FRONT PORCH SERIES
BROADCAST CALLS

Science in the Preschool Classroom: Why and How This Can Be a Teacher's Best Friend

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Q. What assessments are there to measure early science knowledge?

A. There's a particular approach that tries to allow teachers and teaching staff to evaluate how their children are doing on a regular basis and to use that information to guide instruction. A number of assessment systems are moving towards providing science. For example, one that's been around for a while that has a pretty well-developed science domain area is called Galileo. Through our research committee, as part of the Florida Head Start Association, we have been helping Head Start programs in Florida learn how to use Galileo. Once teachers know how to use the system they can evaluate how well their children are doing and whether they're actually learning science. That assessment has feedback built into it so that you can look at different readiness areas and there are activities that are suggested. A number of programs I know are also beginning to use the Teaching Strategies GOLD™ system. This system doesn't have a section on science that is quite as well developed, but there is a section that can begin to help teachers accomplish their goal. There is movement to provide teachers and teaching staff with a way of ongoing assessment to evaluate how well children are doing in science.

In terms of direct assessments, the assessment that we're currently developing is called Lens on Science. It's really the only assessment at this point that will allow program staff to see whether the children have learned from more of a summative perspective from, for example, the beginning of the year to the end of the year. We are trying to get this done as quickly as we can because we have a list of colleagues who are asking to use it!

Q. How do you help teachers who are not comfortable with science to understand science well enough to be able to stimulate children's thinking in the classroom? How do you help them to get some of those rich interactions—those high-quality, instructionally supportive, concept-development type of interactions around science, if teachers are feeling a little less than confident and competent in it?

A. A number of the curriculums I know, for example, HighScope® and Creative Curriculum®, which are not necessarily science curriculums, do actually have science activities that teachers can try out. It's really just a matter of not being frightened; stick your toe in the water and give it a try. When we first started this project six or seven years ago we saw (and we have a very, very large data set) that in the state of Florida very little science was going on and teachers were afraid of science. They didn't want to do it, they felt uncomfortable teaching science, they didn't feel competent in doing it. They felt there was not enough time in the day to cover everything, so science was typically left off.

The consequence of that was that we saw, when we looked at all the different readiness areas with the Galileo system, that science was one of three areas (along with language, literacy, and social-emotional development) to start off low. So, four-year-olds who enter Head Start are low in those three areas, but teachers do feel comfortable in promoting social development. They do feel comfortable reading to the kids and working on language skills—so those two areas showed reasonable sorts of improvement and some catch up. But very little going on in science.

We started working with our Museum of Science here in Miami and with our local Miami Dade County Head Start program. We first started with a group of volunteer teachers and basically showed them that this is really not so difficult—it's a hands-on activity. You're familiar with hands-on activities. Children like hands-on activities. When the children are doing science, a lot of the time, the teachers are worried about behavior management and problem behaviors. When kids start doing science, it's something they're naturally curious about, they're naturally interested in, and as a consequence they tend to be engaged to the extent that the behavior problems disappear. They're really concentrated on trying to figure out what is going on. So, it's really a matter of, say, getting the curriculum specialists or the directors to encourage the teachers to give this a try. Once you do that, you end up seeing that this is fun, the kids like it. It's not that hard to do, it's hands-on. I don't really have to know the answer in advance. Part of what science is about is asking questions, especially questions that the children are already interested in. And then, telling them "That's a great question. Let's see how we can figure out together what the answer is." There are various resources: looking on the Internet, trying out little experiments. I think a lot of it is just giving it a try.

Interviewer:
It sounds like some of the programs you mentioned provide scaffolding for the teacher as well. So, not just "Here's the activity for the child," but "Here are some questions to ask; here are some things to do." That might be important, as people are looking at some of these enhancement curriculums and asking, is there enough information in there that can scaffold the teacher's role as well? I think those are important, because I think we often see science as just a learning center in classrooms. I know that's not what you want to see, but I think sometimes that's where folks think the science happens—that they have a table set up and it's called the science center. But when you were showing some of your class data, you were really focusing in on a science lesson. Some of the resources you mentioned might be good fodder for those lessons.

Q. What are the top five materials you think are really engaging for young learners?

A. I think what really gets children to go into particular areas is when the teaching staff goes there and starts to play and engage them in an activity. Rochelle Gellman, who gave one of the science talks, talked about this. She and Kim Brenneman, who is her colleague, sent me the undergraduate student whose study they reported. This is a study that Irena Nayfeld did. Irena's now one of my grad students.

Irena looked at the science center and noticed that all the science centers tended to have scales so that you could put things on them and weigh them. She observed a number of these in the New Jersey area. For the most part, children just didn't go into the science area and did not engage in using that particular scale. Then she randomly took a subset of the children. She went into the science center and pulled the scale out, started playing with it, and started talking to the kids about, "How do you know if something is heavier or lighter? How can you compare things that weigh differently?" She started out by giving them something very heavy to hold—say in their right hand—and something much lighter in their left hand. It was an easy discrimination and the kids passed it around, "Ah yes, this is the heavier one." And she kept changing that to the point where there's some disagreement. Some kids said, "I think this one is heavier." Some kids said, "No, I think this one is." At that point she introduced the scale and showed the children how you could use the scale as a way of measuring.

She then left, came back later, and found in the classrooms where she didn't intervene (she didn't work with the kids), again, nothing was happening in the science center. Whereas in the classrooms she went into (and intervened) now kids were all going in there. They were bringing in their friends. They were weighing all kinds of things; they were having debates in advance, and making predictions about which side would go down, what would end up happening. So, an example would be something like a scale.

The other thing that is easy for kids to quickly understand is to go into the block area and start to build structures with blocks. Have teachers work with the kids to teach them how to build a stable structure. Then introduce things like ramps and marbles, and let kids explore how marbles roll down ramps. You can end up introducing both engineering and science using block structures and ramps. The children will try all kinds of interesting things, and you can then begin to build science around that. So, I don't think that actual material itself is critical. One way of thinking about it is, "What are the children interested in?" Bring in materials that the children are asking questions about. The teacher could think about, "How can I interact with the children to draw them into the area, to give them something for me to scaffold so that they can begin to use these materials in some meaningful way?" Before you know it, the kids are competing to get into the area to use these particular resources.

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