

Math at Home

Your home is full of opportunities to explore math with your child and, at the same time, build his or her self-confidence and understanding of mathematical ideas. This is a chance for you and your child to "talk math" that is, to communicate about math while discovering relationships between numbers. Being able to describe mathematical patterns and relationships, such as those between "addition and subtraction" or "odd and even numbers," is important to later success in math.



These activities are intended to be enjoyable and inviting and use items that can be found in your home. While doing the activities, keep in mind that an understanding of math and a sense that math is enjoyable will help children develop skills that they will need for success their entire lives.

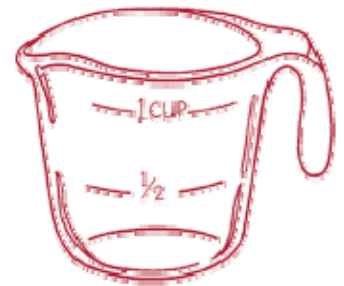
Fill It Up

Grades K-2

What you'll need

A measuring cup, 4 glasses of equal size, and water

What to do



Pour water at different levels ($\frac{1}{3}$ cup, $\frac{1}{2}$ cup, $\frac{3}{4}$ cup and 1 cup) in each glass. Put the glasses next to each other. Ask your child: Are all the water levels the same or different?

Ask your child questions to encourage comparison, estimation, and thinking about measurement. Which glass has more water? Which has less? How many glasses of water do you estimate it will take to fill the container?

Pour more water into one of the glasses to make it equal to the amount of water in another glass. Move the glasses around so that the glasses that have the same amount of water are not next to each other. Ask your child: Which glasses do you think have the same amount of water?

As your child begins to understand more, do activities using different-shaped containers that hold the same amount of a substance (water, rice, and popcorn kernels). This helps your child see comparisons, as well as the various capacities of different-sized and -shaped containers.



Parent Pointer

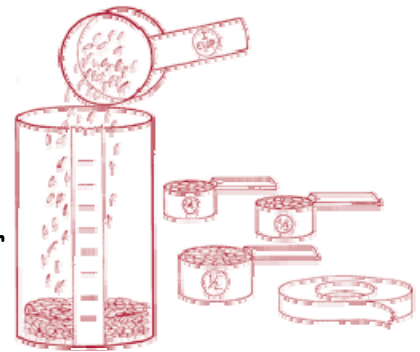
Filling empty containers provides opportunities to explore comparisons, measurement, volume, estimation, and geometry.

Fractured Fractions

Grades K-3

What you'll need

Clear container, masking tape, marker, measuring cups (1/2, 1/3, or 1/4 cup measure), uncooked rice or popcorn kernels, and water



What to do

Have your child stick a piece of masking tape straight up one side of the clear container from the bottom to the top.

For younger children, use a 1/2 cup measure. For older children, use a 1/3 or 1/4 cup measure. Choose the unit of measure and fill the measuring cup. Then let your child pour the substance from the measuring cup into the clear container. Continue to pour the same amount of the substance into the container.

As each equal amount of the substance is poured, mark the level on the container by drawing a line on the tape. Write the cup size or appropriate fraction on each line. The fraction for one-third cup would be $\frac{1}{3}$.

Follow this procedure until the container is full and the tape is marked in increments to the top of the container.

Fill the container again and again using different measures each time. Ask your child "thinking" questions.

- How many whole cups do you think this container will hold? How many $\frac{1}{2}$ cups, $\frac{1}{3}$ cups, or $\frac{1}{4}$ cups do you think the container will hold?
- How many $\frac{1}{2}$ cups equal a cup?
- How many $\frac{1}{4}$ cups equal $\frac{1}{2}$ cup? A cup?
- How many $\frac{1}{4}$ cups equal $\frac{3}{4}$ cup?

Parent Pointer

This hands-on activity explores whole numbers and fractions by using measurements your children can see. Your children also will learn to guess or estimate quantities.

Money's Worth

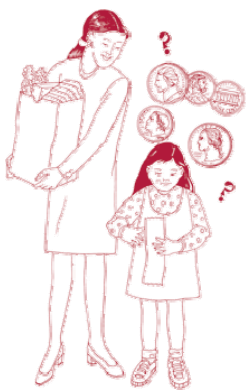
Grades 1-3

What you'll need

Coins, grocery store coupons, and a pencil

What to do

Coin clues. Ask your child to gather some change in his or her hand without showing what it is. Start with amounts of 25 cents or less (for first-graders, you can start with pennies and nickels). Ask your child to tell you how much money and how many coins there are. Guess which coins are being held. For example, "I have 17 cents and 5 coins. What coins do I have?" (3 nickels and 2 pennies).



Clip and save. Cut out grocery store coupons and tell how much money is saved with coins. For example, if you save 20 cents on detergent, say 2 dimes. Ask your child what could be purchased using the savings from the coupon. A pack of gum? A pencil? How much money could be saved with 3, 4, or 5 coupons? How could that money be counted out in coins and bills? What could be purchased with those savings? A pack of notebook paper? A magazine? How much money could be saved with coupons for a week's worth of groceries? How would that money be counted out? What could be purchased with those savings? A book? A movie ticket? What percentage of the original price is the coupon worth?

Count the ways. How many ways can you make 10 cents, 25 cents, 30 cents, 40 cents, or 50 cents? You can help your child add the coins in various ways to get different answers.

Try playing the coin games with coins from another country.

Parent Pointer

Coin games help children to learn the value of coins. They also teach counting, addition, subtraction, and multiplication. Coupons can help teach children money management, as well as subtraction and percentages.

In the News

Grades K-2

What you'll need

Newspaper, scissors, pencil or crayon, glue, and graph paper

What to do

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



Or

Collect only numbers within a certain range, like the numbers between 20 and 30. Arrange the numbers on a chart, grouping all the numbers with 2s in them, all the numbers with 5s, and so on.

Counting book. Cut out pictures from the newspaper and use them to make a counting book. Page 1 will have one thing on it, page 2 will have 2 things that are alike, page 3 will have 3 things that are alike, and so on. All the things on the each page have to be the same. At the bottom of each page, write the number of items on the page and the word for the item. Have your child tell you a story about what is on the page.

Parent Pointer

This newspaper activity helps children read and understand numbers and charts.

Newspaper Search (More Challenging)

Grades 3-5

What you'll need

Newspaper, calculator, pencil, paper, and graph paper (can be hand-drawn)

What to do

List it. Give your child the grocery section of the newspaper in order to make up a list of foods that will feed the family for a week and also meet a budget of a certain amount of money. Have your child make a chart and use mental math or a calculator to figure the cost of a few items. If the total for the groceries is more than you have budgeted for, talk about which items can be eliminated. Could the list be cut down by a few items or by buying less of another item? What will best serve the needs of the family?

Shop around. Have your child search for advertisements in the newspaper for an item they have been wanting, such as a piece of clothing or tennis

shoes, in order to find the lowest price for the item. After your child finds the best buy, have him or her compare the best buy to the rest of the advertised prices. Are this store's prices lower for everything or just items in demand?

Highs and lows. Have your child search the newspaper for daily temperatures and create a graph showing weekly trends. Ask your child for the differences in temperature from day to day.

Parent Pointer

This activity helps children see how much math is used in everyday life. It also helps in the variety of ways in which math is used to tell a story, read a timetable or schedule, plan a shopping list, or study the weather.

Treasure Hunt

Grades K-2

What you'll need

Large container, buttons, screws, bottle caps, old keys, anything else you can count, and graph paper (can be hand-drawn)

What to do

Find a container to hold the treasures.

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?

Use these treasures to tell addition, subtraction, multiplication, and division stories. For example, if we share 17 buttons among 3 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?

For older children, you can 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. Make a

simple graph showing how many of each type of screw there are. This activity may also provide an opportunity to talk about fractions: $\frac{7}{21}$ or $\frac{1}{3}$ of the screws are long.

Parent Pointer

Organizing the "treasures" in one's house provides practice in addition, subtraction, multiplication, and division. Children can also graph data on shapes and sizes.

Squash That Box (More Challenging)

Grades 4-5

Ever notice what happens when you flatten cereal boxes, tin cans, or other 3-dimensional shapes for recycling? Or do you ever wonder how they design and make all those interesting containers you find in the department store? Mathematicians call the flat, unfolded designs of 3-dimensional shapes "nets."

What you'll need

Small cardboard boxes, aluminum cans, and cardboard tubes from toilet paper or paper towels

What to do

Explain to your child that when we recycle materials, we need to flatten them. Ask him or her why (to save space). Ask your child to imagine what shapes will be created when you flatten the boxes or cans. Some people crush cans, which is not the same as flattening. When you take apart a cylinder, you have two circles for the ends and the flat cylinder makes a rectangle. Cut a cardboard tube lengthwise. What shape do you see (a rectangle)? What will a cereal box look like if you carefully unfold it and cut along the edges?

Here is the net of a cube.



Here is the net of a cylinder.

Unfold a cardboard box, without showing your child the original box. Ask your child to imagine what the original box looked like. What shape will it be when it is put back together? How will the ends look?

Have your child trace all the faces of a box or other 3-dimensional shapes by laying every side and top and bottom on the paper to be traced. Ask the child the names of the drawn 2-dimensional shapes.

Have your child study a box. Then see if your child can draw a net (the unfolded version) of the box. Unfold the box to see how closely the drawn net corresponds to the actual net. What would the net of a pyramid look like? What would the net of a cube look like?

Parent Pointer

Recognizing 2-dimensional shapes in 3-dimensional objects and visualizing shapes are essential skills in fields as varied as architecture, manufacturing, medicine, and design.

Simply Symmetrical

Grades 1-5

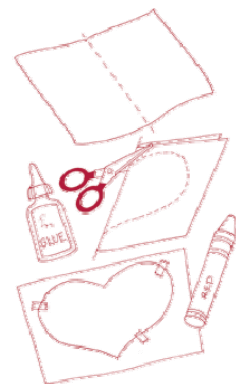
What you'll need

Paper, pencil, marker or crayon, magazine pictures, scissors, and glue

What to do

Explore your house for symmetrical designs. See how many your child can find. Look at wallpaper, floor tiles, pictures, bedspreads, and appliances.

Cut out a magazine picture that is symmetrical. Cut it along the line of symmetry. Paste one half of the picture on the paper. Have your child draw the missing half.



Write your child's name in big block letters, then write your name. Which name has more letters with lines of symmetry? How many letters have one line of symmetry? How many of each letter have two? (a B has one line, an H has two). Does anyone have a name with all symmetrical letters? (BOB is one.) Can any letter be turned upside down and still look the same? (Yes H, I, O, S, and X are symmetrical around a center point.) Go through the alphabet, making a list of the letters that look the same on both sides and those that look different.

Fold a sheet of paper in half lengthwise. Have your child draw half of a circle, heart, or butterfly from top to bottom along the fold on each side of the paper. Help your child cut out the shapes that were drawn. Unfold the paper to see the symmetrical figure. Have your child color and glue the full figure on another sheet of paper to display the design.

Parent Pointer

A shape can be symmetrical when two parts of it are exactly alike. This exercise helps young children develop an understanding of symmetry and a sense of geometric patterns.

Tracking Time

Grades 2-5

What you'll need

Clock or watch, newspaper, blank paper, and graph paper (can be hand-drawn)

What to do

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

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

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

Parent Pointer

Statistics includes collecting information, analyzing it, and describing or presenting the findings in an organized way.

Resources

Math Websites

- The Math Forum: <http://www.mathforum.com>
- Eisenhower National Clearinghouse for Mathematics and Science Education: <http://www.enc.org/classroom/index.htm>
- National Council of Teachers of Mathematics: <http://www.nctm.org>
- U.S. Department of Education, America Counts: <http://www.ed.gov/americancounts/>
- U.S. Department of Education, Office of Educational Research and Improvement: <http://www.ed.gov/pubs/parents>

Math Books for Parents

- Apelman, Maja and King, Julie. Exploring Everyday Math. Heinemann.
- Burns, Marilyn. Math for Smarty Pants. Little, Brown, and Company.
- Gillespie, Janet G. and Kanter, Patsy. Every Day Counts Partner Games K-6. Great Source Education Group, Division of Houghton Mifflin.

- Great Source Education Group, Division of Houghton Mifflin. Math on Call (4-6). Math at Hand (2-5).
- Kulm, Gerald. Math Power at Home. American Association for the Advancement of Science.
- Kulm, Gerald. Math Power in the Community. American Association for the Advancement of Science.
- Kulm, Gerald. Math Power in School. American Association for the Advancement of Science.
- Matyas, Marsha and Triana, Estrella M. In Touch with Mathematics (available in English and Spanish). American Association for the Advancement of Science.
- National Council of Teachers of Mathematics. Family Math Awareness Activities.
- National Council of Teachers of Mathematics. Principles and Standards for School Mathematics.
- National Council of Teachers of Mathematics. Using Calculators to Improve Your Child's Math Skills.
- National PTA and Exxon Foundation. Math Matters.
- Room, Adrian. The Guinness Book of Numbers. Sterling Publishing Company, Inc.
- Stenmark, Jean, Thompson, Virginia, and Cossey, Ruth. Family Math. University of California at Berkeley.
- Thomas, David A., 1988. The Math-Computer Connection. Franklin Watts.
- Thomas, David A., 1988. Math Projects for Young Scientists. Franklin Watts.
- Walthall, Barbara, ed. IDEAAAS: Sourcebook for Science, Mathematics, and Technology Education. American Association for the Advancement of Science.

Books for Children

Almost every book you read with your child will offer the opportunity to talk about math. Some books lend themselves more to in-depth and specific math discussion. Here's a sampling of books to enjoy with your child. Check your public library for these and other books.

- Anno, Mitsumasa. Anno's Counting Book. Thomas Y. Crowell.
- Anno, Mitsumasa. Anno's Counting House. Philomel Books.

- Anno, Mitsumasa. *Anno's Hat Trick*. Philomel Books.
- Anno, Mitsumasa. *Anno's Math Games*. Philomel Books.
- Anno, Mitsumasa. *Anno's Mysterious Multiplying Jar*. Philomel Books.
- Carle, Eric. *The Grouchy Ladybug*. Philomel Books.
- Carle, Eric. *1,2,3 to the Zoo*. Philomel Books.
- Carle, Eric. *The Very Hungry Caterpillar*. Philomel Books.
- Clement, Rod. *Counting on Frank*. Gareth Stevens Publishing.
- Cobb, Vicki and Darling Kathy. *Bet You Can*. Avon.
- Cobb, Vicki and Darling Kathy. *Bet You Can't*. Avon.
- Dee, Rub. *Two Ways to Count to Ten*. Holt.
- Demi. *Demi's Count the Animals 123*. Grosset and Dunlap.
- Feelings, Muriel, *Moja Means One: Swahili Counting Book*. Dial.
- Grayson, Marion. *Let's Count*. Robert B. Luce, Inc.
- Grayson, Marion. *Count Out*. Robert B. Luce, Inc.
- Hoban, Tana, *Circles, Triangles, and Squares*. MacMillan Publishing Company, Inc.
- Hoban, Tana, *Count and See*. MacMillan Publishing Company, Inc.
- Hoban, Tana. *Is It Rough, Is It Smooth, Is It Shiny?* MacMillan Publishing Company, Inc.
- Hudson, Cheryl. *Afro-Bets 123 Book*. Just Us Productions.
- Hutchins, Pat. *The Doorbell Rang*. Greenwillow Books.
- Hutchins, Pat. *One Hunter*. Greenwillow Books.
- Jones, Carol. *This Old Man*. Houghton Mifflin Company.
- Keats, Ezra Jack. *Over the Meadow*. Scholastic.
- Kitchen, Bert. *Animal Numbers*. Dial.
- Kredeser, Gail. *One Dancing Drum*. Phillips.
- Lionni, Leo. *Numbers to Talk About*. Pantheon Books.
- Marley Deborah. *Animals One to Ten*. Raintree.
- McMillan, Bruce. *Counting Wildflowers*. Lothrop, Lee & Shepard Books, Inc.
- McMillan, Bruce. *One, Two, One Pair*. Scholastic.
- Nolan, Dennis. *Monster Bubbles*. Prentice Hall.
- Pinczes, Elinor J. *A Remainder of One*. Houghton Mifflin.
- Pluckrose, Henry. *Know about Counting*. Franklin Watts.
- Pomerantz, Charlotte. *The Half-Birthday Party*. Clarion Books.
- Ross, H.L. *Not Counting Monsters*. Platt and Munk.
- Schwartz, David M. *How Much Is a Million?* Lothrop, Lee & Shepard Books, Inc.

- Schwartz, David M. *If You Made a Million*. Lothrop, Lee & Shepard Books, Inc.
- Sciczka, Jon and Smith, Lane. *Math Curse*. Viking.
- Tafuri, Nancy. *Who's Counting?* William Morrow & Co.
- Testa, Fulvio. *If You Take a Pencil*. Dial.
- Viorst, Judith. *Alexander Who Used to Be Rich Last Sunday*. Atheneum.
- Vogel, Ilse-Margaret. *1 Is No Fun, But 20 Is Plenty!* Atheneum.
- Ziefert, Harriet. *A Dozen Dizzy Dogs*. Random House.

Magazines

- *Games Magazine*, P.O. Box 10147, Des Moines, Iowa 50347. The adult version of *Games Junior* (see below). Older children may prefer this to *Games Junior*.
- *Dynamath*. Scholastic. Available from the school division. Filled with many different activities that involve all strands of math. Children in grade five particularly like this. Nine publications are sent each school year. \$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." Appropriate for ages 7 and up.
- *Math Power*. Scholastic. Available from the school division. Exciting and inviting, this magazine is filled with many activities that involve all types of math. Good for grades 3 and 4. Nine publications are sent each school year for \$5.00.
- *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 decisionmaking. The cost is approximately \$2.75 per issue.