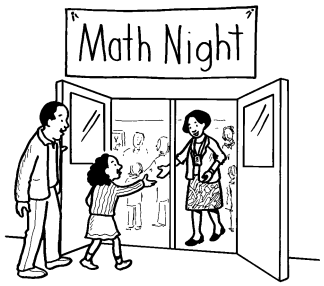
I'm a Mathematician!

Encouraging your child to see herself as a mathematician can help her learn—and enjoy—math. Use the advice in this guide to improve her confidence and motivation, and she'll be proud to say, "I'm a mathematician!"

Boost math confidence

Be your youngster's cheerleader along her mathematical journey with these strategies.

Stay involved



After school, ask your child, "What did you do in math today?" When she finishes math homework, let her explain how she solved a few of the problems. Attend school math nights, open houses, and parent-teacher conferences. You'll inspire her to take pride in her math work, and she'll see that her learning is important to you.

Recognize effort

Pay attention to your youngster's math efforts and accomplishments, just as you would his athletic or musical achievements. You might say, "I know you've been working hard on multiplying fractions. Can you double this recipe for me?" Also, display math tests or papers at home on your refrigerator or family bulletin board. Include not only those with high grades, but also ones with good mathematical explanations or positive comments from the teacher.

Offer encouragement

If your child struggles with a math concept or procedure, remind her of the progress she has made. Say she's learning long division. Point out that she learned to divide smaller numbers, and tell her that she'll conquer bigger ones, too. If she makes a mistake on a quiz or on homework, ask her to show you what part she did *right*. Maybe she used the correct formula but put the decimal point in the wrong place, for instance. She'll realize that there's a lot she knows how to do, and she'll get a chance to learn from her mistakes.

Celebrate math

Send the message that math is fun by letting your youngster plan a math-themed party or family night. From the invitations to the food and games, there's always a place for math!

Invitations. For a birthday party, your child could feature a problem about his age. ("Owen will be 648 ÷ 72 years old!") His guests could RSVP with the answer (9). Or for a movie night, he might write a math-related clue to help everyone guess the film: "We will watch a movie with 250 – 148 dogs." (*Answer: 102 Dalmatians*—the sequel to *101 Dalmatians.*)

Food. Serve "tangram" brownies. Give your youngster a plastic knife to divide a pan of brownies into seven shapes (see illustration). Or have guests build 3-D shapes like cubes and pyramids by connecting pretzel sticks with marshmallows.

Games. Play hopscotch with multiplication facts in the squares. Guests call out answers as they hop to each problem. Or let your child draw circles on an old sheet and write a math problem in each circle. Players throw water balloons at the targets and shout the answers to the problem they hit.

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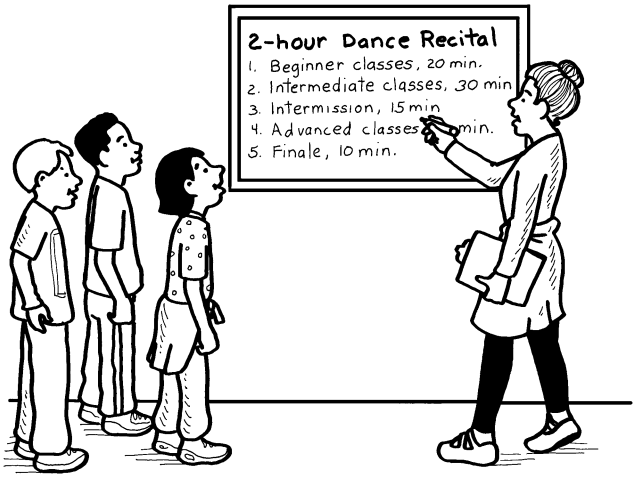
Let's talk math

Did you know that how you view math will rub off on your youngster? So talk it up! Consider these suggestions to show him how wonderful math can be.

Talk about math in positive ways. In daily conversation, sprinkle in comments such as "I like working with patterns" or "I enjoyed celebrating Pi Day when I was your age." Regardless of your past experiences, avoid negative remarks like "I never did well in math class" or "I'm not a math person." It's natural to want to empathize with your child, but phrases like those can send the message that it's okay to not like math.

Share ways grown-ups use math. Mention math-related tasks you do on the job or at home. Maybe you plan schedules for the staff at work or handle your family's budget. Find out what kinds of jobs might interest your child, and brainstorm ways people use math in them. For example, a dance studio director plans the length of a recital and how long each piece may be. A doctor interprets test results and calculates doses of medicines.



Promote a growth mindset. Encourage your youngster to have a *growth mindset* when it comes to math. If he says, "I can't" or "I don't know how," have him tack the word "yet" onto the end of his sentence. ("I can't *yet*" or "I don't know how *yet*.") Remind him that there was a time when he could have said, "I can't count yet," and point out how he could count to a million now—if he had 11 days, 13 hours, 46 minutes, and 40 seconds to spare!

Math is fun

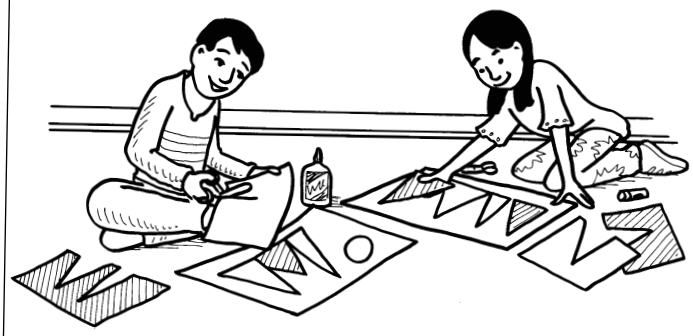
Build your child's math motivation by playing games and doing family projects that involve numbers and shapes. Here are a few to try.

Number scavenger hunt

When you run errands or go for a walk, challenge everyone to find different kinds of numbers. *Examples:* Whole numbers (Route 66), ordinal numbers (5th Avenue), fractions ($\frac{1}{2}$ off), decimals ($2.79 per gallon), negative numbers (–6° F). Who can find the most types of numbers?

"I'm thinking of a number…"

Take turns picking a secret number, and have others ask yes-or-no questions to figure it out. You might say, "I'm thinking of a number between 20 and 50." Your youngster can ask, "Is it divisible by 7?" If it is, she can narrow down the possibilities in her head (21, 28, 35, 42, 49), then keep asking questions to eliminate more numbers. *Examples:* "Is it an even number?" "Is the digit in the ones place smaller than the digit in the tens place?"



Geometric art

Gather construction paper, scissors, and glue. Family members can create masterpieces by cutting out shapes with different angles and gluing them on their papers. For instance, perhaps your youngster will cut out acute triangles (all angles less than 90°) to make mountain peaks. Another family member may design a trapezoidal robot with octagonal buttons. Share your creations with each other and identify the shapes and angles.

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Amazing Math Games VI

Your youngster can shuffle, roll, sculpt, and even laugh his way to better math skills! This collection of family games will give him plenty of practice with fractions and decimals, word problems, geometry, and more.

Fraction and decimal matchup

Here's a twist on Go Fish that lets your child pair fractions with their equivalent decimals.

You'll need: *52 index cards or slips of paper, pencils, paper, calculator (optional)*

1. Write these fractions and decimals on separate cards: $\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{4}$, $\frac{3}{10}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{1}{2}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{7}{10}$, $\frac{3}{4}$, $\frac{4}{5}$, $\frac{9}{10}$, 0.1, 0.2, 0.25, 0.3, 0.333…, 0.4, 0.5, 0.6, 0.666…, 0.7, 0.75, 0.8, 0.9. Make two sets.

2. Shuffle the cards, deal seven to each player, and stack the rest facedown. Players lay any fraction and decimal matches faceup (*example:* $\frac{2}{5}$ and 0.4). *Tip:* To check if cards match, let your youngster divide each fraction's numerator (top number) by its denominator (bottom number). If he has $\frac{3}{5}$, he would solve 3 ÷ 5 = 0.6 to see that 0.6 is a match.

3. On each turn, a player asks for a match to one of his cards. Your child might say, "I have 0.25. Does anyone have the matching fraction?" The first one to call out "yes" gives him the card ($\frac{1}{4}$). If no one has a match, the player draws a card from the pile. He lays down a match if there is one or keeps the new card in his hand if there's not.

4. The first player to get rid of all his cards is the winner, even if that happens on someone else's turn.

Wackiest word problem

Which family member can write the funniest word problem? Play this game to find out, and to help your youngster become more comfortable with word problems.

You'll need: *24 pictures cut from old magazines or catalogs, two dice, pencils, paper*

1. One player chooses a picture, perhaps of a flamingo, and rolls the dice to form a two-digit number. For instance, if your child rolls 2 and 3, she could create 23.

2. Everyone else writes a silly word problem based on the picture—with that number as the answer. *Example:* "A snail challenged a flamingo to a race. The snail chugged along and completed the race in 25 minutes. The flamingo kept stopping to admire her reflection in the pond, and she finished in 48 minutes. How many more minutes did it take the flamingo?" (48 – 25 = 23 minutes)

3. Fold your papers, and pass them to the person leading the round. She reads them all aloud and decides which one is the funniest (and also mathematically correct). The person who wrote the problem keeps the picture and picks the next one.

4. Continue choosing pictures and rolling the dice. The first player to collect four pictures wins.

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3-D challenge

Boost your youngster's geometry skills with this play dough game that encourages her to identify 3-D shapes and think about their *attributes*, or features.

You'll need: *20 index cards, pencil, play dough, paper*

1. Have your child label seven index cards, each with one of these geometry terms: *vertex, face, edge, circle, square, triangle, rectangle.* Then she should label the remaining cards 0–12, and stack the word cards and number cards facedown in separate piles.

2. On each turn, a player draws a card from each stack (without showing anyone). She uses play dough to sculpt a 3-D shape that meets the criteria. So if your youngster draws *circle* and 2, she would make a shape with two circles (cylinder). Or if she draws *face* and 6, she'd sculpt a shape with six faces (cube, rectangular prism).

3. The first player to identify the shape scores a point. The sculptor scores a point, too—if her shape meets the criteria. (*Note:* Have your child check her math book or the internet to be sure it's correct.) Keep score on a sheet of paper.

4. Play five rounds. When you run out of cards, shuffle them and restack. The person with the most points wins.

Cash stash

This game lets your child practice counting money as he adds, subtracts, multiplies, and divides his way to the "bank." End up with the most money to win.

You'll need: *play money (ones, fives, tens, and hundreds), pencils, paper, two dice*

1. Give each player $12, a pencil, and a sheet of paper. Have each person write $12 at the top of his paper. Place the remaining play money on the table.

2. On your turn, you have the option to roll one or two dice. *Note:* You must use each operation (+, –, x, ÷) once per game.

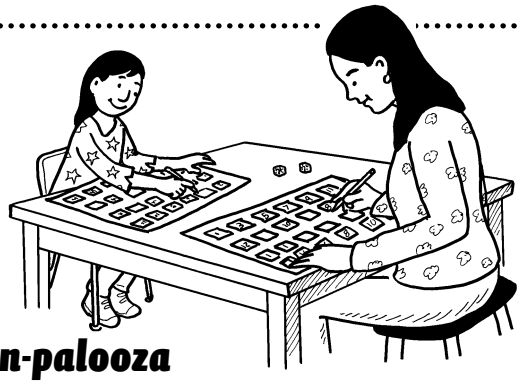
• ***One die:*** Multiply *or* divide your total cash by the number rolled. *Example:* Roll 2, and multiply $12 x 2 = $24 on your paper. Take $12 from the play money for a total of $24.

• ***Two dice:*** Form a two-digit number, and add *or* subtract that much money from your total. *Example:* Roll 3 and 4, add $12 + $43 = $55 on your paper. Take $43 in play money for a total of $55.

Round all answers to the nearest dollar. If any operation would take your total below $1, keep $1.

3. After four rounds, whoever has the most money wins!

Variation: Allow a player to pay $3 if he wants to re-roll the dice.



Pattern-palooza

Fill your boxes with number patterns to win this game that sharpens logical thinking.

You'll need: *paper, markers, pencils, two dice*

1. Have each player draw four rows of six boxes on a sheet of paper.

2. Take turns rolling the dice and writing either of the numbers rolled, *or* the sum of the two numbers, in any square on your paper. *Example:* Roll 3 and 5, and choose to write 3, 5, or 8.

3. The object is to make a number pattern in each row of boxes. If your child put 1 in the first box of a row and 3 in the second, she might try to roll 5, 7, 9, and 11 to finish filling in that row (1, 3, 5, 7, 9, 11 is a pattern in which 2 is added to each number). Or she could wait until she gets 4, 6, 7, 9 (1, 3, 4, 6, 7, 9 is a pattern, too—add 2, add 1, add 2, add 1).

4. When all the squares have been filled, trade papers to try to figure out each other's patterns.

5. Players score one point for every pattern they make and two points for every pattern they figure out from another player. High score wins.

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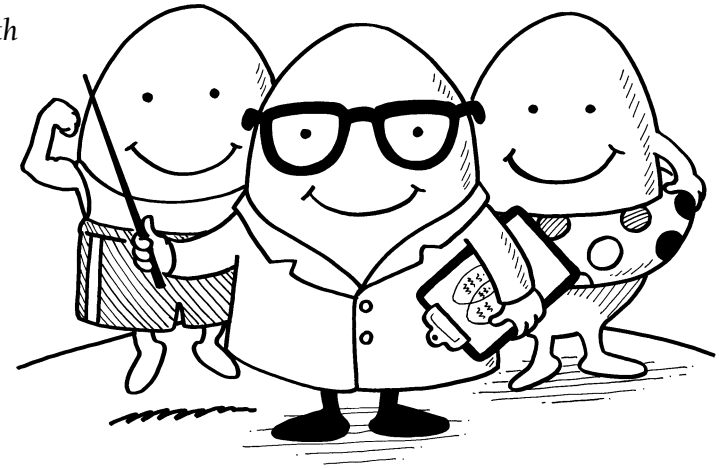
Egg-cellent Science

Open your child's eyes to the exciting world of science with a few simple activities—all involving ordinary eggs. He'll discover that an egg is actually pretty extraordinary, from its surface to its shape.

Note: *Always wash your hands after handling raw eggs.*



Bouncing egg

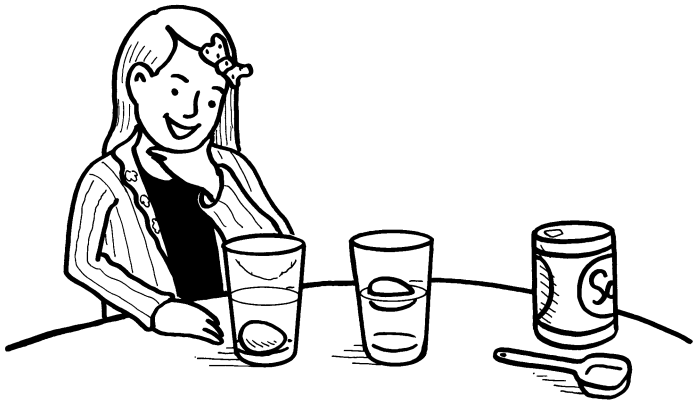
What happens if you accidentally drop an egg? It cracks! With this idea, your youngster will make an egg bounce instead.

You'll need: raw egg, glass or jar, white vinegar

Here's how: Ask your child to gently place the egg into the glass or jar and cover it with vinegar. What does he observe? (Little bubbles form on the egg.) After two days, help him carefully pour out the vinegar. Now he can hold the egg a couple of inches above a plate or counter and drop it.

What happens? When your youngster drops the egg a short distance, it bounces! (If he holds it too high, the rubbery membrane will break, and the egg yolk and white will spill out.)

Why? A chemical reaction between the acid in the vinegar and the calcium carbonate in the eggshell caused the shell to dissolve. The bubbles were a visible sign of the reaction taking place. Because the membrane beneath the shell is rubbery, the egg bounces when dropped.



Floating eggs

Does an egg sink or float? That depends on the *density* of the water your child puts it in.

You'll need: two clear glasses, tablespoon, salt, two raw eggs

Here's how: Have your youngster fill each glass halfway with water. She should measure 6 tbsp. of salt into one glass and stir until dissolved. Help her gently place an egg in each glass.

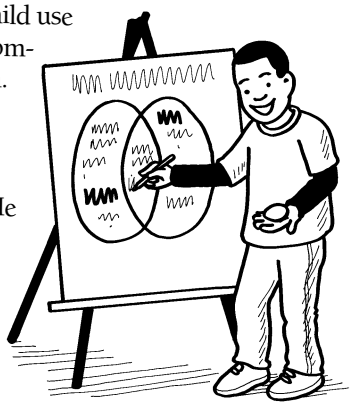
What happens? The egg in plain water sinks, while the egg in salt water floats.

Why? An egg is *denser* than water (its molecules are packed together more tightly), so it sinks. But salt water is denser than plain water—and it's also denser than an egg, so the egg floats.

Tip: Need an easy way to tell if an egg is fresh? Your child can put it in plain water—if it floats, don't use it. An older egg has more air inside, making it less dense than water.

Eggshells vs. skin

Does your youngster know how his skin resembles an eggshell? Encourage him to draw an "egg" Venn diagram to compare the two surfaces: Instead of drawing two overlapping circles, he can draw overlapping egg shapes. Have him write "Human skin" in one egg, "Eggshell" in the other, and "Both" in the shared space.



Now suggest that your child use his senses to examine and compare an eggshell and his skin. He could look closely at the surfaces under a magnifying glass, touch a shell and his skin, and even smell them. He can write what he observes.

For example, your youngster might notice that his skin is soft and an eggshell is hard. Or he may observe tiny holes (*pores*) on both surfaces. *Fun fact:* An eggshell has as many as 17,000 pores!

continued

Raw or hard-boiled?

Your child will have fun spinning eggs—and discovering factors that affect how they spin.

You'll need: one raw egg and one hard-boiled egg

Here's how: Let your youngster spin each egg on a flat surface (the egg should be on its side), then touch it briefly.

What happens? The raw egg will wobble as it spins and keep spinning after she touches it. The hard-boiled egg spins faster and more smoothly—but stops when touched.

Why? A raw egg has liquid inside, which sloshes around and makes the egg wobble. When your youngster touched the raw egg, the liquid inside kept moving, so the spinning continued. On the other hand, a hard-boiled egg is solid all the way through. Since nothing was moving inside, it spun smoothly. But when she touched it, it stopped because there was no sloshing to keep it spinning.

"Vacuum" an egg

How can an egg fit through an opening smaller than itself?

You'll need: peeled hard-boiled egg, glass bottle or vase with a mouth narrower than an egg, bowl, small pot of boiling water, pot holders

Here's how: Have your youngster set the bottle in a bowl in a sink. While he watches, carefully pour boiling water into the bottle. Using pot holders, dump the water out of the bottle, and let your child quickly place the egg on the bottle's mouth.

What happens? The egg gets "sucked" into the bottle!

Why? When the air inside the bottle is heated by the boiling water, it *expands* (its molecules get farther apart). As the air cools, it *contracts* (its molecules get closer together), leaving an empty space (a vacuum) inside the bottle. The egg is sucked into the vacuum.

Strong as a shell

Although an eggshell is fragile, its dome-shaped ends make an egg surprisingly strong. Let your child test a shell's strength with these two activities.

1. Crush an egg. Over a bowl, have your youngster hold an egg in one hand so she's gripping its domed ends. Can she crush it easily? Now let her hold another egg around the middle over a bowl and try to crush it. The first egg is harder to crush because the domes evenly distributed the pressure exerted by her hand. The second egg cracks more easily.

2. Stack books on shells. Help your child crack two eggs in half. Save the insides (you could make scrambled eggs or omelets), and rinse out the shells. Ask her to place the four halves, broken edges down, on a table. Then, she can set a book on top. Encourage her to keep adding books—how many will the shells hold before they begin to crack? She may be surprised by how much weight the domes support!

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