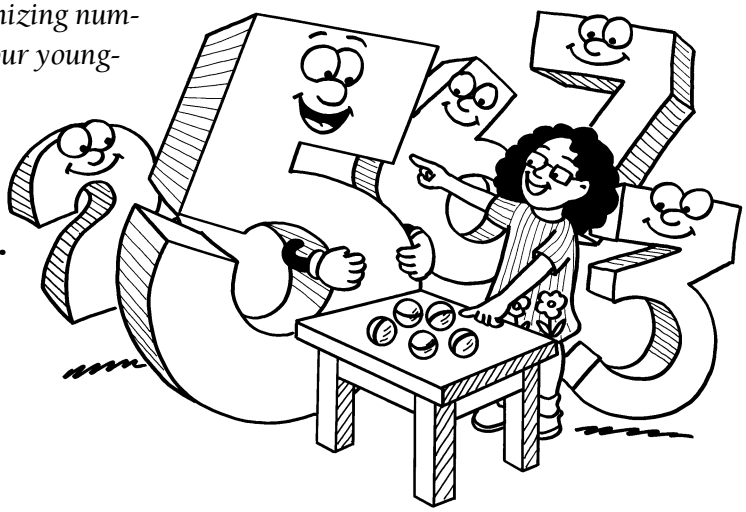
Early Number Sense

What is number sense? It begins with your child recognizing numbers and knowing how to count. But it also means that your youngster understands what each number represents, how numbers are related to each other, and how to use them. Together, enjoy learning all about number sense with these ideas.



Roll and paint

Your child can paint her way to number recognition and counting with this art activity.

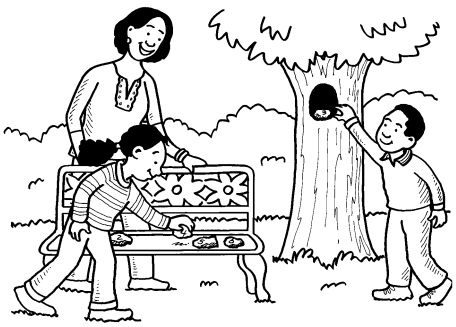
Ask her to number 10 slips of paper, 1–10. On 10 more slips, she could draw a shape or symbol (square, heart, circle, star). Have her put each set of slips in a separate paper bag and shake them up.

Then, let her pull one slip from each bag. The picture slip tells her what to paint on her paper (say, a star), and the number slip indicates how many times to paint it (perhaps 3). So your youngster would paint 3 stars. Now it's your turn to choose slips and paint. Continue taking turns until you've used all the slips. Finally, help her count the total number of symbols you painted—and hang up your masterpieces.

Go on a rock hunt

How is 5 related to 4 and 6? It's *between* them, or *after* 4 and *before* 6. With this hide-and-seek game, your child will discover where numbers belong in relation to one another.

Let your youngster gather 11 rocks and use a permanent marker to write a number, 0–10 (or 10–20), on each. Then, have him cover his eyes while you hide the rocks around the yard. Give him clues to find each number—using the word *before*, *after*, or *between*. *Example:* "Find the number *between* 1 and 3." (2) If he spots a number other than the one he's searching for, he should try to remember its location so he can find it when you *do* ask for it.



As he locates the rocks, he could put them in sequence. Once he finds them all, it's his turn to hide the rocks and give you clues using "relation" words.

Friendly numbers

"Friendly numbers" make it easier to add and subtract. Show your youngster how doubles and numbers that end in 0 can be his "friends" with these strategies.

● **Use doubles.** Children often memorize doubles like 4 + 4 = 8 or 12 – 6 = 6. When a problem is an *almost* double, turning it into a double will help your youngster solve it. If he's solving 14 – 8, for instance, he could think of the doubles that make up the bigger number (7 + 7 = 14, so 14 – 7 = 7). Then, he can compare 7 to 8. ("I know that 8 is 1 more than 7, so 14 – 8 must equal 6.") Or for 5 + 6, he might realize that 5 + 5 = 10, and 6 is 1 more than 5, so 5 + 6 = 11.

● **Turn the bigger number into 10 or 20.** Encourage your child to use small "counters" (paper clips, plastic animals) to solve a problem like 8 + 5. He should put 8 counters in one pile and 5 in another. Ask him which number is larger (8). How many counters will he need to move from the 5 pile to turn the 8 into 10? (2) Now have him look at the counters and count them to solve the problem (10 + 3 = 13). When he puts the counters back in their original groups (8 and 5) and counts them, what does he notice? He gets the same total—but 10 + 3 is easier to solve.

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Estimation jar

Try this family activity to sharpen your child's estimation skills.

Each week, choose small objects like paper clips, dry pasta, or marbles. Put a random quantity into a small, clear jar, and place colorful construction paper squares, a pencil, and an empty tissue box nearby. (*Note:* Use up to 30 objects for a younger child and up to 100 for an older one.) Each family member can look at the items carefully and estimate the total. He should write his estimate and name on a paper square and put it in the box.

When everyone has entered the weekly competition, have your youngster dump out the jar and count the objects. *Tip:* Help him put them in groups of 10 and skip count the groups by 10s (10, 20, 30).

Ask each person to explain his strategy for estimating. If your child chose 25, perhaps he'll say that he has 10 fingers and 10 toes, and it looks like there are a few more than that total in the jar. The person with the closest estimate picks next week's object.

Quick—how many snacks?

When you roll a 5 on a die, you probably don't need to count the dots to know there are 5. That's because you've learned to *subitize*, or instantly recognize small numbers of objects without counting. And your child can learn to do this, too.

While she covers her eyes, put out a small number (1–5) of snack items like blueberries, cheese cubes, or mini pretzels. Have her open her eyes and quickly tell you how many pieces she sees. Let her count each one to see if she spotted the number correctly. *Idea:* After snack time, invite her to practice *subitizing* with pennies, jacks, or any other small items—she'll even enjoy saying the big word!

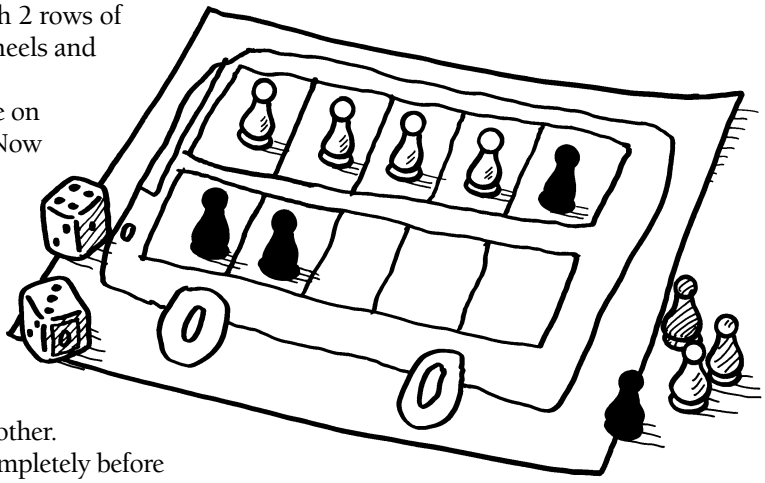
A ten-frame bus

Hop aboard this double-decker bus—and have fun with a "ten frame."

To make a ten frame, your youngster should draw a bus-shaped rectangle with 2 rows of 5 boxes. Suggest that she add wheels and headlights to her bus, too!

Get two dice, put masking tape on the 6s, and write a zero on each. Now let her gather 20 game tokens (or small toys), 10 of one color and 10 of another. Then, take turns rolling the dice and "seating" a matching number of tokens on her bus.

For instance, if your child rolls a 4 and a 3, she would use 4 tokens of one color and 3 of another. *Note:* Have her fill the top row completely before starting on the bottom. Ask her to count the total (7). This shows her that the number 7 is *composed* of the numbers 4 and 3. How many other ways can she seat 7 passengers on her bus? *Examples:* 5 + 2, 6 + 1. When she finishes, it's your turn to roll.



Idea: Have your youngster make a life-sized ten frame by setting up 2 rows of 5 seats (chairs, throw pillows). She could roll the dice and seat stuffed animal "passengers" to represent different numbers on her "bus."

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A Box Full of Math

It's a shoebox…wait, it's a math kit! Your youngster can explore numbers, measurement, and shapes by making and using these fun-filled boxes. Help him collect the materials listed and put them into shoeboxes for games and activities that he'll enjoy at home or on the go.

Counting

1-2-3

Materials: *playing cards (ace = 1, face cards removed), small bouncing ball*

Stack the cards facedown. One player secretly draws a card and bounces a ball the number of times shown (draw a 9, and bounce the ball 9 times).

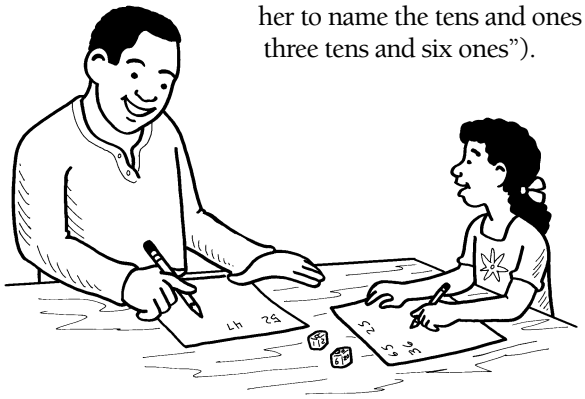
The other player listens carefully and counts the bounces. If he announces the right number, he takes the card, and it's his turn to draw a new card. If not, the bouncer keeps the card and gets another turn. The first player to collect 10 cards wins.

Ones and tens

Materials: *2 dice, masking tape, pencil, paper*

Put a square of masking tape on each side of the dice. Number the faces of one die 1–6. On the other die, write 10, 20, 30, 40, 50, and 60.

Have your child roll both dice and use them to write a two-digit number. For example, if she rolls a 30 and a 6, she would write 36. The tens digit represents how many groups of 10 there are—3 groups of 10 = 30. The second number, 6, represents ones. After she writes each number, ask her to name the tens and ones ("36 has three tens and six ones").



Addition

Six in a row

Materials: *paper, pencil, 2 dice, crayons*

Draw a grid with six rows and six columns. Randomly write the numbers 2–12 in the boxes three times each, one number per box. Include three "free spaces" so every square is full.

To play, your youngster rolls two dice and adds the numbers (say, 2 + 3). Then, she colors in one box with the answer (5). Keep rolling and coloring—the goal is to color six squares in a row, either vertically, horizontally, or diagonally. Encourage her to think strategically—she should color in the boxes that will help her get six in a row the fastest.

Domino dots

Materials: *dominoes, index cards, pencil*

Help your child number the index cards, 1–12. One player picks a card and says the number shown. Then, he pulls out dominoes until he finds one whose two halves add up to that number.

For instance, if he drew a 7, he'd need a domino with 3 and 4 dots, 2 and 5 dots, or 1 and 6 dots. He keeps drawing until he gets a correct combination and says the number sentence (3 + 4 = 7). He should lay that domino on the card and return the extra dominoes to the shoebox. Now it's the next player's turn. Who can make the most matches?

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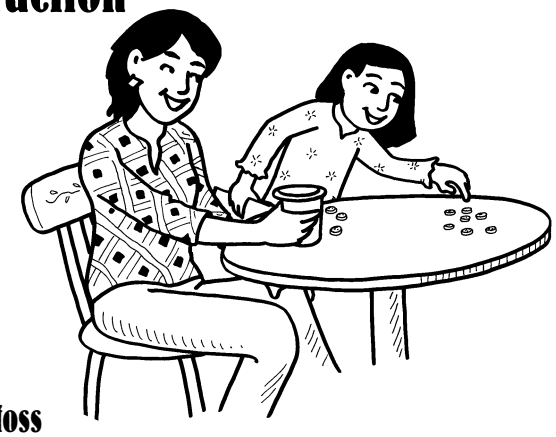
Subtraction



Button toss

Materials: *plastic cup, 10 buttons, paper, pencil*

Have your youngster sit on one side of a table, and place the cup on the other side. Tell her to try to throw 10 buttons, one at a time, into the cup. Once she has attempted all 10, she looks at the result and writes a subtraction sentence to figure out how many successful shots she made.

For instance, if there are 3 buttons outside the cup, she would write "10 – 3 = 7" to show that 7 buttons landed in the cup. Now she can dump out the buttons and count them to check her answer.

Heads or tails

Materials: *12 pennies*

Let your child toss a dozen pennies in the air, one at a time. Encourage him to count the number of heads and the number of tails that land facing up (*example:* 7 heads, 5 tails).

His first job is to figure out whether there are more heads or tails. Then, you can ask, "How many more are there?" To answer that question, he'll need to subtract the smaller amount from the larger one (7 – 5 = 2). His answer tells him there are 2 more heads than tails.

Measurement

Balancing act

Materials: *ruler, 2 sandwich bags, tape, marbles, a variety of small objects (crayon, toy car, notepad)*

Your youngster can make a balance scale by taping the center of one open sandwich bag to each end of the ruler. Help her balance the center of the ruler on the arm of a chair.

To weigh objects, she should hold down the middle of the ruler with her finger and put a small item in one bag. Then, she can add one marble at a time to the other bag until the ruler balances and she's able to let go. Ask her to tell you how many marbles the item weighs. ("A toy car weighs about 7 marbles.")

What's the length?

Materials: *index cards, crayons, string, scissors*

On separate index cards, ask your child to draw objects to measure (couch, magazine, board game). Then, he takes out a card, finds the item, and cuts a piece of string that he thinks is about the same length.

He can use the string to test his guess. If it's too long, he could cut it again. If it's too short, have him cut a second piece of string and try again. Suggest that he keep the string pieces in his box to pull out later—he can estimate other objects that might match those lengths.

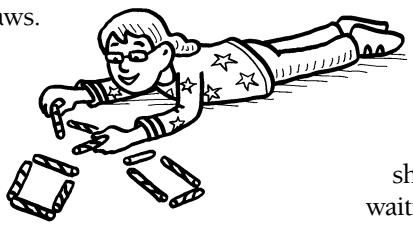
Geometry

Mix and match

Materials: *drinking straws cut into 1-inch, 2-inch, and 3-inch pieces*

How can your youngster make squares, triangles, and rectangles out of straws?

Using the pieces in her shoebox, she might form an equal-sided triangle out of three 3-inch straws. Or she can make a triangle that does not have equal sides with two 3-inch pieces and one 1-inch piece. After she creates each shape, have her name the shape and count its vertices (corners) and sides. She could say, "A square has four sides and four vertices."



Shape hunt

Materials: *solid shapes from around the house—cube (die), sphere (Ping-Pong ball), cone (funnel), cylinder (marker), rectangular prism (the shoebox); index cards; crayons*

Ask your child to look for solid shapes that match the ones in his box—and the box itself!

For instance, he might see a crayon box that's a rectangular prism. When he finds a solid shape, he can draw and label it on an index card and keep the picture in his shoebox. Let him tell you how many faces (flat sides) and vertices each item has. ("The crayon box has six faces and eight vertices.") *Idea:* He could look for solid shapes when he's out and about—perhaps in a waiting room or at the post office.

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Physical Science Is Fun!

What do ice cream and boats have in common? Both are possible because of physical science! Your child can learn about physical science—the study of all nonliving things around us—with these fun experiments.

Sinking (or floating) feeling

A boat may float on water, but what about a leaf or a rock? Have your youngster predict which objects will float or sink—and then test to find out.

You'll need: *paper, pencil, sink or container filled with water, variety of objects (examples: leaf, crayon, rock, toothpick, straw, tennis ball, plastic fork, metal fork)*

1. Help your child make a chart with two columns labeled "Float" and "Sink." Ask him to predict what will happen to each object when he puts it in water. He can write or draw each item in the column matching his prediction.

2. One at a time, your youngster should place the objects in the water. If his prediction was correct, he can circle the item on his chart. If not, he should cross it out and write or draw it in the other column.

What happens? Some objects (plastic fork, tennis ball) will float. Others (metal fork, rock) will sink.

Why? Objects that sink are denser than water. This means their molecules are packed more tightly together than the water's molecules. Items that float are less dense than water, so they stay on top.

The power of motion

A *force*, in physical science, causes an object to change its motion. Let your child use her imagination to see how many ways she can change the motion of a ball.

You'll need: *ball, measuring tape, string, tape, cutting board, pencil*

1. Have your youngster pick a starting spot for her ball on a flat surface. How far can she make it roll? She could use her hand to push it gently and then try pushing it harder. Help her measure the distance it travels each time. Which way makes it go farther?

2. Suggest that she find other ways to "force" her ball into motion. She might tape string to the ball and pull it. Or maybe she'll place it on the cutting board and lift up one end, allowing the force of gravity to get it rolling.

3. Give her the chance to change the direction of the ball while it's moving. Perhaps she'll poke it with the pencil as it rolls past or, while it's on the cutting board, lift up a different edge to make it roll another way.

What happens? Anytime your child applies a force to her ball, it will cause a change in its motion—moving it forward, backward, or in a different direction. Some forces make the ball move farther or change its direction more than others.

Why? Forces cause motion. The stronger the force, the larger the change in motion will be.

continued

Static electricity seasonings

Science is all around us—even in your spice cupboard. With a few shakes of salt and pepper, your child will see static electricity at work.

You'll need: *salt, pepper, plate, plastic spoon, piece of wool (sweater, coat)*

1. Let your youngster shake or grind some salt and pepper onto the plate.

2. Have her rub the back of the plastic spoon on the wool and hold the spoon over the plate. *Hint:* Suggest that she get at eye level with the plate to really see what's going on.

3. She can hold the spoon very close to the plate and then a little farther away.

What happens? When the spoon is very close to the plate, the salt and pepper jump up and stick to the spoon. As your child moves the spoon away, pepper will still jump and attach to the spoon, but not the salt.

Why? Rubbing the spoon on wool creates a buildup of static electricity that the salt and pepper are drawn to. Pepper is lighter than salt, so it's easier for it to jump to the spoon, even when the spoon is farther away.

Grape juice "indicators"

This surprising color-change experiment lets your youngster discover what chemists call *acids* and *bases*.

You'll need: *frozen grape juice concentrate (thawed), pitcher, water, spoon, three clear glasses, measuring cups and spoons, vinegar, baking soda*

1. Have your child pour the thawed juice into the pitcher and stir in 1 can water.

2. Help him pour $\frac{1}{2}$ cup of the purple liquid into each glass. He should stir 1–2 tbsp. vinegar into one glass and 1 tbsp. baking soda into the second, then observe what happens to each. Do nothing to the last glass—this is the *control*.

3. Now have him slowly drip $\frac{1}{4}$ tsp. vinegar into the baking soda glass.

What happens? Vinegar turns the juice red (compare it to the plain juice to see the difference). The baking soda causes the juice to foam and turn blue, but when vinegar touches the foamy liquid, it changes back to purple.

Why? Grape juice is an *indicator* of *acids* and *bases*—it chemically reacts with acids (like vinegar) by turning red, or with bases (like baking soda) by turning blue. When the acid and base combine, they cancel each other out, returning the juice to purple. *Variation:* Encourage your child to test other liquids (lemon juice, dish soap) to see if they are acids or bases.

Ice cream in a bag

Your child can watch the changing states of matter—from a liquid to a solid—while making a tasty treat.

You'll need: *half and half, sugar, vanilla, measuring cups and spoons, mixing spoon, bowl, 1 quart-size and 1 gallon-size zipper bag, ice, salt, gloves*

1. Let your youngster stir 1 cup half and half, 2 tbsp. sugar, and $\frac{1}{2}$ tsp. vanilla in the bowl until the sugar dissolves. Pour into the quart-size bag and seal tightly.

2. Now have him fill the gallon-size bag halfway with ice and add $\frac{3}{4}$ cup salt. He can massage the outside of the bag to mix the ice and salt. Help him put the small bag inside the larger bag, right in the middle of the ice. Seal the bag.

3. Wearing gloves (to protect from the cold), take turns shaking the bags vigorously for about five minutes, or until the liquid turns solid.

What happens? The ingredients combine, and the liquid turns into ice cream!

Why? The salt lowers the freezing point of the ice, making the mixture cold enough to freeze solid. If it warms up again, it will melt back into a liquid.

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