

Sharing the Wonder Science With Infants and Toddlers

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Fourteen-month-old Kim-Le is holding a clean, empty two-liter bottle. Her teacher, Carlita, is handing her large puff balls, pipe cleaners, and craft feathers. Kim-Le spends some time touching the bottle and the items her teacher offers. Carlita watches Kim-Le as she explores. Kim-Le easily places the items in the bottle, but soon realizes she can't get them out because her fingers don't fit! She tries banging the bottle and turning it upside down. A few pipe cleaners come out, but the other items are stuck inside. Kim-Le shakes the bottle upside down, and a few more things come out. As she tries different strategies, Carlita narrates Kim-Le's actions. Kim-Le finally realizes that her fingers can reach the items when the bottle is upside down. She looks up at her teacher with a big smile before she begins to fill the bottle again.

Twenty-six-month-old Adrian holds a cup of water outside. He is drinking the water, but then it spills into the dirt. He looks down and touches the wet dirt, then looks up at his teacher. He asks, "Water go?" His teacher, Janna, says, "Where did the water go? It spilled, but then what happened?" Adrian bends down to get a closer look.

Infants and toddlers are natural scientists! You might have heard that before, but what does it really mean? Kim-Le is behaving in the same way a scientist behaves. She is doing an experiment! After she has filled the bottle with items, she wants to get them out and must figure out how. She has a question: How can she get the items out of the bottle? She makes a prediction—first, that she can take the items out with her fingers. She tests that prediction and it fails. She makes more predictions and tests them until she finds out that by turning the bottle

upside down and using her fingers, she can take everything out. She has results! Now Kim-Le knows how to get these items out of the bottle. She shares her triumph with Carlita and then tries it all again.

Adrian is a little boy with questions. He understands that things don't just disappear, but when that water spilled, where did it go?

What is science?

For infants and toddlers, it is a process of exploration and discovery. We call it scientific inquiry, best thought of as a "way of thinking and acting" (Worth 2010).

You don't have to have a background in science to support children's ability to think deeply about problems, develop and test hypotheses, and share their discoveries. While it can help to understand a few basic science concepts, the best thing you can do is observe the kinds of problems infants and toddlers create for themselves, and then let those problems unfold. Adrian's teacher did not have to go into a long explanation of what happened to the water; she simply supported his question and exploration. Of course, be ready to step in whenever something looks unsafe or children become very frustrated.

Scientific inquiry allows children to develop a range of skills across all domains of development (Worth 2010), including skills like

- › Exploring objects, materials, and events.
- › Developing vocabulary to describe what they are seeing and doing.
- › Asking questions.

- › Making careful observations.
- › Engaging in simple investigations, like dropping various objects into water to see which float and which sink.
- › Comparing shape or size, and practicing skills like matching and sorting.
- › Recording observations using words or pictures. Imagine a toddler room where a 2-year-old tells her caregiver all about the bird outside the window. Her caregiver snaps a photo of the bird and quickly jots down the child's words. Later the photo and observation are hung near the window for other children to see.
- › Using a variety of simple tools to extend observations, such as ramps to experiment with movement and speed.

How can you support science learning?

Babies are natural explorers. They are curious about everything and are constantly watching to see how things work or what's going to happen next. Use the guidelines that follow to build a culture of science and exploration in your environment.

Create an “environment of yes.” Such an environment provides interesting opportunities for safe exploration and reduces the amount of time you have to spend keeping children safe or saying no (Early Head Start National Resource Center 2010).

Trust the child. Infants and toddlers often create their own problems to solve. One toddler may decide he wants to see how high his block tower can get. A baby may try different ways of turning, pushing, banging,

or tapping on the door of a pop-up toy to make it open. Try not to solve the problems for them. A little bit of frustration can lead to learning.

Use language. When you describe what children are doing and the results of their actions, you help them make sense of their experiences. Imagine a baby tossing toys and her caregiver narrating this experience: “Wow, that rattle made a big CRASH. That soft ball didn't make any noise at all.”

Ask questions. For toddlers, questions like “What do you think will happen if you do that?” or “I wonder why . . . ?” can encourage children to think about other ways to approach a problem.

Do some background learning. For example, when an educator understands the basics of a concept like floating/sinking, he can enrich a child's understanding of a water play activity.

Follow children's leads. Watch and listen to see what engages children's interests. Give them the time and space to explore the problems. Imagine a pair of toddlers who collect a bucket of leaves outside that they would like to bring into the classroom. By creating a space for their treasures indoors, a teacher supports their desire to explore, experiment, and learn.

Offer interesting objects to “provoke” children's interest. When children arrive and discover a basket of different seashells and several magnifying glasses on a table, they are invited to discover what makes these objects the same and different. A treasure basket filled with soft-edged, washed pieces of wood; a dry, clean sponge; a scarf; and a laminated leaf encourages infants to explore shape, size, and texture.

Think about it

As you begin to plan how best to introduce or deepen children's exploration of science, consider reflecting on the questions below.

- › What does the word *science* bring up for you?
- › How do you see infants and toddlers exploring and understanding their world?
- › How do you feel when you discover something new?

Try it

Notice when infants and toddlers are making their own observations and creating questions or problems to answer. Wonder with them.

Set out open-ended materials like containers of various sizes. Observe and document the kinds of experiments children create. Watch to see how children solve the problems of stacking, nesting, filling, and dumping as they play.

Document discoveries. Snap photos, write down children's dictations, take video, create a museum, or develop other exciting ways to capture children's learning. Post or display these discoveries at children's level whenever possible so that children can share their work with peers and parents. For example, laminate photos of infants mouthing objects with different textures, and post the photos where the infants can see them from a seated or supported-standing position.

Be a wonder-er. Show babies that you value curiosity and exploration by modeling these behaviors yourself. In the opening vignette, Carlita was happy to wonder with Kim-Le about how to get the objects out of the bottle.

Children come to us with a passion and natural curiosity to explore, ask questions, wonder, and experiment. As you plan new science experiences for children in early childhood education settings, begin by building on children's interests. From there, add a healthy dose of joy and creativity and a sense of fun. Science learning provides a broad and flexible structure within which we can ignite children's innate wonder in the world around them—and perhaps re-ignite our own.

References

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