Treasure Hunt – Ontario – 6 to 10

This Treasure Hunt contains directions to guide navigation through the **Content Menu**, the **Ontario Curriculum Menu** and the **Frameworks for Learning** of UMathX. An observation question is connected with each set of directions to assist you in experiencing a variety of learning environments in UMathX.

UMathX is created to address the following **Principles of Learning**:

- Interactive with audio;
- Encourage "grappling" to support a "growth mindset" - learning from mistakes;
- Multiple representations of concepts;
- Moving from concrete to pictorial to abstract;
- Pacing controlled by the learner;
- Using a wide variety of teaching strategies – options/suggestions within "Frameworks For Learning"

Record your observations in the "Your Answers" column and note the "Principle of Learning" featured in each lesson. Please appreciate that you may be navigating into the middle of a math topic and may be missing the background information needed to complete the lesson. In those situations, you may want to simply navigate to preceding lessons or concepts to find the needed information.

Log into UMathX and work your way through the Treasure Hunt in a non-linear, random order.
An Answer Key is available at www.UMathX.com under Training.

Directions	Questions or Suggestions	Your Notes or Answers
In the **Content Menu**, follow the path **Fractions>Multiplying Fractions> Pattern Blocks> Hexagon1** Return to the **Content Menu** and follow path **Fractions>MultiplyingFractions> Real World Problems with Pictures> Boris' Money** Work through the lesson	Do the short lessons. Make mistakes. Comment on learning from concrete to abstract. Go to www.umathx.com . Select "**framework**" under "**resources**", **Mult Fractions – Word Problems -1** Write a note on how the diagram helps in understanding the word problem here. What is the role of "Reflect/Connect" in the framework?	
In **Ontario Menu**, navigate to **8.NSN.02.04** Click on the button marked, **Lessons** - Find and select the lesson, **Ex. 3 – Proper Fraction X Proper Fraction** Work through the lesson. Now navigate to **8.NSN.02.04** again. Click on the button marked **frameworks**. Multiplying Fractions & Whole Numbers. Select the **framework** – **Multiply Proper Fractions - 1** Follow instructions in the framework.. Note the 3 tiered frameworks. This is a difficult topic. One must not "tell the rule" . The 3 tiered frameworks help lead towards understanding. Students reflect/connect with Benoit's Problem. Note that one can also reach the same frameworks through www.umathx.com and select "frameworks" under "resources"	Comment on scaffolding in the **UMathX** menu. **Fractions – Multiplying – Pattern Blocks – Fraction Strips - Developing the Rule** This is a rich sequence .. List the variety of methods and steps to scaffold to understanding "why" we multiply as we do. In this case, the **Getting Started** section of the framework refers to another graphic – a simpler example with pattern blocks. This however does not prove the algorithm. **Reflect and Connect** with a partner. In doing so, one may at some point say … "I GOT IT!!" … not I "believe you" or "you told me"	The methods of multiplying here are: … pattern blocks(particular/concrete) … number line (fraction strips) … rectangular (area model) Note the 3 methods direct from concrete to abstract. .. note the scaffolding. First we use specific numbers and then we use red and blue arrows to lead to the algorithm for mult of fractions. We suggest a teacher led, whole class lesson here .. difficult concept . Class needs to grapple/reflect &connect to move toward understanding here.

Directions	Questions or Suggestions	Your Notes or Answers
From the **Ontario Curriculum** Menu, find and work through **lessons.. Introduction 1 & Introduction 2** under **6.NSN.03.01.** Now from **6.NSN.03.01** in the **Ontario Curriculum** Menu select the framework, **"Ratio – Ratio Tables _ Introduction-2"**	How do the two introductions differ? Please fill in the tables on page 1 of the framework. In the "Working In It" section on pg 2, complete the "Lawn Fertilizer" question.	
From the **Content menu** bar select **Graphing** **>Quadratic Functions** **>Maximize Cage Area** Work through the beginning of each of the sub lessons to the graph in **Summary.** In **ONT** menu, select **MFM2P.QR.03.01** Then select the **framework, Quadratic Functions – Maximize Cage Area -1**	Note the "scaffolding" as each concept leads to the next concept. Describe how the real life concept is linked to the visual graph to the abstract equation in …**Summary** Draw and label the final graph in **Summary** to the right…	
From the **Content** menu bar select the path **>Percent >Ratios and Proportions >Proportions >Example 3 - Marbles**	How does this lesson help understanding?Write a related question to estimate the number of pike fish in a lake.	
From the **Content menu** select **Algebra**. Then select: **>Adding Expressions** **>Adding Expressions with X and YTile** **>Example 1**	Go back and recall blue representing positive and red representing negative. With the information above**, record how dragging colored tiles helps understanding.**	
From the **Ontario Menu** select **MPM2D.QR.03.02** Then select the button, **Frameworks.** Then select the framework and do … **>Factoring Trinomials**	List the 3 parts of every framework. What is the relationship in scaffolding from blue and red algebra tiles to multiplying and factoring. In the framework, **Getting Started** begins work on paper. Work through parts of this framework.	
Navigate to the **Ontario Curriculum Menu .. MFM1D.LR.02.02** First find 2 **lessons** in **The Elastic** … Setup Equations … Graph Equations Just do the beginning of each. Navigate to the **Ontario Menu .. MFM2P.MLR.02.06**. Find the first lesson **"The Walker"**.It is labelled .. **"Same Speed"**. Work through the first few questions.Now find the 3 tiered **frameworks** within the curriculum menu **MFM2P.MLR.02.06** Slope &Line–Walk in Real World -1,-2,-3	How could you utilize the variety of examples to incorporate different teaching strategies in your classroom? These lessons address STEM. How? How do frameworks and lesson on the computer complement each other? Check each of the 3 frameworks and comment on how a teacher might organize a class to accommodate a variety of levels in a class.	
From the **Content menu bar** select **Equations**. Then select the sections: **Problem Solving** **Solving Linear Systems** **Solving Linear Inequalities**	In **Problem Solving** , scan 5 problems. In **Solving Linear Systems** List the number of methods. Do Ex 2 in **Solve Problems Using Linear Systems** In **Solving Inequalities**,check Graphing Linear Inequalities in 2 Variables.	
Navigate within **the Content Menu** along path .. **Exponents> Pythagorean Theorem**. Skim through the list of concepts from … **In This Topic** to … **The Pythagorean Theorem**	Find the corresponding lessons on **Pythagorean Theorem** within the **CCSS Curriculum Menu** for 8th grade. Find and list the corresponding **Frameworks.**	

Examples of Instructional Scaffolding from Basic to Higher Order within UMathX

Instructional Scaffolding is a Central Design Element used throughout UMathX.

The Instructional Scaffolding supports learning from an introductory, often concrete approach to understanding in depth with an abstract sometimes challenging approach. UMathX is written so that concepts are scaffolded from their beginning to help everyone get started.

Example 1: Dividing Fractions
The 3 sets of tiered frameworks are scaffolded from basic in Example with Diagrams to challenging in Modeling the Real World.
From the **Ont Menu**, select, **8.NSN.02.04**, select the frameworks: **Dividing Fractions- Ex with Diagrams -1**
Dividing Fractions- Modeling Examples -1
Dividing Fractions- Modeling the Real World -1
In **Dividing Fractions – Example with Diagrams**, work through the Ice Cream example at the bottom of the first framework.
The graphic leads to the concept of multiplication by a reciprocal.
In **Dividing Fractions - Modeling Examples, work through Model #3 – Water** to check understanding of division.
The framework, **Dividing Fractions- Modeling the Real World** certainly is challenging but assisted by graphics.

Example 2: Pythagorean Theorem
From the **UMathX** menu, select **Exponents**. Then select **Pythagorean Theorem.**
Note the lesson list and how the theorem is developed from Concrete to Abstract. The objective is to scaffold to understanding.
Describe the instructional layout of these lessons.
Briefly check the **frameworks on Pythagorean Theorem** at www.umathx.com/frameworks

Example 3: Reading and Sketching Graphs
From the **UMathX** menu, select **Graphing**. Then select, **Reading and Sketching Graphs**, then **Graphs Without a Scale**
Work through **Example 4 -** Nelia"s Bike Ride**; Example 9** - Bottles of Water-Matching**; Example 11 -** Bathtub #1
From the **Ontario menu,** select **8.DMP.02.05**
Find the 3 **lessons** above **&** the 3 relevant **frameworks**.
Note the scaffolding from **Graphing Without a Scale-3** to **Graphing Without a Scale-2** to **Graphing Without a Scale-1**
Also note the scaffolding within the framework, **Graphing Without a Scale-1**

Example 4: Area of Polygons .. Knowledge is built on knowledge. Understand rather than memorize.
From the **UMathX** menu bar
select **Measurement and Geometry**. Then select, **Perimeter and Area of Polygons**. Then select, **Area of Polygons**.
Then note the scaffolding building from Rectangle to Parallelogram to Triangle to Trapezoid.
Then notice the 4 approaches for finding the area of a trapezoid. Also note the Tiered Frameworks **.. Area of Trapezoids**.

Example 5: Linear Relations .. a STEM example
From the **Ontario Menu**, select **8.PA.02.02**. Select the **lesson** - **Setup Equations** leading to **Elastic Example.**
Now select the **framework, Linear Relations – Elastic- 1**
Note the 3 representations of a linear relation.

Example 6: Slope and the Line – Walk in the Real World
From the **Ontario** Menu select **MPM1H.AG.03.01**.
Then click on the **"frameworks"** button and work through the tiered framework.
Work through a few steps of one of **framework, Slope and the Line – Walk in the Real World -1** .
Note the scaffolding from Tier 3 to Tier 2 to Tier 1. Tier 3 begins with helping students off computer to understand "Slope"
Tier 2 reviews "Slope" within UMathX in "Getting Started". Tier 1 assumes that the students know "Slope".

Example 7: Matching
From the **UMathX** Menu, select **Graphing.** Then select, **Equation of a Straight Line.**
Then select **Match. Equation, Graph, Points, Story.** Note the scaffolding. Previous lessons lead to this challenging lesson.
See www.umathx.com and find the corresponding **support sheet** for this lesson.

Example 8: Ratio Tables
In the **Ontario** menu, select - **6.NSN.03.01**. Then select **Lessons.** Then select **Introduction 1**
Now select the **framework – Ratio Tables-Introduction -2**
Note the scaffolding .. from simpler addition solution to multiplication solution.

Go to www.umathx.com/frameworks and select **The Tangy Drink Problem.**
Give this to a group of students to grapple with. Require a number of solutions.
Then follow the path in the UMathX menu .. **Fractions** to **Ratios & Proportions** to **The Most Tangy Drink**
Earlier concepts in ratio are scaffolded to help in solving The Tangy Drink.
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