Intermediate Edition

Math+Science Connection

Building Understanding and Excitement for Children

October 2019

Harmony Elementary School
Dr. Barbara Griffieth, Principal

INFO BITS

Take a perimeter walk

Build your child's "measurement sense" with this outdoor activity. Let her estimate the number of heel-to-toe steps it will take her to walk the perimeter of your yard or a playground. Then, she can count her steps to check. To calculate the perimeter in inches, she could measure her step size in inches and multiply that by her number of steps.

Nature's carvings

Water and wind gradually erode, or wear away, rocks and soil to create amazing natural wonders. Outdoors or in photographs, help your youngster find examples (caves, canyons, river gorges). Then, have him model erosion by making a "mountain" of dirt and gently blowing on it through a straw or pouring water over it. How does it change?

Book picks

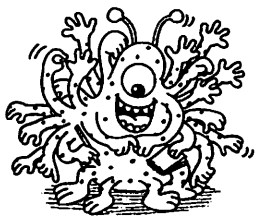
The Number Investigators are gearing up for their school math bee, which is in 14 days—or 1,209,600 seconds—in the story of *Charlotte Morgan and the Great Big Math Problem* (Martin Tiller).

Your child will discover interesting ways to combine science and art in *STEAM Lab for Kids: 52 Creative Hands-On Projects for Exploring Science, Technology, Engineering, Art, and Math* (Liz Lee Heinecke).

Just for fun

Q: How does a monster count to 100?

A: On his fingers and toes.



Everyday fractions

Does your child know why a 25-cent coin is called a quarter? It's one quarter, or $\frac{1}{4}$, of a dollar. Help him discover fractions like that all around him with these ideas.

Spot 'em

Challenge your youngster to look (and listen) for fractions at home and on the go. He might pour juice from a $\frac{1}{2}$-gallon carton, attend a game with four quarters, or see a freeway sign for an exit in $\frac{3}{4}$ mile. Or perhaps he'll hear you say, "It's a quarter to seven" or "I'm a third of the way through my book."

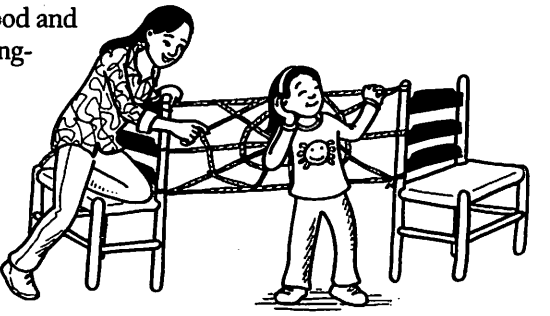
Fold 'em

Turn laundry time into fraction time. Let your child fold a towel in half and then in half again. Ask him how it's folded now (into fourths). What happens if he folds a towel into thirds and then in half? (It's folded into sixths.) To see the fractions more easily, suggest that he make the same folds in paper. Then, he can unfold to see the creases. How could he fold and get eighths? Twelfths?

Show 'em

Quarters are great tools for modeling fractions. Gather a few, and ask your youngster to show you $\frac{3}{4}$ of a dollar (3 quarters) or $1\frac{1}{2}$ dollars (6 quarters is $\frac{6}{4}$ or $\frac{3}{2}$ or $1\frac{1}{2}$). Now have him tell you a fraction to show in quarters.

Good vibrations (for spiders)

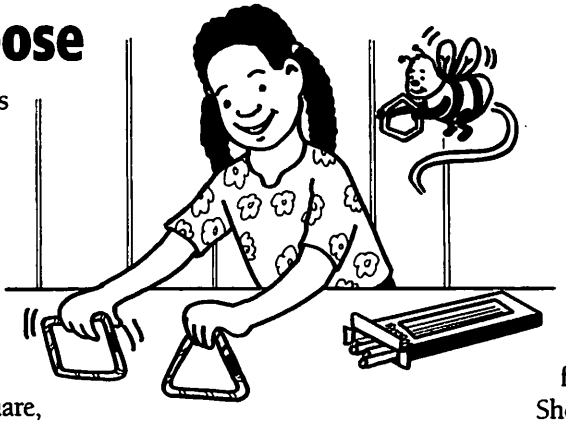


A spider's web helps it gather food and stay safe from predators. Your youngster can learn how by building a model of a web.

Help her stretch yarn tightly between two chairs, weaving and tying the strands into a web. Have your child hold one strand and close her eyes while you pluck a different strand—first gently, and then harder. Does she feel the difference?

Spiders sense different vibrations in their webs. The vibrations may signal danger, rain, or even another spider. Other vibrations mean it's dinnertime—a bug has been caught in the web. And spiders know the difference!

Shapes with a purpose



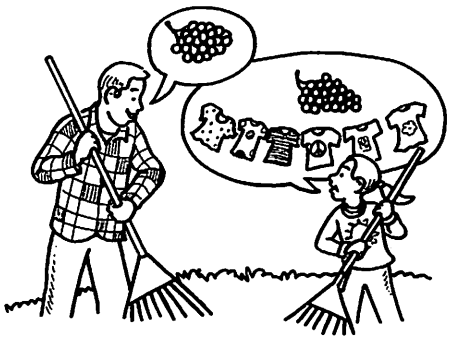
Engineers often use triangles as supports in bridges and buildings, while bees use hexagons to construct their honeycombs. These activities will encourage your youngster to explore the practical side of shapes.

Triangles. A triangle is considered a sturdy shape for building. To see why, let your child bend one drinking straw into a triangle and another into a square, taping each shape's ends together. Now have her try to carefully transform each one into a different shape—without bending its sides. The square can become a parallelogram, but the triangle stays rigid.

Hexagons. Bees use hexagons to build their honeycombs so they can store the most honey possible. Your youngster can see how by drawing a few rows of hexagons linked together and then a few rows of circles side by side. She'll see how the hexagons share sides with no wasted space between them, but the circles leave lots of gaps.

MATH CORNER In my head

Practicing mental math is fun with this variation on a popular road-trip game.

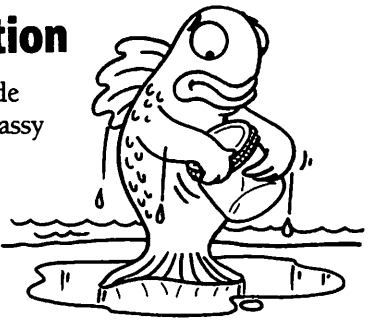


Take turns naming an item to take on a trip and telling how many you'd take. ("I'm going on a trip, and I'm taking 24 grapes. That's 24 items in all.") Your youngster repeats your item and adds her own. ("I'm going on a trip, and I'm taking 24 grapes and 6 shirts. That's 30 items.")

Keep playing until someone forgets an item or adds incorrectly. If you make it to 100 items without a mistake, everyone wins!

Variation: Include multiplication with statements like, "I'm going on a trip, and I'm taking 10 pairs of socks. 2 x 10 = 20. That's 20 items."

SCIENCE LAB Fascinating friction



Your child can slide down a playground slide much more easily than he can slide down a grassy hill. That's because the smooth metal surface creates less friction—the resistance of movement when two surfaces rub together. Let him try this experiment to see how friction works.

You'll need: screw-top jar with lid, soap, water

Here's how: Screw the lid on the jar as tightly as you can. Then, your youngster should wet his hands with soap and water and try to unscrew the jar. Next, have him rinse and dry his hands and the jar—and try again.

What happens? The jar is easier to open when his hands are dry.

Why? The friction between his hands and the lid helps him unscrew it. The water and soap reduced that friction, so his hands slipped instead of gripping the lid to remove it.

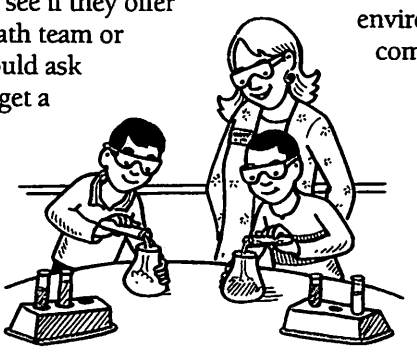
Q & A Math and science extracurriculars

Q: *My son is trying to choose an after-school activity. He loves math and science—any ideas for extracurriculars related to those subjects?*

A: Start by calling your son's school or visiting the website to see if they offer any activities like a math team or science club. Or he could ask a teacher to help him get a new group started.

Also, check the public library, the parks and recreation department, and nature centers. You may find STEM classes, chess clubs, or nature programs about plants or animals.

If he joins Scouts, he could earn merit badges in everything from astronomy to chemistry to forestry. Or consider your local 4-H club, where kids explore the environment, agriculture, computer science, and more.



Idea: Suggest that your child ask a friend or two to join a group or club with him. He'll have someone he knows there, and you may be able to carpool with the other parents.

OUR PURPOSE

To provide busy parents with practical ways to promote their children's math and science skills.

Resources for Educators,
a division of CCH Incorporated
128 N. Royal Avenue • Front Royal, VA 22630
800-394-5052 • rfecustomer@wolterskluwer.com
www.rfeonline.com

Intermediate Edition

Math+Science Connection

Building Understanding and Excitement for Children

November 2019

Harmony Elementary School
Dr. Barbara Griffieth, Principal

INFO BITS

Geometry George

Play this version of "Simon Says" to help your child practice geometry terms. Take turns giving each other instructions like "Geometry George says, 'Draw perpendicular lines'" or "Geometry George says, 'Hold your arms parallel.'" If you follow the instructions when the person doesn't say "Geometry George," you're out!

Have a heart

Your youngster's heart pumps more than 1 gallon of blood every minute! To see how hard it works, she can pretend a gallon jug is a heart. Poke a hole in it, and insert a straw (an "artery"). Then, let her fill the jug with water, replace the lid, and squeeze it over a sink. How much water can she pump out through the straw in 1 minute?

Book picks

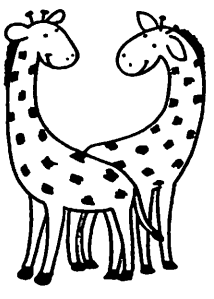
Rumpelstiltskin has returned—with a magic multiplying stick. In *Multiplying Menace: The Revenge of Rumpelstiltskin* (Pam Calvert), a boy must use math to defeat the fairy tale villain.

When the Sun Goes Dark (Andrew Fraknoi and Dennis Schatz) explains what happens during a total eclipse of the sun.

Just for fun

Q: When do giraffes have eight feet?

A: When there are two of them.



A place for each number

While $1, $10, and $100 each start with 1, your child would certainly rather have $100 than $1. The 1 in $100 is worth more—since a digit's value depends on its place in a number. Try these place value activities to bring this concept to life.

See the value

Ask your youngster to pick any three-digit number (perhaps 263) and name something close to the value of each digit. She might say she ran 200 meters in PE (hundreds place), a tissue box has 60 tissues (tens place), and there are 3 people in the room (ones place). Although 2 is less than 6 and 3, its place in 263 gives it the greatest value.

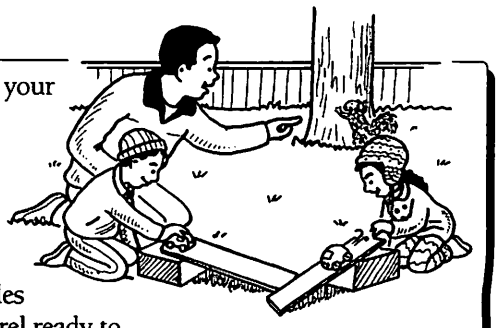
Rotate the rings

Your child can read large numbers with this place value tool. Help her cut a paper towel tube into five rings and write the digits 0–9 around each ring. Now ask her to slide the rings onto a stick or ruler, rotate them a few times, and read any number whose digits are lined up in front of her. *Example:* "Fifty-eight thousand seven hundred eighty one" for 58,781.

Rearrange the digits

Make the biggest six-digit number to win this game. Use playing cards, ace (1) through 9. Each person draws six cards and arranges them faceup in the order drawn. On each turn, a player makes her number larger by swapping places for any two of her cards. (For 351,642, switch 6 and 3 to make 651,342.) After three turns, the player with the highest number wins.

Two kinds of energy



What's the difference between a ball in your youngster's hands and a ball that's flying through the air? The ball he's holding has *potential* (stored) energy. The one in the air has *kinetic* energy—it's in motion. Let him explore these two types of energy.

1. Potential. Help your child find examples of potential energy. He might spot a squirrel ready to scamper up a tree, a toy car at the top of a ramp, or a ceiling fan that's turned off.

2. Kinetic. Can he turn potential energy into kinetic energy? For instance, he could push the car down the ramp or turn on the fan. The squirrel? He's on his own!

Fall-themed graphs

Pie, acorns, pinecones ... encourage your youngster to use fall's treasures to practice graphing.

Slices of pie

Let your child cut a paper plate into one slice per family member. Each person labels his slice with his favorite kind of pie and colors it (red for apple, orange for pumpkin). Now your youngster can glue the slices onto a second paper plate, putting slices with the same answer next to each other. It's a pie graph about pie! Ask questions he could answer by analyzing the data in his graph: "Which pie is most popular?" "What fraction of people chose pumpkin?"

Natural objects

Have your youngster gather items from the ground and show his findings on a *scaled picture graph.* This type of graph uses one picture to represent a chosen number of objects. Have him draw a key, for example:

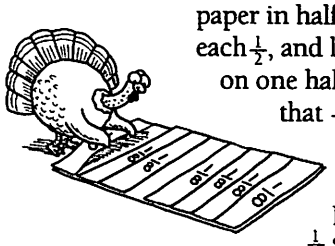
= 5 acorns = 5 leaves

So if he collected 20 acorns and 15 leaves, he would draw a graph with 4 acorns (4 x 5 = 20) and 3 leaves (3 x 5 = 15).

MATH CORNER Prove it!

My daughter Amanda was making careless mistakes on her math homework, so we made up an activity we call "Prove it." She has to find a creative way to prove that her answers are correct.

When she solved $\frac{1}{2} + \frac{3}{8} = \frac{7}{8}$, for example, Amanda cut one piece of paper into 8 equal parts and labeled each strip $\frac{1}{8}$. Then, she folded a second piece of paper in half, labeled each $\frac{1}{2}$, and laid 4 strips on one half to show that $\frac{4}{8} = \frac{1}{2}$.



Finally, Amanda put 3 of the $\frac{1}{8}$ strips on the other half and counted to show that $\frac{7}{8}$ was correct.

For an assignment about the commutative property (which states that you can add or multiply numbers in any order and get the same answer), I asked her to prove that 9 x 5 = 5 x 9. So she drew 9 rows of 5 stars each. When she turned her paper sideways to show 5 rows of 9 stars, she proved that there were still 45 stars.

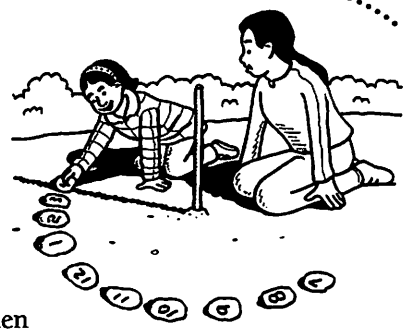
Our activity is helping Amanda to correct her mistakes—and learn from them—as she goes.

OUR PURPOSE

To provide busy parents with practical ways to promote their children's math and science skills.

Resources for Educators,
a division of CCH Incorporated
128 N. Royal Avenue • Front Royal, VA 22630
800-394-5052 • rfecustomer@wolterskluwer.com
www.rfeonline.com

SCIENCE LAB Sundial time



In ancient times, sundials were used to tell time. Your youngster can see how as she builds her own clock on a sunny day.

You'll need: *straight stick, clock, rocks, permanent marker, patch of soil*

Here's how: On a sunny weekend morning, when the clock strikes the hour (say, 7 a.m.), have your child push the stick vertically into the ground. She should place a rock in the stick's shadow and use the marker to write the time on it. As the clock strikes each additional hour, she should write the times on the rocks and place them around the stick. She'll notice that the rocks need to be placed closer together as the sun gets higher in the sky and farther apart again as it gets lower.

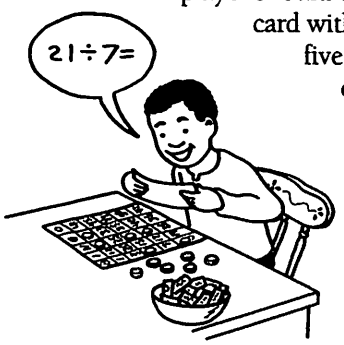
What happens? The sundial will let your youngster tell time. For instance, if the shadow falls about halfway between the 1 p.m. and 2 p.m. rocks, it's about 1:30 p.m.

Why? With Earth's rotation, the position of the stick's shadow changes over time with the position of the sun.

PARENT TO PARENT Bingo night, division–style

Turn bingo night into an evening of family math fun. Making—and playing—this game will help your child work on division facts.

First, everyone can make bingo cards out of construction paper (draw grids with 6 rows and 5 columns and put the letters "B-I-N-G-O" across the top boxes). Then, each person writes random numbers on his card: 1–10 under B, 11–20 under I, 21–30 under N, 31–40 under G, and 41–50 under O.



On separate slips of paper, write 50 division problems whose answers are between 1 and 50 (21 ÷ 7 = __, 300 ÷ 6 = __). Put all the slips in a bowl.

To play, the caller pulls out slips one at a time and reads the problem. Each player should cover the answer on his card with a token. The first to get five in a row (down, across, or diagonal) calls "Bingo!" As a check, he says the math problems and answers aloud. If they're all correct, he wins that round. Trade cards, and play again.

Intermediate Edition

Math+Science Connection

Building Understanding and Excitement for Children

December 2019

Harmony Elementary School
Dr. Barbara Griffieth, Principal

INFO BITS

Math palindromes

A palindromic number reads the same forward and backward, such as 424 or 123,321. Your youngster can stretch her math thinking by creating math problems with palindromes as the answers. *Examples:* 2 x 212 = 424, and 1,000,000 – 876,679 = 123,321.

Welcome, winter!

In the northern hemisphere, December 21 is the winter solstice—the first day of winter and the day with the fewest daylight hours of the year. Have your child look up sunrise and sunset times in the newspaper or online. What does he notice? (We get a little more sunlight each day after the winter solstice.)

Book picks

Your youngster will have fun calculating area in *The Original Area Mazes: 100 Addictive Puzzles to Solve with Simple Math—and Clever Logic!* (Naoki Inaba and Ryoichi Murakami).

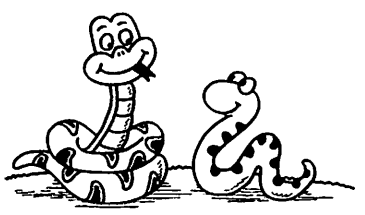
In addition to stunning photographs, *A Drop of Water: A Book of Science and Wonder* (Walter Wick) provides experiments to teach your child about the properties of water.

Just for fun

First snake: I hope I'm not venomous.

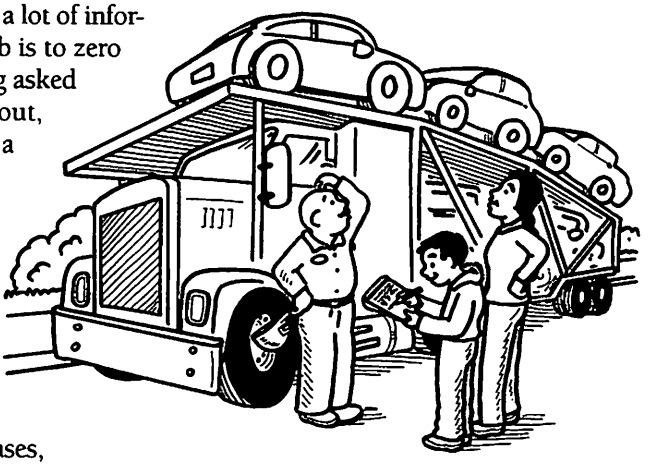
Second snake: Why?

First snake: I just bit my tongue!



Word problems? No problem!

A word problem contains a lot of information. Your youngster's job is to zero in on what exactly he's being asked to do. Once he figures that out, solving the problem may be a snap. Share these strategies.



List key details

Have your child read the entire problem and list facts it tells him. Say he needs to figure out how many trophies can be displayed in a school lobby. He could write, "2 display cases, 5 shelves per case, 6 trophies per shelf." Then he can solve: 2 x 5 x 6 = 60 trophies. *Variation:* Encourage him to draw a picture showing what he knows.

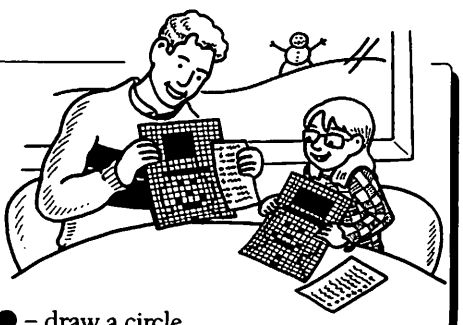
Use easier numbers

Suggest that your youngster replace larger numbers with smaller ones. He might use 35 and 7 for 3,540 and 789. Then he can focus on *how* to solve rather than on harder calculations. For instance, should he add, subtract, multiply, or divide? Once he understands the steps involved, he can swap the original numbers back in and solve.

Check for reasonableness

If a car carrier holds 10 cars, how many trips must the driver take to transport 47 cars? Encourage your child to pay close attention to the context of a problem. That will help him decide whether his answer makes sense. He may realize that while 47 ÷ 10 = 4, remainder 7, it isn't possible to take 4.7 trips. That means 5 trips are required.

Code a snowman



No computer is required for this wintry coding activity. Your child will learn basic computer programming as the two of you write code for each other to draw a snowman on graph paper.

Make a key. List commands you'll use, such as ↓ = move down 1 square, → = move right 1 square, ■ = shade in the square, and ● = draw a circle.

Write code. Direct each other to draw the outline of a snowman by writing strings of commands from your key. Now add commands for decorating the snowman. *Example:* ●↓●↓● means make a column of three round buttons.

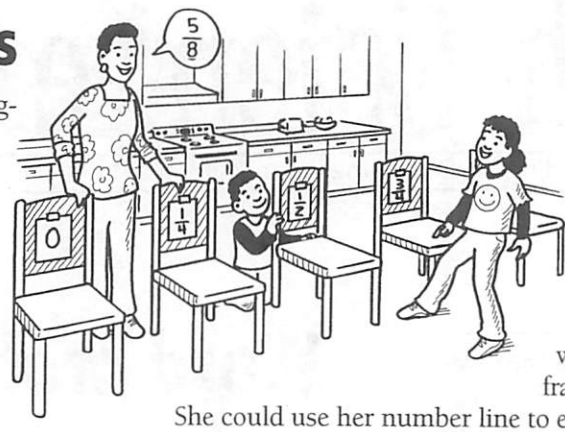
Follow. Trade codes and draw. Check each other's snowmen against your codes—do they match?

Use fraction benchmarks

What does $\frac{3}{8}$ of a sandwich look like? If your youngster compares it to a familiar fraction (a benchmark), she'll know it's close to $\frac{1}{2}$ of a sandwich. She can try these tips for visualizing benchmarks and using them to solve fraction problems.

Walk to benchmarks. Let your child line up five "benches" (perhaps kitchen chairs) equally spaced along a path. She should label them 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1.

Take turns telling each other where to stand. *Example:* "Walk $\frac{5}{8}$ of the way down the path." Your youngster would think about which bench $\frac{5}{8}$ is closest to. ("Hmm, $\frac{5}{8}$ is close to $\frac{4}{8}$, which is $\frac{1}{2}$.") Then, she can find the right spot (halfway between $\frac{1}{2}$ and $\frac{3}{4}$).



Estimate with a number line. Have your child draw a number line with benchmarks at 0, $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and 1. Suggest that she fold her paper in half, then in half again. When she unfolds it, she can write the benchmark fractions on the fold lines.

She could use her number line to estimate before she adds fractions so she knows whether her answer is reasonable. Perhaps she is adding $\frac{1}{3} + \frac{1}{5}$. She might think, "$\frac{1}{3}$ is a little greater than $\frac{1}{4}$, and $\frac{1}{5}$ is a little less than $\frac{1}{4}$. And $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$, so the answer has to be close to $\frac{1}{2}$."

Q & A Be a persistent problem solver

Q: *My son gets frustrated when he can't figure out the answer to a math problem right away, especially if there are multiple steps. How can I help him?*

A: Try asking your youngster questions that help him think through the problem to find the solution.

What kinds of questions should you ask him? Try these: "Can you explain what you've done already?" "Where did you get stuck?" "What is the last step you understood?" "What do you think the next step might be?" "Is there another method you could try?"

And here's an idea to help him help himself. Suggest that he write each of those questions on a separate index card. The next time he's stuck, he can pull one out to get moving again.

Finally, let him know that mistakes are part of the learning process—and "sticking with it" will help him in all subjects.

OUR PURPOSE

To provide busy parents with practical ways to promote their children's math and science skills.

Resources for Educators,
a division of CCH Incorporated
128 N. Royal Avenue • Front Royal, VA 22630
800-394-5052 • rfecustomer@wolterskluwer.com
www.rfeonline.com

SCIENCE LAB Brr! Keeping animals warm

Whales and seals survive in very cold climates thanks in part to their layer of blubber (fat). Your child can feel how that natural insulation works with this experiment.

You'll need: 2 quart-size plastic bags, bowl of ice water, tablespoon measure, shortening (or margarine)

Here's how: Have your youngster put his hand in one bag and briefly plunge it into the bowl of ice water. How did it feel? Then, he should measure 8–12 tbsp. shortening into the second bag. Let him stick his bag-covered hand into the shortening-filled bag and squish the shortening around so it surrounds his hand through the plastic. How does his hand feel when he places it in the water this time?

What happens? In the first bag, his hand will feel very cold. But when his hand is protected by shortening, he won't feel much cold at all.

Why? The shortening acts like blubber, providing insulation that retains the heat from your child's hand—keeping his hand warm.

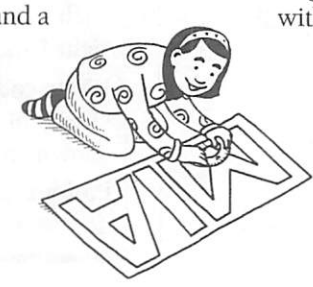
MATH CORNER The angles in my name

Letters contain lots of angles! Build your youngster's geometry skills with these games where family members find the angles in the letters of their names.

1. Each player uses a ruler and a pencil to write her name in large block capital letters. *Idea:* Let your child make one for your pet, too.

2. Now everyone measures each of their angles with a protractor and labels them. For instance, an I has four 90° (right) angles, and perhaps the top of an A has two 115° angles.

3. Each person adds up the total degrees of all the angles in her name. The person with the highest total wins.



Play again with the names of your favorite sports teams, foods, or colors. Your youngster can even do this activity with her spelling words.