

K Mathematics Contents

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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 mathematics 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

- Make sure your child sees you using math as you go through your day. Talk out loud about what you are figuring. Say: “I want to watch this mini-series. It’s two hours long and lasts three nights. Wow, that will take six hours of my time!” (Number Sense and Numeration; Measurement)
- When making dinner, ask your child to predict what shape baking dish you should use and why. Would the food fit in a dish that is another shape, too? (Geometry and Measurement)
- As you move through your day, ask your child questions about which is bigger or smaller, who is taller or shorter, or which bag has more or fewer raisins. (Measurement and Quantity)
- Before putting away groceries, let your child sort them into piles such as cans and boxes, refrigerator or shelf. Can your child think of other kinds of piles? Finally, have him/her sort the groceries however *you* want them to be put away. (Geometry; Analytical Thinking)

In the sun

- Give your child plenty of containers in many shapes and sizes when you play in the sand or water. Let your child scoop, dump, pour, and fill the cups. Ask him/her to predict how many of each of the smaller cups it will take to fill a large container. Use words such as *more than* and *fewer than*. (Volume and Measurement)
- Invite your child to do “Playground Predictions” in your backyard or park. Ask questions like, “How many steps do you think are on this slide?” Then count the steps and compare to the guess. (Estimation; Number Sense)
- Look at the moon when it comes out (sometimes you can even see it during the day). Ask your child if s/he can describe the shape. Is it a full circle? A half circle? A crescent? If you draw all these shapes, can your child find the one that matches? (Geometry; Matching)
- At the beach or in the garden, draw shapes in the sand or soil. Can your child match the shape? Try making them “giant-sized” by walking the shapes or numbers. Pretend you are writing coded messages for airplanes that might pass by. (Geometry; Number Sense)

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)
- To help children pass time while waiting, ask how many people are ahead of you in line or in a waiting room. Subtract one or count down as patients are called or as the line is served. (Numbers)
- When you shop, show your children where to find the price of items. Read the amounts out loud. Point out that some numbers are bigger than others; some containers are bigger than others, and some items are more expensive than others. At the checkout, read the numbers out loud as they appear on the screen. (Number Sense and Numeration; Patterns and Relationships)
- As you visit stores, the post office or other places where people work, point out the many jobs that require math. Encourage your child to ask the workers they see what kinds of math they use on the job. (General Math Attitudes)

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

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

Carol Otis Hurst's Booklists—www.carolhurst.com/products/booksets.html

Exploring Math with Books Kids Love, by Kathryn Kaczmarecki, 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

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/

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/

Education Place

www.eduplace.com

A wealth of worksheets and online activities.

Illustrations: National Council of Teachers of Mathematics (NCTM)

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

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

MathMastery.com

www.mathmastery.com

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

PBS Teacher Source and PBS Kids

www.pbs.org

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

Math Goodies

www.mathgoodies.com

Offers worksheets, software, and puzzles you can download.

FunBrain.com

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/

Offers downloadable and printable worksheets, sorted by grade level.

I Spy a Pattern

A Goal:

To help your child find and recognize patterns in their world

B What You Will Need:

- Time with your child



C Let's Go!

1. Patterns are all around us. Be on the lookout for patterns in your world and point them out to your child.
2. Say, "I spy a pattern. Can you find it?"
3. If your child has a hard time finding the pattern, give some clues.
Example: "My pattern is a blue square followed by a red square."
4. After your child catches on to this game, switch places. Let your child find the pattern and give you clues.
5. Ask your child to trace with their fingers the patterns they find. This will help them understand shapes and use all their senses as they learn.

D Let's Go On!

5. How many patterns can you find? Keep a notebook handy this summer and record all the patterns you find. Bring the notebook to school in the fall and amaze your teacher!

6. Here are some examples of patterns in our world:

Things you can see: quilts; border designs; fabric patterns like stripes, checks or plaids; symmetry in leaves and flowers; stars and stripes on the flag.

Sequence of events: days of the week, months of the year, seasons, calendar events. (Does your swim class meet every other day? That's a pattern.)

Quick Tip for Math:

Answers:

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

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

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

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/P/P/N (see answers at left)

Zig-Zag Book

A Goal:

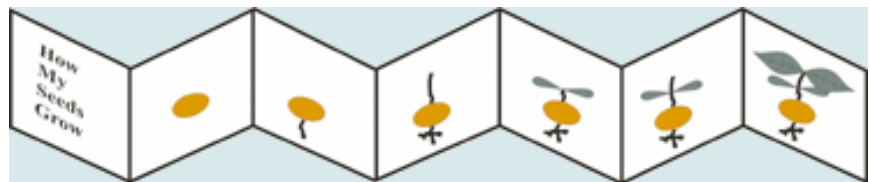
To help your child see and record a growing pattern in sequence

B What You Will Need:

- Seed or small plant
- Long sheet of paper folded into a zig-zag pattern (A cut open paper grocery bag works well.)
- Crayons, markers, or colored pencils

C Let's Go!

1. Buy a small packet of seeds and plant a few seeds in a garden patch or paper cup. (Or simply observe a seedling you buy from a garden center.)
2. Have your child draw a picture of the seed before it's planted on page two of your zig-zag book. (Write a title on page one.)



3. Have your child watch for changes in the seed. When he notices a change, have him or her draw what s/he sees on each page in order. Mark how many days after planting each picture represents.
4. Talk about what you are seeing. What kinds of changes did you notice? Is the plant growing at a steady speed? Or did the plant grow more on some days than other days? What kinds of things might have affected the growth pattern?

Quick Tip for Math: Next time you and your child build with blocks or Legos®, try some pattern games. Start with a simple pattern, then add gradually to the pattern. Then ask your child some questions:

- What is changing?
- What comes next?
- What is the pattern?



Sort It Out

A Goal:

To help your child classify things and find relationships

B What You Will Need:

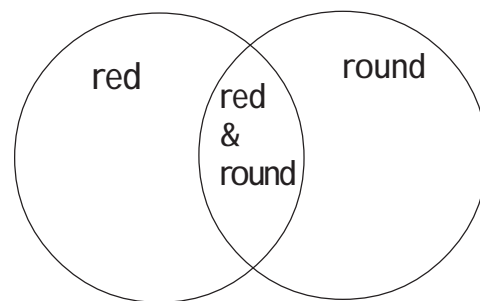
- Household objects in various sizes

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. (*Example: They may all be white, round or plastic.*)
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 matches have been made.

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 intersecting circles out of yarn or 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: Show your child how to set the table. Help them see the pattern of plate, cup, and silverware, and ask her/him to repeat that pattern for each person. Some children will count out the napkins, knives, forks, spoons, and plates as they take them to the table. Others may set the table one piece at a time. Let them develop their own strategies for getting the job done.

Can you think of other patterns you could use to set the table?

Which One Is Missing?

A Goal:

To help your child build memory skills, practice counting, and recognize patterns

B What You Will Need:

- Toys, blocks, or other items that come in a variety of colors or shapes

C Let's Go!

1. Line up a row of matchbox cars or different shaped blocks. Line them up in random order, using no particular pattern.
2. Have your child count the objects.
3. Then have her/him close her/his eyes while you take away some of the objects.
4. After s/he reopens her/his eyes, count the remaining objects.
5. Can s/he tell how many are missing?
6. Now, exercise memory skills; ask her/him to tell you which objects are missing.
7. Now line up the objects in a pattern. *Example:* red, blue, green; red, blue green.
8. Repeat steps 2-6.
9. Was it easier to remember what was missing when the objects included a pattern?



D Let's Go On!

10. The game can be varied to teach grouping skills by hiding all the green cars or blue blocks. Make it tougher for older children by hiding all the sports cars or trucks. Can your child tell which group is missing?

Quick Tip for Math: What Does It Take to Grow?—Teach cause-and-effect relationships. Use two similar, healthy plants. Ask your child to water one plant and ignore the other for a week or two, keeping both plants in the same place. Keep a picture or word record of what happens each day to each plant.

Read more about playing with patterns in *Vroom, Vroom!* by Stuart Murphy.

At the end of that time, ask your child to water the drooping plant. Then talk about what happened and why. Plants usually perk up with water, just as children perk up with good words and smiles from parents.

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:

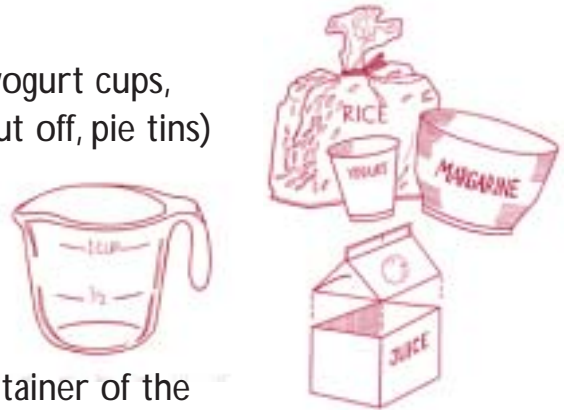
Fill It Up

A Goal:

To help your child understand measurement, volume, and comparison

B What You Will Need:

- Empty containers in different shapes (yogurt cups, margarine tubs, juice boxes with top cut off, pie tins)
- Rice, popcorn kernels, or water
- Paper



C Let's Go!

1. Have your child choose an empty “container of the day” for each day of the week. Label it, writing the day on a piece of masking tape and sticking it on the container.
2. Now, as you go through your day, discover which containers hold more than, less than, or the same as the container chosen for the day:
 - Fill** the day's container with water, uncooked rice, or popcorn kernels;
 - Pour** the substance from that container into another one.
 - Observe**—Is the container full, not full, or overflowing?
3. Ask your child, “Does this mean the second container holds more than the first, less, or the same?”
4. Ask your child questions to encourage comparison, estimation, and thinking about measurement.
5. Put all the containers that hold more on one sheet of paper, those that hold less on another, and those that hold the same on yet another. Label the papers “more,” “less,” and “the same.”
6. After the containers have been sorted, ask, “Do we have more containers that hold more, hold less, or hold the same? How many containers are in each category?”

D Let's Go On!

7. Repeat this activity each day this week. Use a different container each day as your starting point.

Shape Hunt

A Goal:

To help your child find, recognize, name, and compare shapes

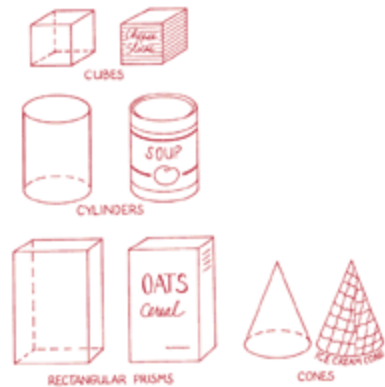
B What You Will Need:

- Time with your child

C Let's Go!

1. As you go through your day, explore and identify familiar shapes in your world. For example, windows in a room may contain squares or rectangles; a tire on a car looks like a circle; STOP signs have eight sides, so they are octagons.
2. Collect examples of two-dimensional (flat) and three-dimensional (solid) items and compare them to shape blocks you may have at home. Help your child see that balls may be round, but they are similar to circles.
3. Talk about the characteristics of the shapes you find. Say things like:
 - “This square has four equal sides with square corners.”
 - “This box looks like a cube. That means it has six faces. Can you count how many edges it has? Do all cubes have the same number of edges?”
 - “Look at these two circles. Can you tell me how they are the same? How are they different?”
 - “See that STOP sign? Did you know that all STOP signs are the same shape? How is it different from the speed limit sign?”
4. Now, challenge your child to find objects with one or more special attributes (attributes are things like color, size, texture, edges, or corners).

Examples: “Find a shape with three corners.” Or “Find some red circles.”



Quick Tip for Math: Solid search. Look at the store ads or coupons for pictures of all the cylinders (cans) or cubes (square boxes) you can find. What are their different uses? Paste the pictures on paper and make a “book of geometric solids.” Have one page for each solid.

Read more about shapes in the *Flat Stanley* books, by Jeff Brown and Tomi Ungerer.



Let Them Eat Shapes!

A Goal:

To help your child experience shapes in a way that engages all the senses

B

What You Will Need:

C

- Food that can be cut or shaped into a variety of shapes

Let's Go!

- To make eating more fun—and educational—cut your child's food into different shapes.
Examples: Form scrambled eggs into triangles, or cut sandwiches and fruit into circles or squares.
- Don't limit yourself to simple shapes, but use your imagination to create different designs.
- Choose a theme for a day. On "circle day," serve round foods like crackers, cookies, or tortillas for a snack. Talk about how all the snacks today will be round.
- Find cereal or pasta that comes in shapes, including letters or numbers.
- Make number pancakes. Instead of pouring batter to make a circle, pour to make numbers. Children especially love numbers that describe their age, birthdate, or other personal favorites.

D

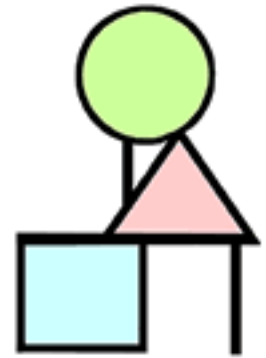
Let's Go On!

- Children can use mealtime to understand the relationships within and between shapes. Cut sandwiches diagonally to make 2 triangles, up and down to make 2 rectangles, or in 4 parts to make 4 squares. Ask your child to name the shape and experiment with putting them back together. Can you make new shapes?

Quick Tip for Math:

Read more about math fun with food. Ask at your library or book store for books about math fun with Hershey® bars, M&M's®, Cheerios®, and more!

Observe and talk about the shapes you see in your world. For example, you might find a rectangle in a window frame. Birds' nests are usually circles. And cars come in all kinds of shapes. Some are more rectangular, some are round (a VW Beetle, for example.) Do you see any triangles on cars?



Snack Math 1

A Goal:

To help your child find and name two-dimensional shapes

B What You Will Need:

- Snack-sized crackers in a variety of shapes: circles, rectangles, squares, triangles
- Small plastic bags for each child

C Let's Go!

1. Put some of each shaped cracker into plastic bags—one for each child.
2. Cut construction paper placemats for each child, one to match each shape of cracker in the bags.
2. Ask each child to complete the chart below with their guesses. Guess how many crackers are in the bag? How many circles? How many squares? Triangles? Rectangles?
3. Open the bags and talk about the similarities and differences in the crackers. (Some may be orange, some white. Some have 3 sides, some have 4 sides or no sides.)
4. Have the child(ren) count the total number of crackers in the bag. Write this number on the chart.
5. Now sort the crackers using the sorting placemats. Count the number of each shape and enter into the chart. How close were your guesses?

	My Guess	My Count	How Close?
Number of all crackers			
Number of circles			
Number of squares			
Number of triangles			
Number of rectangles			

Feel a Shape

A Goal:

To help your child use the sense of touch to identify shapes

B What You Will Need:

- Shoe box with a hole cut into the side the size of your child's fist OR Cloth bag with drawstring at the top
- 5-10 items in different shapes (Plastic blocks or wooden beads work well.)

C Let's Go!

1. Place several items in the shoe box or other container.
2. Have your child reach inside without peeking.
3. Tell her/him to choose one item.
4. Can s/he tell you something about the object? (Is it soft or hard? Bumpy or smooth?) Ask what kinds of things s/he can feel that might give clues for what shape it is. (Does it have corners? Sharp edges? Can s/he count the faces?) Now, can s/he tell you what shape the item is?

D Let's Go On!

5. Once your child can identify shapes without looking, try doing the activity using coins.
6. First look at the coins and talk about their attributes: color, size, smooth edges, jagged edges, pictures on the front and back.
7. Put the coins in the box or bag and repeat steps 2-4. Can s/he tell which coin s/he's holding? Don't worry if it's too hard for your child. Just keep trying and remind her/him of the attributes that could help.

Quick Tip for Math: Children learn by doing— by moving, touching, tasting, feeling, and seeing. They learn by asking questions. You can use your children's natural curiosity about the world to help them learn.

When children play with mathematics in their everyday lives they can grow up loving it. It's possible for you and your children to *enjoy* mathematics!

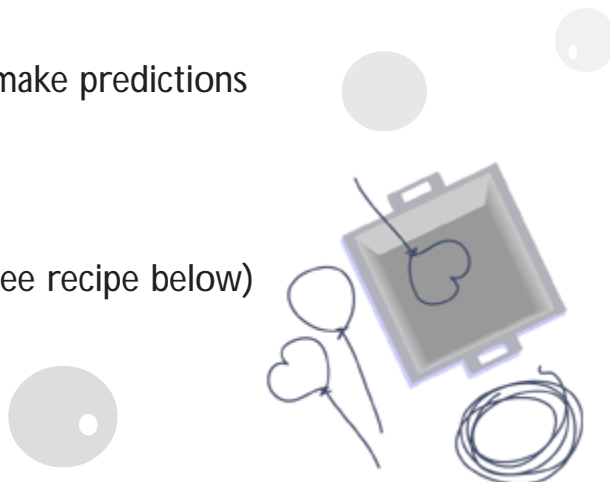
Bubble Shapes

A Goal:

To help your child identify shapes and make predictions

B What You Will Need:

- Shallow baking pan
- Ingredients to make soap bubbles (see recipe below)
- 2 drinking straws per child
- One 3-foot length of string
- Wire coat hangers



C Let's Go!

1. Combine 1/4 cup dishwashing liquid, 3/4 cup water and either one tablespoon of sugar OR one package unflavored gelatin OR one tablespoon glycerin. (These last ingredients slow down the drying time. Dry bubbles break.)
2. Thread three feet of string through two straws and tie the ends together.
3. Hold one straw in each hand to create a square.
4. Pour the bubble mixture into a large baking pan and slosh the straws and string through the bubble solution.
5. Take turns predicting what shape the bubbles will be.
6. Wave the frame into the air to release a giant bubble.

D Let's Go On!

7. Twist wire coat hangers into more shapes. Dip these into the bubble mix.
8. Predict what shape the bubbles will be.
9. Wave the frames and release the bubbles. Were your guesses right?

Quick Tip for Math: One of the best ways adults can help children become successful in math is to ask questions and get your children *thinking*. It is not just the activities that children do that help them learn. The questions you and your children ask and the things you point out can get them thinking mathematically.

Talk to your children about why you are doing these activities. Answer their questions and ask them your own questions. Ask things like "Why do you suppose that happened?" "What makes you think so?" "What would have happened if we did it another way?"

Measuring in Jumps and Bumps

A Goal:

To help your child practice estimating, counting, and measuring using nonstandard units of measure

B What You Will Need:

- Pencils
- Paper



C Let's Go!

1. Brainstorm a list of measuring tasks: How many hops from the basketball hoop to the sidewalk? How many baby steps from the deck to the swingset? or Which is longer, the garage door or the porch?
2. Give each child a pencil and piece of paper. (If you have only one child, invite a neighbor to play, or play along yourself.)
3. Assign a measuring task to each child.
4. First ask, "How long do you think it will be?" and have each child record a guess on the paper.
5. Now, go ahead and measure. Record the answer next to each guess.
6. Repeat for all the measurements you brainstormed earlier.
7. Look at your charts and talk about what you learned. Were your guesses close? Why do some children have different "baby steps" measurements from others?

D Let's Go On!

8. Use cones or rocks to mark off distances you want measured. Ask, "Are there more baby steps or giant steps from cone to cone? Why do you think so?"

Quick Tip for Math: When you measure things at home, let your child hold the ruler or yardstick. Talk about the units of measure you use.

Read more about measuring in *Measure Up! a Bug Contest* by Frank C. Wilson and Mircea Catusanu; or in *How Big is a Foot*, by Rolf Myller and Susan McCrath.

You don't have to have special equipment to measure, though. Your child's hand, foot, or even a toy can be used to measure distance. For example, how many footsteps are in between the slide and the swing set at the playground? Walk heel to toe to find out.

Now compare that distance to that between the car and the picnic table. "If we use Dad's feet to measure, will our answer be larger or smaller? Why?"

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:

Family Portrait

A Goal:

To help your child get to know members of your family by collecting information and picturing it on a graph

B What You Will Need:

- Paper
- Pencil
- Crayons

C Let's Go!

1. Choose a personal characteristic: shoe size or name length, for example.
2. Count how many people in the family have five or more letters in their name. How many have four letters? Three or fewer?

5-or-more letter names	Annie Justine
4-letter names	Pete Erin Dave
3-letter names	Sam Jim Sue Kim Ron

3. Make a graph. For example, if two people have names with five letters, write the two names side by side to show these two people. Do the same for the other name lengths.

Graphs help everyone, including adults, understand information at a glance. For example, by looking at the lengths of the lines of names, your child can quickly see which name is most common.

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: Did you know that you can teach a lot of math just by reading books to your child?

Children's books can pose interesting problems, prepare children for mathematical concepts, and provide teaching opportunities. Check the book lists in the introduction or start with books from these publishers:

Math Start Series (Levels 1-3), by Stuart J. Murphy. Harper Trophy.

Math in Literature Book Sets, selected by Carol Otis Hurst. Order from Didax educational resources, www.didaxinc.com; 800-350-2345.

Favorite Ice Cream

A Goal:




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

B What You Will Need:

- Paper
- Friends, family, or neighbors to survey

C Let's Go!

1. Make a survey sheet similar to the one shown above.
2. Ask your child to name three flavors of ice cream. Then color each scoop to resemble those flavors.
3. Together, write the flavor names in the box below the scoop.
4. Ask 10 people which of these three flavors they would prefer.
5. Use tally marks to record each person's answer.
6. Count the tally marks in each column and write the matching numeral at the bottom of the column.

Ice Cream Survey		
		
Strawberry	Superman	Chocolate
	 	\
1	5	4

7. Talk about your results:

Which column has the least marks?

Which column has the most?

Are there more _____ or more _____?

Are there fewer _____ or fewer _____?

How many people did you ask? Do you have that many marks?

How many more _____ are there than _____?

How many less _____ are there than _____?

How many _____ altogether?

Are any columns the same?

D Let's Go On!

8. You can build a graph out of almost any information you can collect. Look for things that interest your child, collect data, and then talk about what you learn using the questions above. Examples: favorite vacations, different bugs or plants found in your yard, favorite sports, time spent eating each day.



Jumping Jack Graphs

A Goal:

To help your child understand time, and to predict and chart data

B What You Will Need:

- Stopwatch or watch with a second hand

C Let's Go!

1. Invite your child(ren) to wave hands for 10 seconds so they will know how long 10 seconds is.
2. Now, predict how many jumping jacks they can do in 10 seconds. Write that number in a table like the one at the top.
3. Say, "Ready, set, go!" and begin timing for 10 seconds. Encourage child(ren) to count the number of jumping jacks as they jump.
4. Call "Stop!" when 10 seconds are up. Record how many were completed. Does that number match what you predicted?
5. Repeat several times, recording your predictions and your actual count each time. Ask, "Are you getting better at predicting? Did you do more or fewer jumping jacks this time? Which time did you do the most jumping jacks?"

Movement	guess	real
J.J./ 10 seconds	20	9
J.J./ 20 seconds	18	15
J.J./ 30 seconds	30	27
hop 1 foot (10)	15	19
hop 2 feet (10)	21	20
twirl (10 sec.)	12	8

D Let's Go On!

6. Make your table more complicated by adding one of the following variables:
 - Ask more people to participate, and include columns for them.
 - Change the amount of time you exercise. How many can you do in 15 seconds? 30 seconds? 60 seconds?
 - Repeat the activity with other movements, such as hopping on one foot, jumping on two feet, or skipping along the driveway.

Quick Tip for Math: Talk about the charts, tables, or graphs you see in your world: sports statistics, price charts, newspaper illustrations, weather forecasts.

Ask your child questions like these to get them thinking:

Read more about predicting and making graphs in *Moir's Birthday*, by Robert N. Munsch.

- Are there more _____ or more _____?
- Are there fewer _____ or fewer _____?
- How many more _____ are there than _____?
- How many less _____ are there than _____?
- Are any _____ the same?

Plan a Family Picnic

A Goal:

To help your child learn to use data to make decisions in the real world

B What You Will Need:

- Paper and pencil
- Time with your child
- An event to plan



C Let's Go!

1. Think of an event that will require some planning: family picnic, birthday party, etc. Invite your child to help you plan the event.
2. Raise questions and think about what information you need. Example: What kinds of food shall you serve? How could you find out what most guests will want?
3. Prepare a simple survey to ask your guests what kinds of food or games they would like to have at your event. Organize your data into a table that will help you make a decision.
4. Talk together with your child about what you learned through your survey. Does everyone want the same thing? Do most people agree? How many kinds of food will you have to buy to make everyone happy? Can you afford that much food?
5. Decide on a menu and how much food to order. Look again at your survey. Will this menu work for people who are vegetarians or who have food allergies?
6. After your event, talk to your children about how it went. Did your research help make the event go well? Did you forget anything? What did you learn to do differently next time?

Quick Tip for Math: Give everyone, even little ones, summer jobs at home. These provide opportunities for learning every day, and teach valuable life skills that will help in school and beyond.



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:

Number Spy

A Goal:

To help your child find and identify numbers in her/his world

B What You Will Need:

- Time with your child



"Let's play
Number Spy!"

C Let's Go!

1. Invite your child to play "Number Spy" with you. S/he will be a "spy" who has to find matching numbers.
2. Now, think of a number that your child knows.
3. Say, "I'm thinking of a number that describes how many feet the kitty has. Can you tell me, Number Spy?" (Your child should answer, "4.") Or say, "I'm thinking of the number of birdfeeders hanging from our tree." (Your child may need some help at first.)
4. Switch places after your child seems to understand the game. Let her/him think of a number and you be the "Number Spy."

D Let's Go On!

5. Try the same game, but this time match numbers to real objects in your world. Say, "I see 5 of something in my world. Number Spy, can you tell me what they are?" If your child can't guess right away, offer clues. "My objects are colorful and keep us cool in the sun." (5 beach umbrellas). This is harder, but with patience and a little help, your child will be a "number spy" in no time!

Quick Tip for Math: Dot-to-dot activities are a fun way for children to practice recognizing and ordering numbers. Buy them at any supermarket or variety store.

It's also easy to make up your own dot-to-dot patterns while you wait at doctors' offices or attend a performance. Just map out numbers in the shape of a simple figure (house, boat, car). Add a few details in the proper places (windows, doors, etc.) and let your child connect the dots in order.

Number Bingo

A Goal:

To help your child count and recognize numbers while having fun

B What You Will Need:

- A Math Bingo game sheet
- A set of clues prepared by an adult
- One marker (a coin or chip will work)
- Paper and pencils for each player

20	6	12	17
13	X	14	2
1	10	5	7
X	8	4	9

C Let's Go!

1. Prepare grids with four rows and four columns. Choose numbers to fill each square. Make enough for each child who will play, but make each one different.
2. Prepare a set of picture clues or word clues.
3. Read your first clue. Example: Show a picture of three cats. Or say, "This is the number of children in our family."
4. Have each child find the answer, by counting or other method, and put a marker or chip on the number they think answers the question.
5. When each child has marked a number, count the objects together. If they got it right, remove the marker and place an x over the number. If they got it wrong, remove the marker and try again.
6. Continue reading or showing clues and marking answers until one child gets four in a row, across, up and down, or diagonally.

Quick Tip for Math: You can adapt this game to play with one child, or many children. You can also adapt it as your child gets better at finding numbers:

- Make more steps to finding the problem. "I'm thinking of a number that comes before 8."
- If only one child will play, challenge her/him to improve her/his speed when finding numbers.
- Introduce some geometry: "I'm thinking of the number of sides in a triangle."

Picture Puzzle

A Goal:

To help your child understand that symbols can stand for numbers

B What You Will Need:

- 50 or more straws, craft sticks, or cotton swabs
- Rubber bands

C Let's Go!

1. Help your child bundle some of the straws into groups of 10.
2. List some numbers and have your child show bundles and single straws that represent each number.

For example: $15 = 1$ bundle and 5 single straws

$43 = 4$ bundles and 3 single straws

$31 = 3$ bundles and 1 single straw

D Let's Go On!

3. Now try drawing pictures of bundles and single straws to represent the numbers. Using pictures to depict numbers introduces children to the idea that symbols on a page can represent amounts.

If you draw 2 bundles and 3 single straws, your child should be able to tell you it represents the number 23.

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: Teaching math skills can be as easy as playing a game. That's because games teach children to focus on details and sharpen their memory. Here's one to try:

Using a deck of playing cards (face cards removed), play "Go Fish" with your child. Deal four cards to each player. Take turns asking for number cards from one another to match numbers you hold in your hand. If the player you ask doesn't have that number, "go fish" in the remaining pile. When players make a match, put the pairs down on the table. The player with the most pairs wins.

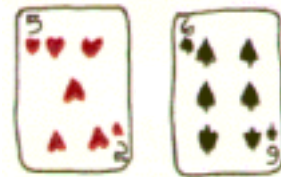
More or Less

A Goal:

To help your child develop number sense and learn about the relationships of numbers

B What You Will Need:

- Coin
- 2 decks of cards
- Scratch paper to keep score



C Let's Go!

1. Tell your child(ren) you will be playing a card game similar to the game War.
2. Decide whether the winner of each round will be the person with "more" (a higher value card) or "less" (a lower value card).
3. Before playing, remove all face cards (jacks, queens, and kings) and divide the remaining cards in the stack between the two players. Aces equal one.
4. Place the cards face down. Each player turns over one card and compares: Is mine more or less? How many more? How many less?
5. If you decided "more" would win the round, then the player with the higher value card takes both cards. If you decided "less" would win the round, then the player with the lower value card takes both cards.
6. Repeat until all the cards have been played. Count each pile to see who wins!

This game for young children encourages number sense and helps them learn about the relationships of numbers (more or less than) and about adding and subtracting. By counting the shapes on the cards and looking at the printed numbers on the card, they can learn to relate number of objects to the numeral.

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: It's easy to turn any snack-time into math time!

- Serve two different shapes of snack crackers. Line them up using various patterns (ABABAB or AABAABAAB) and see if your child can complete the pattern.
- Give each child a piece of bread dough to shape into her/his favorite number. Add the matching number of raisins on top of the dough. Then bake the numbers and enjoy!

Money Match

A Goal:

To help your child learn how to count change (Lots of repetition will make it even more effective.)

B What You Will Need:

- A die to roll
- 10 of each coin (penny, nickel, dime)
- 6 quarters

C Let's Go!

1. For young players (5- and 6-year-olds), use only two different coins (pennies and nickels or nickels and dimes). Older children can use all the coins.
2. Explain that the object of the game is to be the first player to earn a set amount. (Ten or 20 cents is a good amount.)
3. The first player rolls the die and gets the number of pennies shown on the die.
4. Players take turns rolling the die to collect additional coins.
5. As each player accumulates five pennies or more, the five pennies are traded for a nickel.
6. The first player to reach the set amount wins.
7. Add the quarter to the game when the children are ready, and increase the amount needed to win.



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Quick Tip for Math: Encourage comparison of prices and quantities marked on containers to determine the best buys. Allow the child to purchase an item and figure out the change to be received.

Newspaper Numbers

A Goal:

To help your child develop the ability to read and understand numbers

B What You Will Need:

- Newspapers
- Glue
- Paper
- Safety scissors
- Pencil or crayon



C Let's Go!

1. Help your child look for the numbers 1-100 in the paper.
2. Cut the numbers out and glue them in order onto a large piece of paper. For children who cannot count up to 100 or recognize numerals that large, collect only up to the number that they know.
3. Have your child say the numbers to you and practice counting.

D Let's Go On!

4. Collect only numbers within a certain range, like the numbers between 20 and 30.
5. Arrange the numbers on the chart, grouping all the numbers that end with 5s, even or odd numbers, numbers that end in 0, and so on.

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

- Count the "Ants on a Log." Spread peanut butter onto celery sticks, and put various numbers of raisins on top. Order from smallest number to largest number of raisins. Then count the total.
- Using small colored marshmallows, have children sort and count the different colors they have. Older children can tell what fractional part of the whole they have of each number. *Example:* I have 6 marshmallows; 2 of them are green. So 2 out of 6 or $\frac{2}{6}$ are green.

Jump Counting

A Goal:

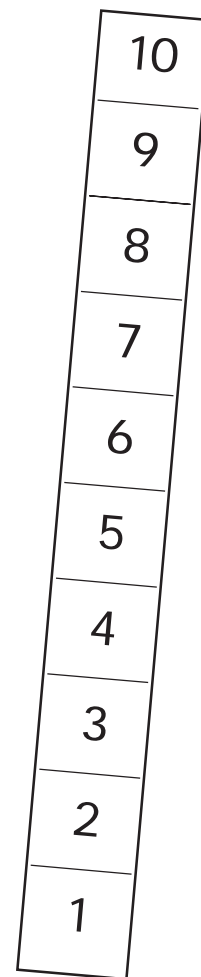
To help your child understand even and odd numbers

B What You Will Need:

- Sidewalk chalk OR
- Masking tape

C Let's Go!

1. Use sidewalk chalk to create a special "number line" on the ground. If you are working indoors, use masking tape to form numbers on the floor.
2. Number the boxes from 1-20. (Or 1-10 for a younger child.)
3. Invite your child to jump along the number line and say the numbers as they land on them.
4. Now, start on the 2 and jump to 4, 6, 8, 10 and so on. Ask questions:
 - Do you know how many squares you are jumping over each time?
 - What is the next number you would jump on after 10?
 - Do you remember what these numbers are called? (even numbers)
5. Repeat, but have your child begin on the 1 square, and jump on every other square. Again, ask the questions in step 4.



D Let's Go On!

6. As your child gets better at this activity, extend the line to include more numbers.
7. Try asking your child to jump-count by 3s. Can s/he do it by 4s?
8. Brainstorm ideas for jump-counting by larger numbers, (by 5s, 10s, etc.). What would you have to do first? Could you make a different number line, using only numbers that ended in 5 or 0? Could you use antigravity shoes?

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:

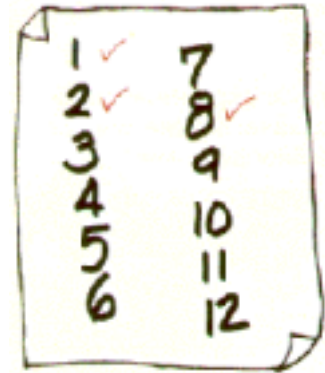
Super Sums

A Goal:

To help your child develop different ways to see and work with numbers by using them in different combinations to achieve a goal.

B What You Will Need:

- Deck of cards
- Paper
- Pencil



C Let's Go!

1. Have each player write the numbers 1-12 on a piece of paper. The object of the game is to be the first one to cross off all the numbers on the list.
2. Open a deck of cards. Use only the cards 1(Ace)-6 in every suit (hearts, clubs, spades, diamonds).

3. Each player picks two cards and adds up the numbers on them. The players can choose to mark off the numbers on the list by using the total value or crossing off two or three numbers that make that value. For example, if the player picks a 5 and a 6, the player can choose to cross out 11, or 5 and 6, or 7 and 4, or 8 and 3, or 9 and 2, or 10 and 1, or 1, 2, and 8.



D Let's Go On!

Make 100. Using only Ace–6, have each player draw eight cards. Each player must get as close to 100 as possible without going over. Players can decide whether to use a card in the tens place or the ones place. For example, if a player draws two 1s (aces), a 2, a 5, two 3s, a 4, and a 6, he can choose to use the numerals in the following way: 30, 40, 10, 5, 6, 1, 3, 2. This adds up to 97.

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: 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 understanding 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.

List It

A Goal:

To help your child use numbers for planning

B What You Will Need:

- Grocery ads from a newspaper
- Paper and pencil
- Calculator
- Coupons



C Let's Go!

1. Provide your child with the grocery section of the newspaper in order to make up a list of food that will feed the family for a week and meet a budget of a certain amount of money.
2. Help your child make a list of items you might need. Mark checks or tallies next to each item to indicate the number needed.
3. Look for the foods you listed in the newspaper and write their prices on the list.
4. Use a calculator to figure out the cost of your items.
5. If the total for the groceries is too great, talk about ways to save money.
 - Which items can be eliminated?
 - Could you buy fewer items?
 - Could you find a cheaper brand?
 - What will best serve the needs of the family?

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: Let your child clip out coupons of items you often buy or plan to buy during a shopping trip. Then have some fun before you shop:

- Sort the coupons in a number of ways: by item, by value, by shape, or in other groups your child can find.
- Use mental math or a calculator to add up the savings you would have if you were to use every coupon.
- Let your child hold the coupons in the store and find the matching items. Consider letting her/him keep the money you save with the coupons s/he helped find.

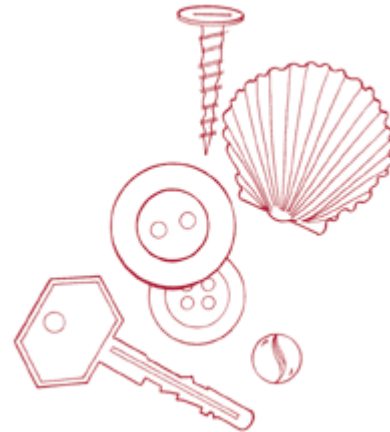
Treasure Hunt

A Goal:

To give your child hands-on experience with numbers, counting, sorting, and other mathematical concepts.

B What You Will Need:

- Buttons
- Screws
- Washers
- Bottle caps
- Old keys
- Sea shells
- Rocks
- OR anything else you can count



C Let's Go!

1. Find a container to hold the treasures. Have your child predict what size and shape will be needed to hold all the items.
2. Sort and classify the treasures. For example, do you have all the same sized screws or keys? How are they alike? How are they different?
3. Use these treasures to tell addition, subtraction, multiplication, and division stories. For example, if we share 17 buttons among three friends, how many will we each get? Will there be some left over? Or, if we have 3 shirts that need 6 buttons each, do we have enough buttons.
4. Organize the treasures by one characteristic and lay them end-to-end. Compare and contrast the different amounts of that type of treasure. For example, there are 3 short screws, 7 long screws, and 11 medium screws. There are 4 more medium screws than long ones. This may also provide an opportunity to talk about fractions: $\frac{7}{21}$ or $\frac{1}{3}$ of the screws are long.

D Let's Go On!

5. Ask your child to think about objects that might belong to two groups at one time. Example: buttons with 4 holes and objects that are round. Can s/he think of a way to display that?

Find the Missing Parts

A Goal:

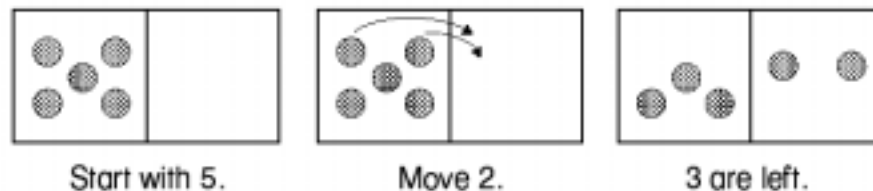
To give your child practice with subtraction

B What You Will Need:

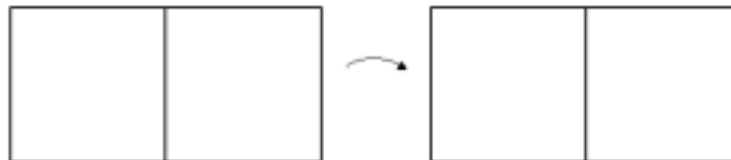
- Time with your child
- Pencil
- Counters—you can use dry beans, buttons, or any other small objects.

C Let's Go!

1. Look at the following example with your child and talk about what's happening in the picture.



2. Ask your child to practice solving the problems below. Use counters in the empty boxes below to help.



1. Start with 6. Move 1. _____ are left.
 2. Start with 7. Move 2. _____ are left
 3. Start with 5. Move 3. _____ are left.
 4. Start with 7. Move 1. _____ are left.
 5. Start with 4. Move 2. _____ are left.
 6. Start with 5. Move 4. _____ is left.
3. Make up more problems as long as your child is interested. Adjust the difficulty according to your child's ability.
 4. You can do this activity when you're out and about by using a baking sheet and small magnets. Divide the baking sheet with a line of masking tape down the center. If you don't have magnets, buy stick-on magnet sheets at an office supply store and place on the back of coins or other small objects.

Problem Solving With Shapes

A Goal:

To help your child use analytical thinking to solve problems

B What You Will Need:

- Pencil

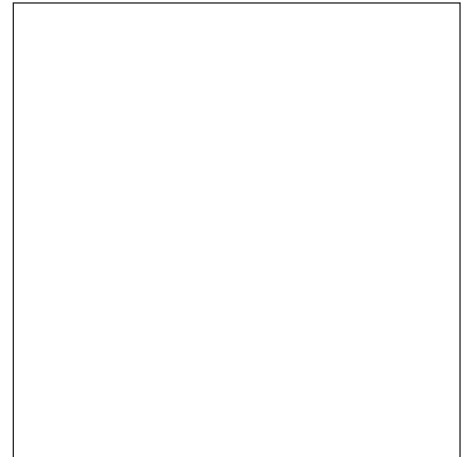
C Let's Go!

1. Draw an animal with two heads and three legs.

Choose one of these shapes for the body.

Use a different shape for the two heads.

Use the last shape for the three legs.



2. Write 1 in each body shape.
3. Write 2 in each head shape.
4. Write 3 in each leg shape.
5. Then write a number from your animal in each shape below.
6. Find the sums.

$\begin{array}{r} 7 \\ + \square \\ \hline \end{array}$	$\begin{array}{r} 5 \\ + \bigcirc \\ \hline \end{array}$	$\begin{array}{r} 6 \\ + \parallel \\ \hline \end{array}$	$\begin{array}{r} 8 \\ + \square \\ \hline \end{array}$	$\begin{array}{r} 9 \\ + \parallel \\ \hline \end{array}$
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$\begin{array}{r} 6 \\ + \bigcirc \\ \hline \end{array}$	$\begin{array}{r} 9 \\ + \parallel \\ \hline \end{array}$	$\begin{array}{r} 8 \\ + \square \\ \hline \end{array}$	$\begin{array}{r} 7 \\ + \parallel \\ \hline \end{array}$	$\begin{array}{r} 7 \\ + \bigcirc \\ \hline \end{array}$
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D Let's Go On!

7. Make up similar problems, based on your child's interest and ability.

Break the Bank

A Goal:

To boost your child's subtraction skills

B What You Will Need:

- Large supply of pennies
- One die
- 2 or more players

C Let's Go

1. Start with a designated amount of pennies. (For those children who are just starting out, ten is best.)
2. Have the first player roll the die. Then, have her/him take away that many pennies from her/his pile. The player must talk about what s/he is doing. Example: I rolled a four. I have ten pennies. I must take four pennies away. I have six pennies left.
3. Now it's the next player's turn. Repeat step 2.
4. The first to lose all his pennies or "break the bank" wins.

D Let's Go On!

5. Add more pennies as your child develops his understanding of subtraction.

Quick Tip for Math: When you play board games with your child, try starting at the end and playing backwards. This way they must subtract their spaces instead of adding them.

Get children to talk about what they are subtracting as they move their game piece. Guide them without giving them answers. When we struggle for an answer and get it on our own, we understand a concept better and remember it longer.

Subtraction Art

A Goal:

To give your child practice with subtraction

B What You Will Need:

- Paper and art supplies
- OR wipe-off “white” board with dry-erase markers
- Paper and pencil



C Let's Go!

1. Allow your child to paint or draw a picture containing any amount of objects. (The more the better!)
2. After the picture is complete have him roll a die.
3. Then, ask her/him to erase, cross out, or wipe out that many objects and write a number sentence about what he did with his art.

Example: Say your child draws a picture that contains fifteen toys. He then rolls a die and gets the number six. He should erase, or cross off, six toys in his picture in any way he chooses. Then at the bottom or top of his artwork, he should write $15-6=9$.

4. Talk with your child during the activity to get a sense of what he is thinking. That way if he makes a mistake you will understand why and know how to help him find a way to correct his mistake.

D Let's Go On!

5. You can use the same method to do “Addition Art.” After rolling the die, have your child add that many elements to her/his picture. Don't forget to write the number sentence that goes along with the addition.

Quick Tip for Math: Your feelings will have an impact on how your children think about math and themselves as mathematicians. Take a few minutes to answer these questions:

*Did you
Know?*

- Did you like math in school?
- Do you think anyone can learn math?
- Do you think of math as useful in everyday life?
- Do you believe that most jobs today require math skills?

If you answer “yes” to most of these questions, then you are probably encouraging your child to think mathematically.

**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 out 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 out of 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 is the probability that three coins will all turn up 'tails'?"
6. Lay out all the possibilities and then record 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.

Put It Away

A Goal:

To help your child develop classifying and reasoning skills and the ability to examine data or information

B What You Will Need:

- Paper
- Pencil
- Ruler
- Computer (optional)



C Let's Go!

1. After getting home from grocery shopping, find one characteristic that is the same for some of the products. For example, some are boxes and some are cans.
2. Put together all the items that have the same characteristic.
3. Find another way to group these items.
4. Continue sorting, finding as many different ways to group the items as you can.

D Let's Go On!

5. Play "Guess My Rule." In this game, you sort the items and ask your child to guess your rule for sorting them. Then, reverse roles and let your child sort the items so that you can guess her/his rule.
6. Using paper, pencil, ruler or computer spreadsheet, make a table of how many items are in each category.

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: Learning to do math often requires children to learn a whole new language. Whenever you can, try to connect the language of math with the concepts. For example, when you share an apple or sandwich, split it into two parts of the same size. Explain to your child that each of you is eating one-half.

You can talk to children about other mathematical concepts: greater than, less than, or equal to; likely and unlikely events; adding together, subtracting; grouping and sorting; about, approximately, in between, around.

Photo Match

A Goal:

To help your child notice when things are different or alike

B What You Will Need:

- Doubles of family photographs you have had developed

C Let's Go!

1. When you take your pictures in to be developed, order doubles. Photos of the child, or photos your child has been involved in taking with you, will especially capture interest.
2. Using the doubles, have your child find the sets of two that are exactly the same.
3. Next, ask her/him to sort the sets into categories. For example, pictures of animals, pictures of buildings, pictures of people, and so on.

D

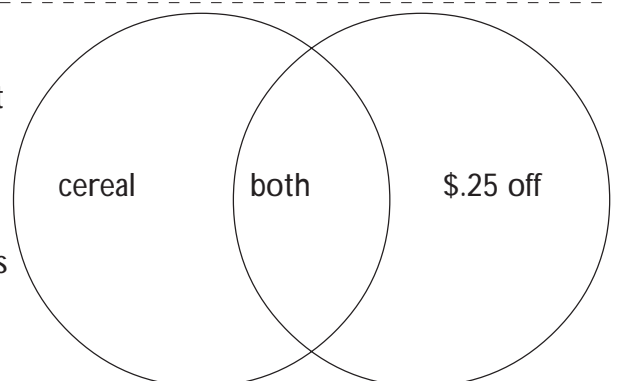
Let's Go On!

4. Teach your child to sort using a Venn Diagram (see below).
5. Ask your child to find photos that belong to more than one category.
Example: A photo of a boy and a dog could go with animal photos or with people photos.
6. Draw a Venn Diagram similar to the one below or create one out of hoola hoops or two circles made from yarn.
7. For the example above, you would label one circle "people," and label the other "animals."
8. Tell your child to sort the photos into the proper circles. Photos that fit into both circles go in the center. Photos of just scenery stay outside both circles.

Quick Tip for Math:

Venn Diagrams are visual aids to help your children sort objects in more than one way. Draw them onto paper and label with any categories you like. Or use overlapping hoola hoops or circles made of yarn.

Example: In the diagram at right, you could sort coupons for cereal into the left circle. You could put all 25-cent-off coupons in the right circle. Any coupons for cereals that are 25 cents off would go in the center.



Is It Certain?

A Goal:

To help your child understand the difference between chance and certainty

B What You Will Need:

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

Certain	Impossible	Chance

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/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.

Find the Ways

A Goal:

To help your child find several ways to combine numbers

B What You Will Need:

- Time with your child
- Pencil

This table shows all the ways to put 3 strawberries into 2 bowls.

		in all
0	3	3
1	2	3
2	1	3
3	0	3

C Let's Go!

1. Show your child the example above. Tell her/him you are going to complete similar tables below.

1. How many ways can you put

5 into 2 ?

in all

		in all
0	5	5

There are _____ ways.

2. How many ways can you put

8 into 2 ?

in all

		in all
0	8	8

There are _____ ways.

D Let's Go On!

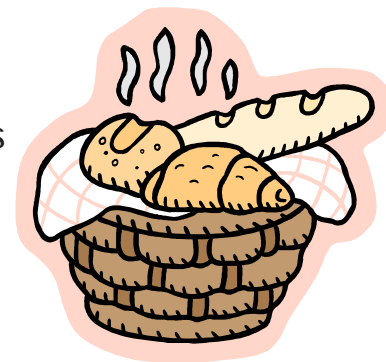
2. Make similar tables for your child using problems from real life.
Example: How many ways can you seat 8 guests at 2 tables? How many ways can you plant 5 plants into 3 pots? **Even better**, get plastic flowers and practice "planting" them in the ground in various combinations. Record the combinations.

Adapted from an activity by Scott Foresman Addison Wesley

Step by Step

A Goal:

To help your child arrange and explain a sequence of pictures for baking a cake or other job with many steps



B What You Will Need:

- Ingredients to bake a cake (or other favorite treat) with your child
- Long sheet of paper (Paper towels or shelf paper will work.)
- Crayons, markers, or colored pencils
- Safety scissors

C Let's Go!

1. Let your child take part in preparing a favorite recipe.
2. When you are finished, ask your child to pretend s/he has to teach someone how to prepare this food, using a series of pictures.
3. On a long piece of paper, have your child draw a series of pictures telling exactly, in order, the steps needed to prepare the recipe.
4. When the drawing is finished, have your child explain the steps in order.
5. Now, cut the steps apart. Can your child put them in order again?

D Let's Go On!

6. Repeat this activity with other tasks familiar to your child: building a birdhouse, taking a bath, baiting and catching a fish, setting up a tent.
7. Bind all the instructions into a simple book and give it a fancy title:
Jason's Book of How To Do Stuff

Quick Tip for Math: Cut apart frames of comic strips your child enjoys. See if s/he can put them back together in order.

Put sets of these cut-up comics in plastic sandwich bags and tuck them into your purse or glovebox. They will fill the time on trips and in waiting rooms when your child says, "I'm bored!"

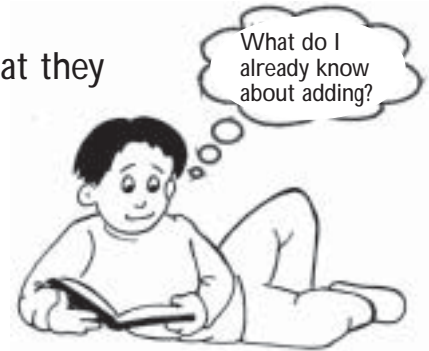
Math Maps for the Mind

A Goal:

To help your child connect new math ideas with what they already know

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. Help your child think of some examples, and write them in the left box.
Example: ball, clock, coins.
5. Ask your child to describe what it is like, and write this in the bottom box.
Example: It is curved.
6. Have your child think of some non examples, and write these in the right box. *Example:* book, paper, clip.

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

Geometry Words: circle, square, triangle, rectangle, right, left, top, bottom, next to, under, over, around.

Subtraction Words: 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.

Additional Concepts: graph, estimate, measure, number, statistics, patterns, shapes, groups, match.

Word Map

PILOT



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

FOR LITERACY & MATHEMATICS

<p>WHAT IS IT?</p> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>CONCEPT</p>	<p>WHAT ARE SOME NON EXAMPLES?</p> <hr/> <hr/> <hr/> <hr/> <hr/>	<p>WHAT IS IT LIKE?</p> <hr/> <hr/> <hr/> <hr/> <hr/>
	<p>WHAT ARE SOME EXAMPLES?</p> <hr/> <hr/> <hr/> <hr/> <hr/>		

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!

