

BETTER · KID · CARE

Topic: Mathematical and Scientific Thinking

Introduction:

Children are born curious! And no one is more curious than a two-year-old! “Twos” seem to be into everything, adamantly demanding to do things themselves. Although this age can be trying for caregivers, it’s also an age in which children are gaining a remarkable amount of knowledge about how the world works. It’s also a year in which they gain the incredible ability to talk – to communicate in a new way what they are noticing and thinking. This “Nurturing Learning” focuses on how twos learn about their world and how caring adults can support that learning.

What caregivers can say and do:

- Watch what a child does with the materials, notice what he or she seems to be experimenting with, and then comment on his/her discoveries.
- One of the best ways to encourage further exploration is to ask, “What else can you do/try?” You can vary the question depending on the materials, but keep it open-ended, so children are encouraged to try out their own ideas.

Making Things Happen

What children are doing:

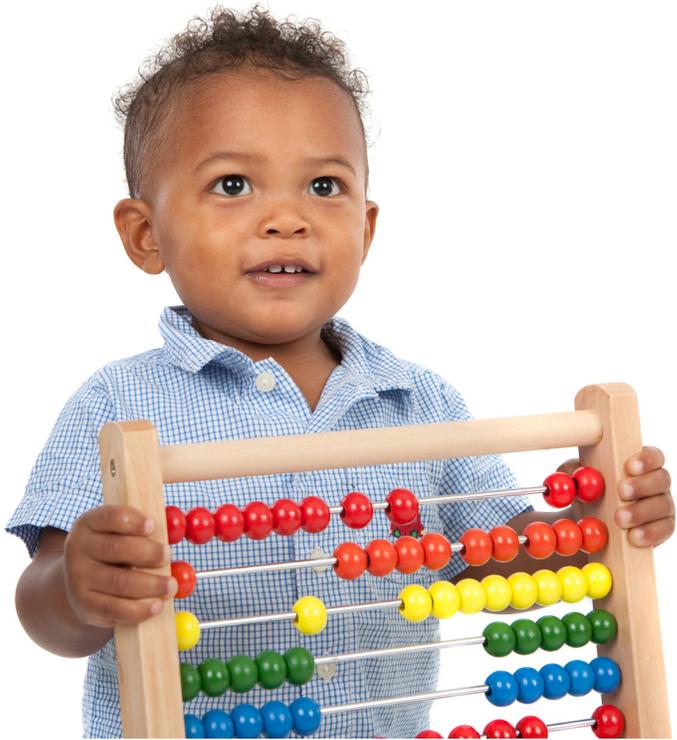
Twos (two-year-olds) are all about action! They are fascinated by performing an action and watching what happens next. It’s not enough to watch someone else do it – they want to do it themselves, sometimes over and over again! They are also becoming curious about what will happen if they change their action: will the result change, too? This is a key element of scientific thinking.

What caregivers can provide:

Ways for children to modify familiar materials/activities.

- Sand/water table with variations: Let children add water to dry sand, or add food coloring or snow to water.
- Painting variations: Let children “paint” with objects that will create different patterns in/with the paint (toy cars/trucks, sponges, feathers, shape blocks, puzzle pieces).
- Ramps and cars, tubes and balls, a balance (store-bought or made with a long board), and other materials that children can use to experiment with changes in movement.





Sorting and Categorizing

What children are doing:

By the time children are two, they have a lot of experience in recognizing similarities and differences and are beginning to group things that go together (i.e., categorize). Learning verbal labels for groups (animals, food, shoes, toys) provides an important boost to their ability to understand the concept of categories.

What caregivers can provide:

- Collections of items that can be sorted and grouped by color, shape, or other obvious characteristics.
- Containers to store toys that go together. When part of the clean-up routine is to “put all the blocks in this bin” and “put all the baby dolls in this basket,” two-year-olds are practicing their understanding of categories.
- Children’s books that show pictures of different objects in a category (animals, trucks, fruit).

What caregivers can say and do:

- Rather than verbally quizzing the twos as they are sorting, offer comments that emphasize the characteristic that is the same when they get it right (“That’s a car, too, isn’t it? It has wheels”). When they don’t get it right, caregivers can demonstrate why that one object doesn’t belong (“Let’s put all the hats in the box. Uh oh, I can’t wear this on my head, can I? That would be silly! It must not be a hat”). Adding some humor helps everyone feel okay about getting it “wrong” sometimes.

Using Their Whole Bodies

What children are doing:

Learning is a full-contact sport for twos! The more of their bodies and their senses that they can use during learning activities, the more interested they will be and the more they will take away from the experience.

What caregivers can provide:

- Movement activities, songs, and rhymes that use children’s bodies to teach concepts (moving their bodies fast, slow, up, down, etc.; counting songs/ games; sorting themselves into groups by gender, clothing color, etc.).
- Opportunities to play with large objects, such as exercise balls (e.g., the kind used for Pilates) and empty but sealed cardboard boxes. Brainstorm materials that children need their whole bodies to interact with and that will respond differently to their actions than smaller objects (think about how a large bouncing ball differs from a small one).

What caregivers can say and do:

- One simple way to acknowledge twos’ need to use their whole bodies is to reassess the activities for which children typically sit down and the caregiver can ask, “Is there any reason why the children couldn’t do this activity standing up?” One option, for example, is to move some of the chairs away from the table where there are paints or puzzles set up to encourage children to stand while working with them.

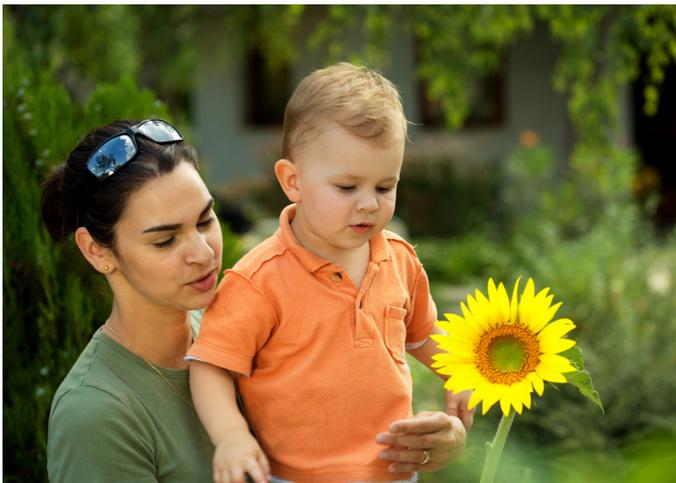
Wondering About Living Things

What children are doing:

Although they've been able to tell the difference between living and non-living things for quite a while, twos are becoming more attuned to what it means to take care of a living thing, whether it is plant or animal. They are especially curious about different animals in their environment (including insects, worms, and mice!) and are puzzling through how they are the same as people and how they are different.

What caregivers can provide:

- Opportunities to examine, observe, and (when possible) interact with real animals and plants in order to gain factual knowledge. This includes books with photos of the real thing.
- Pretend replicas (e.g., plastic animals/insects, stuffed animals/puppets, silk flowers/plants) that encourage children to act out their growing knowledge in pretend play. Pretend animals and plants can also be compared to the real thing, encouraging children's observation skills.
- Tools to encourage closer observation: magnifiers, binoculars, etc.
- Puzzles that depict animal or plant parts or different species of living things within the same category (e.g., a variety of butterflies, birds, flowers).



What caregivers can say and do:

- Be careful observers; notice what individual children are noticing, what questions they ask or comments they make. Notice what aspects of animal life their pretend play includes. Adults should not assume that they know what twos are curious about – let their words and actions speak.
- This is a great time to begin modeling and encouraging positive, caring attitudes toward other living things. "Be gentle," "It's time to give our plants some water so they can grow," and "Let's be quiet, they're sleeping right now," are all examples that convey the message to children that they can help care for living things in many of the same ways that they themselves are cared for.

Keep in mind

By their second birthday, toddlers are well into a phase of child development experts call the "language explosion," characterized by rapid learning of new words. They are also learning how to put words together into brief sentences. What does this mean for science and math learning? It means that caregivers have a new way of finding out what two-year-olds are thinking when they are exploring and experimenting, so adults can take advantage of it! It also means twos' language skills can be intentionally built by introducing new words and modeling more complex sentences, all in the relaxed and interesting context of conversations about their explorations.