



MACHE 2009 Annual Conference Friday Workshops

Workshop: Making Math Meaningful with Games

Speaker: Nancy Bjorkman

Session: I **Time:** 10:30 a.m.

Starting easy – Understanding numbers:

*The Number board - Make a simple number board with numbers 1-? Up to ten. Use 3x5 cards or outdated business cards as playing cards. Use markers or stickers to put objects (stickers, stars, dots, etc) on the cards that the student can sort onto the board in the correct spaces.

1 *	2 **	3 ***
4 ****	5 *****	6 *****

Trip to Grandma's - Use number cards or flash cards to make a "trail" for the student to follow through the house. They may keep any card that they can demonstrate that they know what it is (i.e. - jump 3 times for a 3, clap 4 times for a 4; answer the math equation correctly). They must give any one that they don't answer correctly to Mom. Have the trail end with a treat or at a special place like a cozy chair with a book to read.

*Race to 100 - Use a chart with 100 items in columns of 10's for this game. You'll need beans or other counters to cover the board. Roll one or two dice and place that many items on the board beginning at the top left and working down one column at a time. At any time the student must be able to tell how many spots are covered. If you also use a board to play, the student will begin to follow your example of counting by tens and then ones to find the total. You can also play by drawing a card from a deck of cards and placing that number of counters on the chart. Any time a player draws a J, Q, or K he must state the number of beans on his chart. Or a J, Q, or K could result in removing a certain number of counters from the chart. To play competitively, the winner would be the person to fill his/her chart first. To demonstrate subtraction, begin with a filled or partially filled board and "take away".

*Number Line Game – Actually, any number line will do for this game. Having the numbers on a specially shaped line just adds to the fun. One player chooses a number on the chart without telling the other. The second player guesses a number on the chart, and the first tells whether his/her number is greater or less than the guessed number. Through a series of guesses the player can eventually determine what the chosen number is. A chart of numbers 1-100 can also be used if the student understands larger numbers.

Uno - A purchased game the whole family will enjoy that's great for matching. Set in another more advanced matching game.

Dominoes - A good chance to match numbers and recognize number groupings quickly. There are several great family games that can be played easily by all ages.

Counting with rhythms "Skip Counting" – by 2's, 3's etc. - Use body motions along with counting to help a student get the hang of counting by numbers other than 1. 100 Sheep is a CD of Scripture based skip counting songs. See Resource list.

Bean Sticks - These are great counting sticks to learn base 10. Firmly glue 10 beans onto craft sticks. Secure them with an extra layer of glue on top. Play games by rolling dice to earn beans. However, no one may ever have more than 9 individual beans. He must always trade 10 beans for a stick. He can then count his beans easily by counting the sticks (10's) and then the beans (1's). When someone earns 10 sticks they can be bundled together with a rubber band to create a 100 bundle. The winning goal can be any predetermined number. It's also fun to start with 100 and subtract. It's a good visual of "borrowing". After the student has mastered the idea of trading 10 beans for a stick, have them write the problem out to see how this activity relates to carrying and borrowing.

Dice Games – Using dice helps reinforce number patterns to the point that we no longer count the dots but “see” the number. 1. Roll two 10-sided dice and add or multiply the numbers. This can get a lot of drill in quickly anywhere you are. Keep them in your purse.

2. Roll four 10-sided dice and make the largest or smallest 4 digit number possible to show understanding of place value. 3. Each of the players rolls one 10-sided die. The greater number wins a token. The player with the most tokens at the end of the game wins.

The Facts!!

Addition:

10 - Use a regular deck of cards with the 10-K removed. Each player is dealt 5 cards. The goal is to use as many of these as possible adding and subtracting to end with the final sum of 10. At the end of each round the player scores as many points as the number of cards he used in his equation. (i.e. - The player's hand has 6,3,2,7,4 - $7+3=10$ The player earns just 2 points for using two cards in his hand. $3+2+4+7-6=10$, earns 5 points for using all five cards.)

Two Card War - In the typical game of "War" the deck is split in two for the two players. Both players turn over a card from the top of their stack simultaneously. The player with the higher number gets both cards. If the cards are the same, they each place 3 cards face down on the table and turn over another card. The winner of this round gets all the downed cards. The goal is to win the most cards. For "Two Card War" each player places two cards on the table. The one with the higher sum (or product for multiplication Two Card War) wins the round. The student must determine the winner of each round by naming the sums.

*To 12 and back – In Math Games Galore

*Cover Up - In Math Games Galore

Timed flash cards - Using a regular deck of flash cards for any operation, time the student and keep a running record displayed in a prominent place so he/she can see their improvement. This is a great motivator for the competitive student. Many students respond better to being timed if the clock is counting up rather than down to a buzzer that limits their time. They can then graph their progress as they improve their speed.

Multiplication:

Multiplication Graph Game – You need 1 cm graph paper, 2 dice, and crayons or markers. Roll the dice and color in an area equal to the product of the 2 dice. i.e. If you roll a 2 and a 4, color in an area 2 squares by 4 squares. Continue rolling and coloring in areas until there isn't room for more. You'll find this a great picture of what multiplication is.

*Multiplication Chart - See chart in Math Games Galore for ideas

*Multiplication Dice Games - See game boards in Math Games Galore packet

*5 in a row - See Math Games Galore packet for game board and instructions

*Uncle Randy's game - See Math Games Galore for game board and instructions

Bathroom mirrors and Bedroom ceilings - Use any available space to encourage the learning of those "hard to remember" facts. Let the student create a beautiful 8 1/2 x 11 "poster" of the fact that's eluding them. Tape it to the bathroom mirror or the ceiling over their bed for a week or so until it settles in for good.

Multiple Operations:

Target - Our favorite of all time!! Use a regular deck of playing cards with the face cards removed. One player chooses any number from 1-100. Each player is dealt 5 cards. His goal is to use ALL 5 cards and any mathematical operations (+, -, x, or division, even exponents) to get as close to the target number as possible. Players are given points against them for how far from the target number they get. It is amazing how much math goes through a head in this game. Another great addition is to require the players to write their final equation on paper. They will have to show knowledge of order of operations and how to use parenthesis.
Sample hand - 4, 5, 7, 8, 9 - target # 63 - $7 \times 9(5+4-8) = 63 \times 1 = 63$

Money:

*Menu math – Available in Math Games Galore. Use this fun, kid-friendly menu to play restaurant. You or the student can place the order. He must then determine the amount owed. Use real money to pay and make change. I keep a ziplock bag of change in my desk for this.

**Grocery Cart Math – Fun and practical activities make trips to the market an educational field trip.

Good stuff you should have on hand:

- Decks of cards
- 3x5 cards
- file folders
- dice
- clear contact paper to cover boards
- counters (beans, pennies, poker chips, etc)
- markers

Strategy Games You Can Make or Buy:

**Smath – Pressman Toys – Like Scrabble with numbers and operation signs. A great way to create equations for beginners or those learning the order of operations.

**Bump: The Sneaky Number Game – Addition/Subtraction game with a twist

**Goose Egg: - Two multiplication games in one

**The Book of Classic Board Games, by Sid Sackson, Klutz Press, 2008 – Cardboard paged game book with 15 classic strategy games from 3D tic-tac-toe to backgammon. Comes complete with playing pieces. A favorite for family trips.

Chess/Checkers – No one ever grows out of these strategy games!

Backgammon – A roll of the dice can change the outcome, but strategy plays a big part in who wins. Rules at - <http://www.bkgm.com/rules.html>

- **Mancala – All you need is a 12 count egg carton and beans or counters. Rules at – <http://www.centralconnector.com/GAMES/mancala.html>
- **Mastermind – A critical and deductive thinking game using colored pegs to and clues to determine the pattern created by your opponent. A classic!
- Othello- Played on an 8x8 board just like checkers and chess. The trick is to have 64 playing pieces with one color on each side. Make your own with wood, cardboard or paper pieces. Find the rules at this website - http://www.pressmangames.com/instructions/instruct_othello.html.
- **Cribbage – A classic card game with LOTS of addition and decision making. http://www.cribbage.ca/crib_description_en.htm
- Pente – Strategy for ages 7-107! <http://www.pente.net/instructions.html>

Some of my favorites, but not exhaustive, list of fun math resources:

- **Games for Math, by Peggy Kaye, Pantheon Books, 1988 – Great math ideas for K-3
- **Times Tales, by Jennie von Eggers, Trigger Memory Systems – Wow! Finally a great story based, visual way to learn the upper times tables 3's through 9's with NO pain! Mnemonic aids help children remember the facts. Games and activities for reinforcement included.
- The Usborne Book of Brain Benders – includes picture puzzles, number puzzles and brain puzzles. Nice, colorful illustrations and not too hard for beginners.
- **One Hundred Sheep – CD & booklet of songs that reinforce counting for numbers 2-10. Songs are based on stories from the Gospels. Kindergarten – 4th
- **Usborne Young Puzzle Books, by Susannah Leigh – As many as 12 titles each with a thematic story to lead you through about 15 puzzles of all types. My kids love these! Great for grades 2-5.
- **Mind Benders - Deductive thinking puzzles that develop the logic, reading comprehension, and mental organization skills vital to achieving high grades and top test scores in all subjects. Grades 3+
- **Logic Books by Bonnie Risby, Dandy Lion Publications – come in all levels and teach great basic concepts in Logic. Some titles include Logic Safari, Lollipop Logic, and Logic Countdown. Grades 1 and up.

* Black line masters available in "Math Games Galore!" packet –

**Available from Heppner's Legacy Homeschool Resources. Included in the packet are game boards and instructions for 15+ games. \$19.50 + \$3.75 shipping. For information contact Heppner's Legacy Homeschool Resources, PO Box 753, 920 Hwy 10, Elk River, MN 55330. www.legacyhomeschool.com