

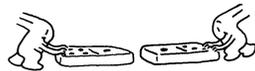
Math+Science Connection

Beginning Edition

Building Excitement and Success for Young Children

September 2019

TOOLS & TIDBITS



Name that shape

“That red and white sign is a triangle!”

“Those orange and white barrels are cylinders!” Let your youngster explore geometry by asking her to name flat and solid shapes she spots. To “collect” the shapes,



help her draw them on separate index cards and label them with their names.

A five-senses log

With this homemade book, your child will discover different ways he uses his five senses. Have him staple together five squares of paper, one for each sense (sight, smell, taste, touch, hearing). Now he can list things he notices thanks to each sense. He might write “Mom’s coffee” on the “smell” page and “wind chimes” on the “hearing” page.

Book picks

▣ In *Zero the Hero* (Joan Holub), your youngster will realize just how “super” important zero is.

▣ Your child can read bite-sized poems while learning about food groups in *Our Food: A Healthy Serving of Science and Poems* (Grace Lin and Ranida T. McKneally).

Just for fun

Q: What has four legs but can’t walk?

A: A desk.



Back to school...in numbers!

From the big yellow bus to the September calendar, your child’s school year is full of numbers! Try these school-themed activities that encourage him to write numbers and count.

Math pictures

Have your youngster draw pictures that involve math. For example, he might cut a school bus out of yellow construction paper and label it with his bus number. Or ask him to tell you how many students are in his class (say, 28)—he could draw a picture with that many students.



September calendar

Let your child find numbers on a calendar. Together, look at the month of September, and ask him how many days it has (30). Then, encourage him to circle and count only the school days—how many are there? He could put stickers on days he has special classes (library, music, art, PE) and count how many times he’ll go to each one this month. (“I will have PE 8 times.”)

Business card

Your youngster can learn his address and phone number by making “business cards.” Help him print his name and his contact information (“123 Apple Tree Lane, 555-0123”) on index cards and decorate them with stickers. Now suggest that he hand out his cards to relatives. Maybe they’ll make their own business cards to trade—then he can read their addresses and phone numbers. 🦋

Observe the daytime sky

What’s in the sky today? Encourage your child to observe and record what she sees—just like a scientist does.

Sun. Watch a sunrise or sunset together so your youngster can see how the sky changes colors. She could draw a series of pictures as the sun rises or sets, using crayons (peach, lavender) that match the sky for each sketch.

Moon. Show your child that the moon is always in the sky—even in the daytime. When she spots it, let her draw it along with a landmark (say, a tree) to show where it’s located. She can draw the moon again a few hours later, then compare the drawings to see that it appears in a different location. 🦋



Sort and pretend

Math + imaginary play = learning and fun. Invite your child to open a pretend store or restaurant and practice sorting with these ideas.

Play store. Let your youngster sort and display products to “sell.” For an arts and crafts store, maybe she’ll sort crayons and markers into different cups on one shelf and make separate piles for plain paper and construction paper on another. Or perhaps she’ll sort by color (red crayons and red markers with red paper). Pretend you’re her customer, and she can sort the coins you pay with.



Make a menu. To play restaurant, your little chef can first create a menu. Help her fold a sheet of paper into thirds, and give her old magazines to cut out food pictures. She might sort the foods by meal (breakfast, lunch, dinner), course (appetizers, entrees, sides), or food group (fruits, vegetables, grains). She could pick her favorite sorting method, then label the menu sections and glue the pictures to the pages where they belong. Now you get to order food from her restaurant.



PARENT TO PARENT

Math box

At back-to-school night, my son Bobby’s teacher had a great idea for helping children practice math at home. She suggested that we put together a portable “math box” to play with anytime.

I got a plastic tote box, and together Bobby and I filled it with math tools. He put



in a deck of cards, dominoes, dice, and flash cards. I added a pencil, a notepad, and a small bag filled with beads.

Then, we thought of math games he could try. Bobby suggested rolling three dice and arranging them from smallest to largest number. I said he could add the dots on both sides of the dominoes.

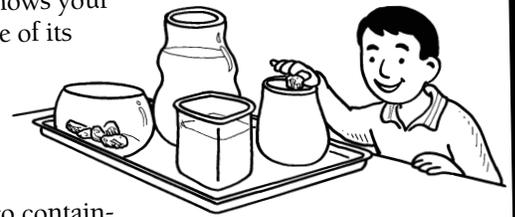
We wrote each idea on a separate piece of paper and stapled them into a “math idea book.” Now he’s using his math box in the car, in bed before he goes to sleep, and even at breakfast—because he likes playing with math!

SCIENCE LAB

Liquids vs. solids

This experiment shows your youngster that a liquid takes the shape of its container—and a solid doesn’t.

You’ll need: four clear containers of various shapes and sizes (vase, jar), water, rocks



Here’s how: Have your child fill two containers with water and put rocks in each of the other two.

What happens? Water (a liquid) changes shape to fit the container. A rock (a solid) stays the same shape no matter which container it is in.

Why? The molecules, or tiny particles, in liquids move around freely. But the molecules in a solid are tightly packed and can’t move past each other, so a solid doesn’t change shape.

MATH CORNER

Let’s graph our names

Which family member has the longest name? The shortest? Your child can make a name graph to find out.

Materials: poster board, pencil, markers, strips of paper, scissors, glue

1. Help your youngster divide poster board into 12 columns and 8 rows. Number the top row 1–12.

2. Give each person a strip of paper and a marker to write her first name. (Make strips for pets’ names, too!)

3. Have each family member cut her name apart into individual letters.

4. Now everyone can glue their letters in order across the poster board (one letter per column).

5. Look at the graph together, and compare the length of your names. For example, how many more letters does Mallory have than Carl? Do any two names have the same number of letters?



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Number "hat trick"

Score a "win" with this sequencing game. Have your child number slips of paper 1–20 and place them in a hat. Take turns pulling out three numbers and arranging them from smallest to largest. Choose one number to keep, and put the rest back. The first person to get three numbers in a row (4, 5, 6) calls out, "Hat trick!"



Earth's path in space

Give your youngster an idea of how Earth orbits the sun. Let her stick a big ball of play dough (the sun) on the middle of a pie plate. Then, help her tilt the plate to roll a smaller play dough ball (Earth) around the edge. Although Earth's orbit isn't a perfect circle, this model helps her understand how we travel around the sun.

Book picks

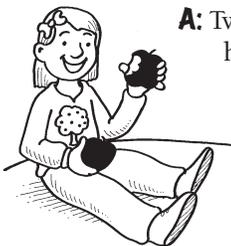
▣ Your child will learn pumpkin facts as he skip counts with Charlie and his classmates in *How Many Seeds in a Pumpkin?* (Margaret McNamara).

▣ The story of *Magnet Max* (Monica Lozano Hughes) will inspire your youngster to figure out what's magnetic and what's not.

Just for fun

Q: If a tree has 10 apples and you pick two, how many apples do you have?

A: Two, because that's how many you picked.

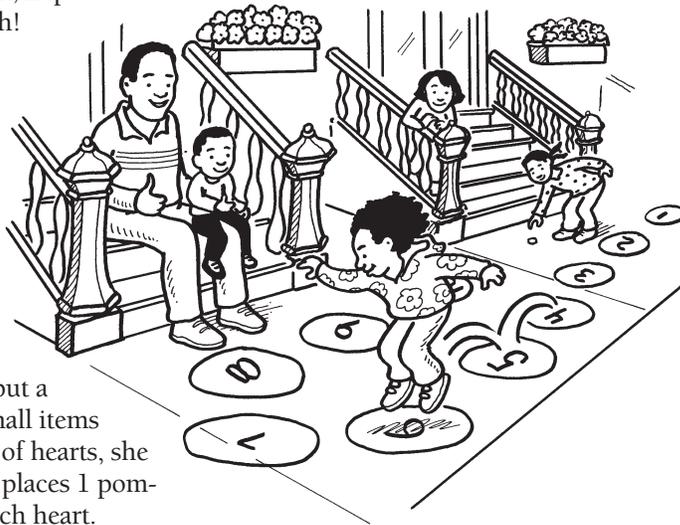


Fun with number sense

Play cards, eat a snack, hop like a frog—and do math! Here are hands-on ideas for building your child's number sense.

1-to-1 matching

Playing cards are ideal for matching up objects 1-to-1. Let your youngster arrange cards faceup on the table (face cards removed, ace = 1) and put a matching number of small items on each card. For the 6 of hearts, she could count to 6 as she places 1 pom-pom or jelly bean on each heart.



Snacks at a glance

As an adult, you can probably tell how many objects are in a small group without counting. Help your child practice this skill. Arrange 1–10 small snacks (pretzels, raisins) on a plate, and give her a few seconds to look before you cover the plate with a napkin. Ask her to tell you how many snacks there are, then count to check. Now it's time to eat!

Lily pad hop

Your youngster can pretend she's a frog while counting from numbers other than 1. Let her use green chalk to draw 10 lily pads, numbered 1–10, on a sidewalk. She should roll a die and stand on the number rolled (say, 4). Ask her to hop and count on to 10 (5, 6, 7, 8, 9, 10) or backward to 1 (3, 2, 1). *Challenge:* Erase the numbers—can she count the circles without them? 🐸

My science station

Inspire your junior scientist to make discoveries by helping him set up a science station.

First, let your youngster gather science tools he can use to investigate and explore. *Examples:* magnifying glass, flashlight, tweezers, cups, spoons, paper, pencils, crayons.

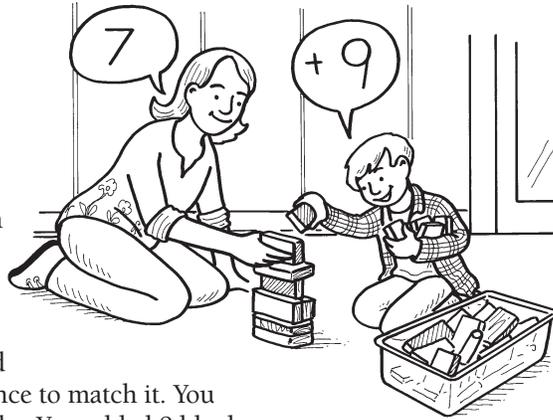
Then, encourage your child to collect natural objects, or "specimens," from the ground outside (bark, rocks, dirt, sticks, flower petals). He can label and display them, then use his tools to observe them closely. Have him draw what he sees. 🐸



Let's build story problems

Your youngster builds a tower with 30 blocks. The dog knocks down 15 of them. What a problem—a math story problem, that is! ($30 - 15 = 15$) Solve story problems together with these activities.

Build it. Make up a story problem, and have your child write a number sentence to match it. You might say, “I built a house with 7 blocks. You added 9 blocks.”



How many blocks did we use in all?” ($7 + 9 = \underline{\quad}$) Now use blocks to act out the problem so he can find the answer. You would stack 7 blocks, then he'd add 9 and count the total (16 blocks, because $7 + 9 = 16$).

Take it apart. Once you have several buildings, use them to create subtraction problems. You could say, “Our tower is 35 blocks tall. A friend wants to use 12 of the blocks for her tower. How many blocks will we have left?” Your youngster can write the number sentence ($35 - 12 = \underline{\quad}$), remove 12 blocks, and count to get the answer (23 blocks, because $35 - 12 = 23$).



Q & A What can we measure with?

Q: My daughter is learning about measurement in school, but she's not using a ruler. Why is this, and how can she practice measuring at home?

A: Children first explore the concept of measurement with familiar objects, such as pasta noodles or paper clips. Later, your daughter will move onto standard units like inches or centimeters.

Together, find fun items to measure with, and give your youngster “measurement challenges” she'll enjoy. You might ask, “How many noodles long is your shoe?” or “How many pencils long is the table?” Then, help her line up the objects carefully, end to end, and count them to check. (Each object must be the same length, just like an inch is always the same. For example, brand-new pencils would work, but not used pencils.)

When your child learns to use a ruler, she'll already know the importance of measuring with units that are all the same size.



MATH CORNER

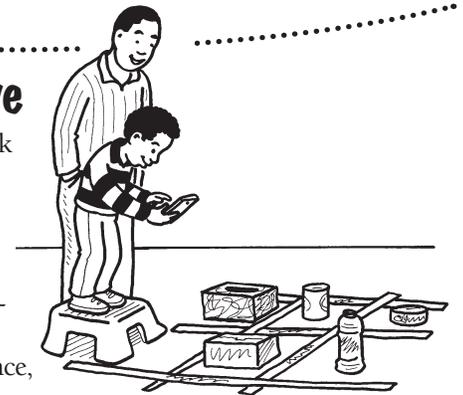
View from above

How does your child think your town looks to a bird flying high above it? With this map-making activity, he'll find out—and develop spatial reasoning skills.

Encourage your youngster to create a miniature town with masking tape “streets” and “buildings” from the recycling bin. For instance, he might use a tissue box for his school and a soup can for a water tower. Now let him pretend he's a bird—he can stand over his finished town and take a photo or draw a sketch.

Have your child use the picture to make a map. He'll realize that birds see the tops of things, so he might simply draw a rectangle for his school and a circle for the water tower. Finally, hide a small toy person or animal in one of the buildings in his town, and mark an X in the matching spot on his map. Can he find the toy based on its location on the map?

Idea: The next time you visit a mall, park, or historic place, let him use a map to locate attractions.



SCIENCE LAB

“See” the oxygen

Your youngster will gasp when this experiment shows her how plants give off oxygen!

You'll need: lettuce, two bowls, measuring cup, water

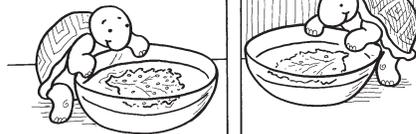
Here's how: In each bowl, have your child place a lettuce leaf and add 2 cups warm water. She should set one bowl in a sunny spot and the other in a dark room, then check the leaves in 1 hour.

What happens? Tiny bubbles form on

the surface of each leaf. The leaf in the sun, however, has more bubbles.

Why? Plants, such as lettuce, make their own food with the help of water and sunlight. Water contains oxygen, which plants don't need (but humans do), so as plants make food, they let out the oxygen they got from the water. The

plant in the shade couldn't release as much oxygen because it didn't have sunlight to help it start the food-making process.



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Hooray for patterns

Encourage your child to practice making patterns by creating “cheers.” She might count by 2s: “Give me 2, 4, 6, 8, 10. Say my pattern once again!” Or make up a cheer for her, and she can continue your pattern and add a rhyme.

“Bendy” light

Have your youngster fill a glass with water and place a spoon in it. What does he see when he looks through the side of the glass? (The spoon looks bent.) This is called refraction—the



bending of light as it passes from one material to another (in this case, from air to water).

Book picks

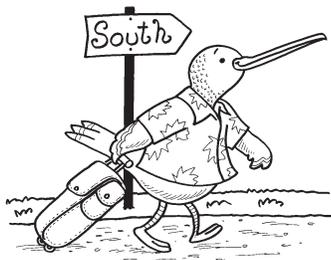
▣ *If You Were a Minus Sign* (Trisha Speed Shaskan) shows cute critters solving subtraction problems as they let go of balloons, hide acorns, and more. Part of the Math Fun series.

▣ *Star Stuff: Carl Sagan and the Mysteries of the Cosmos* (Stephanie Roth Sisson) tells the true story of a boy who was fascinated by the universe and grew up to become a famous astronomer.

Just for fun

Q: Why do birds fly south for the winter?

A: Because it's too far to walk.



Let's make shapes

Triangles, rectangles, circles—shapes like these make up the world around us. These hands-on geometry activities will teach your youngster about shapes and their attributes.

Walk the “tightrope”

Ask your child to make large shapes (square, triangle) on the floor with masking tape. Have him walk along the edges of each shape, balancing like a tightrope walker and counting the sides and corners (vertices). What does he notice? (A triangle has 3 sides and 3 corners, for example.) Does each shape have the same number of sides as it has corners?

Shift the shapes

How many turns will it take to make a stop-sign shape (an octagon) in this game? Each person gets 8 craft sticks and lays down 5 to form a pentagon. On each turn, a player flips a coin and changes his shape: heads = add 1 stick, tails = remove 1 stick. Name your new shape. *Example:* Flip heads, and add 1



stick to your pentagon—it's a hexagon (6 sides). Add another, and you've got a heptagon (7 sides). The first player to create an octagon (8 sides) calls “Stop” and wins.

Build in 3-D

With this activity, your youngster will see how 2-D shapes make up 3-D shapes. First, he might build a square using 4 toothpicks and 4 marshmallows. Then, he could add more toothpicks and marshmallows to create a cube (12 toothpicks, 8 marshmallows). He'll see that a cube has 6 square faces. What other 3-D shapes can he construct out of 2-D shapes? 

Imagine a new animal

Your child can use what she knows about the survival skills of real animals to invent an imaginary creature.

Together, think of animals with cool features that help them survive. A porcupine's quills protect it from predators, an elephant's trunk picks up food, and a kangaroo's pouch carries babies.

Now suggest that your youngster draw an imaginary animal with a good survival strategy.

Maybe she'll sketch a colorful fish that stuns predators with a cloud of sparkles. Or perhaps she'll create a furry blue mammal that lives on blueberries and camouflages itself in blueberry bushes. Encourage her to make up a story about her animal and read it to you. 



Estimating with collections

Whether your youngster realizes it or not, she's probably a collector. She might have lots of scrunchies, rocks, or stickers, for instance. Here's how she can use her treasures to estimate.

Choose storage

Let your child find a way to display her collection. First she'll have to consider the size and number of her items. Will an empty jelly jar be big enough for all her scrunchies? She can put them in to find out. Not enough room? She'll need a larger container.



Make comparisons

Does your youngster have more animal stickers or food stickers? More smooth rocks or rough ones? Which color scrunchie does she have the most of? She could estimate, then sort and count to check. Now suggest that she make estimates within each group. For example, she

might estimate which type of food sticker she has the most of—fruits, vegetables, or desserts. Have her count to see how close her estimate was.

MATH CORNER

That's my age!

Six candles on a cake ... your child lights up at the mere mention of her special number: her age. Use this excitement to help her recognize and represent numbers.



Encourage your youngster to make groups of objects (crayons, forks, blocks, toys) that have the same number as her age. For example, if she's 6, she might stand 6 toy dinosaurs together.

Your child can also use her age to solve problems and represent other numbers. How old will she be next year? She would show 7 dinosaurs ($6 + 1 = 7$). How old was she last year? She should show 5 dinosaurs (because $6 - 1 = 5$).

Idea: Have her represent other family members' ages, too. Can she use a box of 36 crayons for Dad's age?

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SCIENCE LAB

Design a mini-trampoline

Bounce, bounce, bounce!

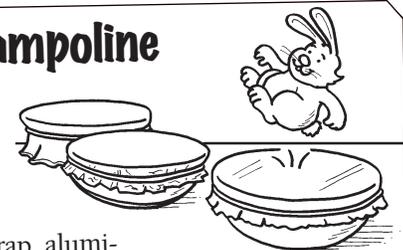
With this experiment, your youngster will test different materials to make the bounciest trampoline.

You'll need: three identical bowls, plastic wrap, aluminum foil, cloth napkin or dish towel, three rubber bands, small plastic animal

Here's how: Help your child stretch a different material (plastic, foil, cloth) over each bowl to create a flat surface and then secure each "trampoline" with a rubber band. To test his trampolines, he should drop an animal on each one.

What happens? The toy bounces on the plastic-covered bowl but not on the foil- or cloth-covered ones.

Why? The plastic is the best material for the job, since it is stretchy, or elastic. In real life, gymnasts and acrobats jump on trampolines that use elastic material, too.



PARENT TO PARENT

A math walk in the park

My mother-in-law teaches math, and she often gives me good ideas to try with our son Stephen. Recently, she suggested that we take a "math walk." She said I should ask Stephen what he's working on in math, and then we could look for examples outdoors.

On our next trip to the park, Stephen said he was learning about "equal parts." When we stopped for a picnic, he pointed out that our table had four equal rectangles. Then we noticed people

playing volleyball, and he said there were two teams of six people each, for a total of 12 people.

During our most recent walk, Stephen told me he's studying symmetry. An object has symmetry, he said, if each side is a mirror image of the other.

He spotted a flying flock of geese and realized the "V" was symmetrical, and I saw a symmetrical swing set on the playground.

Our math walks give me a glimpse into what Stephen is learning—and they let him practice his skills in a real-world way.

