Math+Science Connection

Intermediate Edition

Building Understanding and Excitement for Children

Let's skip count

Can your child skip count by numbers other than 2s, 5s, or 10s? Give him a random number (say, 7) and a starting point (perhaps 65). He would count 65, 72, 79, 86. Then, have him skip count backward. Maybe you'll have him begin at 103 and count back by 11s (103, 92, 81, 70).

Making mountains

Have your youngster lay two sheets of paper on a baking sheet so they overlap slightly and spread sand (or soil) over the seam. Holding down the top sheet with one hand, she should slowly push the other sheet underneath. The sand starts to mound. This shows how underground movements help form mountains over time.

Book picks

📖 Marty views every situation like a math equation in *The Math Wiz* (Betsy Duffey). But can he solve the problem of being picked last in gym class?

📖 Captivate your child with fascinating facts about tarantulas, diving bell spiders, jumping spiders, and more in *Spiders* (Kay de Silva).

Just for fun

Q: Which weighs more, 1 pound of rocks or 1 pound of feathers?

**A:** Neither — each weighs 1 pound!

Mental math games

The more often your youngster does math in her head, the more efficient she'll become. Play these games that will inspire her to come up with strategies for solving problems— without pencil and paper.

Math Jeopardy

In this game, players first choose answers and then call out problems. Let your child draw a Jeopardy board (6 columns, 5 rows) and write a one- or two-digit number in each box.

Take turns picking an answer (say, 8) and stating four problems (addition, subtraction, multiplication, division) that equal it. *Example:* 5 + 3, 60 – 52, 4 x 2, 16 ÷ 2. Your youngster will practice doing all four operations in her head!

Check problems on a calculator. If they're all correct, score 8 points and cross out the 8. When all answers are chosen, the person with the highest score wins.
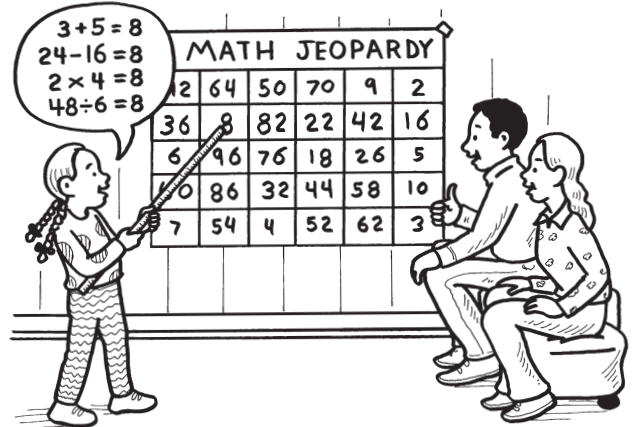
Fact fluency race

Who can score closest to 100 points without going over? Each player rolls a die to get her starting score. On each additional roll, she may add the number rolled to her score *or* multiply the number by her score.

Say your youngster has 32 points and rolls 5. By using the mental math strategy of rounding, she'll realize that 32 x 5 would put her over 100, since 30 x 5 = 150. So adding (32 + 5 = 37) is the better choice.

Keep track of scores on paper. A player may choose to stop rolling at any time — the winner is the person who gets closest to 100.

Mixtures and solutions

Stir up your child's enthusiasm for chemistry with some hot chocolate! Here's how he can explore mixtures and solutions.

First, let him scoop cocoa powder and marshmallows into a mug. It's a *mixture* because the substances don't dissolve, melt, or otherwise change. What happens when he adds hot milk? It becomes a *solution* because the cocoa dissolves and the marshmallows melt.
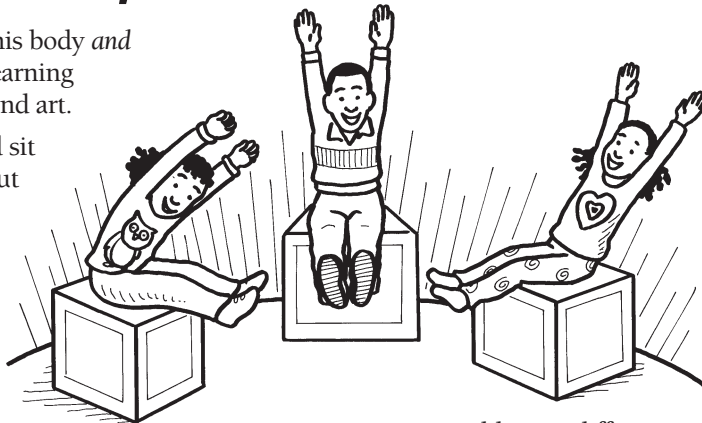
Together, think of more examples of mixtures and solutions. Your youngster might say that trail mix is a mixture and lemonade is a solution.
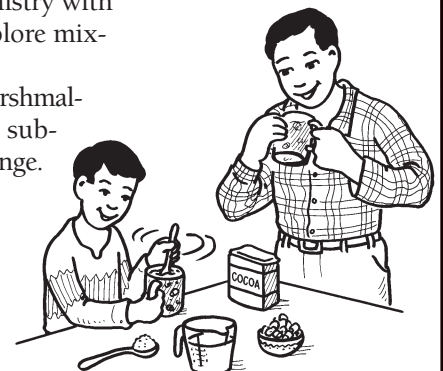
Geometry: Move it, draw it

Your youngster can stretch his body *and* his mind with these ideas for learning geometry through movement and art.

Strike a pose. Have your child sit upright with his legs straight out in front of him and his arms stretched above his head. He's a right angle (90°). How could he make an acute angle (less than 90°)? (Lean forward.) An obtuse angle (more than 90°)? (Lean backward.) Now suggest that he hold his arms so they're parallel lines (lines that never touch). Can he make perpendicular lines (lines that intersect at right angles) with his arms?

Create abstract art. Encourage your youngster to draw a dozen straight, crisscrossing lines all over a piece of paper and color the shapes he forms. He could use a different color for each type of shape (trapezoid, rhombus, pentagon) and count how many of each there are. Now let him display his colorful work of art on the refrigerator. 🎲

PARENT TO PARENT

Solving for *x*

I noticed my daughter Lucy's math assignments had problems with *x* in them. Since I didn't do equations like that until middle school, I asked her teacher why they were already doing algebra.

He explained that teaching kids to solve for *x* is an early algebra skill that builds number sense and gives them a head start on the more advanced math they'll do later. That made sense to me, so I asked how I could help Lucy work on algebra.

$$5 + \text{☺} = 12 \qquad 5 + 12 = \text{♥} \qquad \text{🍎} + 7 = 12$$
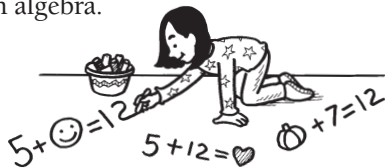
The teacher said we might make up problems with numbers missing in different places, such as $x + 7 = 12$, $5 + x = 12$, or $5 + 7 = x$. He pointed out that Lucy doesn't have to use *x*—she could draw a heart, a star, or anything she likes.

Lucy decided to write problems on the sidewalk using pictures in place of *x*. Sometimes, we leave equations on sticky notes for each other to find—under dinner plates or on the bathroom mirror, for instance. Her current favorite math activity? Typing equations on my phone or tablet—with emojis in place of *x*. 🎲

MATH CORNER

Place-value scarecrow

This twist on "Hangman" will build your child's understanding of place value.

1. Secretly think of a four- or five-digit number. (You may use the same digit more than once.) Draw a blank line for each place. *Example:* For 5,078, write _, _ _ _.

2. Your youngster should guess a digit (0–9). If he guesses 7, you would say, "There's a 7 in the tens place," and he would write a 7 in the correct blank (_ , _ **7** _).

3. If he guesses a digit that's not in your number, he draws a scarecrow body part and writes the digit next to it.

4. When all the blanks are filled in, ask your child to read the number to you ("Five thousand seventy-eight").

5. Switch roles, and play until your scarecrow is complete. 🎲

SCIENCE LAB

Why does my brain do that?

Your family may get tongue-tied with this brain-testing experiment.

You'll need: 2 sheets of white paper, 8 different-color crayons or markers, stopwatch

Here's how: On one piece of paper, have your child write 8 color words with matching crayons (blue with a blue crayon). On the second sheet, she should write the same words, but this time in a different order and in the "wrong" colors (blue might be written in orange). Time family members as they quickly say the colors of the words on the first page. Repeat with the second page—make sure to say the colors and not read the actual words (say, "orange" rather than "blue").

What happens? You say the colors when they match the words faster than you do when they don't match.

Why? One part of the brain reads words and another part identifies colors. When you try to simply name the colors, your brain instead tries to read the words. 🎲
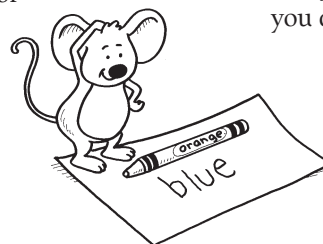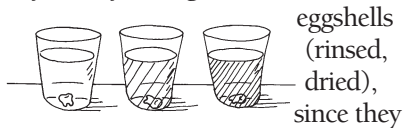
INFO BITS

Cookie symmetry

Your youngster will enjoy serving these symmetrical "cookies." Let her flatten play dough and cut it into circles, stars, and hearts. How would she cut each cookie so each side is a mirror image of the other? (Down or across the middle.) If she flips one half over the *line of symmetry* (where she cut), it should match the other side exactly.

Teeth and soda

Let your child see for himself the effects of soda on his teeth. He can use baby teeth you might have saved or use eggshells (rinsed, dried), since they have calcium like teeth do. Have him soak one in water, one in orange juice, and one in cola. How do the teeth look after a week? A month?
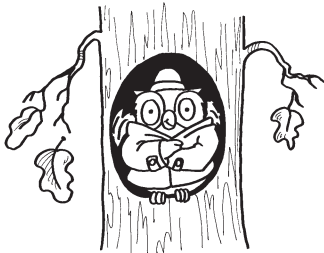
Book picks

▯ Get a kick out of math with *Riddle-iculous Math* (Joan Holub), a joke book of riddles and equations.

▯ Through poetry, *Leaf Litter Critters* (Leslie Bulion) tells about earthworms, bacteria, and other creatures that live in leaf piles.

Just for fun

**Q:** What falls in autumn but never hits the ground?

A: The temperature.

Thanksgiving multiplication

This month, your youngster can be thankful for multiplication! Share these Thanksgiving-themed ideas to let him learn multiplication facts in playful ways.

Turkey facts

Have your child draw a dozen turkeys, each with 12 tail feathers, on separate sheets of paper. He can number the turkeys 1–12 and write a matching multiplication fact on each feather. For instance, on turkey number 8, his "feather facts" would be $8 \times 1 = 8$, $8 \times 2 = 16$, and so on up to $8 \times 12 = 96$. You can quiz each other ("What is 7×6?") and use the "feathers" to check the answer (42).
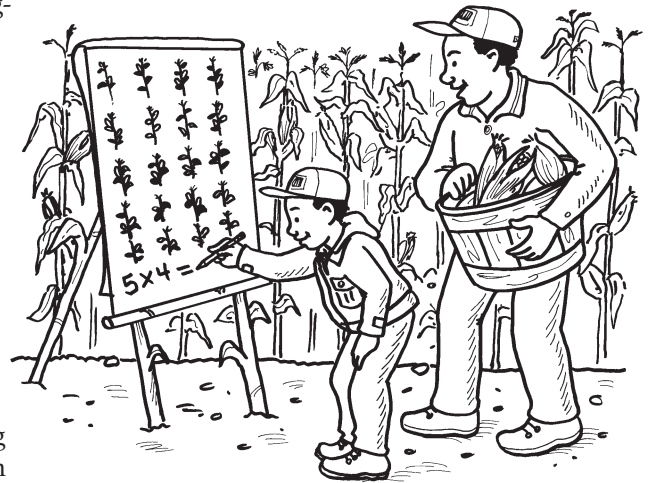
Cornfield arrays

While the corn pudding is in the oven, your youngster can make cornfield arrays. Let him draw a cornfield with even rows and columns (perhaps 5 rows of 4 cornstalks) and say the equation shown ($5 \times 4 = 20$). Then he can draw the same number of stalks a different way (4 rows of 5 stalks) and give the problem ($4 \times 5 = 20$). How else could he make 20?

Mealtime equations

Suggest that your child write and illustrate scrumptious word problems to share at Thanksgiving dinner. *Example:* "We used 2 12-oz. bags of cranberries to make the cranberry sauce. How many ounces of cranberries did we use?" He can write the equation on the back: $2 \times 12 = 24$ oz.

Be a bird-watcher

"That bright red bird is a cardinal!"

Your youngster can observe and identify birds with this project. Let her make a bird feeder by spreading peanut butter or shortening on a pinecone or an empty cardboard tube and rolling it in birdseed or dry oats.
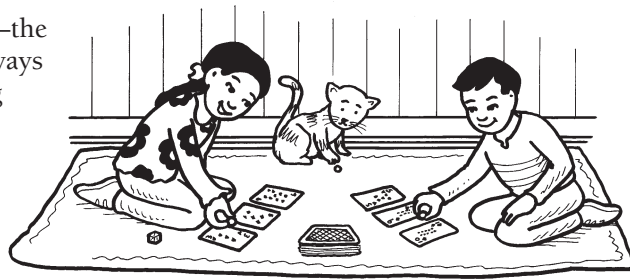
Then, she can hang it from a tree branch with yarn or string. When birds visit, have her take photos or draw pictures and identify her feathered friends. She might check out a field guide from the library, use a free app like Seek, or search the internet for "bird identification."

Number sense with decimals

Let's get straight to the point—the decimal point, that is! Here are ways for your child to practice reading and comparing decimals.

Mark the number line. Using sidewalk chalk outside, have your youngster draw a long horizontal line and add 11 short vertical lines to divide it into 10 equal parts. She should label the first mark 0 and the last mark 1. Then, counting each mark in between as 0.1, she can fill in her number line (0.1, 0.2, 0.3). Now have her stand on any number and "hop" to math problems. If she's on 0.2, you might ask, "What is 0.2 + 0.3?" (She would hop three tenths to 0.5.)

Place the decimal. Get a deck of cards (no face cards, ace = 1), one marble per player, and a die. For the die, cover 4, 5, and 6 with squares of masking tape, and mark 1, 2, and 3 on them. Stack the cards facedown. Each player draws three cards and lays them faceup in the order drawn (say, 9, 5, 3). Take turns rolling the die—roll 1 and put your marble (decimal point) before the first digit (0.953), roll 2 and place it before the second digit (9.53), or roll 3 and it goes before the third (95.3). Who made the biggest decimal? The smallest? 🎲

Q&A Back to the drawing board

Q: *My son mentioned that he's learning the engineering design process in school. How can he try it out at home?*

A: The engineering design process is creative problem solving in five main steps: ask/identify, imagine/brainstorm, plan, create, and compare/improve.
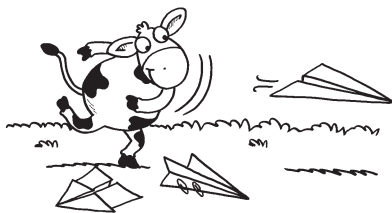
Get your son's wheels turning by helping him identify an engineering problem. Perhaps he wants to create a paper airplane that will fly all the way across the room. He could brainstorm different designs, then choose one to make and test. Now how could he improve his design? Maybe he'll try different kinds of paper or folds. Or perhaps he'll add paper clips.

After each "flight," ask questions like "What worked well?" or "Why do you think your plane nosedived?" You'll encourage him to analyze his design and see any flaws as areas for improvement. 🎲

SCIENCE LAB Watch the "moon" glow

The moon isn't a star—so why does it appear to shine? Your child will find out with this demonstration.

You'll need: washable marker, mirror, flashlight, soccer ball or basketball

Here's how: Have your child draw a big round moon on a bathroom mirror, close the bathroom door, and turn off the light. Now shine a flashlight (the "sun") at the moon. Then, let him use the ball (the "Earth") to partially block the sun. Can he create a crescent moon and a half moon?
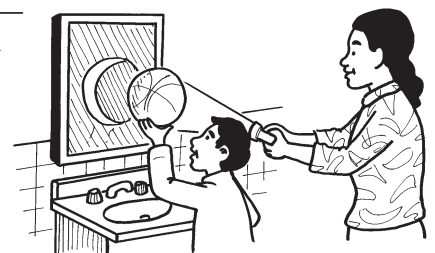
What happens? Your youngster can't see the moon when the sun isn't shining on it. When he points the sun at the moon, the moon appears to shine. And the Earth casts a shadow on the moon.

Why? The moon reflects sunlight. When the Earth blocks the sun, all or part of the moon is dark. 🎲

MATH CORNER Choose the best unit

Your youngster wouldn't use millimeters to measure an elephant—but she might for an ant. Help her pick the best measurement unit for the job with this idea.

Animals

Take turns naming animals and choosing the unit that makes sense for measuring their length. Your child might pick inches or centimeters for a chipmunk because smaller units would be more precise for tiny animals. And she'd use feet or meters for a buffalo—it would take too long to measure a huge animal with small units.

Household objects

Give your youngster a tape measure and a ruler, and send her on a mission to find the length or height of 10 items. She'll discover that either tool works for smaller things like a book or a remote control. But a tape measure is better for a bookcase or refrigerator so she doesn't have to keep moving the ruler. 🎲