Teaching and Learning: The Journal of Natural Inquiry & Reflective Practice

Volume 12 | Issue 2 Article 5

4-1998

Jack's Crab: Learning from our Studies

Caroline Owens

Cecily Ryan

Jack's Crab: Learning From Our Students

by

Caroline V. Owens and Cecily Ryan

Classroom talk can be one of a teacher's richest sources for teaching ideas. Science ideas, especially ones that involve disgusting or taboo topics, crop up in children's conversations frequently. It is a rare teacher, however, who genuinely listens to children's talk for evidence of scientific thinking. If we do listen carefully and analyze what children say to one another, we can find at least two kinds of information: what children have experienced previously and what they are ready to learn. Knowing these, we can map out new teaching directions and strategies with confidence in the interest of at least a portion of the class. In the same manner, though, children's talk can also confront us with the senselessness of much of our curriculum–such as when children dismiss the activities we provide in favor of the intensely rewarding pursuit of solutions to the messy questions embedded in everyday life, like catching crabs.

Jack's first grade class was engaged in a general study of animals and their habitats. Cecily Ryan, then a graduate intern, was observing a small group of students at lunch when talk turned to Jack's pet crab, a visitor in the classroom a few weeks previously. As you read the following transcript, ask yourself what it tells about Jack's scientific thinking. Consider the sophisticated processes Jack displays as he reaches back into his memory to explain first the crab's death, then how it was kept alive as a pet, and finally how it was captured in the wild. Try to imagine, as Cecily did, where Jack's ideas might have come from. The children's conversation is printed in the left column. Cecily's analytical comments appear on the right half of the page.

Jack:	You know my crab died? I was so mad! I think the dogs got it.	*Possible food chain connections.*
Dave:	How do you know that? Did you see them get it?	*Where's the evidence? What's your data?*
Jack:	No, but my Dad found parts of him laying on the carpet in the den.	*Hypothesizing about events that were not observable. Collecting evidence to support his theory.*
Dave:	Part of him? You mean some of him wasn't there? Gross. What WAS there?	
Jack:	Just part of him was there, like my dog had tasted him or something and didn't like him so he left the rest of him on the floor.	*Jack was very mature about this–he knows crabs are food just like chocolate cake! Hypothesizing about how the remnant came to be left.*
Jaimy:	How did it get there?	
Jack:	Well, I think what happened was this. There was too much dirt in the jar. It came up to here (gestures), and it was	*Further hypothesizing. His family has really thought about the downfall of this pet! Jack's storytelling was sequential and reasonable.*

	so much he could climb out. I think he got on the remote and climbed out, but I'm not sure.	
Dave:	How come he didn't climb out before when you brought him to school? (The children laugh very hard at this)	*What conditions were present when he got out that had not been before?*
Jack:	No! No! He didn't climb out in class because my Mom put a lid on the jar for when he was here. Remember? There were holes in the lid so he could breathe. I took it off when we got home so he could breathe better.	*Jack has already given this thought. Jack knew his crab needed air and assumed that more was better than less.*
Jaimy:	Did you feed him? (She laughs and is joined by the others)	*They know this is a silly question. Every animal needs food to survive.*
Jack:	Of course I fed him! He wouldn't have lived at all if I hadn't of fed him!	*Jack also knows this.*
Dave:	Did you feed him peas? (He smooshes the remnants of his lunch around his tray)	*An alternate theory! The crab might have been escaping intolerable conditions! Do they eat human food?*
Jack:	No. My mom bought some crab food at the grocery store.	
Antoine:	Did you get on your dog because you were so mad at him?	*Antoine knows that when you displease others a punishment is possible.*
Jack:	No. He eats a lot of stuff. My dog eats ROACHES!	*Eating roaches is the ultimate form of the indiscriminate diet.*
Jaimy:	What do they eat at the beach?	*Tell me more. I'm really interested.*
Jack:	Dogs? Oh. Crabs. Probably salt water and some jellyfish.	*Jack figures they consume what is available.*
Jaimy:	AAAAAH! I hate jellyfishes. They are too scary!	*Jaimy draws on prior experiences.*
Jack:	They probably taste good if you're a crab. Plus, once I saw a little crab eating this huge jellyfish.	*Considering another perspective.*
Dave:	The crab was eating the jellyfish?	*Comparing Jack's statement with his own observations and knowledge.*

Jack:	Oh yeah. The crab was under the jellyfish eating it. Yeah. Crabs eat bologna, too. That's what me and my Dad caught mine with–bologna.	
Jaimy:	You caught your crab?	
Jack:	Yeah. We put bologna out as bait. We tried to catch one for a couple of days, and finally we got one.	*Used prior knowledge of animals' need for food to entice the crabs.*
Dave:	Whyja use bologna?	
Jack:	We didn't at first. At first we used a cookie. That was my idea. But none of them wanted it.	*Jack likes cookies. So does his dog. Overgeneralizes to include crabs.*
Dave:	Howja know?	*Another request for evidence. What told you? What were you thinking?*
Jack:	Because we didn't catch any! There were a lot of them, too. They live all together at the beach. We put bait in different places. Finally, when we used bologna and had it in this one place we caught one. I was so glad!	*Observation and reasoning.* *Trial and error testing.*

Science is Everywhere

Listening to children's talk is both humbling and uplifting. It can help all of us to maintain a sense of perspective about our profession. Although we take responsibility for exposing children to formalized science ideas and experiences, classroom teachers are not the only ones who are promoting scientific thinking. Our young students are experiencing interesting things all the time, and families, neighbors, friends, and classmates are helping them to identify the patterns among their experiences that are the fabric of science.

Jack's family helped him to learn about science by providing him with uninterrupted time to develop and pursue a personal interest–catching a crab. They elevated his interest above "fun" and "cute" by taking him to a place where he could observe crabs and draw some inferences about how they live. His father helped him to experiment with different bait and locations for their traps. His mother brought the crab to school in a safe container, making sure that Jack understood the reasons for having air holes in the lid. He, in turn, shared his knowledge with his friends as he answered their eager questions about the demise of his pet.

This overheard conversation is an unusually rich example of the manner in which both classmates and adults may learn from young children. As she analyzed the conversation, Cecily quite unexpectedly discovered that Jack's friends prompted one another to use most of the process skills which have been identified as the goals of early childhood science instruction. She was surprised to find that process skills are evident in casual conversation as well as teacher-directed activity.

Learning From Our Students

At a recent workshop at one of the University of South Carolina's 17 professional development schools, I asked how teachers found out what children knew or were ready to learn about science. There was an uncomfortable stirring in the room. Finally a young teacher asked, "Does it really matter? I just start with the four seasons and follow the curriculum to baby animals."

If science is regarded as a body of facts which children must master within the thirteen years of public schooling, this teacher was correct. What children think may not matter. But most science educators have a different view of science. We think of science as a way to approach questions and problems about the world. The theories, techniques, and terminology of science are important in this, but they are the tools, not the end-points, of scientific thinking. Memorizing the solutions Galileo or Newton found for the problems that were important to them may not matter as much as allowing children to develop their use of the processes of science–especially in early childhood.

Unfortunately, process skills can only be refined through actively solving personally relevant questions or problems. Providing meaningful experiences, then, cannot be a matter of "following the curriculum." It requires some knowledge of what is important to each student. Does it make sense, we must ask ourselves, for children to study the four seasons simply because it is September and leaves are falling in New Hampshire? Does this have relevance for children living in an area where the average daily temperature in October is 75 degrees? Or is there a more compelling interest on which to capitalize–insects, perhaps, or the trajectories of balls that are kicked, thrown, and dropped?

There Is So Much More to Learn

Later in the workshop, the teachers analyzed Jack's conversation. They, like Cecily, found evidence of observing, measuring, comparing, predicting, questioning, hypothesizing, testing, and analyzing. In short, they decided that talk between children, *with no adult mediation*, could be one vehicle for developing most science process skills–provided that there was a sufficient "trigger" in the form of intriguing activity or objects to consider. As she thought about this, one veteran teacher raised her hand and rather tentatively asked, "So now science isn't just doing activities? It's talking about what you do, too?"

Curricular change was nothing new for this experienced second-grade teacher who had weathered the science curricular reform of the 1960s, when Sputnik challenged American educators to create miniature scientists in the classroom; the late 1970s, when the back-to-basics reforms reduced much of the school science curriculum to vocabulary lists; and the 1990s, when constructivists revisioned the activity approach. What she wanted was a deeper, more enduring answer to the challenges of science education. Unfortunately, now as then, curriculum design includes contextual factors that render it anything but enduring. Science educators can say which things appear to provoke science learning and design corresponding curricula, but there are no guarantees that today's approach will persist beyond the end of the decade.

The one constant in the dynamic equations of teaching and learning across the years is the need for educators to constantly listen and respond to their students. The response to this wonderfully open-minded professional is that, while activity is necessary for conceptual learning in science, we now believe that it is not sufficient in and of itself to bring about the kinds of knowledge we hope to see developing in our children. In addition to the decontextualized activities which have characterized science classes in the past, our students need opportunities to develop proficiency in the use of the tools of science–including disciplinary skills, language, and theory as well as actual implements for measurement and analysis. Teachers must be sensitive to young children's need for flexible skills that apply to everyday questions (What is safe to feed a dog when the bag of food is empty?) rather than the arcane questions (Is a dog a carnivore, omnivore, or herbivore?) that are more typical of primary science curricula.

Each semester, I assign student interns to listen in on children during freely chosen activities. Each semester, their surprise is palpable when they analyze the interactions and find evidence of children's spontaneous use of science to explore, explain, and predict their world. Young children are asking us for more science. It is the adults around them that make the artificial distinction between science and play. It is time for all of us engaged in education to step back from our pursuit of ultimate teaching methods and really listen to the questions children are trying to solve. They have a great deal to tell us about teaching.