Pre-K Mathematics Contents

Math Home Page

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

At home

- Make sure your child sees you using mathematics as you go through your day. Talk out loud about what you are measuring or figuring. Say: "I need to double this recipe. Let's see, 1 cup plus 1 cup is two cups. Can you count with me?" (Number Sense and Numeration; Measurement)
- Laundry Math—Sharpen skills by doing a necessary household job. Ask your youngster to sort laundry—before or after washing. How many socks? How many sheets? And you may find a lost sock as well! (Number Sense and Numeration; Patterns, Relationships, and Functions)
- Place number magnets on your refrigerator or on another smooth, safe metal surface. When you are working in the kitchen, ask your child to name the numbers she plays with and see if she can match them to the correct number of objects. (Number Sense and Numeration)
- Give your child empty plastic food containers or pots and pans. Encourage him/her to stack them on top of or inside of each other. Many children will stay busy for a long time as they touch and handle objects, learning shapes, sizes and relationships. (Geometry & Relationships)

In the sun

- Give your child sidewalk chalk or paintbrushes with a cup of water. Let him/her draw or paint shapes or numbers on the concrete. Or at the beach or in the garden, have your child draw shapes or numbers in the soil using legs and feet for a "pencil." Show how to write the shapes or numbers giant-sized. Imagine a plane flying overhead and seeing your "code." Try describing just the attributes of a mystery shape (no sides, round, no corners). Can s/he draw it? (Geometry; Number Sense)
- 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)
- 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)

On the run

- While you're on the go, have your children keep their eyes open for numbers: street and building numbers, phone numbers on the sides of taxis and trucks, dates on buildings and monuments, and business names that have numbers in them. Keep a pad of paper and pencils handy to copy down what they see. (Number Sense and Numeration)
- Ask your child to find shapes in your world. Look for circle shapes on the can of soup, or the square on a box of rice as you shop for groceries. Play a game in which you look for other items that are the same shape as you shop. It will help your child begin to recognize, name, and describe shapes. (Geometry)

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 Puzzeles, 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.*** Promethius 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.shtm

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 Kaczmarski, 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 Monkees 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.

Illuminations: 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

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.

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Find the Pattern

A Goal:

To help your child describe and extend items in a pattern

B What You Will Need:

- Small toys in a variety of colors or shapes (miniature cars, colored blocks, beads)
- Time with your child

C Let's Go!

1. Tell your child you are going to make a pattern. Her/his job is to finish the pattern.
2. Lay out the toys with a repeating pattern.
   Example: red car, blue car, red car, blue car, and so on.
3. After you've repeated the pattern 2 or 3 times, see if your child can continue the pattern.
4. Ask your child to tell you why s/he used the car s/he did.
5. When your child gets good at simple patterns, make it a little more complicated.
   Example: red, red, blue; red, red, blue blue; red red blue; red, red, blue blue.
6. Trade jobs. Let your child make up the pattern and you see if you can finish it.

Quick Tip for Math:

Practicing math skills is as simple as playing a game you may already have on your shelf. For example, when children play with dominoes they learn to recognize number patterns by sight.

Adjust the play to fit the skill of your child. Make simple matching games for young children. Count the dots as you go. It won't be long before your child can recognize the patterns in the number tiles without having to count the dots.

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Record-a-Pattern

A Goal:

To help your child describe and record pattern and sequence families

B What You Will Need:

- Paper
- Crayons, colored pencils or markers
- Time with your child

C Let's Go!

1. Tell your child you are going to make a pattern. Her/his job will be to use letters (A, B, C) to label the patterns.
2. Draw several patterns using 4 color blocks or shapes. Show your child how to use letters to label the patterns.

   Example: In the following three-shape sequences, the first shape is represented by an A, since it comes first; the second shape by a B because it comes second; the third shape by a C because it comes third.

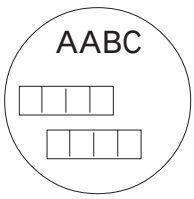
   SO: ▲ ● ■ *is called an "ABC sequence."*

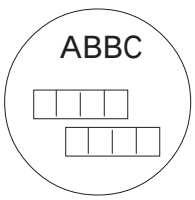
   ▲ ● ■ ■ *would be called an "ABCC sequence," because the third shape (labeled C) is repeated.*

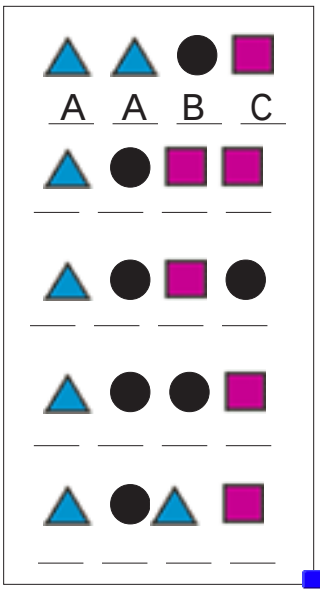
   ▲ ▲ ● ■ *would be called an "AABC sequence," because the first shape (labeled A) is repeated.*

   ▲ ● ● ■ *would be called an "ABBC sequence," because the second shape (labled B) is repeated.*

3. After you've practiced labeling a few of these types of sequences with your child, draw out some more and ask your child to label each one.
4. Next, cut the pattern sequences apart and ask your child to group the patterns that are the same. (For example, all the AABC patterns go on one paper plate; all the AABB patterns go on another paper plate; and so on.







PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

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 blue followed by a red space."
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 & 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: **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 graphic record of what happens each day to each plant.

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.

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Quilt-a-Pattern

A Goal:

To allow your child to create a pattern

B What You Will Need:

- Construction paper in several colors
- Scissors
- Glue or paste

C Let's Go!

1. Ask your child to cut out different shapes from construction paper. (If s/he has a hard time getting the shapes s/he wants, help draw or trace the shapes onto the paper first. Shape tiles, plastic storage lids or jar lids make good objects to trace.
2. Have your child paste the shapes in a pattern to make a "quilt."
3. Can s/he describe the pattern? Does the pattern ever change? Why did s/he choose that pattern? Is there more than one pattern in the "quilt"?
4. Display the finished creation and see if other family members or visitors can find the pattern.

D Let's Go On!

5. Try this activity with various shapes and colors of pasta!

Quick Tip for Math: Snack time is math time when you serve crackers in a variety of shapes. Look for crackers in squares, triangles, rectangles and circles. Serve all the shapes at once, then have some fun as you crunch.

Can you make a cracker **pattern**? Can someone else repeat it?

Sort the crackers by shape, size or color. Mix them up and sort again!

Compare. Do you have more circles than squares? Which shape is biggest?

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

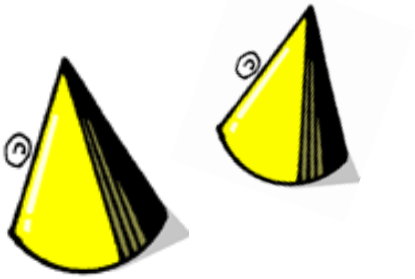
Pattern Obstacle Course

A Goal:

To help your child learn to identify and describe variations in patterns

B What You Will Need:

- Enough space to set up an obstacle course
- Things to climb over, under, around, and through



C Let's Go!

1. Set up an indoor or outdoor obstacle course. Use playground equipment you already have, or use empty boxes, hoola hoops, lawn furniture, cushions, etc.
2. Choose 2 or 3 motions that your child will use to get around the obstacles in her/his path. *Examples:* over, under, around, through, beside, along.
3. Now, choose a pattern for your child to follow as s/he runs the obstacle course. *Example:* You might first tell your child to run the course with a pattern of over and under. Your child would climb over the first obstacle and wiggle under the next. Since this is a pattern with only two motions, s/he would continue this way all through the course.
4. As your child gets comfortable with this game, vary the pattern in different ways. *Example:* add another motion or do one motion twice before going back to the first.

D Let's Go On!

5. Now run the obstacle course yourself. Introduce a new pattern your child has not yet followed, but don't tell her/him what you plan to do. Can your child identify the pattern? Can s/he name it? Can s/he copy you?

Quick Tip for Math: To do well at math, children need to solve problems, communicate mathematically and to have the ability to reason mathematically.

Reasoning ability means thinking logically, being able to see similarities and differences about things, making choices based on those differences, and thinking about relationships among things. You can encourage your child to explain his or her answers to easy math problems and to the more complicated ones. As you listen, you will hear your child sharing his or her reasoning.

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Record Temperatures

A Goal:

To help your child see patterns and relationships in nature, and predict the future based on what they observe

B What You Will Need:

- Outdoor thermometer or weather channel
- Simple chart (see appendix)

C Let's Go!

1. Record the outdoor temperature for 4 days, several times a day. (Morning, noon, evening and night, for example.) Make sure you record it at the same time each day.
2. Keep a graph of the temperatures and the time you take it each day.
3. Look at your data after a few days and talk about what you can see. Is there a **pattern** to the way the temperature goes up and down?
4. Try to predict whether the temperature will change in the same way tomorrow. Check your predictions to see if you were right.

D Let's Go On!

5. Draw a little picture to describe the weather conditions at the time you record the temperature. (Cloudy, sunny, rainy?)
6. Is there a **relationship** between the temperature changes and the weather conditions? Does the temperature change more on sunny days or rainy days?
7. You can repeat this type of activity with any information you can observe and record: the number of birds at your birdfeeder each day; the time the sun rises or sets; the number of cars driving down your street at different times of day.

Quick Tip for Math: Help your children be risk takers. Help them see the value of trying to do a problem even if it is difficult for them.

Give your child time to explore the different approaches to solving a problem. Your child's way might differ from yours, but if the answer is correct and the strategy or way of solving it has worked, it may be a great alternative.

By encouraging children to talk about what they are thinking, we help them to have stronger math skills and become independent thinkers.

A Goal:

To help your child _____

B What You Will Need:

-
-
-

C Let's Go!

1.

D Let's Go On!

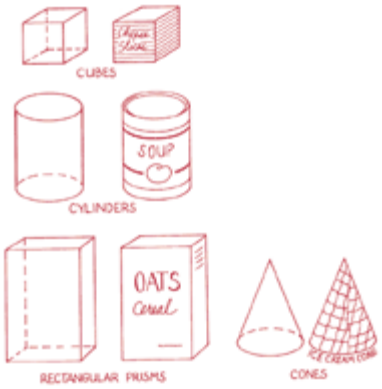
Adapted from the School-Home Links Reading Kit with permission from the U.S. Department of Education

Quick Tip for Literacy:

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 baking powder 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?"

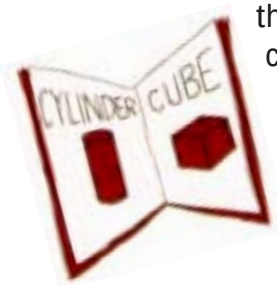
   "Look at these two circles. Can you tell me how they are the same? How are they different?

   "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 (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.

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

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Copy That Shape

A Goal:

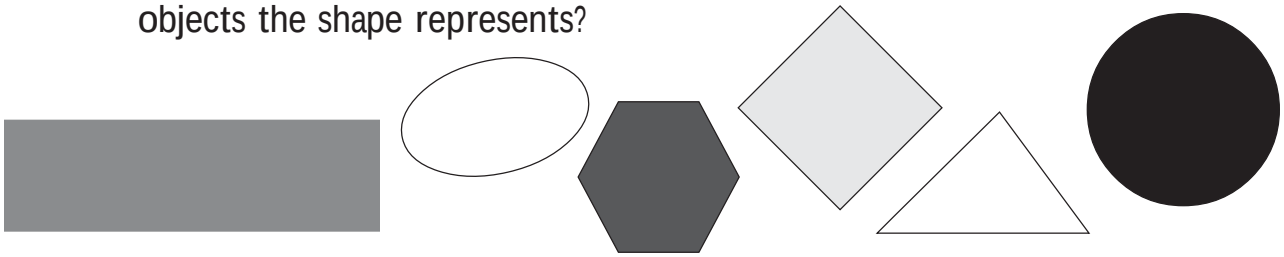
To help your child remember and describe the shapes s/he sees

B What You Will Need:

- Paper
- Pen, pencil, or marker
- Toothpicks
- String or twist-ties

C Let's Go!

1. Draw a shape on the paper, or build it out of toothpicks, twist-ties or string. Let your child examine it.
2. Flip the paper over and see if your child can draw, trace in the air, or describe to you the shape s/he just saw. You might also ask the child to re-create the shape using a piece of string or toothpicks.
3. Don't worry if s/he can't remember. As you repeat the activity, s/he will begin to develop strategies for remembering the shape.
4. Remember, numbers are just shapes for young children. Do this activity by drawing a number. Can your child draw the number once you have hidden your copy? Can s/he name the number? Can s/he show you how many objects the shape represents?



Quick Tip for Math:

Did you know your child can learn about shapes and geometry simply by playing every day? Younger children can play with puzzles and shape blocks. Older children enjoy games that involve shapes in different positions or patterns. These are great "hands-on" activities that help children understand spatial concepts.

Here are some games you might try: Yahtzee, dominoes, Jenga, GeoShapes, Geo/Derby USA, The Mage's Triangle. If your child isn't old enough to understand all the rules, make up your own versions that match his/her ability.

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

Measure and Compare

A Goal:

To help your child learn about quantity and volume

B What You Will Need:

- Dinner preparations
- Containers and measuring cups in a variety of shapes and sizes

C Let's Go!

1. Invite your child to help you make a meal.
2. Pour uncooked rice, macaroni, oatmeal, or water into a tall, thin container.
3. Pull out a short, fat container with a similar volume. Ask your child: "Do you think it will spill over if I pour this into the new container? Do you think we'll have lots of extra space?"
3. Then pour the grain or water into the short, fat container.
4. Your child may be amazed to see that the two containers hold similar amounts.
5. If you have time, experiment pouring the ingredient into other shaped containers. Can they guess whether the rice or water will overflow or come short of the top?

D Let's Go On!

6. You can also play this game at the beach (use sand or water), the tub, or the backyard pool. Help your child make guesses about how much volume their pails or cups will hold. How many cups of sand will fit into a pail, for example. Count it out and see how well you guessed!

Quick Tip for Math: Most children love to bake and feel important as they help adults. Let your child help put together the ingredients as you read aloud a recipe. Cooking helps build math skills as well:

Measurement: "We need a cup of flour. Can you find the measuring cups?" Allow older children to help measure less messy items.

Sorting: "We need to mix all the wet ingredients first, then the dry ingredients."

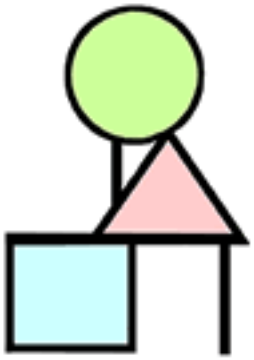
Sequences (order of events): "First we put in the eggs, then we add the flour."

PILOT FAMILY FUNdamentals FOR LITERACY & MATHEMATICS

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:

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

C Let's Go!

1. To make eating more fun—and educational—cut your child's food into different shapes.

   Examples: Cut scrambled eggs into triangles, or sandwiches and fruit into circles or squares.

2. Don't limit yourself to simple shapes, but use your imagination to create different designs.
3. Choose a theme for a day. On "circle day," serve round foods like crackers, cookies, or tortillas for snack. Talk about how all the snacks today will be round.
4. Find cereal or pasta that comes in shapes, including letters or numbers.
5. 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!

6. Children can use mealtime to understand the relationships within and between shapes. Cut sandwiches once 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: Observe and talk about the shapes you see in your world. For example, you might find a hexagon in a beehive. Birds' nests are usually circles. And cars come in all kinds of shapes. Some are more rectangular, some are round (a V.W. Beetle, for example.) Do you see any triangles on cars?

Shoe Sort

A Goal:

To help your child notice the attributes of shoes and sort them by attributes.

B What You Will Need:

- Shoes, socks, or other items that come in pairs

C Let's Go!

1. Dump several different pairs of shoes (or socks, mittens, or other unmatched pairs) into a pile.
2. Ask your children to match up the pairs.
3. After they are properly matched, count the pairs.
4. Talk about the difference between single shoes and pairs of shoes.
5. Note the different sizes, shapes, and colors of shoes. Ask your child how s/he knew these shoes went together. What attributes (characteristics) did s/he use to sort them into pairs?

D Let's Go On!

6. Mix up the pairs again. This time make some silly pairs.
7. Pair up items that wouldn't normally go together, but that have at least one attribute in common. For example, two items that are the same color or two shoes that can be worn for running. How about two socks that belong to Dad (but aren't part of a set).
8. Challenge your child: "Why did you put those together? Can he name what the items have in common?

Quick Tip for Math: Help your child measure time by playing "Beat the Clock" as they work on daily chores. Use a timer or hourglass as they put on pajamas or brush their teeth, for example. Offer a special treat, like reading an extra book before bed, if they get ready for bed in 3 minutes.

Feel a Shape

A Goal:

To 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 a 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 him/her to choose one item.
4. Can s/he tell what shape the item is? What kinds of things can s/he feel that tells her/him what shape it is? (Does it have corners? Sharp sides? Can s/he count the sides?

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: It's possible for you and your children *to enjoy* mathematics! Maybe you didn't think mathematics was fun when you were in school, but when children play with mathematics in their everyday lives they can grow up loving it.

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.

Source: Early Childhood: Where Learning Begins, By Carol Sue Fromboluti and Natalie Rinck. U.S. Dept. of Education, 1999.

PILOT FAMILY FUNdamentals FOR LITERACY & 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 in 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 that get your children *thinking*. The questions you and your children ask can get them thinking mathematically.

Ask questions about sequence: What comes first? What comes next? What comes last?

Ask things like "Why do you suppose that happened?" "What makes you think so?" What other way could we do this?" "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?
   Which is longer, the garage door or the porch
2. Give each child a pencil and piece of paper.
3. Assign a measuring task to each child.
4. First ask, "How long do you think it will be?" and have children record their guess on the paper. (For pre-writers, an adult can write the guess.)
5. Now, go ahead and measure. Record the answer next to the 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 measurement you use.

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 shoe lengths are between the slide and the swing set at the playground? Walk heel to toe to find out.

Now compare that distance to the distance 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!

Adapted from the School-Home Links Reading Kit with permission from the U.S. Department of Education

Quick Tip for Literacy:

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?
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.

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

Graphs help everyone, including adults, understand information at a glance. By looking at the lengths of the lines of names, your child can quickly see which name, for example, 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.

Jumping Jack Graphs

A Goal:

To help your child understand time, estimate, and chart data

B What You Will Need:

- Stopwatch or watch with a second hand

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

C Let's Go!

1. Invite your child(ren) to wave their hands for 10 seconds so they will get a sense of how long 10 seconds is.
2. Now, predict how many jumping jacks they can do in 10 seconds. Write that number on 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?

D Let's Go On!

6. Expand the table by adding one or more of the following:
   - 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:

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?

Chart Your World

A Goal:

To help your child understand that statistics tell stories about our world

B What You Will Need:

- Sheet of paper
- Pencil or pen
- Any kind of recurring event, such as eating fruit, answering the phone, or choosing clothing

Fruit	apples	bananas	pear	peach
Sunday	○			○
Monday	○			
Tuesday		○ ○	○	
Wednesday	○			○
Thursday				
Friday	○			
Saturday	○			○ ○

C Let's Go!

1. Tables help some children reach a greater understanding of numbers because they can see quantities organized and displayed on paper. This may help them understand number relationships more clearly than looking at numbers.
2. Practically everything you do is "chartable." *Example:* Take the stickers from bananas, apples, or pears and place them in columns on a piece of paper.
3. At the end of the week you can count them up to see how many of each type of fruit you ate. Ask, "Based on this chart, what should we add to our grocery list?" "How many _____ did you eat this week?"

D Let's Go On!

4. Keep a similar chart near your phone. Put colored stickers or use different colored markers to chart the calls you get—family, friends, strangers.
5. Chart what your child wears each day. Use one column for shorts, another for long pants/skirts; or chart by shirt color or type of shoes.

Quick Tip for Math: Talk about the charts, tables, or graphs you find in newspapers. Ask:

- Which column has the least marks?
- Which column has the most?
- Are there more _____ or more _____?
- How many less _____ are there than _____?
- Are any columns the same?
- Can we predict anything with this information?
- Does this chart help anyone make a decision?

Stop Light Statistics

A Goal:

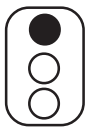
To help your child learn to record and interpret data and see what numbers can tell them about things in their own lives

B What You Will Need:

- Piece of paper of cardboard
- Red and green markers or crayons

C Let's Go!

1. Draw a line down the middle of the paper or cardboard to make two columns.
2. Make a red X at the top of one column. Make a green X at the top of the other.
3. While you drive or ride the bus, ask your child to put a mark in the red column every time you stop at a red light. Ask them to put a mark in the green column each time you go through a green light.
4. At the end of the trip, ask if you encountered more red lights than green lights, fewer red than green, or the same number of each. Ask how many of each they found.

Red Lights	Green Lights
	
3	3
3	3
3	3
3	3
3	
3	

Variation

5. You can also do this activity with a metal baking sheet and red and green magnets. Draw or make a line with masking tape down the center of the baking sheet. Red lights can be tallied with red magnets; green lights can be tallied with green magnets.

Quick Tip for Math: Don't worry about packing every summer day with activities 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.

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

C Let's Go!

1. Invite your child to play "Number Spy" with you. S/he will be a "spy" who has to find numbers that answer a question.
2. Now, think of a number that your child knows.
3. Say, "I'm thinking of a number that describes how many feet a 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 him/her think of a number question 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!
6. For older children, ask harder questions. *Example:* "I'm thinking of a number that's the sum of 10 and 25. What's my number, Number Spy?" or "I'm thinking of a number that's greater than 20 but less than 22."

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 numbered dots 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.

Name That Coin

A Goal:

To help young children learn to recognize coins and develop problem-solving and higher level thinking skills.

B What You Will Need:

- Penny
- Nickel
- Dime
- Quarter

C Let's Go!

1. Look at the coins and talk about what color they are, the pictures on them, and what they are worth.
2. Put a penny, nickel, and dime on the floor or table out of sigh
3. Tell your child that you are thinking of a coin.
4. Give your child hints to figure out which coin you are thinking of. *Example:* "My coin has a man on one side, a building on the other."
5. Let your child think about what you have said by looking at the coins.
6. Ask, "Can you make a guess?"
7. Add another clue: "My coin is silver."
8. Keep giving clues until your child guesses the coin.
9. Add the quarter to the coins on the table and continue the game.
10. Have your child give you clues for you to guess the coin.

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: Children are naturally curious about everyday problems. Invite your children to figure out solutions to everyday situations. You can do this by talking about the problem, asking your children for ways to solve it, and then asking how they came up with those solutions.

Counting Book

A Goal:

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

B What You Will Need:

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

C Let's Go!

1. Cut out pictures from the newspaper or magazine and use them to make a counting book.
2. Write a number at the bottom of each page. Page one will be labeled 1; page two will be labeled 2; and so on.
3. Tell your child to find, cut out and glue a picture(s) on each page. The number of objects on the page should match the page number. *Example:* 2 cars on page two; 4 cats on page four.
4. When your child is finished, write the word that describes the objects pictured on each page along with the number of objects. *Example:* 1 Cat.
5. Have your child tell a story to you about the pictures on the page.

D Let's Go On!

6. Make a picture book that includes fun things that start with the same sound as the numeral on each page. For example, "one wacky wig," "two tiny turtles," "three terrible toads," etc.

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

- Show place value by making cereal necklaces. Place one colored loop, then 9 brown loops to make a necklace showing how to count by groups of ten. Older children can arrange their colored loops by 5s 6s 7s etc. to get ready to multiply.
- Label the cups of an egg carton with the numbers from 1-12. Have children put the proper number of small snacks into each cup. Ask older children to put multiples of a number into each cup. *Example:* for multiples of 3, put 3 pieces in the 1 cup; put 6 pieces in the 2 cup; and so on.

Jump Counting

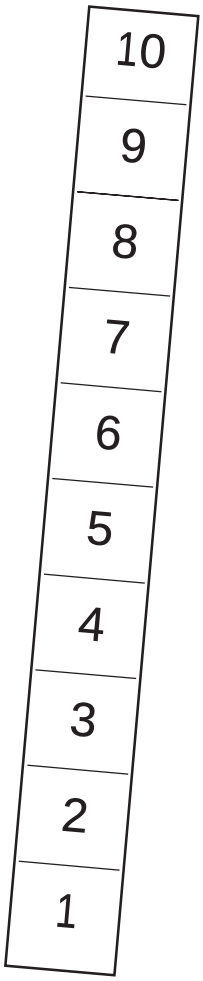
A Goal:

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 younger children.)
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:

PILOT

FAMILY FUNdamentals
FOR LITERACY & MATHEMATICS

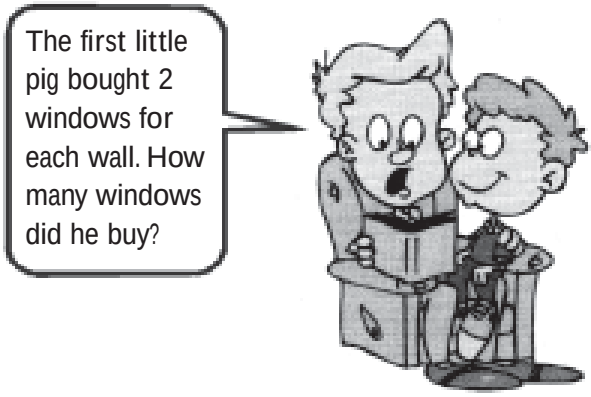
Storybook Math

A Goal:

To help your child strengthen their operational skills by combining literature and mathematics

B What You Will Need:

- Familiar story
- Time with your child



C Let's Go!

1. Tell a story with math facts in it.
   Example: Little Red Riding Hood had 4 tassles on her hood and 3 on her dress. How many tassles did she have?
2. Wait to continue until your child gives the correct answer.
3. Then continue. She took 3 steps and then took another 10, how many steps before she met the wolf?
4. Keep going as long as your child remains interested.

D Let's Go On!

5. This time, have your child tell a story, adding in the math facts as they go. You provide the answer and have your child check to see if you get the right answer.
6. You can make up stories, or use familiar storybooks and look for chances to insert math activities.

Quick Tip for Math:

Does your child enjoy watching Arthur, Between the Lions, or any of the other children's programs on the Public Broadcasting System (PBS)? If so, you can find learning activities in math and other subjects at **http://pbskids.org/**.

Click on any of the show titles, then "grownups." You'll find activities connected to episodes your child can watch, with suggestions for more books that include math concepts.

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 an equal amount of pennies for each player. (For those children who are just starting out, ten or fewer 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 her/his understanding of subtraction.

Quick Tip for Math: When you play simple children's 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 getting 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
- White wipe-off board with dry-erase markers OR
- Paper & pencil
- 1 die

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 or 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 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.

Ice Cream Parlor Operations

A Goal:

To give your child practice adding and subtracting

B What You Will Need:

- Play dough in several colors
- Index cards or paper cut up into squares
- Empty ice cream carton
- Small plastic cups and ice cream scoop

C Let's Go!

1. Together with your child, make 10 colored play dough balls (ice cream scoops) and put them into the ice cream carton. Talk about what you are doing as you go. *Example:* "Let's see, you put in 3 scoops and I just added 2 more. How many do we have now?"
2. Next, make six cards, each labeled with a numeral from 0-4. Place them face down on the table.
3. Explain to your child that you are pretending to be an ice cream parlor owner. You want your child to play the role of a store worker who sells ice cream to customers.
4. Pass the container to your child and draw the first card from the pile. The number on this card is the number of scoops the first customer has ordered.
5. Ask your child to add that many scoops to a small dish or cone and "serve" the customer. Then ask your child, "We had 10 scoops and you sold _____. So how many scoops are left in the tub?"
6. Continue until all customers are served. Now talk about your results. Did you have enough scoops for everyone? If not, how many more did you need? Which "flavor" was more popular? How much more of each "flavor" will the owner need to order?

D Let's Go On!

7. Put all the scoops back in the tub. Practice making combinations of different "flavors." Say, "If we add the strawberry and the chocolate, how many do we have?" "How about if we take away the bubblegum? How many are left?"

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:

Put It Away

A Goal:

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

B What You Will Need:

- Paper
- Pencil
- Ruler
- Computer

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. (You don't have to use all the 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, a pencil, a ruler, or a 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 of the item.

You can talk to children about other mathematical concepts, too: 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. Using photos of the child, or photos your child has been involved in taking, will especially capture your child's interest.
2. Using all the photos, have your child find the pairs 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.

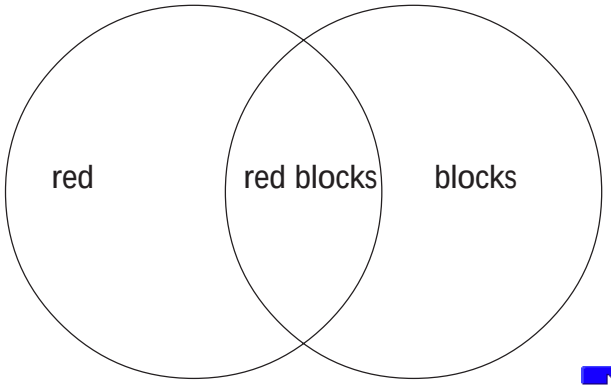
D Let's Go On!

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 that do not contain a person or animal should be put outside both circles.

Quick Tip for Math:

Venn Diagrams are visual aids to help your children sort objects in more than one way. Draw two circles on paper and label with the items to be sorted. Or use overlapping hoola hoops or circles made of yarn.

Example: In the diagram at right, you could put red objects into the left circle. You could put several blocks in the right circle. Any blocks that are red would go in the center.



Treasure Hunt

A Goal:

To help your child count sort, and classify objects

B What You Will Need:

- Buttons
- Screws
- Washers
- Bottle caps
- Old keys
- Sea shells
- Rocks
- Any other group of objects in different sizes and shapes

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 6 buttons among three friends, how many will we each get? Will there be some left over? Or, if I have 2 buttons in my pile, and I need 6 for my shirt, how many more do I need?
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.

D Let's Go On!

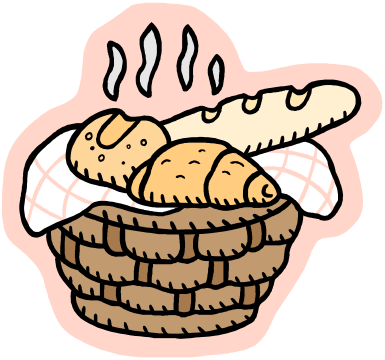
5. Ask your child to think about objects that might belong to two groups at one time. *Example:* buttons with 4 holes; objects that are round. Can s/he think of a way to display that?

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

Step by Step

A Goal:

To help your child arrange and explain a sequence of pictures that describe a task 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 sequence of pictures.
3. On a long piece of paper, have your child draw a series of pictures showing, 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, or setting up a tent.
7. Bind all the pictures 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!"

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

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.

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:

Additional Learning Tools

PILOT

FAMILY FUNdamentals
FOR LITERACY & MATHEMATICS

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

Four-Column Chart

Copy and use this chart to collect, compare, and analyze any data that interests your child: daily weather patterns, distances between objects, height of their friends, food choices of family members, favorite movies, time of sunrise/sunset.

Topic _____			

PILOT

FAMILY FUNdamentals
FOR LITERACY & MATHEMATICS

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!