Daryl Greenfield: Encouraging Our Youngest Scientists at Work

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Announcer 3: Welcome to the National Center on Early Childhood Development, Teaching and Learning podcast series, which focuses on the Head Start Early Learning Outcomes Framework. In this podcast, you will hear from Daryl Greenfield on the scientific reasoning of very young children. We hope you enjoy this broadcast.

Announcer 3: From the ELOF — "'Scientific reasoning" refers to the emerging ability to develop scientific knowledge about the natural and physical worlds, learn scientific skills and methods, and continue developing reasoning and problem-solving skills.

Jan Greenberg: Daryl, I am delighted to be sitting here with you today, having a conversation about the Head Start Early Learning Outcome Framework. I'd like to start by asking you to introduce yourself, and talk a little bit about your background and current involvement as it relates to cognition and science.

Daryl Greenfield: Thank you. I'm Daryl Greenfield from the University of Miami and the Department of Psychology, and a professor in the Department of Psychology and Pediatrics. And for the last 30 or so years, I've been very interested in doing research around early development, focusing on low-income populations. And for the last 10 years or so, my focus has been on science, education, and early childhood.

Jan: Tell us about important findings from current research that would help with our understanding of what children should know and do in the areas of cognition, which we know in the ELOF relates to infants and toddlers, as well as in science, which relates more to preschool-age children.

Daryl: There is a notion that infants are born scientists, and at every age, young children — infants and toddlers and preschool-age children — really want to understand how their world works. And if you think about what makes the content of how your world works, it's about the people around you, it's about things that grow, changes that occur. In the life sciences, children want to know "why my shoes don't fit anymore," why clothes don't fit, how they're growing, and so forth. And that's actually the focus of life science. Children are also interested in the objects that are in their environment, what sinks, what floats, what's hard, what's soft, what bounces. Children — infants, for example — will consistently drop things off their high chair to just see what happens. So, in some sense, the children are experimenting already at a very, very young age, and they're trying to make predictions so that the aspects of physical science are also relevant for young children.

The third main content of science is earth and space science. And again, children at very young ages are interested in, you know, what's outside, what the earth is made of, what's this big ball

in the sky during the day, and how come that changes to something different at night. So, earth and space science is also a focus of children. So, if you think about how children learn best — to pick on something, choose something that is motivating to them — it's goal-directed. They want to find the answers, they're curious about it, they can do it in an engaging way so that they're actively engaged in understanding it, as well as thinking about it, and can do it with other children, as well as with adults. This sort of makes learning work best. And the content area of science is what young children, from a very early age, are motivated to understand. So, science really is a great focus for not just preschool, but also for infants and toddlers.

Jan: If you were to give some important guiding principles or concepts to teachers on family childcare providers and home visitors who are working with parents in the home, they should keep in mind as they are working with children, thinking about those early cognitive foundations leading into some more refined scientific thinking.

Daryl: If you look at infants, toddlers, and preschoolers, if you look at practices like observation, making predictions, doing little experiments, certainly infants can't do them to the same extent that older children can do, but you see, when you watch infants, you see them doing these things. Infants that will take objects and drop them off the high chair, they're, in some sense, observing what happens. They're making predictions about what they think is gonna happen. Some objects are gonna bounce. Some objects are gonna splat. And they keep doing it to see, you know, "Is this replicable?" which is sort of the essence of how you do science experiments. They're also paying attention to patterns, they're seeing cause-and-effect relationships, and they're interested in people, the life science. They're interested in objects in their environment. So, what teachers need to realize is that observing children from this particular frame, from this reference of "The children are engaged in scientific practices," the goal is to identify the science that's happening in the classroom. See what the children are doing in your classroom, and then ask yourself what practices are you observing. What crosscutting concepts do you see that potentially would be available, that you could help scaffold and help the children learn?

What's the content area that the child is currently focusing on? So, a lot of the earlier science was learning — learning facts, scientific facts — as opposed to how to ask questions, because science really is not so much about what we know, but what we don't know. And young children, you know, don't know lots of things. So, teachers are frightened by doing science because they're afraid that children will ask questions that they don't know the answer to, but that's exactly what you want to happen. What's also great about children's questions is that it tells you right away what are the children interested in.

So now you've got something that is motivating the child, and it also tells you what does the child know, what does the child not know.

Jan: Daryl, thank you so much for taking the time to talk with us today about how early-childhood educators can integrate science into their everyday activities with young children. You've helped us see that it's not about teaching science facts, but really it's about building on children's natural curiosity about the world around them and helping them think about how things work and why things happen.

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