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February 25, 2016

Early Learning (https://www.zerotothree.org/issue_area/early-learning/?post-type=resource)

Help Your Child Develop Early Math Skills



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Before they start school, most children develop an understanding of addition and subtraction through everyday interactions. Learn what informal activities give children a head start on early math skills when they start school.

Children are using early math skills throughout their daily routines and activities. This is good news as these skills are important for being ready for school. But early math doesn't mean taking out the calculator during playtime. Even before they start school, most children develop an understanding of addition and subtraction through everyday interactions. For example, Thomas has two cars; Joseph wants one. After Thomas shares one, he sees that he has one car left (Bowman, Donovan, & Burns, 2001, p. 201). Other math skills are introduced through daily routines you share with your child—counting steps as you go up or down, for example. Informal activities like this one give children a jumpstart on the formal math instruction that starts in school.

What math knowledge will your child need later on in elementary school? Early mathematical concepts and skills that first-grade mathematics curriculum builds on include: (Bowman et al., 2001, p. 76).

- Understanding size, shape, and patterns
- Ability to count verbally (first forward, then backward)
- Recognizing numerals
- Identifying more and less of a quantity
- Understanding one-to-one correspondence (i.e., matching sets, or knowing which group has four and which has five)

Key Math Skills for School

More advanced mathematical skills are based on an early math “foundation”—just like a house is built on a strong foundation. In the toddler years, you can help your child begin to develop early math skills by introducing ideas like: (From Diezmann & Yelland, 2000, and Fromboluti & Rinck, 1999.)

Number Sense

This is the ability to count accurately—first forward. Then, later in school, children will learn to count backwards. A more complex skill related to number sense is the ability to see relationships between numbers—like adding and subtracting. Ben (age 2) saw the cupcakes on the plate. He counted with his dad: “One, two, three, four, five, six...”

Representation

Making mathematical ideas “real” by using words, pictures, symbols, and objects (like blocks). Casey (aged 3) was setting out a pretend picnic. He carefully laid out four plastic plates and four plastic cups: “So our whole family can come to the picnic!” There were four members in his family; he was able to apply this information to the number of plates and cups he chose.

Spatial sense

Later in school, children will call this “geometry.” But for toddlers it is introducing the ideas of shape, size, space, position, direction and movement. Aziz (28 months) was giggling at the bottom of the slide. “What’s so funny?” his Auntie wondered. “I comed up,” said Aziz, “Then I comed down!”

Measurement

Technically, this is finding the length, height, and weight of an object using units like inches, feet or pounds. Measurement of time (in minutes, for example) also falls under this skill area. Gabriella (36 months) asked her Abuela again and again: “Make cookies? Me do it!” Her Abuela showed her how to fill the measuring cup with sugar. “We need two cups, Gabi. Fill it up once and put it in the bowl, then fill it up again.”

Estimation

This is the ability to make a good guess about the amount or size of something. This is very difficult for young children to do. You can help them by showing them the meaning of words like more, less, bigger, smaller, more than, less than. Nolan (30 months) looked at the two bagels: one was a regular bagel, one was a mini-bagel. His dad asked: “Which one would you like?” Nolan pointed to the regular bagel. His dad said, “You must be hungry! That bagel is bigger. That bagel is smaller. Okay, I’ll give you the bigger one. Breakfast is coming up!”

Patterns

Patterns are things—numbers, shapes, images—that repeat in a logical way. Patterns help children learn to make predictions, to understand what comes next, to make logical connections, and to use reasoning skills. *Ava (27 months) pointed to the moon: “Moon. Sun go night-night.” Her grandfather picked her up, “Yes, little Ava. In the morning, the sun comes out and the moon goes away. At night, the sun goes to sleep and the moon comes out to play. But it’s time for Ava to go to sleep now, just like the sun.”*

Problem-solving

The ability to think through a problem, to recognize there is more than one path to the answer. It means using past knowledge and logical thinking skills to find an answer. *Carl (15 months old) looked at the shape-sorter—a plastic drum with 3 holes in the top. The holes were in the shape of a triangle, a circle and a square. Carl looked at the chunky shapes on the floor. He picked up a triangle. He put it in his mouth, then banged it on the floor. He touched the edges with his fingers. Then he tried to stuff it in each of the holes of the new toy. Surprise! It fell inside the triangle hole! Carl reached for another block, a circular one this time...*

Math: One Part of the Whole

Math skills are just one part of a larger web of skills that children are developing in the early years—including language skills, physical skills, and social skills. Each of these skill areas is dependent on and influences the others.

Trina (18 months old) was stacking blocks. She had put two square blocks on top of one another, then a triangle block on top of that. She discovered that no more blocks would balance on top of the triangle-shaped block. She looked up at her dad and showed him the block she couldn’t get to stay on top, essentially telling him with her gesture, “Dad, I need help figuring this out.” Her father showed her that if she took the triangle block off and used a square one instead, she could stack more on top. She then added two more blocks to her tower before proudly showing her creation to her dad: “Dada, Ook! Ook!”

You can see in this ordinary interaction how all areas of Trina’s development are working together. Her physical ability allows her to manipulate the blocks and use her thinking skills to execute her plan to make a tower. She uses her language and social skills as she asks her father for help. Her effective communication allows Dad to respond and provide

the helps she needs (further enhancing her social skills as she sees herself as important and a good communicator). This then further builds her thinking skills as she learns how to solve the problem of making the tower taller.

What You Can Do

The tips below highlight ways that you can help your child learn early math skills by building on their natural curiosity and having fun together. (Note: Most of these tips are designed for older children—ages 2–3. Younger children can be exposed to stories and songs using repetition, rhymes and numbers.)

Shape up.

Play with shape-sorters. Talk with your child about each shape—count the sides, describe the colors. Make your own shapes by cutting large shapes out of colored construction paper. Ask your child to “hop on the circle” or “jump on the red shape.”

Count and sort.

Gather together a basket of small toys, shells, pebbles or buttons. Count them with your child. Sort them based on size, color, or what they do (i.e., all the cars in one pile, all the animals in another).

Place the call.

With your 3-year-old, begin teaching her the address and phone number of your home. Talk with your child about how each house has a number, and how their house or apartment is one of a series, each with its own number.

What size is it?

Notice the sizes of objects in the world around you: That pink pocketbook is the biggest. The blue pocketbook is the smallest. Ask your child to think about his own size relative to other objects (“Do you fit under the table? Under the chair?”).

You’re cookin’ now!

Even young children can help fill, stir, and pour. Through these activities, children learn, quite naturally, to count, measure, add, and estimate.

Walk it off.

Taking a walk gives children many opportunities to compare (which stone is bigger?), assess (how many acorns did we find?), note similarities and differences (does the duck have fur like the bunny does?) and categorize (see if you can find some red leaves). You can also talk about size (by taking big and little steps), estimate distance (is the park close to our house or far away?), and practice counting (let's count how many steps until we get to the corner).

Picture time.

Use an hourglass, stopwatch, or timer to time short (1–3 minute) activities. This helps children develop a sense of time and to understand that some things take longer than others.

Shape up.

Point out the different shapes and colors you see during the day. On a walk, you may see a triangle-shaped sign that's yellow. Inside a store you may see a rectangle-shaped sign that's red.

Read and sing your numbers.

Sing songs that rhyme, repeat, or have numbers in them. Songs reinforce patterns (which is a math skill as well). They also are fun ways to practice language and foster social skills like cooperation.

Start today.

Use a calendar to talk about the date, the day of the week, and the weather. Calendars reinforce counting, sequences, and patterns. Build logical thinking skills by talking about cold weather and asking your child: What do we wear when it's cold? This encourages your child to make the link between cold weather and warm clothing.

Pass it around.

Ask for your child's help in distributing items like snacks or in laying napkins out on the dinner table. Help him give one cracker to each child. This helps children understand one-to-one correspondence. When you are distributing items, emphasize the number concept: "One for you, one for me, one for Daddy." Or, "We are putting on our shoes: One, two."

Big on blocks.

Give your child the chance to play with wooden blocks, plastic interlocking blocks, empty boxes, milk cartons, etc. Stacking and manipulating these toys help children learn about shapes and the relationships between shapes (e.g., two triangles make a square). Nesting boxes and cups for younger children help them understand the relationship between different sized objects.

Tunnel time.

Open a large cardboard box at each end to turn it into a tunnel. This helps children understand where their body is in space and in relation to other objects.

The long and the short of it.

Cut a few (3–5) pieces of ribbon, yarn or paper in different lengths. Talk about ideas like long and short. With your child, put in order of longest to shortest.

Learn through touch.

Cut shapes—circle, square, triangle—out of sturdy cardboard. Let your child touch the shape with her eyes open and then closed.

Pattern play.

Have fun with patterns by letting children arrange dry macaroni, chunky beads, different types of dry cereal, or pieces of paper in different patterns or designs. Supervise your child carefully during this activity to prevent choking, and put away all items when you are done.

Laundry learning.

Make household jobs fun. As you sort the laundry, ask your child to make a pile of shirts and a pile of socks. Ask him which pile is the bigger (estimation). Together, count how many shirts. See if he can make pairs of socks: Can you take two socks out and put them in their own pile? (Don't worry if they don't match! This activity is more about counting than matching.)

Playground math.

As your child plays, make comparisons based on height (high/low), position (over/under), or size (big/little).

Dress for math success.

Ask your child to pick out a shirt for the day. Ask: What color is your shirt? Yes, yellow. Can you find something in your room that is also yellow? As your child nears three and beyond, notice patterns in his clothing—like stripes, colors, shapes, or pictures: I see a pattern on your shirt. There are stripes that go red, blue, red, blue. Or, Your shirt is covered with ponies—a big pony next to a little pony, all over your shirt!

Graphing games.

As your child nears three and beyond, make a chart where your child can put a sticker each time it rains or each time it is sunny. At the end of a week, you can estimate together which column has more or less stickers, and count how many to be sure.

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