Reel to Reel Research: Living in Relations

Early Science and Nature

[Music]

Teacher: Everyone's going here and everyone is going here.

Narrator: In pre-K classrooms across the country, young children engage in activities which reinforce language, literacy, mathematical thinking, and yes, scientific learning.

Dr. Sandra Waxman: Even Piaget said, you know, the child is a little scientist. So she tries to figure this out, and it doesn't work this way, and she tries it a different way. So that sort of iterative process of observing, thinking you have it right, then something surprises you, then you have to shift how you think; that's science.

Teacher: So you stir it and stir it and stir it.

Narrator: Studies show that even 3- and 4-year-olds are ready for age-appropriate scientific activities and observation.

Dr. Megan Bang: In fact, increasingly, we know from research that kids can do far more extraordinary things than we typically give them credit for. And that started with kindergarten and pushed up. And a lot, for me, is the point is that I think it's true with 3-year-olds, 4-year-olds, 5-year-olds. So that pre-K age, I think there's far more going on there around complex observations and sense-making than we have typically thought about or incorporated into classrooms.

Narrator: A traditional science curriculum has been put under the microscope by Dr. Megan Bang at the University of Washington and her colleagues at Northwestern University. They say a "one size fits all" approach may not benefit children who either are not European-American or who don't live in urban areas.

Dr. Doug Medin: And one of the fascinating observations that really got us started on this work were some results from standardized tests with Menominee children. And what these data indicated was that in fourth grade, Menominee children's best subject is science, and they score at or above the national levels even though they're behind on, like, language skills, et cetera, et cetera, many of the typical markers you see with children who are not middle class, et cetera. But by eighth grade, science shifts from being their best subject to being their worst subject, and they score below the national average.

Narrator: The results, Medin says, beg the question: Is there a clash between the orientation that Native children and rural children bring into the classroom and the structure or curriculum they're exposed to?

Sandra: Do you learn about animals and their interactions in the world from books and Disney? Yes, if you're urban kids or suburban kids whose parents are not working daily with the natural world. Or do you learn about them because you're in an agrarian society or an agrarian culture? And it turns out, it matters importantly, and these are the sorts of things that matter that we can see by the time the kids are 3.

Narrator: To the members of Menominee Nation outside Green Bay, Wisconsin, the connection between their experiences in nature and how they understand science is clear.

Karen Washinawatok: Our people are really people of the forest. Our elders and our grandparents and our children think and live differently than people in an urban setting do.

Jim Smith: If you visualize these Indian people being a scientist 100 years ago, they knew statistics back at that time. They could figure out how many trees, what set of trees, for example, would be needed to make and develop a project like maple syrup, maple sugar, and what time of the year it took to go out and do this activity and who would all come along with it.

Teacher: Squirrels, slugs, worms, spider web.

Narrator: And the idea of learning among nature still holds true today. With a childhood rooted in forest walks and berry-picking with elders, Brett Reiter says his definition of science has changed.

Brett Reiter: I think that science is part of just what we're taught since we started the process of learning, you know, and that would probably be at home with the parents when you're very young, all the way up through grade school and middle school. But I think that we're just now starting to realize that it has been science that we've been learning.

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Narrator: While not all indigenous children learn the same or have the same set of beliefs, Dr. Bang says there are ways in which different cultural communities have different kinds of practices. In their project called Living in Relations, Doctors Bang, Medin, and Waxman examine the role of culture in the development and reasoning in the natural world in both Native and non-Native populations. They focus on three kinds of observations.

Doug: One is cognitive interviews or probes or experiments, if you will, where we try to test some particular ideas to see what we can learn about how kids are thinking about nature, how they're understanding biological relationships.

Narrator: The project also studies everyday interactions between parents and children. And the third kind of observation? Design work.

Megan: You build on kids' intellectual resources that they're developing in homes, right? So you start to understand cross-culturally what's happening around those kinds of things and then how might you build on that in classrooms so that you're facilitating kids more into the practices of science rather than into specific content all the time.

Narrator: The American Indian Center in Chicago embraces this approach with an outdoor classroom that is organized around ecosystems.

Amanda Marin: It's really nice and fun to watch the kids. They'll stop along the way and watch bees for, like, 10 or 15 minutes. There's some cicadas around this year, so they'll check out the cicadas. We usually have some yellow finches that visit our garden, will eat the seeds from the hyssop and the echinacea. And we have some juneberry trees and other bearing trees that birds are attracted to. So that's what we've been doing here with kids.

Narrator: It's an outdoor classroom.

Amanda: It is an outdoor classroom. And kind of our teaching philosophy is that land is our classroom and that's our teacher, and that we can learn as much from the garden as we can from each other.

Narrator: Organized forest walks taken with members of the community are also an important learning opportunity.

Child: There's a log, Mom. Look it. There's a hole in it.

Narrator: Whether on a forest walk, in the garden or inside a traditional walled classroom, elders at the American Indian Center as well as Menominee Nation members make core decisions about what children should learn, ensuring culturally and community-based perspectives.

Karen: I think our mothers and our families are really our first teachers. And so as families, we could impact the learning of our children.

Narrator: Learning, which Menominee members say takes place early, often, and includes outdoor classrooms.

Brett: One thing that I learned was just never underestimate a kid. I mean, they — especially these kids up here. I mean, during the tasks that we do and the data collection and the research that we do, I mean, a lot of times, I was just floored by what kids knew already. I mean, at the age of 3, you know, maybe not in those terms, they know what pollination is. They know that — what the seasons are and they're kind of thinking more in terms of everything being connected in the forest.

Teacher: So the other one we saw is the June beetle. They're okay, but this is its cousin.

Narrator: While these young scientists observe the world around them, ask questions, hypothesize, and find solutions, researchers say they're also learning about what it means to learn.

Sandra: Our job as educators is to see where each child is and meet that child so that she can take that baton that she came in with and run with it. And so that's really, really important, I think. When you meet a kid who's different, the idea of different versus deficit comes in. And we can't help it because we have to say what did the child know and what does the child learn, and how does it fit on this scale? The important thing to remember is the scale is only useful for the group on which it's been created.

Megan: We've developed a pipeline that's very rigid, and the only way out is to burst it open and leave it completely. And so, you know, we keep trying to repair that when in fact, actually, maybe there's ways to think about multiple pathways. And I think we're getting there. But I think seeing kids' strengths and what they do know is really going to be important for us to be able to change some of the kinds of achievement statistics that really haven't changed much in a long time.

Narrator: Focusing the lens not only on what to teach but how children learn, taking into account and respecting different cultures and different approaches to science.

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