and Proportion (also in U %)  
Ratio in the News  
Writing Ratios  
.. show DVD model lesson .. “mix paints”  
What is a Ratio?  
Ex. 4 Gears  
What is a Proportion?  
Proportion  
Ex. 3 Marbles \*\*.. see below  
Ex. 4 Scale Drawings

**Things Worth Noting:**

1. Take a moment to go through some of the off computer questions both provided by State/Provincial tests and the NLS handout. They are very similar in format and content.
2. Possible off computer extensions for Proportion could be to have students create their own “Marble” example. Their task would be to go home and fill a container with like objects and mark a set number of them. On the bottom of the container they could note the number of objects and the number of marked objects. In future math classes, students could rotate through these student created examples to create proportions and estimate the number of objects in a container. The neatest ones I have seen are rice in an ice cream tub and plastic grocery bags in a large garbage bag.
3. \*\*\*EXCELLENT.. Note DVD .. Integrating Understanding Math into Your Mathematics Curriculum ... U % .. “Mixing Paints”

**Worksession: On Computer**

**\*\*note .. much material here ..let them choose a few lessons**

**UNDERSTANDING MATH Plus©**  
**Program: Understanding Percent**

- Topic:** 1)The Meaning of Percent
- Percent in the News
  - Percent Means
  - Examples
- 2) Percent to Fraction/Decimal
- Expressing a Percent as a Fraction
- 5) Percent of a Number
- The Bouncing Ball
- 6) Problems Involving Percent
- Finding The Whole – 2 Methods
  - % Less Than 1%
  - Percent Change
- 7) Percent in Business
- Sales Tax
  - Discount
  - Commission

**Things Worth Noting:**

1. Take a moment to go through some of the off computer questions provided by State/Provincial tests. Note the similarities between these questions and the format of the software.
2. Note the power of technology and the visual aids that are provided for students throughout the percent lessons.

## Worksession: On Computer

### Understanding Math PLUS©

\*\*note .. much material here ..let them choose a few lessons

### Understanding Measurement and Geometry©

#### Topic – 1) Introduction to Measurement

- Metric and US Measurement System
- Measurement with a Ruler
- Converting Between Metric Units

#### 2) Perimeter and Area of Polygons

- Polygons .. What are They?
- Amount of Surface
- Relationship Between Area and Perimeter
- Given Area and Perimeter – Create Shape

#### 8) Projective Geometry

- Given Solid...Build It
- Given View...Build It

### Things Worth Noting:

These lesson are an excellent example of how numeracy and literacy are linked together in the software.

(refer to [www.neufeldmath.com/workbank/](http://www.neufeldmath.com/workbank/))

An excellent book that corresponds with this lesson is The Greedy Triangle by Marilyn Burns(Topic 2)

## Worksession: On Computer

### Understanding Math PLUS©

\*\*note .. much material here ..let them choose a few lessons

### Understanding Measurement and Geometry©

#### Topic – 3) Circles

- Radius, Circumference, Diameter
- Pi...A Special Number
- Area of a Circle

#### 4) Solids – Volume and Surface Area

- Classifying Solids
- Surface Area of a Solid

### Things Worth Noting:

If time permits, show the DVD clip, Paper Boxes, after working through these sections. It is an excellent off computer link with a quick assessment at the completion of the task.

Note the visual aid of the 3D shapes quickly breaking into the appropriate nets.

**Worksession: On Computer, Off Computer(and discussion of a lesson/vocabulary review/introduction)**

**Understanding Math PLUS©**

**Understanding Measurement and Geometry©**

**Topic – 5) Angles and Their Measure**

In this topic

Lines and Rays

Angles – An Introduction

**Off Computer** –Freyer Word Model .. see the pages

- Wax Paper Protractor .. see the pages

**On Computer** – The Degree

Classifying Angles

Measuring Angles

Practice Questions

**Things Worth Noting:**

The initial computer activity is to reinforce vocabulary and concepts of rays, lines and angles. Students then complete an off computer activity involving a unique word definition activity. Having students complete this on chart paper in groups is an nice method of presentation.

The Freyer Model for word definitions included in their package is a very nice activity to complete with the group. Assign each teacher a word they have to define (multiple people get the same word), have them work together to define their word and record this then share some examples.

**ALL TOGETHER .. Brief Presentation**

**Video Clip:**

**Things Worth Noting:**

This video is just meant as a nice ‘break’ with the group. It’s a very humorous approach to investigating multiple approaches to addition and multiplication of numbers. This is a nice lead in to the addition and multiplication strategies within the Understanding Whole Numbers and Integers© section.

## Worksession: On Computer

### Understanding Math PLUS©

#### Understanding Whole Numbers and Integers©

(15 minutes .. show them or have them go through the \*  
sections)

#### Topic – for Intervention .. with Understanding

- 1) The Meaning of Whole Numbers
  - Seeing the Number to Thousands Ex. 1
  - \*Represent Numbers in Different Ways Ex 1,3
  - Comparing Large Numbers Ex. 3
- 2) Adding and Subtracting Whole Numbers
  - \*Add – Trade First Ex. 1
  - Whole Numbers Around Us Ex. 5 and 8
- 3) Multiplication and Division of Whole Numbers
  - Mult by 2 digit multiplier
    - \*Partial Product .. Ex 1 with Blocks
    - .. work through this for 10 min
    - Partial Product .. Ex 4 without Blocks
    - Distributive Method .. Ex 1
    - Standard Method .. Ex 1

#### **Things Worth Noting:**

Make mistakes in the Whole Numbers Around Us to demonstrate the scaffolding that is available for students.

Encourage participants to preview the multiple approaches and strategies with an open mind. Remember that our students are blank slates and are not relearning a concept, rather learning through understanding.

## Worksession: On Computer

### Understanding Math PLUS©

#### Understanding Whole Numbers and Integers©

#### **Topic – 4) The Meaning of Integers**

- Integers Around Us
  - Opposite Integers
- 5) Adding Integers (variety of approaches)
- Elevators
  - Markers
  - Going for a Walk
- 6) Subtracting Integers
- Markers...An Introduction
  - Ex. 5..(have them check this or do with them)

#### **Things Worth Noting:**

Encourage participants to preview the multiple approaches and strategies. Note that a new section on multiplying integers is coming soon!

## Demonstration of many options & Discussion

### **Understanding Math Plus©**

### **Understanding Algebra©**

**Topic** – 1) Introduction to Algebraic Thinking

**Lesson** – Trick #1 – Integers

Explanation

Function Machine

### **Off Computer –**

\*Note that this content is appropriate for many grades.

The purpose of bringing everyone together for this activity is to demonstrate a TEACHER LED lesson using one computer and a projector.

Note ... refer to the excellent worksheet from ... [www.neufeldmath.com](http://www.neufeldmath.com) on this section.

## Worksession: On Computer

### **Understanding Math PLUS©**

### **Understanding Algebra©**

**Topic** – 2) Introduction to Tiles and Algebra

Introduction to Tiles

Algebraic Expressions to Tiles

5) Adding Expressions

Adding Expressions with X/Y Tiles

3) Patterns, Patterns, Patterns

Number and Geometric Patterns

Patterns to Formulas

### **Things Worth Noting:**

This is a great activity to provide students with corresponding manipulatives. Giving students Algebra Tiles to mimic the expressions created on screen.

Students can create the patterns like on the screen and continue it using these tools. If students are given the opportunity to use these tools through modeling, they will become more comfortable when they need to apply their learning or create their own problems.

Note that the initial patterns are very visual and later develop into the concrete and abstract working together.

Note .. Use this lesson with a “Smart Board”

## Worksession: On Computer

Much material here .. Suggest that they spend the most time in the section that is most relevant for their students.

### **Understanding Math PLUS©**

#### **Understanding Graphing©**

**Topic – 1) Reading and Sketching Graphs (show some)**

Graphs Without a Scale

Ex. 1, 2, 6, 7, 8, 9, 12

(Note the worksheets .. next page .. pg 1, 2)

(Note .. DVD .. U. Graphing .. Water Height vs Time)

3) Points on a Grid

Josh's Neighborhood

Ordered Pairs

Battleship

4) Transformations

Introduction to Common Transformations

Translations – Introduction

Reflections – Introduction

Rotations – Introduction

The Transformation Machine

Tangrams

5) Relations, Equations, Functions

Relations

Ex. 1...Triangles

Ex. 2...Tiles Part 1

Ex. 3...Tiles Part 2

\*Make note of where these lessons exist for teachers as it may not be the first place they would think to look.

6) Linear Relations ..The Elastic .. see DVD.. Stacking lesson

7) Slope of a Line

## Worksession: On Computer

### **UNDERSTANDING MATH Plus©**

#### **Understanding Equations**

**Topic - 1) Tiles, Balances, Equations**

The Meaning of "Solving an Equation"

Balances...An Introduction

Tiles, Balances, Equations

7) Solving Inequalities

#### **Things Worth Noting:**

3. Take a moment to go through some of the off computer questions provided by State/Provincial tests. Note the similarities between these questions and the format of the software.
4. Note the power of technology and the visual aids that are provided for students throughout the percent lessons.

**Worksession: On Computer**

**UNDERSTANDING MATH Plus©**

**Program:** Understanding Probability

**Topic:** 1) Introduction to Probability

- Probability Line
- Experiments with Spinners
- Spinner Game

**Topic:** 6) Pascal's Triangle

**Worksession: On Computer**

**UNDERSTANDING MATH Plus©**

**Program:** Understanding Exponents

**Topic:** 1) Meaning of Exponents

- Introduction
- Money Game

**Topic:** 8) Pythagorean Theorem

- Pythagorean Theorem

## ALL TOGETHER

Have the participants complete the Summary Sheet at the end of the workshop. This is the final page in their handouts. This is an excellent way to keep in touch with your participants.

**Understanding Math Plus®**  
**Understanding Numeration Plus®**  
Neufeld Learning Systems  
**6 – 8+ Session**  
**Summary Sheet**

**Name:**  
**School:**  
**Assignment:**

List three things that you learned today during the session.

- 1.
- 2.
- 3.

Outline one lesson that you are excited to go back and use with your class (could be small groups, one-on-one, teacher led lesson, lab etc.) Please be specific and possibly include an off computer link you would do with your students.

Do you have any further questions or concerns you would like to have addressed?

Check this box if you would like us to contact you.