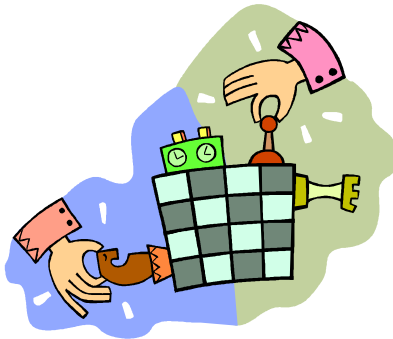


Summer Math Fun:

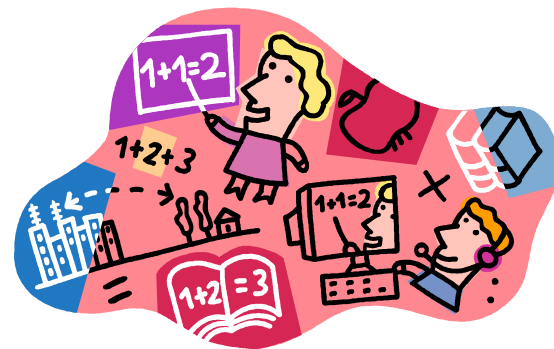
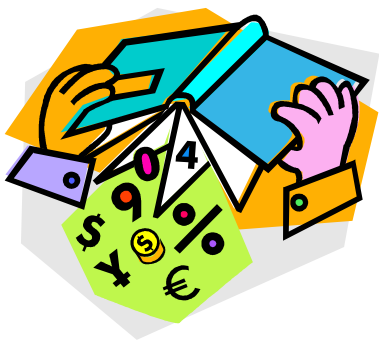
Put Some MATH in Your Summer!



Madison Public Schools

Grades K-4

Summer 2013



Dear Parents and Families,

Summertime is a great time to help children investigate mathematical concepts in a variety of exciting ways. Playing games, telling math stories, solving real world problems, and using technology are just a few fun ways to help our students retain their number sense and to further develop their fact fluency.

The mathematical portion of the Common Core State Standards places emphasis on **how** children understand mathematical problems and strategies, rather than memorization of rules, algorithms, and formulas. In addition to content standards, there are 8 standards for Mathematical Practices, described below or visit <http://www.corestandards.org/Math/Practice> for more information.



Brain research indicates that ability in mathematics should be looked at as less of a talent and more of as a result of hard work and continued practice. This research supports the belief that confidence in math, and thus prowess and talent, is developed through exposure, practice, and effort. We hope you can make this commitment to developing your child's numeracy skills and help complete the form, "*Ten Ways I Practiced Math During the Summer*" (contained herein), with your child and return this to the Math Specialist at your elementary school at the beginning of the 2013-2014 school year.

Happy Learning! Best wishes for a safe, fun-filled, mathematical summer!

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Sample Real World Problems to Try

Order Dinner Out for Your Family

Choose a local restaurant from which you can order dinner.

- Using a menu from the restaurant, determine what you would order for each family member. Keep in mind that it should be a balanced, healthy meal.
- Determine the total cost to order those items.

Plan a Day at an Amusement Park

Choose an amusement park (i.e. Six Flags, Lake Compounce, Quassy)

- Calculate cost for the day. Consider admission, parking, food/drink, souvenirs, etc.
- Create a schedule for the day of which rides/ attractions you will go to as well as when you will break for lunch, snacks, etc.
- Determine how your family will travel to the park. Calculate the distance from your home, the time it will take to travel there, and the fastest way to get there.

Plan a Fun Day for your Family

Choose what you will do for the day and plan a time schedule.

- Figure out if there is a cost associated with any of the activities you have planned. Calculate the total cost.
- If you need to travel, figure out the route you will take and the amount of time it will take you to travel.
- Plan for meals.

Design a Garden

Create a plan for a garden in your yard.

- Decide on the size and shape of the garden.
- Calculate its area and perimeter.
- Plan out what plants you will include in your garden, where you will place them in the garden, and how they should be spaced.

Create an Obstacle Course

Create a number (5-10) of fun stations to get you up and moving this summer!

- For example: long jump, skip count jump rope, find hidden objects in a pool/sandbox/ball pit, squeeze a soggy sponge into a measuring cup...be creative!
- For an extra math emphasis in your course, add flags to each event that need to be grabbed. Have a math fact or problem written on each flag that needs to be solved in order to pass to the next station.
- Use a timer to see how quickly you and your friends can get through the course. You could even graph your results and try it more than once to see if you get faster with practice!

Build a Board Game

Spend some time playing a variety of board games like some we mention in this packet to decide what type of game you could create. Notice what types of things your favorite games have in common. Then, plan out your own board game, using math as your theme or anything that interests you!

Planning ideas: Will your game involve chance, skill, or a combination of both? Will you need dice, a spinner, money, tokens, or cards? What is the object of your game?

Get a large poster board or piece cardboard and a ruler. Measure out the spaces, path, or areas your game will need. Design your game and make sure you test it out plenty!

Plan a Trip Using Public Transportation

Choose a means of transportation such as Shoreline East Train or Metro North. (You might plan a trip from Madison to Pizza Works in Old Saybrook or from Madison to New Haven to visit Yale Art Museum.)

- Decide where you will begin your trip and where you will end.
- Find a time schedule for the chosen transportation and determine when you will need to leave, how long it will take, how long you will remain at your destination and when you will return home.

You can get really creative with this type of project and give yourself an imaginary amount of money and plan a trip to a place you need to fly to. Then, look into flight schedules and costs.

QUESTIONS TO ASK TO HELP YOUR CHILD TO BECOME MATHEMATICALLY PROFICIENT

1 Make sense of problems and persevere in solving them.	<ul style="list-style-type: none"> • How would you describe the problem in your own words? • What do you know that is not stated in the problem? • Would it help to create a diagram? Make a table? Draw a picture?
2 Reason abstractly and quantitatively.	<ul style="list-style-type: none"> • What does it mean when...
3 Construct viable arguments and critique the reasoning of others.	<ul style="list-style-type: none"> • What do you think about what ____ said? • Do you agree? Why/why not? • Can you explain what _____ is saying? • Can you explain why his/her strategy works? • How is your strategy similar to ____'s? • Can you convince the rest of us that your answer makes sense?
4 Model with mathematics.	<ul style="list-style-type: none"> • What number sentence represents your drawing/picture? • How could we use symbols to represent what's happening?
5 Use appropriate tools strategically.	<ul style="list-style-type: none"> • How did using that tool help you solve the problem? • If we didn't have access to that tool, what other one would you have chosen?
6 Attend to precision.	<ul style="list-style-type: none"> • Can you tell me why that is true? • How did you reach your conclusion? • How does your answer connect to the question? Does it make sense? • Can you make a model to show that? • Can you convince the rest of us that your answer makes sense? • What new words did you use today? How did you use them?
7 Look for and make use of structure.	<ul style="list-style-type: none"> • How do you know your rule/equation will always work?
8 Look for and express regularity in repeated reasoning.	<ul style="list-style-type: none"> • Is there a shortcut / algorithm you could use? • Do the solutions for these problems have anything in common?

Board, Card, and Dice Games:

Sudoku	Chess	Checkers	Monopoly	Bingo
Dominoes	Set	Blokus	Brain Quest	UNO
Mancala Beads	Memory	Sorry	Hi! Ho! Cherry-O	Chutes and Ladders
Yahtzee	Connect 4	Guess Who?	Qwirkle	Flip 4

Great Math Learning Apps

NCTM's Deep Sea Duel	NCTM's Okta's Rescue	Math Lines	NCTM's Concentration	Kakooma
Matho	Base Ten Fun by ABCya	Counting Money	Fraction Fling by ABCya	Marble Math Addition
Math Tappers	Math Run	Math Evolve	Numerosity	Elevated Math

Recommended Websites:

(visit our webpages for many more!)

http://illuminations.nctm.org/	<p>Official site of the National Council of Teachers of Mathematics for lots of interactive Math games in all areas of number and operations; algebra; geometry; measurement; and data analysis and probability. Some of our favorite activities include:</p> <p>For grades K-2: Okta's Rescue, Ten Frams, Grouping and Grazing, Concentration, How Many Under the Shell.</p> <p>For grades 3 -5: Deep Sea Duel, the Factor Game, the Product Game, Daily KenKen.</p>
http://www.gregtang.com	<p>To give kids the practice they need, <i>Greg</i> designs games that kids love to play. Games that have high <i>math density</i> where every moment is spent calculating and thinking mathematically, not doing unrelated, non-educational activities often found in other games. Each has a clever twist that grabs your attention and challenges you to play more. The result is students who have great computational and mental math skills and the abstract thinking skills needed for higher math. Kakooma and Break Apart are excellent games for practice math facts in a fun manner.</p>
http://bedtimemath.org/	<p>A nightly math problem to get kids fired up about math in their everyday lives.</p>
http://www.aplusmath.com	<p>Addition, subtraction, multiplication, and division facts, as well as to play "MATHO" (like BINGO), and Hidden Picture with Math facts. Flash cards are automatically scored in sets of 10 and the student receives immediate feedback.</p>

http://www.funbrain.com/ http://www.mathplayground.com	Lots of great Math games, related to students' favorite activities and interests.
http://www.multiplication.com	A nice site to help students learn and practice multiplication facts with games, video tutorials, quizzes, etc.
http://www.figurethis.org	Challenging Problem Solving ideas.
http://nlvm.use.edu	Visit the National Library of Virtual Manipulatives to practice Math concepts in all standards areas by manipulating objects online via excellent technology.
www.setgame.com www.tao-game.dimension17.com	For a challenge related to classifying and attributes of objects, try the daily puzzle!
www.mrnussbaum.com	Think of it as an entirely academic amusement park, where practice, assessment, standards, competition, reinforcement, and even collecting are blended together.
http://calculationnation.nctm.org/	The games of Calculation Nation [®] are organized around content from the upper elementary and middle grades math curriculum. By becoming a citizen of Calculation Nation [®] , students will play online math strategy games that allow them to learn about fractions, factors, multiples, symmetry and more, as well as practice important skills like basic multiplication and calculating area — all while having fun.
http://www.abcya.com/	This site offers interactive activities that are grade level specific. For grades 1 and 2, try starting with the 100 Number Chart and 100 Number Grid activities as well as Base Ten Fun. For grade 3 and 4, try starting with Place Value Hockey and Fraction Fling.

Math Books

Combine your summer reading with learning about math concepts with these engaging books.

Author	Book Titles
Greg Tang	Math Fables Math Fables Too Math For All Seasons Math-terpieces The Grapes of Math Math Appeal The Best of Times Math Potatoes
Cindy Neuschwander	Sir Cumference and the First Round Table Sir Cumference and the Great Knight of Angleland Sir Cumference and the Isle of Immeter Mummy Math: An Adventure in Geometry Pastry School in Paris: An Adventure in Capacity Patterns in Peru: An Adventure in Patterning
Stuart J. Murphy	More or Less Lemonade for Sale The Penny Pot Divide and Ride Shark Swimathon Safari Park Give Me Half Less Than Zero Elevator Magic Game Time (He has written 63 picture books on math topics)
Mitsumasa Anno	Anno's Magic Seeds Anno's Mysterious Multiplying Jar Anno's Counting Book
David Schwartz	If You Hopped Like a Frog If You Made a Million G is for Google: A Math Alphabet Book How Much is a Million Millions to Measure On Beyond a Million: An Amazing Math Journey If Dogs Were Dinosaurs
Marilyn Burns	The Greedy Triangle Spaghetti and Meatballs for All Amanda Bean's Amazing Dream The \$1.00 Word Riddle Book

Games to Practice Addition Facts

Dice Combinations:



Materials: dice and calculators

Use two dice. On your turn, roll the dice and say how many dots are on each die just by looking. Then, add the number of dots altogether. Then, enter the number into your calculator to keep progressive scores. The first person to reach a given number such as 100 wins. This game can be varied to include three dice.

The Game of Pig:

Materials: a pair of dice

Use two dice. On your turn, roll the dice as many times as you like. Each time, add the dots on the dice and keep a running total of the sum of your rolls mentally. You decide when you want to stop rolling and record the sum on a piece of paper. However, if you roll a 1 on one of the dice, your turn is over and 0 is scored for that round. If 1s come up on both dice, your turn is over and your total for the game thus far becomes 0. The first person to reach 100 wins.

Addition War (also called "More")



Materials: a deck of cards

Deal out the entire deck of cards evenly between two players. Face cards can be viewed as the number 10 or removed from the deck for the game. Each player turns over the top two cards from his or her deck and adds them together. The player with the larger sum takes all four cards.

Addition "Go Fish":

Materials: a deck of cards

Use the ace and 2 - 9 from a deck of cards or make a set of cards on index cards with the numbers 1 - 9. Deal out 7 cards to each player. Place the remaining cards face down in the middle. Begin by players looking through their hands to see if they have matches, or combinations of 2 cards that will add to 10. Play then begins by players taking turns asking other players for numbers they need to make pairs of cards adding to 10. The game is over when no more pairs can be made.

Another version of this game can be played using flashcards or index cards with addition facts written on them but no answers. Matches/pairs are made by matching sums. Thus $3 + 2$ and $4 + 1$ can be a match. On a player's turn, he or she asks other player for a sum for a card they have in their hand. Thus, if the player has $5 + 2$ in his hand, he would ask another player for a 7. If that player has $6 + 1$ or $3 + 4$, a match has been made. Otherwise, the player is told to "Go Fish."

Addition Memory:

Materials: addition flashcards or index cards with addition facts written on them but no answers (make sure each card placed down has a card with the same sum)

Place the cards face down on a table or the floor in an orderly fashion. On each player's turn, he or she turns over two cards and determines the sum on each card. If the sums are equal, the player has made a match and keeps the cards. (Thus, $8+1$ and $3+6$ can be a match.) If the sums are not equal, the two cards are turned back over and left in their same place.

Sum Cross Out:

Materials: 2 dice and paper



Each player chooses 15 numbers using the numbers 1 - 9 to write on a piece of paper. Numbers may be used multiple times and not all numbers need to be used. The dice are rolled and the sum of the dice is determined. All players then cross that sum out in any way possible on their lists. Thus, if you have the numbers, 1, 1, 1, 1, 2, 2, 2, 3, 3, 5, 5, 5, 6, 6 written on your paper and you roll a 7, you can cross out any combinations equaling 7. You could cross out 2 and 5; or 1, 3, and 3; or 6 and 1; etc. Then, the dice are rolled again. The game ends when one player crosses out all of his or her numbers or when no one can cross out a combination on their sheets. The winner is the player who crosses out the most numbers. Play this game many times to determine the best numbers to choose on your list and the best strategy to use in crossing out the sums.

Game to Practice Subtraction Facts

Subtraction War:

Materials: a deck of cards and small objects such as kidney beans or small blocks



As in "War", the player with the larger number takes the two cards. They will also take as many beans or counters as the difference between the two numbers turned over (Ex: 6 and 4 are turned over, the player who turned over the 6 gets to take 2 beans).

This game can be varied to increase the difficulty by having each player turn over two cards on his or her turn and adding the sum of the cards.

Games to Practice Multiplication Facts

Multiplication War:

As with War and Addition War, each player turns over the top two cards from his or her deck and multiplies them. The player with the larger product takes all four cards.

Multiplication "Go Fish":

Matches or pairs are made by matching products. On a player's turn, he or she asks another player for a product that would make a match with a card in his or her hand. Otherwise, the player is told to "Go Fish."

Multiplication "Memory":

As with other Memory games, players take turns flipping two cards. If the products are equal, the player has made a match and keeps the cards. If products are not equal, the cards are turned back over.

Array Games:

Materials: graph paper

Make rectangular arrays for the multiplication facts, and cut them out. Then, label the dimensions on one side and the answer on the other side. For example:

	5	X	2	

On the back, write 10

You can then use the arrays to look at the dimensions and give the total or, given the total, state the dimensions. Another variation could be a game of "big array, small array" in which you lay 5 large arrays out for each player. Take turns finding two arrays that can cover a big array completely for a "match".

Draw the Array Game:

Materials: graph paper and a pair of dice

Each player gets a piece of graph paper. On a player's turn, he rolls the dice. The dice will tell the player the dimensions of a rectangle to draw on the graph paper. So, if the player rolls a 3 and a 4, the player draws a 3 by 4 rectangle on the graph paper. Inside the rectangle, the player records $3 \times 4 = 12$. Then, the next player rolls. Play continues until one of the players can't place a rectangle on the graph paper because there is no room left. Each player figures out the total number of squares covered on the graph paper. The winner has covered the most squares.

Games to Practice Division Facts

Division "Go Fish":

Materials: Flashcards or index cards with division facts written on them but no answers

Matches or pairs are made by matching quotients. Thus, $16 \div 4$ and $8 \div 2$ can be a match. On a player's turn, he/she asks another player for a quotient that would make a match with a card in his or her hand. Thus if the player has $12 \div 3$ in his hand, he would ask another player for a 4.

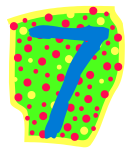
If that player has $24 \div 6$ or any other card equaling 4, a match has been made. Otherwise, the player is told to "Go Fish."



Division Memory:

Materials: division flashcards or index cards with division facts written on them but no answers (make sure each card placed down has a card with the same quotient)

Place the cards face down on a table or the floor in an orderly fashion. On each player's turn, he or she turns over two cards and determines the quotient on each card. If the quotients are equal, the player has made a match and keeps the cards. (Thus, $24 \div 8$ and $6 \div 2$ can be a match.) If the quotients are not equal, the two cards are turned back over and left in their same place. The game ends when all matches are made. The winner is the player with the most matches.



Get Seven:

Materials: 48 cards with the following problems written on one side of each card:

$4 \div 1$	$8 \div 2$	$12 \div 3$	$16 \div 4$	$20 \div 5$	$24 \div 6$
$5 \div 1$	$10 \div 2$	$15 \div 3$	$20 \div 4$	$25 \div 5$	$30 \div 6$
$6 \div 1$	$12 \div 2$	$18 \div 3$	$24 \div 4$	$30 \div 5$	$36 \div 6$
$7 \div 1$	$14 \div 2$	$21 \div 3$	$28 \div 4$	$35 \div 5$	$42 \div 6$
$28 \div 7$	$32 \div 8$	$36 \div 9$	$40 \div 10$	$44 \div 11$	$48 \div 12$
$35 \div 7$	$40 \div 8$	$45 \div 9$	$50 \div 5$	$55 \div 11$	$60 \div 12$
$42 \div 7$	$48 \div 8$	$54 \div 9$	$60 \div 10$	$66 \div 11$	$72 \div 12$
$49 \div 7$	$56 \div 8$	$63 \div 9$	$70 \div 7$	$77 \div 11$	$84 \div 12$

1. Lay the cards face down.

2. Each player draws seven cards, hiding cards from the other players. The remaining cards are removed except for one which remains face down.
3. The first player chooses one he does not want and places it face down in front of the player to his left, and then picks up the extra card left on the table.
4. Play rotates clockwise. Each player passes an unwanted card face down to the player on his/her left and then picks up the one given by the player on the right. The objective is to get seven cards with the same quotient.
5. The game continues with players always placing one card on the table before picking up the next one.
6. The first player to get seven cards with the same quotient wins.



What's Up?

Materials: A set of index cards with 1, 3, 5, 7, 7, and 9. A set of index cards with 1, 2, 4, 6, 6, and 8. A sheet of lined paper with the numbers 10 to 81 written on it.

1. Players take turns, rotating clockwise.
2. To start the game, a player crosses out any unused number on the numbered list. All players use the same numbered list. He or she then choose one of the two sets of index cards and chooses one.
3. Next, the player divides the number on the index card into the number he or she just crossed out and finds the remainder.
4. The remainder for the division problem is the player's score for that round. Players keep a cumulative sum of their scores from round to round.
5. A player who notices another player make a mistake acquires that player's score for the turn.
6. The game ends when all of the numbers on the list have been crossed out.
7. The player with the largest cumulative score at the end of the game wins.

**To shorten the game, use fewer numbers on the list. Try between 20 and 60.

Ten Ways I Practiced Math This Summer 2013:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

(Please return to the Math Specialist at your elementary school.)

Signature of Student

Grade

Signature of Parent/Guardian

Classroom Teacher's Name