



# Grade 2 Math Contents

<b>What is Mathematics?</b> .....	<b>3</b>
<b>Math in a Minute</b> .....	<b>5</b>
<b>Resources for More Math Ideas</b> .....	<b>6</b>
<b><i>Patterns, Relationships, &amp; Functions</i></b> .....	<b>9</b>
Math Magic .....	9
What's My Rule? .....	10
Sunset Predictions .....	11
Sort It Out .....	12
Coin Sort .....	13
Math Maps for the Mind .....	14
<b><i>Geometry and Measurement</i></b> .....	<b>17</b>
Half Full, Half Empty .....	17
Attribute Trains .....	18
Goin' Crackers! .....	19
Rock Races .....	20
Simply Symmetrical .....	21
Time Trackers .....	23
<b><i>Data &amp; Statistics</i></b> .....	<b>23</b>
Time Trackers II .....	24
Who's the Tallest? .....	25
Hot, Hotter, and Hottest .....	26
Travel Graphs .....	27
License Plate Math .....	28
<b><i>Number Sense &amp; Numeration</i></b> .....	<b>30</b>
Guess if You Can .....	30
Numbers in the News .....	31
Napkin Fractions .....	32
Clip and Save Coin Count .....	33
Playing Card Place Value .....	34
Odd or Even? .....	35



<b><i>Numerical and Algebraic Operations and Analytical Thinking</i></b> .....	<b>37</b>
Mental Math .....	37
Better Than Flash Cards-I .....	38
Better Than Flash Cards-II .....	39
Multiplication Tablemat .....	40
Going a "Mile a Minute" .....	41
Fantastic Math .....	42
Shop-o-rama .....	43
2-Bean Salad .....	44
<b><i>Probability &amp; Discrete Mathematics</i></b> .....	<b>46</b>
Coin Toss .....	46
Is It Certain? .....	47
Is It Likely? .....	48
What's the Chance? .....	49
What Color Candy? .....	50
Penny-a-Day Housework .....	51
Let's Go to the Movies .....	52
More Math Magic .....	53
Pocket Change Calculations .....	54
<b>Additional Learning Tools</b> .....	<b>56</b>
Number Chart, 1-100 .....	57
Four-Column Chart .....	58
10 x 10 Geodot Paper .....	59

## *What is Mathematics?*

*Michigan's Curriculum Framework includes six categories of math your child will learn:*

### **1. Patterns, Relationships and Functions**

*Patterns* are things that repeat; *relationships*, and functions are things that are connected by some kind of reason.

#### **Why does my child need this skill?**

Patterns, relationships, and functions are important because they help us understand the underlying structure of things; they help us feel confident and capable of knowing what will come next, even when we can't see it yet. Patterns and relationships are found in music, art, and clothing, as well as in other aspects of math such as counting and geometry. Mathematical thinking begins when your child recognizes the similarities among objects or events. Later, s/he will learn to generalize and think abstractly. Finally, s/he will be able to understand, explain or describe, and make predictions.

### **2. Geometry and Measurement**

*Geometry* is the area of mathematics that involves shape, size, space, position, direction, and movement, and describes and classifies the physical world in which we live. *Spatial sense* gives children an awareness of themselves in relation to the people and objects around them. *Measurement* is finding the length, height, and weight of an object using units like inches, feet, and pounds. Time is measured using hours, minutes, and seconds.

#### **Why does my child need this skill?**

We live in a three-dimensional world. In order to interpret and make sense of that world, students need both analytical and spatial abilities. Geometry and measurement, which involve notions of shape, size, position, and dimension, are used extensively to describe and understand the world around us.

### **3. Data Analysis and Statistics**

*Statistics* help people organize and interpret information and see relationships, by using tables, graphs and charts. Graphing is another way to show and see information mathematically. Tables and charts, including calendars, can be used to organize weekly activities. Students organize, interpret, and transform data into useful knowledge to make predictions and decisions.

#### **Why does my child need this skill?**

We live in a sea of information. In order to make sense of the data that inundate our lives, we must be able to process and transform data into useful knowledge. The ability to interpret data, and to make predictions and decisions based on it, is an essential basic skill for every person.

#### 4. Number Sense and Numeration

*Number sense* is much more than merely counting. It involves the ability to think and work with numbers easily and to understand their uses and relationships. Number sense is about understanding the different uses for numbers (for example, describing quantities and relationships, using informational tools, ordering, etc.). Number sense is the ability to count accurately and competently, to be able to continue counting—or count on—from a specific number as well as to count backwards. Number sense helps a child to see relationships between numbers and to be able to take a specific number apart and put it back together again. It is about counting, adding, and subtracting.

##### **Why does my child need this skill?**

Counting and becoming familiar with numbers will help your child understand all other aspects of mathematics. Students must learn to quantify and measure, concretely at first and increasingly more abstractly as they mature. They also must develop an understanding of numeration systems and of the structure of such systems. They must learn to estimate mathematical quantities and to represent and communicate mathematical ideas in the language of mathematics.

#### 5. Numerical and Algebraic Operations and Analytical Thinking

By learning *numerical operations* and their properties, students understand and use various types of operations (e.g., addition, subtraction, multiplication, division) to solve problems. *Algebraic and Analytical Thinking* teaches students to analyze problems to determine how to solve real-world problems and use algebraic notations to model or represent problems.

##### **Why does my child need this skill?**

Your child needs to understand algebraic and analytical thinking and communication in order to use math in school and on the job. In order to solve problems, your child will need to be able to represent real-world situations with algebraic symbolism, numerical operations, and algebraic thinking.

#### 6. Probability and Discrete Mathematics

*Probability* tells the likelihood of something occurring. It is often expressed as a fraction or a ratio like “1 chance in 10.” Using *Discrete Mathematics*, students apply mathematical principals to real-world situations such as scheduling, routing, sequencing, and networking.

##### **Why does my child need this skill?**

Modern uses of mathematics demand new skills from students. They must:

- learn to deal with uncertainty,
- make informed decisions based on evidence and expectations,
- exercise critical judgment about conclusions drawn from data, and
- apply mathematical models to real-world phenomena.

Understanding probability and discrete mathematics will allow your child to function fully in a variety of work and school settings in a highly technological world.

## Math in a Minute

Helping your child to understand and use math doesn't have to take a lot of extra time or money. Here are some easy ways to build math skills, at home, in the sun, or on the run.

### At home

- Talk out loud so your child can hear you as you use math during your day. For example, "Let's see, our pizza bill is \$15.89. That's almost \$16. I want to give the delivery person a 15 percent tip. Ten percent would be \$1.60. Half of that is 80 cents. If I add 80 cents to \$1.60, I get \$2.40. Can you help me count out 40 cents? (Numerical Operations)
- While you work in the kitchen, let your child experiment with a box of sugar cubes to help learn about volume. Take small boxes in different shapes and see how many sugar cubes fit inside each one. Record how many cubes it took to fill each shape. Then take other boxes and fill them. (Measuring Volume)
- Get your child involved in practical mathematics. Mention the size of containers, such as pints of cream and half-gallons of milk. Encourage children to help when you bake, lay carpet or tile, or seed or fertilize the lawn, and allow your child actually to measure ingredients, areas or quantities of material. (Measurement)

### In the sun

- Take a nature walk and collect items of interest. When you get home, ask your child to sort things you collected. Young mathematicians can sort by color or shape. Older collectors can sort in a variety of ways, using Venn diagrams (two overlapping circles) to group objects that might share some characteristics. (Discrete Mathematics; Geometry)
- Put an ice cube in the sun and have each child guess how long it will take to melt. Write your predictions with sidewalk chalk or a rock. Keep track of the actual melting time. Whose guess was closer? If you use a bigger ice cube, will it take more or less time? Try it and see! (Measuring Time; Estimation; Relationships)
- Record the times of the sunset and sunrises for a week or so. Do you see any patterns. Can you draw a graph to show the changes? What time do you predict it will set a week from now? A month from now? (Data Analysis)

### On the run

- Point out numbers when you are out and about. Point out individual numbers in signs, billboards, posters, food containers, books, and magazines. (Number Sense and Numeration)
- Keep a simple hand-held calculator in your purse or car. Calculators can be used to solve real-life math problems, check your estimation, or to play simple games. (Number Sense; Numerical Operations)
- Practice making reasonable estimates during your day. Ask your child to estimate how long it will take to drive across town or how far you might be able to go without buying gas. Estimate how much a bunch of grapes will weigh or how much the groceries in your cart will cost. Always compare your guesses with the actual facts. (Number Sense and Numeration)
- Keep a piece of string in your purse or car. When you have "down time," play Simon Says Shapes. Give the string to your child. Say, "Simon Says make a triangle." Use the string to make the shape. Can s/he name something in the real world that has that shape? (Example: yield sign)

## Resources for More Math Ideas

### Workbooks to boost mathematics skills

- **Summer Bridge Activities.** Various authors, Rainbow Bridge Publishing. Available for all elementary school transitions. Lots of colorful worksheets, but may be boring for students who are already working at grade level. Better for the child who has struggled during the school year or a child who has not yet mastered basic skills.
- **Summer Smarts: Activities and Skills to Prepare Your Child for \_\_\_\_\_.** Various authors, Houghton Mifflin Co. Available for all elementary school transitions. Less repetition of skills and more focus on reading real books.

### Books for parents

- **Family Math Series.** Various Authors. Berkeley, CA: EQUALS. Call (800) 897-5036 for brochure.
- Adler, David A. (1997). **Calculator Riddles.** Holiday House.
- Blocksma, Mary (1989). **Reading the Numbers: A Survival Guide to the Measurements, Numbers, and Sizes Encountered in Everyday Life.** New York, NY: Penguin Books.
- Burns, Marilyn (1982). **Math for Smarty Pants.** Boston, MA: Little, Brown and Co.
- Gardner, Martin (1961). **Mathematical Puzzles.** New York, NY: Thomas Y. Crowell.
- Kaye, Peggy (1987). **Games for Math: Playful Ways to Help Your Child Learn Math.** New York, NY: Pantheon Books.
- Kenda, Margaret, and Williams, Phyllis S. (1995). **Math Wizardry for Kids: Solve Puzzles, Play Games, Have Fun!** NY: Barrons.
- Pallas, Norvin (1991) **Calculator Puzzles, Tricks and Games.** Dover Publications.
- Parker, Tom (1983). **Rules of Thumb.** Boston, MA: Houghton Mifflin Co.
- Paulos, John Allen (1988). **Innumeracy: Mathematical Illiteracy and Its Consequences.** New York, NY: Hill & Wang.
- Riedel, Manfred G. (1979). **Odds & Chances for Kids: A Look at Probability.** Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Weaver, Jefferson Hane (2002) **What Are the Odds: The Chances of Extraordinary Events in Everyday Life.** Prometheus Books.

### Books for kids

The following resources offer extensive booklists sorted by grade or math concept:

**PBS Teacher's Source**—[http://www.pbs.org/teachersource/recommended/rec\\_books\\_math.shtml](http://www.pbs.org/teachersource/recommended/rec_books_math.shtml)

**Math Literature**—<http://home.nyc.rr.com/teachertools/mathliterature.html>

**Carol Otis Hurst's Booklists**—[www.carolhurst.com/products/booksets.html](http://www.carolhurst.com/products/booksets.html)

**Exploring Math with Books Kids Love**, by Kathryn Kaczmarek, Fulcrum, 1998. (*Parenting J* 372.7 Ka)

**Here are some titles to get you started:**

Anno, M., *Anno's Math Games* (Look for more titles by this author.)  
 Appelt, K., *The Bat Jamboree*  
 Atherlay, S., *Math in the Bath (and other fun places, too!)*  
 Bang, M., *Ten, Nine, Eight*  
 Beaton, C., *One Moose, Twenty Mice*  
 Birch, D., *The King's Chessboard*  
 Bradbury, J., *One Carton of Oops!*  
 Brittain, B., *Mystery of the Several Sevens*  
 Burns, M., *Spaghetti and Meatballs for All! A Mathematical Story*  
 Burningham, J., *Pigs Plus*  
 Christelow, E., *Five Little Monkeys Jumping on the Bed*  
 Daniels, T., *Math Man*  
 Duffey, B., *The Math Wiz*  
 Esbensen, B., *Echoes For The Eye: Poems to celebrate patterns in nature*  
 Giganti, P., *Each Orange Had 8 Slices*  
 Glass, J., *Fly on the Ceiling*  
 Grossman, B., *My Little Sister Ate One Hair*  
 Grover, M., *Amazing & Incredible Counting Stories*  
 Hawkins, C., *Take Away Monsters*  
 Hopkins, L., *Marvelous Math: A Book of Poems*  
 Hutchins, P., *The Doorbell Rang*  
 Jonas, A., *The Quilt*  
 Kaplan, M., *Henry and the Boy Who Thought Numbers Were Fleas*  
 Lasky, K., *The Librarian Who Measured the Earth*  
 Lionni, L., *Inch by Inch*  
 Lobel, A., *Frog and Toad Are Friends*  
 Long, L., *Domino Addition*  
 McMillan, B., *Eating Fractions*  
 Myller, R., *How Big Is a Foot?*  
 Pinczes, E., *One Hundred Hungry Ants*  
 Schwartz, D., *If You Made a Million*  
 Silverstein, S., *Giraffe and a half*  
 Viorst, J., *Alexandar Who Used to Be Rich Last Sunday*  
 Wargin, K-J., *A Michigan Counting Book*

**Math Series (containing many books connecting math and reading)**

**Mathnet (series):** Connell, D. (J Co)

Detectives use mathematical knowledge to decipher clues and solve mysteries.

**MathStart (series):** various authors

Nonfiction picturebooks at preschool and school-age reading levels.

**Math in Literature:** various authors, compiled by Carol Hurst

Contains 3 sets for grades K-4.

## Magazines

- Dynamath.** Scholastic. Available from the school division. Filled with different activities involving all strands of math. Children in grade five particularly like this. \$5.00 for the subscription.
- Games Junior,** P.O. Box 10147, Des Moines, Iowa 50347. A challenging and fun magazine filled with all different kinds of games that give children hours of “brain workouts.” Ages 7 and up.
- Puzzlemania.** Highlights, P.O. Box 18201, Columbus, Ohio 43218-0201. Includes puzzles involving words, logical thinking, hidden pictures, and spatial reasoning. The cost is about \$7.50 per month.
- Zillions.** Consumer Reports, P.O. Box 54861, Boulder, Colorado 80322. Children’s version of Consumer Reports. Shows math in the real world and offers children the opportunity to see how gathering data and information can lead to good decision making.

## Web sites with information and free math activities

### The Math Forum

[www.mathforum.com](http://www.mathforum.com)

Resources for students, parents, and teachers. A related Website, MathWorld Interactive, (<http://mathforum.org/mathworld/>) gives students open-ended word problems online.

### Math Flashcards

[www.edu4kids.com/](http://www.edu4kids.com/)

Online flash cards with a variety of options and mathematical operations.

### U.S. Department of Education, Office of Educational Research and Improvement

[www.ed.gov/pubs/parents/](http://www.ed.gov/pubs/parents/)

### Education Place

[www.eduplace.com](http://www.eduplace.com)

A wealth of worksheets and online activities.

### Illustrations: National Council of Teachers of Mathematics (NCTM)

<http://illuminations.nctm.org/>

Lesson plans and math tools based on NCTM’s Principles and Standards for School Mathematics

### MathMastery.com

[www.mathmastery.com](http://www.mathmastery.com)

Online math courses, daily math activities, and resources you can purchase.

### PBS Teacher Source and PBS Kids

[www.pbs.org](http://www.pbs.org)

Resources for teachers, kids, and parents, connected to your child’s favorite PBS shows.

### Math Goodies

[www.mathgoodies.com](http://www.mathgoodies.com)

Offers worksheets, software, and puzzles you can download.

### FunBrain.com

[www.funbrain.com](http://www.funbrain.com)

At this site, your child can play math games that practice math skills right at the computer.

### Print and Learn for Kids

[www.brobstsystems.com/kids/](http://www.brobstsystems.com/kids/)

Offers downloadable and printable worksheets, sorted by grade level.

# Math Magic

## A Goal:

To help your child see the patterns in simple math operations

## B What You Will Need:

- An inexpensive calculator
- Time with your child

## C Let's Go!

1. Tell your child to punch into the calculator the number 12345679 (the nine digits in order with the 8 removed).
2. Now multiply this number by 9 and see what happens:  
 $12345679 \times 9 = 111111111$ .
3. Now multiply 12345679 by other multiples of 9. (If your child is too young to know the multiplication table, give them the problems yourself, or teach her/him create a chart by counting by nines:  $9+9=18$ ;  $18+9=27$ , and so on)
4.  $12345679 \times 18 = 222222222$ ;  $\times 27 = 333333333$ . After seeing these answers, can they predict the answer to the next problem? If so, they know the magic!

## D Let's Go On!

5. Try some more math magic. Enter the number 142857 into the calculator. Multiply it by 1. Write the answer on a piece of paper.
6. Next, multiply 142857 by 2. Then by 3, 4 and so on. Write each answer down. Talk with your child about how the order of the digits is changing, but the 142857 sequence never changes. Can s/he predict the answers to 142857 multiplied by 5 and 6? Use the calculator to see if you are right.
7. Now, multiply 142857 by 7 and be ready for a surprise!

**Quick Tip for Math:** When choosing a calculator for a young child, try to find one that turns off automatically when it's not being used. Calculators with this feature, a memory function, and a percent key can be bought for as little as \$6.

To find more calculator games, ask your library staff to find you some books in the J510 or J793.74 section. Here are a couple of titles to try:

*Calculator Puzzles, Tricks and Games*, by Norvin Pallas;  
*Calculator Riddles*, by David A. Adler.

# What's My Rule?

**A** Goal:

To help your child analyze and describe change using a table to record and identify the pattern

**B** What You Will Need:

- "What's My Rule" chart
- Time with your child

**C**

Let's Go!

1. Draw or copy a simple chart like the one pictured here.
2. Begin by writing any number you choose on the left side of the chart.
3. Think of a rule that will change the number in some way (add 1, subtract 3, double it, etc.). Write the new number in the right column.
4. Repeat for two or more additional numbers. Can the child tell you the rule you are using? (S/he may need help at first.) Can s/he complete the pattern for the next 3 numbers in the table?
5. Once your child succeeds at some simple rules, change places and let the child think of the rule and insert the numbers.

What's My Rule?

Add 1

1	2
2	3
5	6
7	—
10	—
21	—

**Quick Tip for Math:** Help your child notice the changes that occur in the world around you:

- Talk about how a butterfly develops.
- Explain how the seasons change.
- Discuss together what happens as evening approaches.

Ask questions: "Do butterflies develop the same way every time?" "What things change?" "What will come next?"

# Sunset Predictions

## A Goal:

To help your child make a prediction based on previously collected data

## B What You Will Need:

- Watch or clock
- Clear skies
- Newspaper or weather Web site (optional)

## C Let's Go!

1. Observe the sunset for about a week, and chart the time it sets.
2. If you experience a lot of cloudy evenings, you can research the official sunset time in the weather section of your newspaper, on the nightly weather report, or on a weather Web site.
3. Look at the times of the sunset. Ask your child:
  - What do you notice about the time of the sunset?
  - Do you see a pattern?
  - Based on what we've seen, can you predict when the sun will set tomorrow night? A week from now? A month from now?
4. Write your predictions in one column of your chart.
5. Continue to observe the time of sunset and chart the actual times the sun sets. Were your predictions correct?

## D Let's Go On!

6. You can observe lots of changes in your world and make similar predictions with your child: Predict the weather from cloud patterns; predict the distance a toy car will travel when you change the height of a ramp.

**Quick Tip for Math:** Whenever you find yourself with a few moments to spare and a restless child saying, "I'm bored!", try this simple activity.

Answers:

*Pattern 1: ...P/N/D (simple repeating pattern)*

*Pattern 2: ...P/D (pennies are decreasing by 1; nickel and dime are alternating)*

Pull a few coins from your pocket. Create a pattern with pennies, nickels and dimes. Can your child continue the pattern? Keep them simple at first: P/N/D/P/N/D....

When your child is successful predicting these patterns, spice it up a little. Try a growing and/or shrinking pattern: P/P/P/P/N/P/P/P/D/PP/N.... (see answers at left)

# Sort It Out

## A Goal:

To help your child classify things and find relationships

## B What You Will Need:

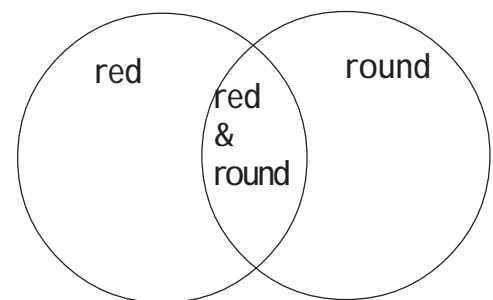
- Household objects in various sizes

## C Let's Go!

1. Collect a number of objects in various sizes: a plastic container, a soap dish, a sock, or even the tube from an empty roll of paper towels.
2. Ask your child to take two items with something in common.
3. As s/he matches items, ask her/him to tell you what they have in common. (They may all be white, round or plastic, for example.)
4. Now you take a turn. Describe to your child why you picked the items you did. (What do they have in common?)
4. Play until all the items are gone.

## D Let's Go On!

5. Once your child gets good at this activity, challenge her/him a little more.
6. Draw two circles on paper, or make two interconnecting circles out of string.
7. Put objects that are alike into each circle. For example, all red items on the left; all round items on the right.
8. Are any items both red and round? Put those in the middle area which is part of both circles.



**Quick Tip for Math:** Help your child understand that wrong answers aren't always bad. They may help you discover what s/he doesn't understand.

When your child gets a wrong answer:

- Be patient. Look further; ask questions, and see what the wrong answer is saying about the child's understanding. Did the child understand the question?
- Ask your child to explain how the problem was solved. Does your child need help with the procedures, the number facts, or the concepts involved?
- Help your children be risk takers: show them wrong answers are OK; assure them that the right answers will come in time.

# Coin Sort

## A Goal:

To help your child observe differences, sort by attribute and describe variations in patterns

## B What You'll Need:

- An assortment of coins
- Paper plates or blank sheets of paper

## C Let's Go!

1. Gather coins from all corners of your home. The more varieties the better (old, new, shiny, dull, from many countries).
2. Look over the coins you have. Ask your child what s/he notices about the coins. Ask, "How can you tell how old a coin is?" "How would you describe the color of this coin?" "What information is stamped on the coin?"
3. Now find different ways to sort the coins. Put each group on a separate paper plate, and label your groups. Example: All the silver-colored coins on one plate; the copper colored coins on another. Or all coins older than the child on one plate; all coins newer than the child on another.
4. Now create a pattern with the coins. Example: large, large, small; large, large, small. Can your child describe the pattern? Can s/he continue it?

## D Let's Go On!

5. After your child catches on to this game, let her/him set the pattern and try to stump you. Make sure s/he describes the pattern after you've guessed.
6. Try creating a pattern that changes or varies. Example: nickel, nickel, nickel, penny; nickel, nickel, penny; nickel penny; nickel, nickel, penny. (The number of nickels goes up or down by 1, while the penny stays the same.)

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**Quick Tip for Math:** You can encourage your child to be a good problem solver by involving him or her in family decision-making using math.

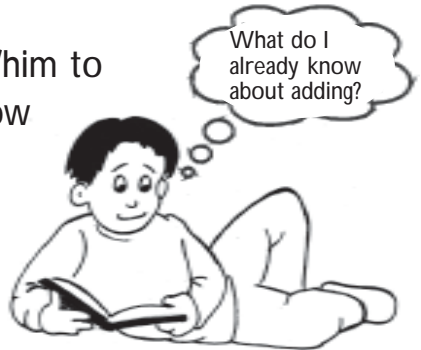
*A problem solver* is someone who:

- questions, investigates, and explores solutions to problems.
- demonstrates the ability to stick with a problem to find a solution.
- understands that there may be different ways to arrive at an answer.
- considers many different answers to a problem.
- applies math to everyday situations and uses it successfully.

# Math Maps for the Mind

## A Goal:

To help your child build bridges that will enable her/him to connect new math ideas with what they already know



What do I already know about adding?

## B What You Will Need:

- Paper and pencil
- [Word Map](#) sheets (attached)
- List of math words/ideas your child is learning

## C Let's Go!

1. Explain to your child that a Word Map is a "graphic organizer" to help your brain connect new math concepts to what they already know.
2. In the center circle, write the word or concept your child is learning.  
Example: Circle
3. In the top box, write a definition in the child's own words. Example: It's a round shape.
4. In the left box, write some examples. Example: ball, clock, coins.
5. In the bottom box, describe what it is like. Example: It is curved and the outline looks like it never ends.
6. In the right box, write some non examples: book, paper clip.

The best words come from your child's own math lessons. But here are some math concepts you might use:

**Multiplication Words:** times, product, double, twice, factors

**Subtraction Words:** decreased by, remain, less than, subtract, minus, difference, take away, have left.

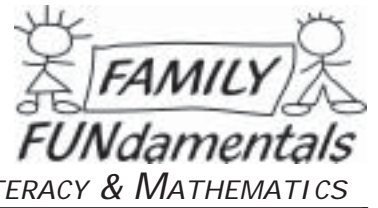
**Addition Words:** add, all together, both, in all, increased by, more than, plus, put together, sum, total.

**Division Words:** divide, separate, quotient, half of, dividend, divisor, half as many.

**Additional Concepts:** graph, estimate, measurement, number, probability, statistics, patterns, shapes.

# Word Map

PILOT



(Use with Word Map Activity to help your child connect new math concepts with what they already know.)

<p><b>WHAT IS IT?</b></p> <table border="1"><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>						<p><b>CONCEPT</b></p>	<p><b>WHAT ARE SOME NON-EXAMPLES?</b></p> <table border="1"><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>						<p><b>WHAT IS IT LIKE?</b></p> <table border="1"><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table>					
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**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C** Let's Go!

1.

**D** Let's Go On!

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Quick Tip for Math:

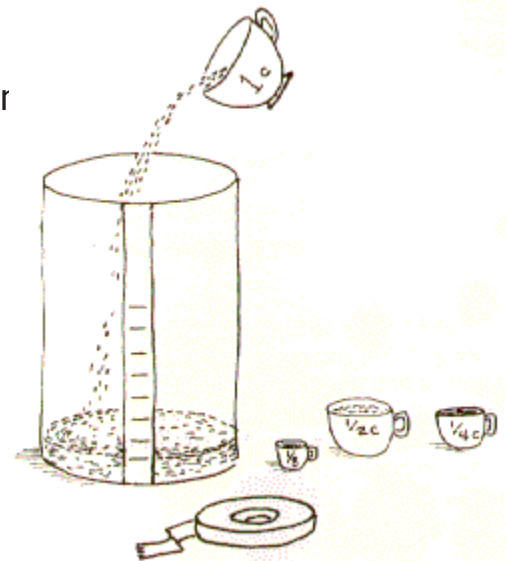
# Half Full, Half Empty

## A Goal:

To help your child experience fractions while making “hands-on” connections to the real world.

## B What You Will Need:

- Clear container with straight sides, that holds at least 4 cups
- Masking tape
- Marker
- Measuring cup with 1, 1/2, 1/4, 1/8 cup measures on it OR a set of individual cups in those volumes
- Uncooked rice, popcorn kernels, or water
- Other containers with which to compare



## C Let's Go!

1. Have your child run a piece of masking tape up the side of the large container so that it is straight from the bottom to the top.
2. For younger children, use only the 1-cup measure. For older children, use a 1/2, 1/4, and 1/8 cup measure. Pour the chosen amount of one of the substances listed above into the container.
3. Mark the level of the jar on the masking tape by drawing a line with a marker and writing 1 for one cup, 2 for two cups, 3 for 3 cups and so on. (Mark fractions like 1/2, 1/4, or 1/8 also with older children.)
4. Follow this procedure until the container is full, and the tape is marked in increments to the top of the container. Now, the jar is marked evenly to measure the capacity of other containers.
5. While filling different containers, ask your child “thinking” questions.
  - How many whole cups do you think this container will hold?
  - How many 1/2, 1/4, or 1/8 cups do you think this container will hold?
  - How many 1/2 cups equal a cup?
  - How many 1/4 cups equal a 1/2 cup? 3/4 cup? 1 cup?
  - How many 1/8 cups equal a 1/4 cup? A 1/2 cup? 1 cup?

# Attribute Trains

## A Goal:

To help your child compare, sort, and classify shapes

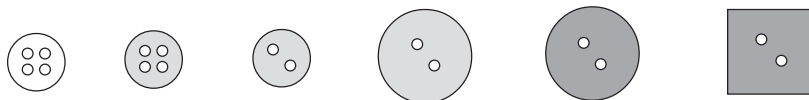
## B What You'll Need:

- Blocks, beads, buttons, or other small objects that vary in color, shape, size, or other attributes

## C Let's Go!

1. Tell your child that "attributes" are characteristics that describe an object: for example, its size, color, thickness, shape, or its type of corners or edges.
2. Practice sorting the objects you've collected into groups according to their attributes. Perhaps you'll group by color, or perhaps by whether it will stack, roll or slide.
3. Next, build an "attribute train" with your child. This means that you will make a "train" of objects that have different attributes. A "one-difference" train consists of objects that differ by one attribute. A "two-difference" train consists of objects that differ by two attributes.

Example: Suppose I'm working with buttons, and I want to build a "one-difference" train. I might make a train like this:



Only one thing about the button changes with each new "car" on the train: color, shape, or number of holes.

4. Practice making new trains together: a two-difference train, or even a three-difference train. Have your child make a train and guess if it's a one- or two-difference train. Can your child describe why?

---

**Quick Tip for Math:** **Weigh Me**—Teach estimating skills. Ask your children to guess the weight of several household objects—a wastebasket, a coat, a full glass of water.

Then show children how to use a scale to weigh the objects. Next, have them estimate their own weight, as well as that of other family members, and use the scale to check their guesses. Some brave parents get on the scale, too.

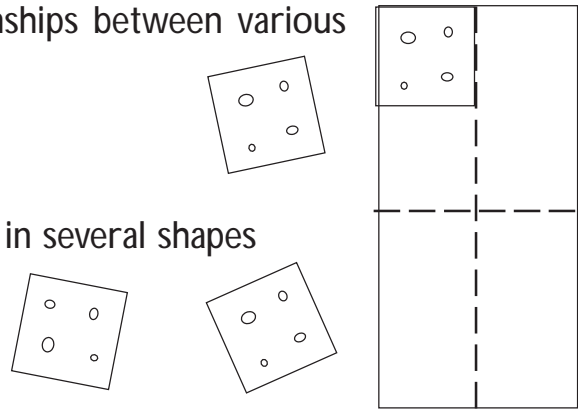
# Goin' Crackers!

## A Goal:

To help your child learn the relationships between various shapes and practice recording data

## B What You Will Need:

- A snack-sized portion of crackers in several shapes
- One large graham cracker



## C Let's Go!

1. Tell your children to choose 6 square crackers from his pile.
2. Ask them to put the crackers together to make another shape. Who can make a shape with the largest perimeter (measurement around the outside)?
3. Next, using 12 square crackers, have them make as many different rectangles as possible.
4. Record each one on a piece of paper on which you've drawn a table.
5. If they eat 5 squares, how many are left? How many rectangles can they make with the crackers that are left? Record these on the graph as well. Which number of crackers made the most kinds of rectangles?

## D Let's Go On!

6. Have your child(ren) figure out how many small square crackers it takes to cover the large graham cracker.
7. Show your child equivalent fractions. For example, if it takes 8 small crackers to cover the graham cracker, how many will cover half the cracker? (4) This means that  $\frac{4}{8}$  is the same as  $\frac{1}{2}$ . Can you find more?

**Quick Tip for Math:** Does your child leave the water running while brushing teeth? Practice some math *and* teach about the importance of conserving resources with a simple activity.

Have your child plug the sink before beginning to brush her/his teeth. First ask her/him to predict how full the sink will be when s/ he is finished. Half full? Almost full? Do you have a different guess?

Brush your teeth the usual length of time. (No fair rushing or dawdling!) How close were you to your predictions?

# Rock Races

## A Goal:

To help your child understand volume and clear your garden of rocks...fast!

## B What You'll Need:

- At least two children ready to race
- Tools that can survive a little rough treatment: kitchen ladles, spoons, scoops, dippers, tongs, and so forth (or use garden tools that children can handle easily)
- A small garden plot with the dirt already turned and loose
- Rocky soil
- Wheelbarrow, buckets, large boxes (optional)



## C Let's Go!

1. Try each tool to see how it works to pick up and carry something. Practice for a few minutes with each tool. Which ones are better for small objects? Which would you use for a big object?
2. Place the carrying tools and the containers at one end of the garden plot. Each person racing will make a separate pile of rocks.
3. Explain how the race works, varying the time according to the age of the participants:
  - You have about three minutes to collect as many rocks as you can.
  - Choose a tool you think will be good for picking up and carrying rocks.
  - Find a rock and use your tool to pick it up and carry it back.
  - Drop the rock onto your pile and quickly go back to get more.
4. Run the race again. Use the same tool, or choose a different tool—one that you think might be better.
5. Play a third time and make the game a little harder. Use a different tool each time you pick up a rock. That means you have to grab it fast and keep moving.

## Let's Go On!

- ## D
6. Sort the rocks you found according to different values or attributes (round, flat, pointy); colors; size. How many ways can you sort them? Do some rocks belong to more than one group?

# Simply Symmetrical

## A Goal:

To help your child develop an understanding of symmetry and a sense of geometric patterns

## B What You'll Need

- Paper, pencil, marker, paint, or crayon
- Magazine pictures
- Scissors and glue

## C Let's Go!

1. A shape can be symmetrical when two parts of it are exactly alike. Explore your house for symmetrical designs. See how many your child can find. Look at wallpaper, floor tiles, pictures, bedspreads, and appliances.
2. Cut out a magazine picture that is symmetrical. Cut it along the line of symmetry. Paste one half of the picture on the paper. Have your child draw the missing half.
3. Write your child's name in big block letters, then write your name. Which name has more letters with lines of symmetry? How many letters have one line of symmetry? How many of each letter have two? (B has one line, an H has two.) Does anyone have a name with all symmetrical letters? (BOB is one.) Can any letter be turned upside down and still look the same? (Yes, H, I, O, S, and X are symmetrical around a center point.) Go through the alphabet, making a list of the letters that look the same on both sides and those that look different.
4. Fold a sheet of paper in half lengthwise. Have your child draw half of a circle, heart, or butterfly from top to bottom along the fold on each side of the paper. Help your child cut out the shapes that were drawn. Unfold the paper to see the symmetrical figure. Have your child color and glue the full figure on another sheet of paper to display the design.
5. Fold a sheet of paper in half lengthwise. Open the fold and have your child paint a simple design on one side of the paper. Before the paint dries, fold again on the line and press gently. Unfold and see a symmetrical design!



**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C** Let's Go!

1.

**D** Let's Go On!

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Quick Tip for Math:

# Time Trackers

## A Goal:

To help your child collect information, analyze it and present the findings in an organized way

## B What You Will Need:

- Clock or watch
- Blank paper
- Graph paper (Your teacher may have attached some, or you can draw your own.)

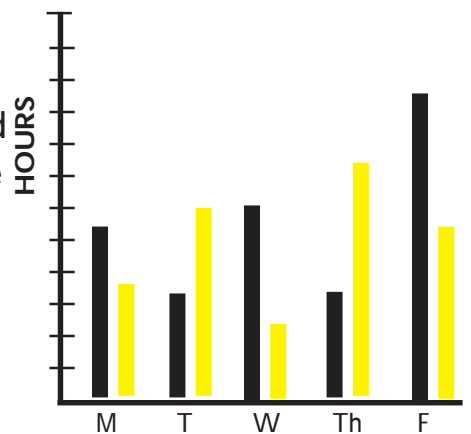
Day	Time w/ TV	Time w/ Reading
Monday		
Tuesday		
Wed.		
Thurs.		
Friday		
Sat.		
Sunday		

## C Let's Go!

1. Together with your child, keep track of the time he or she spends watching television as well as reading.
2. Make a table listing the 7 days of 1 week. Keep two columns, one for television and one for reading.
3. At the end of the week, see if together you can make a graph comparing the two different activity columns.

## D Let's Go On!

4. While watching television, make a chart showing how much time in every hour is used for commercials compared to how much time is used for the actual show. Do this for every half-hour of television you watch.
5. Then make a bar graph or pie chart showing the two amounts. Time the minutes carefully.



**Quick Tip for Math:** Help your child understand that wrong answers aren't always bad. They may help you discover what s/he doesn't understand.

When your child gets a wrong answer:

- Be patient. Look further; ask questions, and see what the wrong answer is saying about the child's understanding. Did the child understand the question?
- Ask your child to explain how the problem was solved. Does your child need help with the procedures, the number facts, or the concepts involved?
- Help your children be a risk takers: show them wrong answers are OK; assure them that the right answers will come in time.

# Time Trackers I I

## A Goal:

To help your child collect information, analyze it, and present the findings in an organized way

## B

### What You Will Need:

- Clock or watch
- Blank paper
- Graph paper (may be attached or make your own with a 1-inch grid)

## C

### Let's Go!

1. Together with your child, keep track of how s/he spends time in one 24-hour period: time spent sleeping, eating, playing, reading, and going to school.
2. Measure a strip of paper that is 24 inches long. Let each inch represent one hour.
3. Color in the number of hours for each activity, using a different color for each activity.
4. When finished, make the strip into a circle and place it on a blank piece of paper. Trace around the circle. Then make lines from the center of the circle to the end of each color.
5. Your child has just made a circle (pie) chart of how he or she spends 24 hours. Compare this with how other people in your family spend their time.



## Quick Tip for Math:

One of the most important ways parents can help a child in math is by exhibiting attitudes and values supportive of learning. Here's a way to start:

- Accept that struggle is a normal part of doing math, just as it is when you become better in sports. Help spot difficulties, and offer suggestions for overcoming them.
- Encourage Mastery. When you learn to play a sport, it's important to repeat fundamentals again and again until you can do it automatically. It's just as important to see practice in mathematics as developing mastery, not a chore or form of punishment.

# Who's the Tallest?

## A Goal:

To help your child understand the concepts of tall and short, improve measurement skills, and use a graph to compare the heights of family members

## B What You Will Need:

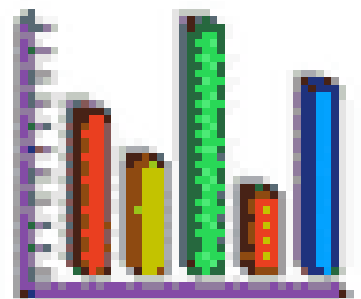
- A long piece of yarn for each family member (approx. 7 to 8 feet each)
- Two paper clips for each family member
- Masking tape (optional)
- Rulers
- One large sheet of paper

## C Let's Go!

1. Explain to your child that s/he will be measuring the people in the family to see how their heights compare.
2. First, measure your child to show her/him the procedure. Ask your child to lie down on her/his back with both hands at sides.
3. Place one end of the yarn at your child's feet. (If tape is available, the yarn can be taped down for accuracy.)
4. Then run the yarn on the floor alongside your child's body until the yarn reaches the top of the head.
5. Fasten the paper clip to this spot. Secure with tape if necessary.
6. Now switch places. Let your child measure you, using a new piece of yarn and paper clip.
7. Repeat for each family member. (Include friends and neighbors if they are willing to take part!)
8. Next, measure each piece of yarn. Use a consistent measurement unit (a tape measure, ruler, a row of ten interlocking blocks, etc.). Help your child figure out the heights of the tallest and shortest family members. Record the results on a bar graph.

Ask questions similar to the following to compare the data collected:

- Which family member is the tallest? How can you tell? How much taller is that person compared to you?





# Hot, Hotter, and Hottest

## A Goal:

To help your child measure temperature and compare data

## B What You'll Need:

- Inexpensive thermometer
- Trip to the beach or park on a hot day

## C Let's Go!

1. On a hot day, measure the temperature of the sand on the beach. (On a hot day the temperature of the sand can reach 120 degrees F!)
2. Record the temperature on a simple table.
3. Repeat, taking the temperature at different locations and at different depths, such as two inches below the surface, just at the surface, and at knee height. You can also test it in the sun and under a beach umbrella.
4. Where is the coolest place? The hottest?

Surface-sunny	113°
Surface-shady	95°
2 inches below	98°
Knee height	88°
Waist height	79°
Surface--near water	86°

## D Let's Go On!

5. Talk about how hard it must be for beach creatures to survive in this hot place. Why do you think they burrow under the sand?
6. If you don't have a thermometer, just burrow your hand in the sand and estimate the temperatures.
7. Can't make it to the beach? Measure the temperature of surfaces in town. Take temperatures on different kinds of surfaces. Which surfaces are hotter?
8. Put soil, sand, and and water in buckets the same size; put them in the sun. Record the temperature every 15 minutes. Which gets hot faster?

**Quick Tip for Math:** Give your child a full-sized calendar and ask them to keep track of what they eat every day. After a week or two, talk about what they've charted:

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

*Handwritten notes on calendar:*  
 - 4: Back to School  
 - 13: Slavery Party  
 - 16: Book Fair  
 - 27: Field Trip

- Do you see any patterns?
- Which day did you eat the most? The least?
- Which foods appear the most? The least?
- Did you eat more \_\_\_\_\_ or more \_\_\_\_\_?

# Travel Graphs

## A Goal:

To help your child collect and analyze data and to learn more about the U.S.A.

## B What You'll Need:

- Road maps or guidebooks from various states
- Paper and pencil

State	bird	flower	tree	motto	rock	animal
Michigan						
Ohio						
Indiana						
Wisconsin						
Iowa						
Minnesota						
Kentucky						

## C Let's Go!

1. Tell your child that each state has its own official state flower, bird, and other wildlife. When you travel, every time you cross another state line, look at a road map or guidebook of the state. (You can also stop in a Welcome Center near the state line to pick up information.)
2. Create a table to record what you learn about each state. Make separate columns for each of the categories listed above.
3. Now analyze what you find.
  - Which state has the least official favorites?
  - Which state has the most?
  - Which states have the same \_\_\_\_\_?
  - Which category repeats the most?
  - Which category repeats the least?
  - Who has the most unusual bird (or flower, rock, mineral, etc.)?
4. No travel plans? Check out maps or travel guides from the local library and look up the answers. Or surf the Web for each state's home page and go on a "virtual" journey.

### Quick Tip for Math:

*Math fact:*

*About 3 million grey squirrels lost their lives on America's highways last year. Why are some animals more frequent victims than others? Visit Dr. Splatt at [www.edutel.org/roadkill/](http://www.edutel.org/roadkill/) to study the data for yourself!*

Looking for a way to spark the interest of even the most reluctant mathematician? How about keeping a log of the roadkill you spot and their locations?

Brewster Bartlett, also known as Dr. Splatt, began the idea of monitoring dead animals along the roadway back in 1992. He thought it would make a good project for students to not only learn about wildlife and math, but also to share their data with other kids across the country. Join the data-collection team at [www.edutel.org/roadkill](http://www.edutel.org/roadkill).

# License Plate Math

## A Goal:

To help your child use data to infer and predict

## B What You Will Need:

- Paper and pencil
- Access to lots of passing cars
- 2 or more players

3	8	7
5	4	0
6	9	1

## C Let's Go!

1. Each player should make a grid of squares, 3 across and 3 down for a total of 9 squares.
2. Each player should fill squares with digits 0-9 in any order they like. (There will be one leftover digit.) The game works better if every player orders their numbers differently.
3. As cars pass you, or you pass them, call out the number of the last digit of the license plate, and each person marks off that digit on his/her card. Three in a row wins.
4. After you've played awhile, ask the players to think about strategy.
  - Do some numbers seem to come up more often?
  - If so, where should you put that number on your card?
  - Why does the game work better if the cards are different?

## D Let's Go On!

5. Play again, but this time remember the last digit of a license plate. Count how many license plates you see until you spot the same last digit again. (Then the round ends.)
6. Do this a few times, recording how many plates you see until you find a match of the original number.
7. Now change the rules. Start recording all last digits. Keep playing until you get a repeat of any last digit. Ask:
  - How many plates did it take to get a repeat?
  - Which version has shorter rounds?
  - Why do you think this is so?

**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C** Let's Go!

1.

**D** Let's Go On!

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Quick Tip for Math:

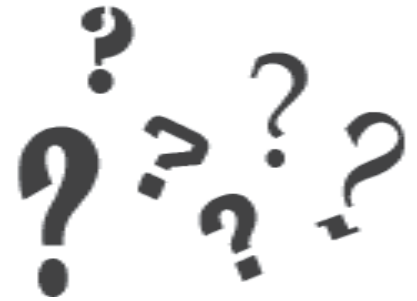
# Guess if You Can

## A Goal:

To help your child develop an understanding of the characteristics and meanings of numbers.

## B What You Will Need

- Questions about numbers



## C Let's Go!

1. Let your child think of a number between a range of numbers you choose (Example: "Think of a number between 1 and 25.")

2. Try to guess the number by asking yes-or-no questions. Here is a sample.

Child: I am thinking of a number between 1 and 100.

Parent: Is it more than 50?

Child: No.

Parent: Is it an even number?

Child: No.

Parent: Is it more than 20 but less than 40?

Child: Yes.

Parent: Can you divide this number up into 3 equal parts?

And so on ...



3. After you have guessed your child's number, you choose a number and let your child guess, asking similar questions.

## D Let's Go On

This activity works on many different levels of math. The questions can serve as learning tools for explaining concepts. For example, you can take the opportunity to explain even and odd numbers, place value, and other concepts.

**Quick Tip for Math:** Did you know that music uses and teaches math skills to children?



- Teach your children to listen to the patterns found within songs.
- Count the beat as you listen to the radio or CDs.
- March along to some patriotic music and get their bodies and brains working together! Some children learn faster and remember more when they move their bodies while they practice mathematics or reading skills.

# Numbers in the News

## A Goal:

To help your child see that mathematical data is everywhere and can be used for many purposes

## B What You Will Need

- Newspapers
- Crayons or colored pencils

## C Let's Go!

1. Have your child find and circle with different colored markers the following things in the newspaper:
  - a graph
  - a number less than 10
  - something that comes in 2s, 3s, 4s
  - a number more than 50
  - the days of the week
  - a number more than 100
  - a number that is more than 100 but less than 999
  - a symbol or word for inches, feet, or yards
  - a schedule of some kind
  - a triangle
  - a weather symbol
  - a percent sign
  - sports statistics



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**Quick Tip for Math:** Want to have fun and build skills for learning all at once? Encourage your child to play card games, either with you or with friends. Card games like Concentration and Go Fish build memory, recognition and recall skills.

Bingo, dominoes, toy telephones, card games, board games, calendars and clocks with large numbers all can help familiarize your child with the world of numbers.

# Napkin Fractions

## A Goal:

To help your child connect mathematical concepts to real objects and make learning fractions fun!

## B What You Will Need:

- Paper napkins or square paper towels
- Pencils, crayons, or markers

## C Let's Go!

1. Start by folding the napkin into two halves. Unfold and label each side:  $1/2 =$  one half.
2. Then fold again to make four quarters. Again, unfold and label each quarter.
3. Be sure to talk about what you are doing as you fold. Example: "If we fold these halves in half again, we get four squares when we unfold it. Let's label these  $1/4 =$  one quarter."
4. Move on to eighths and sixteenths.
5. Talk together about the relationships you see. Example: How many quarters do you see in each half? Which is bigger: one half or one sixteenth?

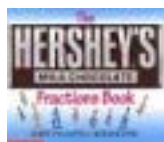
## D Let's Go On!

6. Use a Hershey® bar to have more fun with fractions. Remove the outside wrapper and rub softly over the foil wrap so you can see the sections of the bar.
7. Talk about how each small section is part of the whole bar. Can your child find how many sections are in  $1/2$  the bar?  $1/4$  of the bar? How much of the bar is one section ( $1/12$ )? How many  $1/12$ s are in  $1/2$ ? How many  $1/8$ s in  $1/4$ ? If you share the chocolate bar when you're done, this activity will appeal to almost every child!

## Quick Tip for Math:

You can brush up your math skills just by reading a good book? Your library is full of literature that will help build math skills. Check the book list that came with this packet, or ask your local library staff for ideas. You can start with some more chocolate fun:

Did you Know?



- *The Hershey's Milk Chocolate Bar Fractions Book*, by Jerry Pallotta, Robert C. Bolster, Rob Bolster. Cartwheel Books, 1999.
- *More M&M's Brand Chocolate Candies Math*, by Barbara Barbieri McGrath, Roger Glass. Charlesbridge Publishing, 1998.

# Clip and Save Coin Count

## A Goal:

To help your child learn the value of coins, and practice counting, adding, and subtracting

## B What You Will Need:

- Coins
- Grocery store coupons
- Pencil

## C Let's Go!

1. Cut out grocery store coupons and talk about how much money is saved with coins. Example: If you save 20 cents on detergent, say 2 dimes.
2. Ask your child what could be purchased using the savings from the coupon. A pack of gum? A pencil?
3. Figure how much money would be saved with 3, 4, or 5 coupons?
4. Figure out together how that money could be counted out in coins and bills?
5. Ask your child to estimate (guess) what could be purchased with those savings? A pack of notebook paper? A magazine?
6. If you have time, add up how much money could be saved with coupons for a week's worth of groceries? How would that money be counted out? What could be purchased with those savings? A book? A movie ticket? What percentage of the original price is the coupon worth?



## D Let's Go On!

7. Consider letting your child keep the savings from coupons s/he helps you find and clip. This will keep interest level in this activity very high!

Adapted with permission from *Helping Your Child Learn Math* (1992), by Patsy F. Kanter, edited by Cynthia Hearn Dorfman. U.S. Department of Education

**Quick Tip for Math:** Next time your child is bored and you have a few moments to spare, play "Count the Ways."

Using the coins in your pocket, play money, or just your imaginations, ask, "How many ways can you make 10 cents, 25 cents, 30 cents, 40 cents, or 50 cents?"

You can help your child add the coins in various ways to get different answers. (Younger children will need actual coins in order to see and feel the solutions.)

# Playing Card Place Value

## A Goal:

To help your child learn place value

## B What You Will Need:

- Deck of cards
- Paper and pencil
- 2 or more players

## C Let's Go!

1. The object is to create the number with the most value (the highest number.)
2. Start by having each player draw 3 boxes on a sheet of paper.



3. Next, show your child a deck of cards. If s/he is very young, explain the meaning of the numbers and symbols on the cards. Tell her/him that s/he will be drawing cards from the deck to find the numerals they will use to fill in their boxes.
4. The value of the cards will be as follows:  
Ace=1   2=2   3=3   4=4   5=5   6=6   7=7   8=8   9=9   10=0
5. Begin by drawing one card. Ask each player to write the number represented on the card in one of their three boxes, reminding them that the goal is to create the highest number. Example: A 5 of hearts is drawn. Player one puts a 5 in box #1. Player two puts a 5 in box #3.



6. Continue until all boxes are filled. Which player has the higher number?
7. As the players gain experience with the game, they will learn to put smaller numbers in the "ones" and "tens" place value; higher numbers need to go in the "hundreds" and "tens" place value.

Variations:

- Add more place value, using 4, 5, 6 or more boxes.
- Add a discard box where each player can throw away one number of their choice during the game.

# Odd or Even?

## Goal:

To help your child recognize odd and even numbers

## What You Will Need:

- Paper
- Pencils
- Crayons in two colors

## Let's Go!

1. Draw a simple pattern of boxes.
2. In some of the boxes, write even numbers. In the rest, write odd numbers.
3. Tell your child to find all the boxes with odd numbers. Color them one color.
4. Next, tell your child to find all the boxes with even numbers. Color them another color.

## Let's Go On!

5. You can also do this using a one-month calendar. Have children color the boxes containing odd numbered dates one color. Then color the boxes containing even-numbered dates another color.
6. After finishing a row or two, ask your child if s/he can see a pattern?

Family Calendar						Jan 2000
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

## Quick Tip for Math: It's easy to turn any snack-time into math time!

- Have children spread a graham cracker with peanut butter and make "dominoes" with different number of raisins pressed into each end of the graham cracker. Or use frosting and press chocolate chips into the icing.
- Have children guess how many raisins they think are in an individual box of raisins before opening. Open the box and guess again. Finally, count the raisins to see how close their estimate was to the actual number. (Repeat with a bag of M&Ms™ for chocolate lovers!)



**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C**

Let's Go!

- 1.

**D** Let's Go On!

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Quick Tip for Math:

# Mental Math

## A Goal:

To help your child do math “in her/his head.” This makes your child a stronger mathematician and allows her/him to check whether answers make sense after using calculators and computers.

## B What You Will Need:

- Time with your child

## C Let's Go!

1. Ask your child math questions about every day situations: “If I have 4 beach towels, and I need 7 for our family, how many more do I need?” or “If I need 12 drinks for the family picnic, how many packages of 3 drinks will I need to buy?”
2. When using larger numbers, encourage your child to estimate the answer. When estimating, round up or down to make it easy to solve problems quickly in your head. Rounding properly will still give you a reasonable answer. For example, when figuring 18 plus 29, an easy way to get a “close” answer is to think about  $20 + 30$ , or 50.
3. Let your children use strategies that make sense to them.
4. Ask often, “Is your answer reasonable?” “Is it reasonable that I added 17 and 35 and got 367? Why? Why not?”



**Quick Tip for Math:** Help children do mental math with lots of small numbers at first until they develop quick and accurate answers. Remember, the goal is to help your child feel successful, not to stump him or her.

Experts say children need lots of success before they will move on to more difficult tasks where they might fail. Give your child plenty of practice with problems they can easily solve before making questions harder.

# Better Than Flash Cards-I

## A Goal:

To help your child develop speed and confidence in her/his ability to add and subtract quickly.

## B What You Will Need:

- Time with your child

## C Let's Go!

1. Look for opportunities to practice whatever math facts your child is learning: driving in the car, taking a walk, waiting for breakfast.
2. Say to your child, "Think about the number 3 (or whatever number you choose for the day). "Now, add 4, subtract 1, and add 2 . Can you find the answer?"
3. Choose any numbers, combinations, and operations (adding, subtracting, multiplying, dividing) you know your child has learned. Pay attention to those that need the most practice, and use those often.
4. Make this a fun challenge, not a high-pressure drill. Use it as a chance to focus on the world of numbers and show your children that math can be fun.



## D

### Let's Go On!

5. You can adapt this activity to include the whole family, by making numbers larger or smaller, or by including more difficult operations (like multiplication or division) for older children.
6. Turn your roles around. This time, choose a number and have your child tell you all the math facts s/he knows that total that number, either addition, subtraction or multiplication

**Quick Tip for Math:** You might be tempted when creating math challenges to jump right up to longer and harder problems, and really put your child to the test.

However, research shows that children need lots of success before being moved on to tasks where they might, at first, fail. Resist the urge to move to harder problems until your children come up with the correct answers several times in a row and are eager for a challenge. Then introduce harder operations gradually and let them have plenty of success before moving on.

# Better Than Flash Cards-II

## A Goal:

To help your child develop speed and confidence in her/his ability to add and subtract quickly.

## B What You Will Need:

- Time with your child
- Deck of cards



## C Let's Go!

1. Play the card game War, except lay down two cards each and either add them or multiply them and whoever has the largest sum or product wins the cards.
2. Play a speed challenge with two or more children. Lay two cards down and the first one to give the correct answer to the product or sum wins those cards.
3. Give children a suit of cards from Ace (which will stand for the number one) to ten. Example: All the diamonds with the face cards removed. Mix them up and have the child add them. S/he can tell immediately if s/he made a mistake, because the answer will always be 55. Alternatively, start with 55 and have the child subtract the cards and if he is right, he will always get zero when the last card is played.

## D Let's Go On!

4. Put your catalogs and junk mail to work. Give the child a catalog and let him do a dream order. Have him write up the order on the sheet, total it, and figure tax. Alternatively, give him a certain budget to adhere to and tell him what he needs to purchase. Then let him figure out what to order and calculate it.
5. Have the child figure out the actual cost for an item when it's shown as a certain percentage discount. It's OK to use a calculator.

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**Quick Tip for Math:** Don't worry about packing every day with activity or lessons. Leave enough free time for children to daydream and explore. Free time allows a child to develop new interests and create their own play.

# Multiplication Tablemat

## A Goal:

To help your child develop speed and confidence with multiplication facts by making the multiplication table part of your child's world

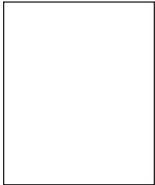
## B What You Will Need:

- 2 sheets construction paper (one 18 x 13 inches; one 13x13 inches)
- Markers, crayons, or colored pencils; glue or paste
- Clear contact paper
- Photo of your child (optional)

## C Let's Go!

1. Cut one sheet of paper into a 13x13-inch square. Using a ruler or straight edge, draw a grid on this square with lines across and down, spaced one inch apart (there will be 12 lines across and 12 down).
2. Have your child write the numbers 1 through 12 across the top row and down the far left-hand column. Leave the box in the upper left corner blank.
3. Help your child fill in the remaining squares so that the intersection of each row and column shows the product of the numbers written at the top and left. (You could make another chart showing addition sums.)

4. Paste this number table onto the larger piece of construction paper.
5. Decorate the right column with your child's photo or a drawing. Personalize it with the date or whatever information you like.

	1	2	3	4	5	6	7	8	9	10	11	12	
1	1	2	3	4	5	6	7	8	9	10	11	12	Joe's Multiplication Table    Summer 2003
2	2	4	6	8	10	12	14	16	18	20	22	24	
3	3	6	9	12	15	18	21	24	27	30	33	36	
4	4	8	12	16	20	24	28	32	36	40	44	48	
5	5	10	15	20	25	30	35	40	45	50	55	60	
6	6	12	18	24	30	36	42	48	54	60	66	72	
7	7	14	21	28	35	42	49	56	63	70	77	84	
8	8	16	24	32	40	48	56	64	72	80	88	96	
9	9	18	27	36	45	54	63	72	81	90	99	108	
10	10	20	30	40	50	60	70	80	90	100	110	120	
11	11	22	33	44	55	66	77	88	99	110	121	132	
12	12	24	36	48	60	72	84	96	108	120	132	144	

6. Cover the whole sheet with clear contact paper, or take it to a local copy shop and ask them to laminate it for you.

Source: *Family Learning*, by William F. Russell, First World, 1997.

# Going a “Mile a Minute”

## A Goal:

To help your child understand the relationship between time and distance

## B What You Will Need:

- Time with your child in the car
- A straight, uncrowded stretch of interstate highway
- A stopwatch, digital clock, or watch with a second hand



## C Let's Go!

1. Tell your child you are going to do an experiment.
2. Keep your car at a constant speed of 60 miles per hour.
3. Ask your child to use the stopwatch or second hand to find how long it takes to go from one green mile marker to the next one. (At 60 mph it should take 60 seconds, or one minute.)
4. Repeat this process several times, to show children that the answer is always the same when you go exactly the same speed.
5. Talk about what you learned. “It looks like we are going a “mile a minute” when we travel 60 miles per hour. That’s because there are 60 minutes in an hour. So if we drive one mile in one minute, we will travel 60 miles in 60 minutes.”

## Let's Go On!

6. Ask your child, “Do you think the time between markers will be shorter or longer if I speed up? Time the intervals between mile markers going different speeds. Talk about what you learn. Were her/his guesses correct?”

---

**Quick Tip for Math:** The best way to spark your child's interest in math is to show him or her how math is useful in everyday life. Instead of making up “schoolbook” problems to practice, look for examples in your child's world where mathematics is used to solve a real problem.

For example, “We have 6 people coming to our picnic. There are 16 cups in this package. If everyone wants 3 drinks during the picnic, can they have a new glass each time? How many people will not get a third cup?”

# Fantastic Math

## A Goal:

To help your child make reasonable estimations while tickling the imagination

## B What You Will Need:

- Time with your child
- Calculator for checking your estimations



## C Let's Go!

1. Think of a problem using fantastic numbers that will capture your child's imagination. Example: "How many pennies stacked would it take to reach the top of the Empire State Building?"
2. Let your child make some guesses. If s/he is completely stumped, ask some questions to get her/him thinking: "More than a hundred?" "More than a thousand?" "More than a million?"
3. Talk about how you might find the answer. What do they know that would help them solve the problem?

Example: We can measure one roll of pennies (50 pennies) and learn it is about three inches long. We know 12 inches are in a foot. So we can figure it will take 4 rolls to reach one foot (12 divided by 3=4). We can look up the height of the Empire State Building (1,250 ft.).

4. Now we need to multiply. Use a calculator to figure the answer if you can (In this case,  $1,250 \times 4$ ). Ask, "Do we need to do anything else?" (Since there are 50 pennies in each roll, multiply your answer by 50. )
5. Compare your estimates with the answer you calculated. Were you surprised by the answer? (A stack of a million pennies would reach 4 times as high as the building.)

**Quick Tip for Math:** It's not always possible—or even important—to find the actual answer to "fantastic math" problems.

Just talking about how you would use the math your child knows to solve the problem will get them thinking and sharpen their skills. Try to draw on all kinds of math facts:

- addition, subtraction, multiplication, or division skills
- volume, area, and shapes
- measurements and equal values (inches/foot; feet/yards)

# Shop-o-rama

## A Goal:

To help your child practice numerical operations and learn to be careful spenders

## B What You Will Need:

- A variety of catalogs, magazines, and store circulars
- Scissors
- Construction paper
- Colored markers
- Glue



## C Let's Go!

1. Label one piece of construction paper "Needs" and another one "Wants."
2. Invite your child to sort through catalogs, cutting out pictures, descriptions, and prices of school clothes and supplies that appeal to you. If there isn't a price on an item, help your child guess the amount the item might sell for.
3. Ask your child to divide your pictures and descriptions in two piles—"Wants" and "Needs", and then glue them onto the appropriate sheets.
4. Now have your child make a "shopping" list. Set a budget of \$250.00 for clothes and supplies. Your child should first look at the "Wants" and "Needs" lists to help decide what to buy, keeping track of what s/he's spending. Remind your child that the goal is to get the most for her/his money.

## D

### Let's Go On!

5. After discussing what your REAL budget might be, do this activity again. Now you're ready to go on a real shopping trip.
6. Encourage your child to find coupons for the items s/he wants to buy. Ask, "How much will you save if you use this coupon? How much will you save all together if you use all of them?" Consider letting her/him keep the money saved with the coupons s/he finds.

## 2-Bean Salad

### A Goal:

To help your child learn logical thinking and get ready to learn algebra

### B What You Will Need:

- Dry Beans in 3 colors (lima, red, and black work well)  
OR markers of various colors
- A glass or clear plastic bowl in which to put the beans



### C Let's Go!

1. Work together to find out what's in each salad described below. Each one has two kinds of beans. Some salads may have more than one answer. Use real beans to solve the problems at first. Can your child think of any other ways to find the answers? Check that answer by using beans.
  - a. This salad has 8 beans. Half of the beans are black. How many are not black?
  - b. This salad has 10 beans. 4 of the beans are lima beans. How many are red beans?
  - c. This salad has 10 beans. It has the same number of each kind of bean. What could be in the salad?
  - d. This salad has 4 black beans. The number of red beans is double the number of black beans. How many beans are in the salad?
  - e. There are 5 lima beans and 2 more red beans than lima beans. How many red beans are there?
  - f. There are 5 beans in all. There is 1 more lima bean than red beans. How many of each kind?
  - g. There are 6 lima beans. There are 3 more red beans than lima beans. How many beans in the salad?
  - h. There are 6 beans in all. There are half as many lima beans as red beans. Describe this salad.
  - i. There are 4 beans in all. There are three times as many black beans as red beans. How many of each color?
  - j. There are 5 lima beans and 2 less red beans than lima beans. How many red beans are there?
2. Don't worry if some of these problems are too hard for your child. Just do the problems that you can. Or make up some simpler problems of your own.



**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C** Let's Go!

1.

**D** Let's Go On!

---

Quick Tip for Math:

# Coin Toss

## A Goal:

To help your child understand probability

## B What You Will Need:

- Two or more coins
- A T-chart (see below)



## C Let's Go!

1. Ask your child, "What is the probability of getting "heads" on both coins?"
2. Lay several pairs of coins to find all the possible combinations. Then draw a chart like the one below to record the possibilities.

(There should be 4.)

3. Since any of these 4 possibilities are equally likely to happen, mathematicians would say that the probability of getting two heads is 1 chance in 4 or  $1/4$ .
4. Now, draw a new T-chart and toss the coins for awhile. Record the tosses for each coin. Did you get two "heads" about  $1/4$  of the time?

Coin 1	Coin 2
T	H
T	T
H	T
H	H

## D Let's Go On!

5. Ask other questions about probability. What are the chances that three coins will all turn up "tails"?
6. Lay out all the possibilities and then chart your answers (There should be 8.) Do you see a pattern between the number of coins and the number of possibilities?

**Quick Tip for Math:** Instead of saying "Let's do some math." say, "Would you like to hear a story?" or "Can I show you a trick?"

Parents who collect a good stock of math stories and tricks will always have an eager audience, especially when kids are trapped in a car or otherwise "bored."

Try *Games for Math: Playful Ways to Help Your Child Learn Math*. Or look for more books in the 793.7 and 510 sections of the juvenile section of your local library.

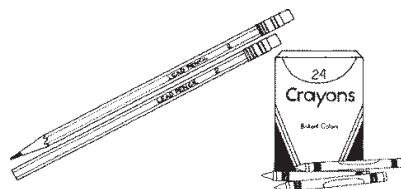
# Is It Certain?

## A Goal:

To help your child understand the difference between chance and certainty

## B What You Will Need:

- Paper divided into 3 columns
- Pencils or markers
- Time with your child



## C Let's Go!

1. Talk with your child about everyday experiences of chance and certainty.
2. Make a list of some things that will never happen (a dog will never have kittens). Label this list: Things that are Impossible.
3. Now make a list of things that will definitely happen. (The sun will rise tomorrow.) Label this list: Things that are Certain.
4. Now make a list of events that may or may not happen. (Tomorrow it might rain.) Label this list: Chance Events.
5. Compare your lists: Which is longer? Which was hardest to create. Which list was the most fun to create?

## D Let's Go On!

6. Look for opportunities to talk about these concepts when going through your day. Ask your child, "Is there a chance that \_\_\_\_\_ might happen this week? Why or why not?"
7. Help your child get used to using the language of probability: impossible/certain; more likely, unlikely or less likely; equally likely/not equally likely; possible/probable; fair/not fair.

---

**Quick Tip for Math:** Reasoning is used to think through a question and come up with a useful answer. It is a major part of problem solving.

Ask your children to figure out why something is the way it is and then check out their ideas. Let them think for themselves, rather than try to figure out what answer you want to hear.

# Is It Likely?

## A Goal:

To help your child compare events and describe them as “more likely” or “less likely”

## B What You Will Need:

- Weekly weather report
- Time with your child

## C Let's Go!

1. Look a weekly weather report for your area. You can find these in local newspapers, on the weather channel, or on the Internet.
2. Talk with your child about the upcoming forecasts. Based on the information in the forecast, have your child answer whether the following weather events are more likely or less likely. Are any of these impossible?

It will rain tomorrow. \_\_\_\_\_

The sun will shine on Tuesday. \_\_\_\_\_

It will be windy. \_\_\_\_\_

It will snow. \_\_\_\_\_

We will have a tornado \_\_\_\_\_

You will need to wear shorts. \_\_\_\_\_

You will need an umbrella. \_\_\_\_\_

The sun will rise before 7:00 a.m. \_\_\_\_\_

3. Talk about your child's answers. Why did s/he give the answers s/he did?

---

**Quick Tip for Math:** Reasoning is used to think through a question and come up with a useful answer. It is a major part of problem solving.

To promote reasoning, ask your children questions and give them time to think about the answer. By simply asking questions and listening to answers, you are helping your children learn to reason.

# What's the Chance?

## A Goal:

To help your child explore the concepts of chance and certainty and develop the language of probability



## B What You'll Need:

- Time with your child
- Paper and pencils

## C Let's Go!

1. For a week, children listen for, discuss, and record events according to the likelihood they will occur.

Event	More/Less Likely	Why?
I will lose a tooth.		
My friend will visit.		
Mom will bake cookies.		
We will have a hurricane.		

2. Explore ways to show the probability of an event occurring.

What Is the Probability?				
	No Way	Poor	Good	For Sure
Of it snowing tomorrow?				
Of it raining today?				
Of Grandma visiting this week?				

3. Ask your child why s/he gave the predictions they did.
4. Discuss possible events throughout the coming season and have fun exploring the concept of probability!

# What Color Candy?

## A Goal:

To conduct an experiment and show your child that you can predict the likelihood of events

## B What You Will Need:

- Several bags of multicolored candy-coated chocolates (like M&Ms™)
- Pencil and paper

## C Let's Go!

1. Open a bag of candy and separate the colors.
2. Count each color and record on a simple table.
3. Discuss what you found:

What color appeared most?

What color appeared least?

Do all bags have the same color appearing most?

If we share a new bag, and you could have any color you choose, which color would you want? Why?

4. Show your child that you can describe the likelihood of events by using fractions.
  - a. Total the number of candies in bag one. (55)
  - b. Total the number of red candies in bag one. (10)
  - c. The likelihood of reaching into the bag and pulling out a red candy is  $\frac{10}{55}$  or "ten chances in 55."
  - d. Using the same steps, show that the likelihood of pulling a purple candy out of bag one is  $\frac{5}{55}$  or "five chances in 55."
5. Repeat this as long as your child seems interested. Then enjoy the treats!

Name _____ My Candy Color Chart _____			
Bag #	1	2	3
Color:			
red	10	8	9
green	6	4	7
brown	13	15	13
blue	4	7	5
purple	5	4	7
yellow	9	13	11
orange	8	8	5
Total:	55	59	57

**Quick Tip for Math:** *To communicate mathematically* means to use words, numbers, or mathematical symbols to explain situations; to talk about how you arrived at an answer; to listen to others' ways of thinking and perhaps alter their thinking; to use pictures to explain something; and to write about math, not just give an answer.

You can help your child learn to communicate mathematically by asking your child to explain a math problem or answer. Ask your child to write about the process s/he used, or to draw a picture of how s/he arrived at an answer to a problem.

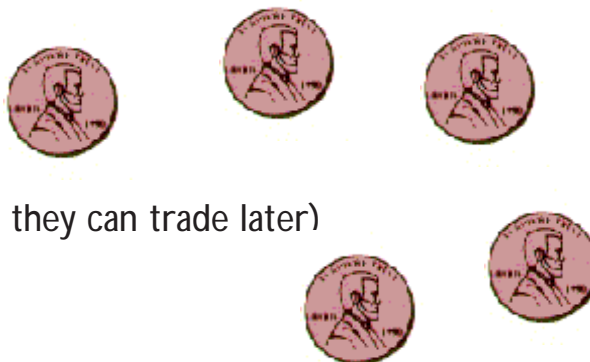
# Penny-a-Day Housework

## A Goal:

To help your child practice mathematical operations while learning about the power (and fun) of math

## B What You Will Need:

- Time with your child
- \$10 worth of pennies (or play money they can trade later)
- Calculator (optional)



## C Let's Go!

1. Ask your child: "Would you work all day for a penny?" (Most children will say, "No way!") Then ask, "Would you do it if I doubled your pay every day for 2 weeks?" (Most will still say it's not enough.)
2. Then offer to play a game. If your child will finish a small job, you'll pay a penny. For each job done after that, you'll double their pay: 2 cents for the second job; 4 cents for the third; 8 cents for the fourth, and so on.
3. Your child may be surprised to learn that the pay for the tenth chore would be 512 pennies, or \$5.12.
4. Use a calculator to figure out how much s/he would earn if you kept playing. (After the 14th chore--or two weeks worth--s/he would be paid \$81.92!)

## D Let's Go On!

4. Use a calendar to mark each day's wages for a month. Then use the calculator to add up the entire amount for the month. Your child will be amazed to learn s/he should have taken the job. After a month, s/he would have earned \$10,737,418.23! (Start with  $1 \times 1$ ; then keep multiplying the answer by 2; do this 30 times.)

---

**Quick Tip for Math:** Instead of saying "Let's do some math," say "Would you like to hear a story?" or "Can I show you a trick?"

Parents who collect a good stock of math stories and tricks will always have an eager audience, especially when kids are trapped in a car or otherwise "bored."

Try *Games for Math: Playful Ways to Help Your Child Learn Math*. Or look for more books in the 793.7 and 510 sections of the juvenile section of your local library.

# Let's Go to the Movies

**A** Goal:

To give your child practice making combinations

**B** What You Will Need:

- Newspaper with movie schedules OR video rental selections
- Paper and Pencils



**C** Let's Go!

1. Draw a simple grid with 3 columns. Label the left column "Movies." Label the middle column "Snack Choices." Label the right column "Combinations."
2. Now, name 3 movies from which your child can choose to plan a night on the town.
3. Next, name 3 snack items and tell your child s/he can choose one to enjoy while s/he watches the show.
4. Using your chart, figure out how many different combinations you could make for your movie night?

Movies	Snacks	Combinations

**D** Let's Go On!

5. Ready for a challenge? Add a fourth column to your grid. Add the 2 or 3 show times you might select. Now how many combinations can you make?
6. If you add another column, like sitting in the front row or the back row of the theater, how many combinations could you make?
7. Do you see a pattern?
8. You can do this with any number of everyday combinations: 3 kinds of bagels with 2 choices of creamed cheese; two kinds of cones, 3 flavors of ice cream.

**Quick Tip for Math:** When talking with your children, ask them to justify their thinking. This will help them clarify their reasoning.

Ask questions like: Why? How do you know? What makes you think that?



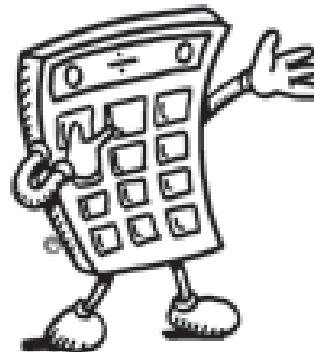
# More Math Magic

## A Goal:

To help your child practice mental math and show a way to have fun with numbers

## B What You Will Need:

- An inexpensive calculator
- Time with your child



## C Let's Go!

1. Have your child choose any number.
2. Ask her/him to multiply that number by 100. (Younger children can use a calculator.)
3. Then subtract the original number from this answer.
4. Next, add up the digits in their answer.
5. Tell them you guess the answer is 18. They'll think you know magic!

Example: Your child selects 8.  $8 \times 100 = 800$ .  $800 - 8 = 792$ .  $7 + 9 + 2 = 18$ .

Why does this work? No matter what number your child starts with, the resulting digits will always total 18.

## D Let's Go On!

6. Have your child choose any number. Have him/her add the next higher whole number.
8. Then have him/her add 9, and divide the total by 2.
9. Now subtract the original number. You guess their answer to be 5.  
(Example: Your child chooses 15.  $15 + 16 = 31$ ;  $31 + 9 = 40$ . Divide 40 by 2 = 20. Subtract the number  $(20 - 15) = 5$  Works every time!

**Quick Tip for Math:** Why do math tricks with your child? They help children reinforce their knowledge of number combinations and operations. Plus, tricks show your child that s/he *can* do math, and s/he can even use it to amaze her/his friends and family.

To find more math tricks and games, ask your library staff to find you books in the J510 or J793.74 section. Here are a couple of titles to try:

*Calculator Puzzles, Tricks and Games*, by Norvin Pallas;  
*Calculator Riddles*, by David A. Adler.

# Pocket Change Calculations

## A Goal:

To help your child practice mental math and amaze your child with numbers

## B What You Will Need:

- A handful of change
- Time with your child
- An inexpensive pocket calculator



## C Let's Go!

1. Tell your child to find some loose change. (Or pull some from your pocket.)
2. Find any combination of coins that adds up to less than one dollar.
3. Now, have your child write his or her age (in years), double it, then add 5.
4. Next, use a calculator to multiply the result times 50 and subtract 365.
5. Now add the value of the loose change, then add 115.
6. Write the total.
7. Look at the result. You will see that the digit (or two) on the left is the child's age, while the two digits on the right reveal the value of the loose change. It's like magic!

Example: Let's say your child is 7 years old and has 57 cents in change.

$$7 \times 2 = 14; +5 = 19; \times 50 = 950; -365 = 585; +57 \text{ (loose change)} = 642;$$

+ 115 = 757. The child's age is on the left (7); and the loose change is on the right (57).

- \* Keep this activity in your purse or glove box. It's a great one to pull out in waiting rooms or when your children cry, "I'm bored." See if it works for everyone in the family.

---

**Quick Tip for Math:** Keep a calculator handy for math challenges that come up during everyday life.

When choosing a calculator for a young child, try to find one that turns off automatically when it's not being used. Calculators with this feature, a memory function, and a percent key can be bought for as little as \$6.

To find some ideas for calculator games, ask your library staff to find you some books in the J510 or J793.74 section.

**A** Goal:

To help your child \_\_\_\_\_

**B** What You Will Need:

- 
- 
- 

**C** Let's Go!

1.

**D** Let's Go On!

---

Quick Tip for Math:

PILOT



FOR LITERACY & MATHEMATICS

## Additional Learning Tools



## Number Chart, 1-100

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



# 10 x 10 Geodot Paper

Copy this dot paper and encourage your child to draw shapes that connect the dots. Can s/he make a shape village? A shape creature? Have fun!

