

Welcome to

# **THE BEST OF TIMES:**

**A MATHEMATICAL PROBLEM SOLVING WORKSHOP BY  
MIKE MCCABE, Ph.D.  
AND YOU!**

**Please feel free to ask question, provide feedback, or discuss issues during the workshop,  
afterwards, in person, or by email to Mike McCabe at [michaelm@nipissingu.ca](mailto:michaelm@nipissingu.ca)**



# THE QUICK RESPONSE (QR) CODE

1. You will need to download an app from your smartphone.
2. Once you have it downloaded, follow the instructions on your phone. Just scan the QR code and the videolink of the related lesson should appear on the smartphone.
3. Apps that you may consider are:

BlackBerry	Code Scanner Pro (Free)
Android	Barcode Scanner (Free)
iPhone	Scan (free) Quickmark (\$1) Optiscan (\$2)
Scan here to access my website	

Videoclips of the strategies introduced in “The Best of Times” workshop

TOPIC	QR CODE	URL
Nifty Nines		<a href="http://goo.gl/tCVx5">http://goo.gl/tCVx5</a>
Multiplying Fingers		<a href="http://goo.gl/nrBAz">http://goo.gl/nrBAz</a>
Perfect Squares		<a href="http://goo.gl/dSgsS">http://goo.gl/dSgsS</a>
Difference of Squares		<a href="http://goo.gl/rF80k">http://goo.gl/rF80k</a>

# MULTIPLY WAR

**Materials:** A standard deck of cards

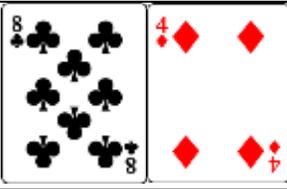
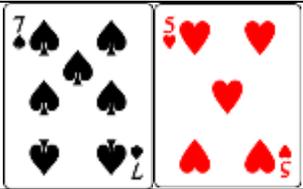
**Instructions:**

Use Aces (as 1's) and the 2-9 cards.

Play multiply war where each player flips over two cards and whoever has the highest answer (the product), wins.

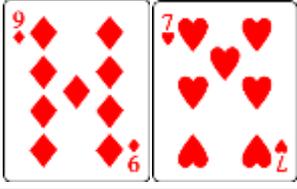
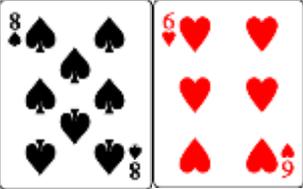
More important is that the player must tell how they got the answer.

**Example:**

Player #1	Player #2
	
<p>She would say:            "8 x 4 = 32".            The player could then say,            "When I multiply by 4, it's the same as double, double so...            8 doubled = 16, and            16 doubled = 32.</p>	<p>He would say:            "7 x 5 = 35."            The player could then say,            "When I multiply by 5, it is the same as multiplying by 10 and dividing by 2, so...            7 x 10 = 70 and 70 ÷ 2 = 35</p>

Player #2 would collect his own cards and his Player #1's cards and the players would play again until one player had all the cards.

**Practice:**

Player #1	Player #2
	
<p>She would say:</p>	<p>He would say:</p>

# + , - , x , ÷ BINGO

Materials: 3 dice

Instructions: Roll the 3 dice and using + , - , x , and ÷ , work together to find number sentences (equations) that equal as many of the numbers in the bingo card as possible.

You must write the equation in the space provided.

Example: If I rolled...



On the equation line, I could write:

$6 \times 1 + 4 = 10$  (and cross off the 10)

$6 - 1 + 4 = 9$  (and cross off the 9)

$6 \div 1 - 4 = 2$  (and cross off the 2)

and so on until I cannot find any more equations. I would then roll the dice again and continue until we get all numbers crossed off (or you could play against one another and play whole card or one line bingo...)

1 Equation: _____	2 Equation: _____	3 Equation: _____	4 Equation: _____
5 Equation: _____	6 Equation: _____	7 Equation: _____	8 Equation: _____
9 Equation: _____	10 Equation: _____	11 Equation: _____	12 Equation: _____
13 Equation: _____	14 Equation: _____	15 Equation: _____	16 Equation: _____

# FRACTION TIC-TAC-TOE

Materials: Create two cubes using paper.  
Scotch Tape, scissors  
A Tic-Tac-Toe board (x's and o's board)

Instructions:

## Targeting comparing Fractions

Write each of the fractions on each of the faces of the cubes so you have 2 identical cubes.

Each player chooses a cube and rolls it. Each player also decides if they will be "X" or "O" as you would in a regular game of Tic-Tac-Toe.

Players compare their fractions (using common denominators). The player with the greatest fraction gets to put an "X" or an "O" on the Tic-Tac-Toe board. If it is a tie, roll again.

The winner is the player who gets three "X's" or "O's" in a row.

## Targeting Subtracting Fractions

The player who rolls the fraction closest to  $\frac{3}{4}$  wins and places an "X" in the space of their choice. This forces the players to subtract fractions. Remember, in order to add or subtract fractions, you must find a common denominator. See the QR Codes (videolinks) for reminders on how to find common denominators.

<u>2</u>	<u>13</u>	<u>4</u>	<u>1</u>	<u>7</u>	<u>5</u>
3	16	5	2	12	8

# FRACTIONS

<b>Comparing Fractions</b>		<a href="http://goo.gl/RNdZK">http://goo.gl/RNdZK</a>
<b>Simplifying Fractions</b>		<a href="http://goo.gl/yqGWx">http://goo.gl/yqGWx</a>
<b>Adding Fractions</b>		<a href="http://goo.gl/sCeKg">http://goo.gl/sCeKg</a>
<b>Subtracting Fractions</b>		<a href="http://goo.gl/IqB9P">http://goo.gl/IqB9P</a>
<b>Converting Mixed Numbers to Improper Fractions</b>		<a href="http://goo.gl/ufPs3">http://goo.gl/ufPs3</a>
<b>Converting Improper Fractions to Mixed Numbers</b>		<a href="http://goo.gl/1FH6A">http://goo.gl/1FH6A</a>
<b>Adding Mixed Numbers</b>		<a href="http://goo.gl/pLOUu">http://goo.gl/pLOUu</a>
<b>Subtracting Mixed Numbers</b>		<a href="http://goo.gl/rJ8qC">http://goo.gl/rJ8qC</a>
<b>Multiplying Fractions</b>		<a href="http://goo.gl/8hixU">http://goo.gl/8hixU</a>

# CREATING A CUBE

**Materials:** Six pieces of square Polydrons or Geofixes (provided)

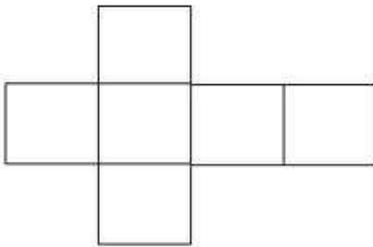
**Instructions:**

The pieces snap together to create a “net” (a two-dimensional shape that folds up to become a three-dimensional figure). Once you snap them together, fold them into place to make a cube. Find eleven (11) different nets that will become a cube.

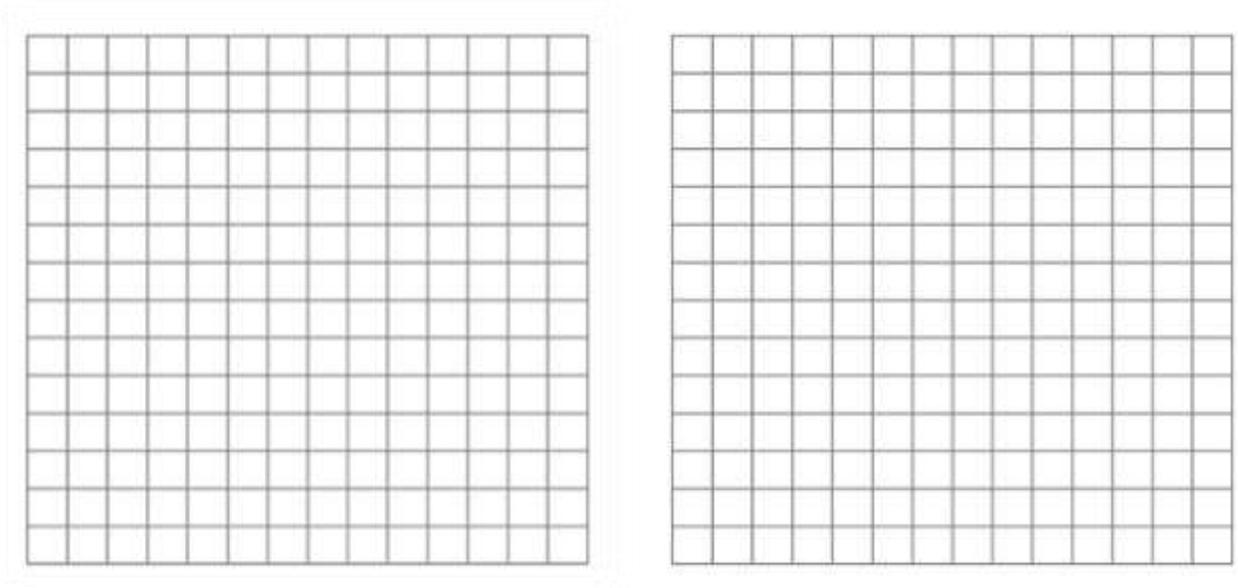
*Make sure that they are different and not simply mirror images of each other.*

Record sketches of the nets on the grid paper provided.

**Example:**



**Grid Paper:**



# SOME MATH WEBSITES

These websites are full of games and activities that have proven to be effective with children and adults. Some of them target specific math concepts and skills while others work to increase your general problem solving skills. Remember that taking different approaches to solving problems is a key component of school mathematics. Try doing this when you solve these problems. In addition to the games and activities, they have tutorials for parents and teachers.

**<http://www.edu.gov.on.ca/eng/curriculum/elementary/math18curr.pdf>**

This is the .pdf file of the Ontario Mathematics Curriculum and provides an general overview of what is taught in each grade as well as a comprehensive list of the specific expectations associated with each grade and strand of the math curriculum.



**<http://www.coolmath-games.com>**

Many of these games are familiar to children but have been adapted to include math concepts. This is a personal favourite of mine due to the math content and the fun and different approaches to learning math.



**<http://nlvm.usu.edu/>**

This website is the *National Library of Virtual Manipulatives* and has a number of activities that use common “manipulatives” that children may use in school math. Manipulatives are the materials (toys/blocks/discs) that teachers may use to introduce concepts during math class. It should help you to understand how concepts are taught in school. It also means you do not have to buy or make the manipulatives.



**<http://ca.ixl.com/>**

This website has an extremely comprehensive list of activities, tutorials, and practice problems for all grades and is directly linked to the Ontario Mathematics Curriculum. Although there is a membership fee that includes a much more comprehensive list of activities, etc., you can also play for free for a limited time. The free activities provide many practice problems for children (and adults).



**<http://www.members.shaw.ca/gf3/circle-the-cat.html>**

If you think you are a cat lover (or not), you must try this one! It provides an addictive look at approaching problems from different angles and forces you to think of alternative strategies that allow you to “circle the cat” every time. (This may not work on your smartphone but it is definitely worth a try on your home computer!)



**<http://www.kenken.com/index.html>**

This is a fun math game that provides children the chance to practice their add, subtract, multiply, and divide skills in a format that is quite similar to Sudoku, but with a twist. There are different levels of difficulty. Start at the 4x4 squares and work your way up!



**[http://setgame.com/set/puzzle\\_frame.htm](http://setgame.com/set/puzzle_frame.htm)**

Patterning is the essence of mathematics! And attributes are the essence of patterning. This site provides a daily puzzle that forces you to understand attributes (things that separate one object from another). You will surprise yourself on how quickly you get good at it!



**<http://www.logic-puzzles.org/>**

Practicing logic puzzles is a sure fire way to improving your problem solving strategies. This site provides a variety of logic puzzles and you will surprise yourself on how quickly you get good at it. Stick with it through the initial frustration!



# NOTES, CALCULATIONS...