



Nurturing learning in 1-year-olds

Topic: Mathematical and scientific thinking

Introduction

Children are born curious! Figuring out how their world works is in their DNA. By the time babies have reached their first birthday, they have logged thousands of hours of watching, listening, touching, tasting, and smelling everything around them. Their rapidly developing brains have been noticing differences between things, events that happen the same way every time, and how they can make events happen. In short, they've already been practicing the most basic of math and science skills! This "Nurturing Learning" looks at developmental changes in babies' second year that impact their math and science thinking and how caregivers can nurture their new abilities.



Exploring properties

What children are doing:

One-year-olds (Ones) continue to use their senses to explore properties—colors, shapes, textures, etc.—of objects around them. Now that they are gaining more eye-hand coordination and mobility, caregivers will also notice them exploring spaces and shapes, fitting things (including themselves!) inside of spaces, and dumping and filling containers.

What caregivers can provide:

- Many different sized containers with toys and materials* that babies can fill and dump out (not too small, though—remember choking hazard guidelines: if it's smaller than the end of a toilet paper roll, it's too small).
- Opportunities to use containers to fill and dump water. Stay within arm's reach for safety when children play with water.
- Simple shape puzzles with knobs as 1-year-olds get older.
- Different objects to explore that share the same color.

What caregivers can say and do:

- Caregivers can use descriptive words as they talk to children about their actions and the materials they are using: "You're putting the balls in the bucket. Now you dumped them out!" "Is that water cold?" "That made a loud sound, didn't it?" "Now you're inside the box!"

*Choking cautions

Young children can choke on small objects and toy parts. All items used for children under 3 years of age and any children who put toys in their mouths should be at least 1¼ inch in diameter and between 1 inch and 2¼ inches in length. Oval balls and toys should be at least 1¾ inch in diameter. Toys should meet federal small parts standards. Any toys or games labeled as unsuitable for children under 3 should not be used.

Other items that pose a safety risk and should not be accessible to children under 3 include, but are not limited to, button batteries, magnets, plastic bags, styrofoam objects, coins, balloons, latex gloves, and glitter.



Noticing differences

What children are doing:

One-year-olds are very aware of differences and love to explore them. Ones notice differences in how things look, sound, taste, feel, and smell. By giving ones opportunities to compare differences, caregivers can help them further develop their observation skills, which are a key component of later science inquiry and mathematical problem solving. Caregivers can also begin to build the vocabulary to describe those differences.

What caregivers can provide:

- Sight and sound tubes: These sealed containers are filled with different objects (bells, feathers, sequins, etc.) that children can see and hear as they move or shake the container. Babies can notice differences in color, sound, and movement for starters. Caregivers can make their own out of plastic containers, but should be sure that the lids are firmly sealed to prevent children from emptying, and perhaps choking on, the contents.
- A collection of textures in a container/bin for children to explore, such as pieces of sandpaper, corduroy, sticky paper (like Contac™), bubble wrap, sponges, etc. Or, caregivers can also use a large, flat box lid and a hot glue gun to firmly attach all of the different textures onto one surface.
- Items from nature: Caregivers can gather items, keeping in mind comparisons and contrasts. Caregivers can collect pinecones of different sizes, shells of different shapes, or feathers of different colors, for example.
- Musical or rhythm instruments with a range of tones (for example, a keyboard or xylophone, different sized bells, drums of different types).

What caregivers can say and do:

- In addition to using comparison words while talking with children as they explore, caregivers can also help focus their attention on likenesses and differences. For example, caregivers can lay objects of different sizes side by side on a table or limit fingerpainting colors to two.
- Caregivers can also encourage children to make different sounds with their bodies: clap quickly/slowly, beat a drum loudly/softly. Children this age will imitate almost any action, so caregivers can take advantage and turn babies' love of imitation into a learning tool!





Recognizing amounts

What children are doing:

Even though 1-year-olds are too young to count, they are aware of differences in amounts. In the math world, this is called number sense.

What caregivers can provide:

- The basic math concept of number/amount is everywhere – no special materials are needed! What caregivers can provide is their own awareness of numbers in everyday experiences!

What caregivers can say and do:

- Use words that refer to amounts throughout the day: “Do you want more carrots?” “They’re all gone.” “She doesn’t have any. Let’s give her some.” “Wow, you have so many blocks!”
- Play simple clapping games: Modeling simple clapping patterns (clap-clap-clap . . . pause . . . clap-clap-clap) captures and focuses babies’ attention on these basic math concepts in a fun way that they can then repeat and experiment with.

Making changes

What children are doing:

One-year-olds are all about doing and then seeing what happens! The voice of their inborn scientist is constantly asking “I wonder what would happen if I . . .” They are very interested in actions and reactions, cause and effect—especially when they are the ones who provide the action. Caregivers can tell when curiosity is behind an action by the intense look of observation on their faces.

What caregivers can provide:

- Toys that children can act on, and that respond when babies perform a simple action.
- Toys and tools for water and sand play.
- Table blocks.
- Fingerprinting or painting with various objects that create different effects.

What caregivers can say and do:

- Recognize the curiosity behind children’s cause-and-effect actions and comment on it: “What happened? Did the blocks fall down when you kicked them?”
- Model an action that will create a different effect or outcome and encourage the child to repeat it.
- Imitate an action that a child just did and narrate—describe what was done and what happened next. By letting the child lead, caregivers are communicating the message that what the baby did was interesting and worth doing again.

Keep in mind

One of the most dramatic changes in the second year of life is mobility—babies’ ability to get around on their own two feet. With time and practice, this ability enables them to interact more and more with the objects and people around them, which in turn gives them more and more information about those objects and people. It also means that they can perform many more types of actions (and then observe the results). It’s also what makes this stage of childhood so exhausting for caregivers—these children are suddenly into everything. While it’s important to set limits to keep them physically safe, caregivers can appreciate that much of babies’ activity is fueled by curiosity and the need to figure out their world—and that’s a good thing.

