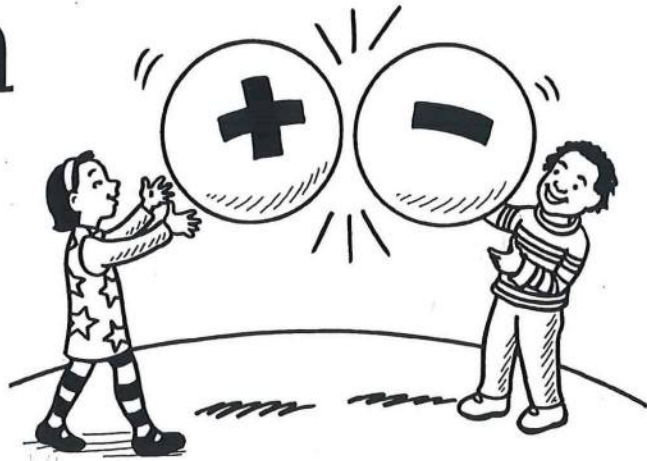


Fun with Addition and Subtraction

Want to help your youngster master addition and subtraction? Let her paint a picture, tell a story, or build a city! Activities like the ones in this guide make math practice playful.



Paint by number

Here's a colorful way to add math to your child's art projects.

Materials: paper, watercolor paints, paintbrushes, coloring books, pencils

On a blank sheet of paper, have your youngster paint a spot of every color in her paintbox and label each one with a different number (red = 3, purple = 5).

Next, you can each choose a page in a coloring book and write a math problem in every space. For example, if blue = 4, she could write $3 + 1$ or $8 - 4$ in the spaces for the sky. (Note: Make sure the answers match a color on the key.) Now trade pictures, solve the problems, and paint!

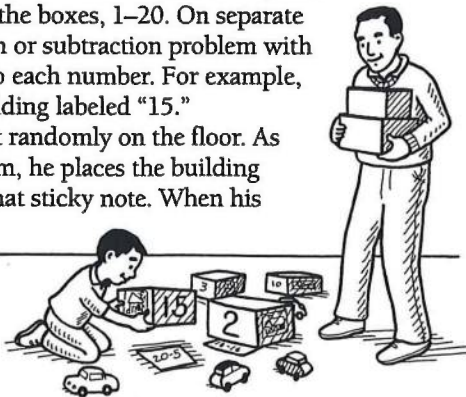
Math city

Let your child use his math skills to design a 3-D city that he can drive his toy cars through.

Materials: old magazines, scissors, glue stick, 20 boxes, markers, sticky notes, toy cars

Help your youngster cut pictures of houses and buildings from old magazines and glue one onto each box. Then, have him use a marker to number the boxes, 1–20. On separate sticky notes, write an addition or subtraction problem with an answer that corresponds to each number. For example, write $20 - 5$ to match the building labeled "15."

Spread the sticky notes out randomly on the floor. As your child solves each problem, he places the building that matches the answer on that sticky note. When his city is complete, he can add toy cars and play in his town. Note: Leave his city set up, and give him new math problems another day.



Toys and tally marks

Have your child use *manipulatives* (small objects he can count) to help him solve math problems. He could stack 12 blocks and then remove 3 to find $12 - 3 = 9$. Or he might visualize the problem by drawing pictures or making tally marks. For instance, he can replace $3 + 4$ with tally marks (III + IIII) and count them to get the answer (7).

Once upon a time...

Making up stories that combine math and favorite toys is an easy way for your youngster to see word problems in action.



Materials: paper, pencil, toys

Write an addition or subtraction problem on a piece of paper, and ask your child to use toys to tell a story that matches it. If you write $8 + 3 = 11$, she might gather 8 ponies, add 3 more, and count the total.

She could move the ponies around and tell a story like this: "I saw 8 ponies playing at the park. Then, 3 more ponies joined them. All 11 ponies galloped around together." Now ask her to write a problem for you to solve and act out.

continued



Teddy bear picnic

Serve up fact-family fun with a pretend picnic.

Materials: masking tape, pencil, four stuffed animals, four plastic or paper plates, four plastic or paper cups, paper

Together, make a math fact family for each stuffed animal. (Note: A fact family is made of three related numbers—you can add or subtract two of them to get the third.) Let your youngster pick two numbers from 1 to 9 (say, 5 and 7). Have him add them ($5 + 7 = 12$) and write each of the three numbers (5, 7, 12) on separate pieces of masking tape. Ask him to stick the largest number on a stuffed animal and the other numbers on a plate and a cup. After he makes four sets of related facts, he can place the animals around the kitchen table while you mix up the plates and cups. His job is to match the dishes to their fact-family animals!

Help him write the addition and subtraction facts for each family. Example: $5 + 7 = 12$, $7 + 5 = 12$, $12 - 5 = 7$, and $12 - 7 = 5$. Tip: Talk about using addition facts to solve the subtraction ones. You might say, "Let's think about $12 - 5$. What number would you add to 5 to equal 12?" (7)

Talk it out

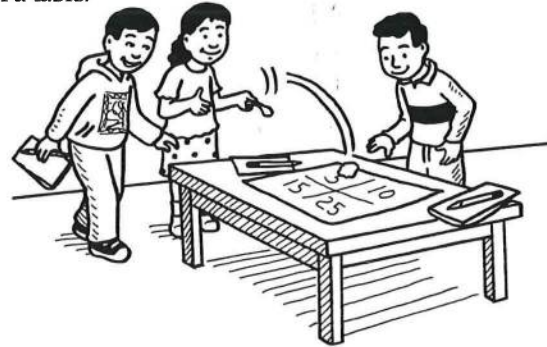
As you do these activities, encourage your youngster to explain her thinking out loud. For example, she might say, "I know that $3 + 3 = 6$. Since 4 is 1 more than 3, then $3 + 4$ must equal 7." Talking about how she got the answers will help her understand math concepts.

Up-and-down race

Hit the target, race to 100—and then back to 0.

Materials: paper, pencils, spoon, cotton ball

Have your youngster draw a giant plus sign to divide a sheet of paper into four equal sections. He should number the sections 5, 10, 15, and 25 and place the paper in the center of a table.



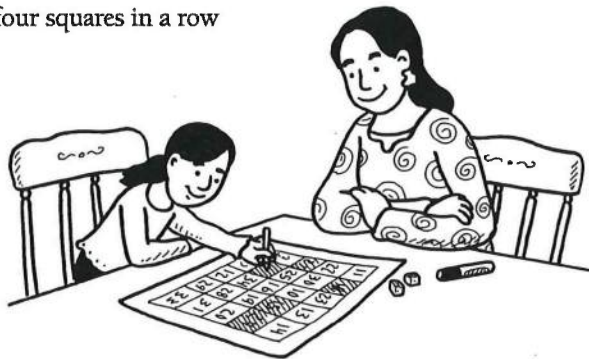
Take turns using the spoon to toss the cotton ball onto the paper target. Add the number it lands on to your score. Each player keeps tossing and adding until he has exactly 100 points. If a toss would put his score over 100, he scores no points that turn. When he reaches 100, he keeps playing but then starts subtracting his tosses from his score. Whoever is first to get all the way to 100 and then back to 0—by exact toss—wins.

Four in a row

The first person to color four squares in a row wins this two-player game.

Materials: paper, pencil, a pair of dice, two different-color crayons, calculator

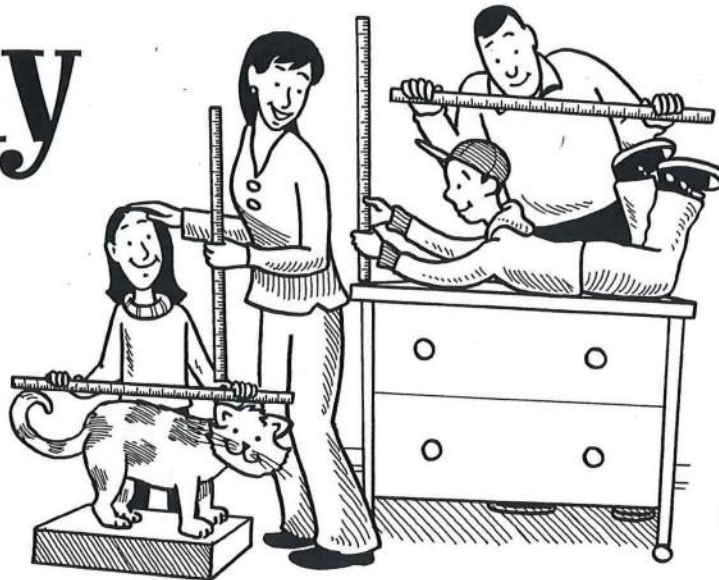
Make a game board by drawing a 5 x 5 grid on paper. Randomly fill each square in the grid with a number from 10 to 34.



Your child picks any square on the board, rolls the dice, and adds the two numbers she rolled to the one she selected on the board. If she picked the 12 square, for instance, and rolled a 5 and a 3, she would say, " $12 + 5 + 3 = 20$."

If correct (she can check her answer with a calculator), she colors in the 12 square. If not, she leaves the square blank. Then it is your turn to pick a square, roll, and add. Color four boxes in a row (down, across, or diagonal) to win.

Family Math Time



Morning, noon, or night... it's always math time! Make every moment count by adding math practice to your family's daily life.

Shortest to tallest

Teach your youngster about measuring and comparing heights with this activity.

Have family members lie down one at a time, and let your child use yarn to measure them. Help him lay a different color yarn beside each person, from head to toe, and carefully cut it to fit. Then, have him line up colored markers end to end alongside each piece of yarn and write down each person's height: "Ethan is 9 markers tall." "Mom is 13 markers tall."

To compare the heights, tape everyone's yarn to a wall, from the floor up. You can work on math vocabulary by discussing the results. "Who is the *tallest* person in our family?" "Who is the *shortest*?" "Who is *taller*—Mom or Dad?"

Tip: If you don't have enough markers, try spoons, straws, or juice boxes that are the same length.

Mix-and-match smoothies



Turn breakfast or snack time into a problem-solving adventure. Set out smoothie ingredients, and ask your child how many ways she could combine them.

For instance, you might put out two types of yogurt (vanilla, banana), two kinds of berries (strawberries, blueberries), and two flavorings

(honey, chocolate syrup). Then, help your youngster write a menu listing all the combinations. *Examples:* Vanilla-Strawberry-Chocolate, Banana-Blueberry-Honey. How many different smoothies can your child find? (*Solution:* 2 yogurts x 2 berries x 2 flavorings = 8 smoothies.)

Finally, let each family member choose a smoothie, and whip them up together. Bon appétit!

Math in the bath

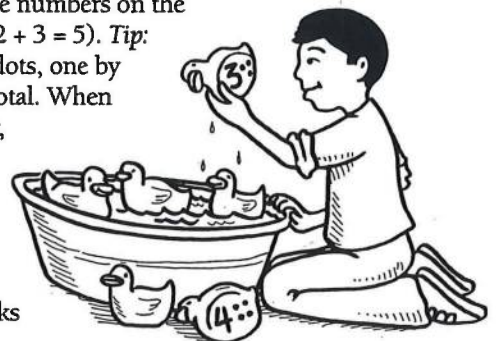
Help your child sharpen arithmetic skills with this version of the "Duck Pond" carnival game. Gather 10 rubber ducks or other floating toys, such as boats. Use a permanent marker to write a number, 1–10, and the corresponding number of dots, on the bottom of each.

Float the toys in the bathtub. Have your youngster pick up two and add the numbers on the bottom (*example:* 2 + 3 = 5). *Tip:*

He can count the dots, one by one, to reach the total. When he says the answer,

have him put the two ducks on the side of the tub and pick two more. Continue until all of the ducks have been chosen.

Variation: Play this game outside in a wading pool or with a bucket of water.



Laundry geometry

Which shapes can your youngster make while folding sheets and towels? Let her practice geometry while she helps you with laundry chores.

Ask her to fold a square washcloth to make a triangle. Have her unfold it, then fold it in a different way to create a rectangle.

Next, see if she can fold a rectangular towel or pillowcase to make a square. Once the linens and towels are all folded, have her sort them into piles of squares, rectangles, and triangles—and help you put them away.

continued

Sail a boat

Can your youngster make a clay boat that will carry "cargo"? First, let him see that clay can sink: have him roll it into a ball and drop it into a bowl of water. Then, ask him to think about what boats look like—does he think the clay will float if he shapes it like a boat? Once he gets it to float, have him add marbles, one at a time, to see how many it will hold.

When it sinks, suggest that he try to make a new boat that will carry more marbles. Your child can keep track of what works best by drawing each boat on a piece of paper and writing down the number of marbles that it holds before sinking.

Break a cup

When water gets cold enough (32 degrees), it becomes solid. Your youngster has seen solid water—he has probably used ice cubes to keep his drink cool, and perhaps he has skated on an ice rink. Let him use your freezer to make ice and see what happens. Help him fill a paper or plastic cup all the way to the rim with water. Set it carefully in a bowl and



place the bowl in the freezer before he goes to bed. Ask him what he thinks will happen. In the morning, he will see that the water turned to ice and cracked the cup. You can explain that when water freezes, it expands, or takes up more space. That's why the cup broke!

Collect raindrops

How big is a raindrop? The next time it rains, your child can find out. Let her pour some flour into a shoebox lid and pat it down flat.

Then, have her set it outside in the rain. After a minute, bring the lid back inside. Help her pour the flour into a colander over a bowl and gently shake the colander. The lumps of flour left behind show the sizes of the raindrops.



The water cycle

Where do puddles go? Where does rain come from? Water is constantly being recycled: it rises into the air (evaporation), forms clouds (condensation), and falls back to earth (precipitation). Your youngster can discover the three stages of the *water cycle* with these experiments.

1. Evaporation

Help your child understand why water seems to disappear. On a hot, sunny day, have him get two glasses, put $\frac{1}{2}$ cup water in each, and use masking tape to mark the water levels. Then, he can put both glasses outside, one in the sun and the other in the shade. Let him check back once an hour, and he'll soon notice that the glass in the sun has slightly less water. The heat from the sun helps water *evaporate* (turn into vapor) faster.

2. Condensation

Your youngster can explore condensation by creating a cloud in a jar. Help her fill a glass jar with hot tap water and let it sit for 1 minute. Then, have her pour out almost all of the water—she should leave



about 1 inch in the bottom of the jar. Next, let her use a rubber band to secure a piece of plastic wrap over the mouth of the jar and put some ice cubes on the top. A cloud will appear inside the jar. The warm water had started to evaporate, and the ice cooled it down. This happens in the sky, too—when water evaporates and then cools, it condenses to form clouds.

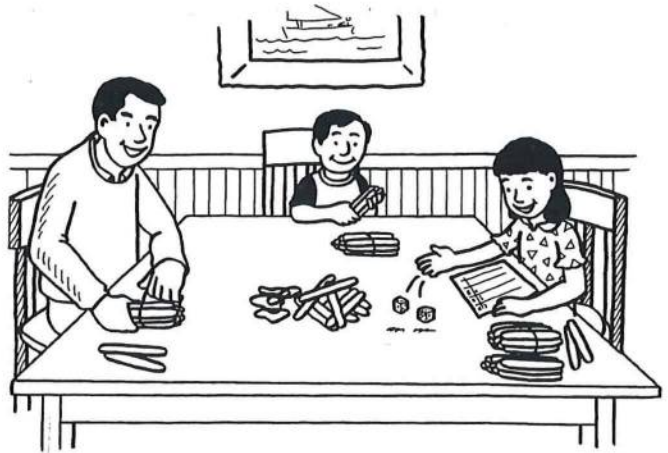
3. Precipitation

With this activity, your child can make a plant water itself! Let him fill a plastic cup halfway with soil, poke a hole in the soil with his finger, and place a few dried beans in the hole. He should water the soil until it's very damp. Then, have him set the cup inside a gallon-sized zipper bag. He can seal the bag tightly, put it by a sunny window, and leave it alone for a few days (he won't need to water it again). What happens? As the sun warms the water in the soil, it will evaporate. As it cools, it will condense into little drops on the bag. And finally, like rain, the drops will trickle down and "water" the plant.

All About Place Value

Would your child rather have \$1, \$10, or \$100? Although all of those amounts start with a 1, the 1 is worth a lot more when it's in the hundreds place!

Use these activities to help your youngster understand that a number's place is always important.



Bundles of sticks

Let your child practice making groups of 10 with this game. She will see that the tens, along with the "leftovers" (ones), give us the digits that go in the tens and ones places.

You'll need two dice, rubber bands, and a bag of craft sticks. On each turn, roll two dice, say the total, and take that number of craft sticks. Once a player has 10 sticks, she gets to put a rubber band around them and set the cluster aside. *Tip:* As you play, ask your youngster, "How many more sticks do you need before you have another ten?"

The winner is the first person with three clusters of 10. Have your child write down how many sticks each player has. If she has 3 clusters and 5 leftover sticks, she would write 35. Explain that the 3 tells how many tens she has and the 5 tells how many ones.

Collection counting

Show your youngster how tens and ones can make it easier for him to count a large number of items.

Encourage him to gather small objects like acorns or beads. Then, ask him how many he has. If he tries to count each item individually, he will probably discover that it's easy to lose track. Ask, "Is there an easier way to count these?" He



might put them in groups of 2 or 5, for instance, and then you could say, "Could you try piles of 10?" He can first count the tens ("10, 20, 30...") and then the ones ("1, 2, 3, 4"). How many does he have in all?

Variation: Let your child put small stickers (stars, smiley faces) all over a piece of construction paper and count them. Drawing a circle around each group of 10 will make counting easier.

Snack-time strategy

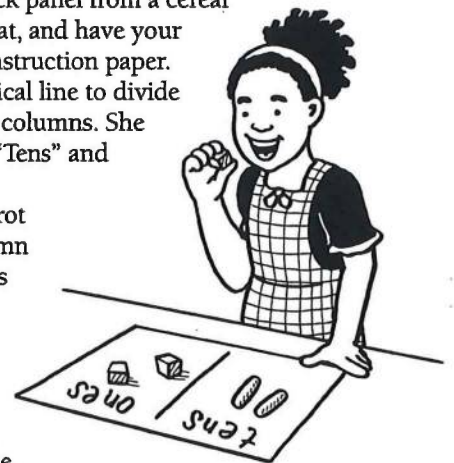
Here's a tasty place-value activity that your youngster can do every time she eats a snack. It will help her remember which is the tens place and which is the ones place.

Cut the front or back panel from a cereal box to make a placemat, and have your child cover it with construction paper. Tell her to draw a vertical line to divide the placemat into two columns. She can label the left side "Tens" and the right side "Ones."

Next, put some carrot sticks in the tens column and some cheese cubes in the ones column, and ask her to tell you what number you made. If you use 2 carrot sticks and 3 cheese cubes, she

should say 23. As she eats each piece, she can say the new number. *Example:* If she eats one cheese cube, her new number is 22, and then if she eats a carrot stick, she would be down to 12. After her last bite, she gets to call out, "Zero!" and then give you a number to figure out.

Variation: Suggest that she make a three-column placemat for hundreds, tens, and ones. Square crackers could represent hundreds.



continued



Art with tens and ones

With this art project, your youngster will see that numbers are made of tens and ones.

Cut several different colors of construction paper into strips. Leave half of the strips intact (these represent tens), and cut each of the other strips into 10 equal squares (these are ones). To help your child understand that one strip is equal to 10 squares, give him a strip, and have him cover it with squares. Ask him to count how many squares he used (10).

Then, write a two-digit number (18) at the top of a large piece of paper. Let your youngster glue the tens and ones on a piece of paper to make a colorful picture showing your number. For instance, he might use a ten for a tree trunk and 8 ones to make the branches. Can he think of a different way to make 18? (He could use 18 ones to create a rainbow.)

Place-value “war”

This twist on the card game war will help your child learn to compare two-digit numbers. Encourage her to pay close attention to each number’s place to determine which one is the biggest.

Deal a deck of cards (face cards removed) evenly to players. On each round, every person flips over two cards. Each player then arranges her cards to make the largest possible two-digit number (ace = 1). For example, if your youngster gets a 2 and an 8, she should make 82.



Ask your child which number is the biggest. The person who made it gets to keep all the cards in that round. (If there’s a tie, draw two more cards each, and the winner of that round takes all the cards.) Play until you’ve used all the cards—whoever has the most wins.

Zero the placeholder

Zero means “nothing,” right? That’s one definition of zero—but this important number is also a *placeholder*. For instance, without a zero to hold the ones place, 20 would be 2. Try these two suggestions to show your youngster the significance of zero:

- Read library books. In *Zero* (Kathryn Otoshi), a sad zero feels like she’s worth nothing. But she soon learns that she makes a difference by teaming up with other numbers. Or try *Zero Is the Leaves on the Tree* (Betsy Franco). Your child will discover that zero is used for lots of things—from the number of sleds on the hill after the snow



melts to the number of kites flying when the wind isn’t blowing. Ask your youngster to come up with more “definitions” for zero!

- What would happen if we suddenly had no zeroes? Have your child list numbers your family uses that contain zero. For example, maybe her mom is 30 years old, her dad wears a size 10 shoe, and her favorite movie is *101 Dalmatians*. Encourage her to write the numbers without the zeros. She’ll laugh to see that her mom would be 3, her dad would wear a size 1 shoe, and the movie would have only 11 dogs!

Taking Math & Science Outside

Playful ways for your child to explore math and science are just outside your door. Go into your yard or to a nearby park, and try ideas like these to put a math and science twist on hide-and-seek, mud pies, and more.



Jumping contests

Young children love to show adults what they can do. Turn a simple jumping contest into an excuse for your youngster to practice measuring and comparing distances.

Have your child draw a start line with sidewalk chalk. Ask him to stand at the line and jump forward as far as he can. When he lands, mark the spot with chalk.

Then, he can measure the distance by walking it heel-to-toe and counting the steps he takes. *Note:* He could estimate partial steps (quarter-step, half-step).

Let him try again, once jumping backward and another time jumping sideways (feet *parallel* to the start line), and measure each jump. Which way does he jump the farthest? Encourage him to compare the distances: "My forward jump was two steps longer than my backward jump."

Idea: Take turns jumping. For every jump, each of you should measure the distance by walking heel-to-toe. Your youngster will see that your results are different (because your feet are different sizes). And he will begin to understand why we use standard units of measurement like inches and centimeters.



Nature collections

This nature "notebook" is a handy way for your budding scientist to collect specimens and make observations.

Together, brainstorm categories of objects your child could find and study outdoors (birds, rocks,

seeds, insects). Have her use a permanent marker to label a zipper bag for each type. Then, when you go outside, she can choose a bag and take along paper, pencil, and crayons.

As she explores, let her fill her bag with samples, drawings, and notes. For example, if she's investigating birds, she might collect a blue jay's feather from the ground or sketch a bird's nest on paper. Or she could list bird names (robin, cardinal, sparrow) and make a tally mark for each one she sees.

Tip: Suggest that she keep her bags in a cardboard box to "read" and explore any time she likes.

Hide-and-seek camouflage

Help your child understand how animals use *camouflage* with this fun game.

Hide a few different-colored plastic toys around your yard, putting some in places

where their color makes them stand out (a blue helicopter in front of an orange flowerpot) and some where their color disguises them (a tan dinosaur in a sandbox).

Tell your youngster how many toys are hidden, and let the hunt begin! *Tip:* If he needs help, give him a hint like, "The truck is hiding next to something green." When he finds all the toys, he can hide new ones for you.



Once he gets the hang of camouflage, encourage him to look for animals blending in with their surroundings. You can explain that camouflage allows animals to hide from predators. He might notice a squirrel on a tree trunk, a beetle on a plant stem, a deer in the woods, or a frog in grass by a pond.

Number-line math

This game will let your child burn off extra energy while practicing addition and subtraction.

Draw a long line with sidewalk chalk on a driveway, sidewalk, or playground blacktop. Starting at the left side, help your youngster number the line evenly from 0 to 20.



To play, have her pick a funny way to move (crawl, bunny hop, giant steps). Use that movement to give her an addition or subtraction problem. For example, if your child wants to crawl, you might say, "Start at 4, and crawl 3 more spaces." She would stand on 4 and crawl to 7. Ask her to tell you the math problem she just did: " $4 + 3 = 7$." Or if she picks bunny hopping, you could say, "Start at 17, and bunny hop back to 14." She would announce, " $17 - 14 = 3$." Then, choose your own silly way to move, and she gets to give you a math problem.

My mud pies

There's almost nothing more fun for a kid than digging in the dirt! Let your youngster put on old clothes and explore the soil in your backyard.

What's in dirt anyway? Have your child put handfuls of dirt into a sifter, hold it over a bowl, and shake. He might see that pieces of rock, tiny twigs, or clumps of soil stay on top of the sifter, while finer particles of dirt wind up in the bowl. Suggest that he use a magnifying glass to examine the different "ingredients."



Another way your youngster can learn about dirt is to mix it with water and make mud pies. First, he could put dry dirt in a foil pie pan and try to mold it into a pie (it won't stay together). Then, let him add water, a little at a time. Does the water stay on top of the soil, or is it *absorbed* into the dirt? How much water and dirt does he need to make a mud pie (half dirt and half water, more dirt, or more water)? Ask him why he thinks it's easier to shape dirt when it's wet.

Map making

Your child can practice map-making skills and observe her environment as you hike on a nature trail or walk to the park.

Have her get crayons and a notebook (or paper on a clipboard). Begin walking, and ask her to draw lines on paper to follow your route as you go. When you make a turn, she can use an arrow to indicate a right or left turn. *Idea:* Help her count the number of blocks before turning and add that information to her map. Also, encourage her to use objects along the way for landmarks. For instance, she might count three trees at a curve in the path and draw the trees on her map. Or she could sketch a sliding board to indicate a playground.

After your walk, suggest that she use her map to describe the route to a friend or family member. And then take the map along another day to follow it—she'll see that her map comes in handy when she wants to take the same walk.

