GETTING STARTED PART 1

BEV CASWELL: I had no idea it would go this far. Really, I was just excited to find a kind of new pet for the classroom, so my expectation and hope would be that, you know, children would like these pets, they'd learn maybe a little bit about what is an insect and, you know what, if I looked at the curriculum, it's, you know, looking at habitats. I wasn't thinking of biology as having these deep concepts of evolution, adaptation, you know, how does anatomy link with the habitat that you're in. Anyway, I didn't have those questions in the beginning but I had the good fortune of, you know, working with Joan. I also worked with Mary Laiman(ph) who had some ideas around big ideas in science so as a beginning teacher, because that was in my early years of teaching, I had – it was very helpful to really think about planning; building on what the students brought to me. Building on their questions and always keeping the big picture of what are these scientific concepts that the children are coming into, and so, you know, I did a lot – I was very excited about the roach, cockroach, and biology, and I would do a lot of reading at night. The children got me excited. You know, people at home, my family, you know, at certain points they were like, okay, okay, mom, let's say enough about cockroaches.

GETTING STARTED PART 2

BEV CASWELL: I didn't wait for children to say, oh, let's study cockroaches. You know, I brought – I put a thought into this pet. I wanted it to be something unusual and, you know, it could be – it doesn't have to be a pet, but just something that children can make observations about. I know other colleagues have, you know, watched children be really interested in how the leaves changed colour, and so like they just start looking at leaves and, you know, thinking about ideas. But often, and I think it's also really important for children to draw. Like we're finding around spatial reasoning, and engineering, like it's very important in spatial reasoning to draw. And so to really have kids doing that with something that is there in front of them that they can hold. And that makes them wonder, so it's – it could even be, you know, dilemma lessons. We recently had the opportunity to go up north and we were learning about wild rice harvest and, you know, the complicated task of harvesting wild rice and then somebody just casually said, oh, and there was no wild rice in Rainy Lake this year, and so like that's an inquiry question. That's a dilemma question. And so that too, can be a way to begin. So I think it's just finding something that either you yourself is interested in, as a new teacher; something that relates to the science curriculum. Or maybe something about environmental sustainability, and just like putting it out to the kids, like let's – like they're going to be part of this research community and really thinking of it that way, and thinking of ways of drawing in resources. That just, you know, giving some time for children to be able to ponder this dilemma and so that's a way to begin. And I think it's also really important to learn about structure, so that it isn't – because people sometimes have the false impression that a knowledge building classroom or an inquiry classroom is with the teacher sitting way back and the kids really doing everything. And it's teaching in this way; teaching in a knowledgeable way is an art. It is really, you know, thinking of participant structures that bring children in and that have children see themselves as contributors; that increases

student participation, increases their engagement. But they're – they feel empowered, that they're actually contributing to this, you know, this overall understanding of this science concept or the science topic. And so I'm looking at participant structures; really understanding the science behind what the kids are doing. We always talk about inquiry being about making children thinking – children's thinking visible. And children are always making their thinking visible, and we as teachers, have to have some of that science knowledge to know. Like so those kids that were questioning how does the children – or how did the roaches survive the ice-age, you know, that is about evolution. And, you know, how do these roaches adapt to their environment, become large, and that, you know, they're not flying. They notice that other roaches had wings and these ones don't. And so these are big questions about evolution, adaptation and survival. And so that, you know, we as teachers, have to learn a little about that as well, to move the thinking forward, so participant structures. You know, allowing for playfulness. Really trusting that the kids will come up with questions and that they're questions are valid. That even the simplest questions can lead into something quite complex. So I think just leap in and not think that you have to do this for every single science unit that you're doing in the year. You know, I would just say, just try one area a year. And just build it up; see what happens. See what the challenges are and don't be afraid to ask for help. There are many of us to help. There are many people and things that sort of seem like failures, just learn from them. I mean, in the beginning, when I was teaching science, I really was going with the centre's approach. And I was designing all of the experiments. I was designing these amazing vinegar experiments. You put the bone in the vinegar and then later it turns to rubber. So I had all these stations around my classroom of experiments that I designed and I was excited about. And I was so disappointed that the kids, you know, I had made charts for them and clipboards and I was so disappointed that they didn't have the spark. They went around, they did it. I'm done this

one, do I have to do the next one? You know, and I really had to reflect on what was going on there. Why was I so excited and they weren't. And so then when I started to learn from Marly (Inaudible) and Carl (Inaudible), this idea of knowledge building, and children being capable of building knowledge and that your classroom being this hub of knowledge creation, that when I switched that around, I started to see something very different. So these student designed experiments and this motivation and engagement, and so when I said, okay, I think it's time to stop the cockroach unit, they're like, no, no. We're still learning, Bev.

CREATING IDEAS

BEV CASWELL: I think of knowledge building as, you know, the whole idea, that we have ideas and ideas are improvable objects and as this classroom, you know, it's our job during this study to actually come together and produce and create knowledge. And so to just improve these ideas and really just keep moving to current theories, so just pushing those boundaries and just, you know, learning as much as we can together. And to do that, you need an inquiry stance. You need this – you know, you need an idea that – so the collaborative inquiry, you know, about looking at a topic and, you know, getting good at it. Sometimes, with collaborative inquiry, I think of it as having an end goal. You know, maybe it's the collaborative inquiry into how to become better at learning how to teach geometry or how to be a collaborative inquiry into birds, in some sort of way. And so part of it, the collaborative inquiry is about listening; just peoples questions and making – thinking visible. I think what's just slightly different about knowledge building is this whole idea of knowledge creation. And that you don't really know what the end product is going to be; that through this community of learners, something is going to – you know, you're going to be very – something's going to rise up and you're going to pursue this in a way that pushes beyond, maybe, what we currently know about something.

PRECONCEPTIONS

BEV CASWELL: I like to use a term different than misconceptions. So misconceptions sort of has the connotation of being wrong and so I always, in my teaching, thinking of preconceptions; that children are on the path. You know, they're on the path to understanding but they're just, you know, not there yet and so I always think of how to bring opportunities so that these preconceptions can be revealed and then we can work with them. And so in the cockroach unit – I need to think about this for a minute. You know, some of the preconceptions would be that if a roach was, you know, hurt or like their leg, part of their leg was off, the next generation, a baby would be born without one leg. And so there would be – this would be time for me to come in and we would do a little bit of work around evolution.

ASSESSMENT

BEV CASWELL: To diversify assessment is one of the great challenges of teaching. To not rely – and especially in science teaching, to not rely on only the quiz at the end of the term or, you know, things that would cause you to teach to the test. In a knowledge building classroom, you have wonderful opportunities to assess student learning. There are, well, knowledge forums, so the use of technology and specifically Knowledge Forum, is a wonderful tool to assess student learning. And it's done in ways that are built into the knowledge build – into the technology itself. Things like how many build-ons do children do. How many actual notes do they write. You know, are they actually responding to other people's ideas. Like all of this is factored into Knowledge Forum, as a way that you can see as a teacher, who might be not part of a conversation and then when you're in a knowledge building circle, you're also listening. You know, who is speaking, who isn't speaking and how can I support the children, maybe, who aren't speaking.

Let me just describe an old school way of assessing. So if you just imagine, you know, a piece of paper and it's divided into the size of square sticky-notes, and each of those squares has the student's name on it. So I have about three pieces of legal size paper, with the student's name and each time that we're doing inquiry or doing science, you know, I'm taking little notes on what students have done and at the end of the week, that whole chart should be filled. If by chance I notice that there are a couple of children who I've not been able to make any notes on, that's a fault of mine. That means I have let two of my students slip through the cracks that week and I don't know what they've been learning in science. And so sometimes it could be just listening to their conversations together. It might be that I work with one of the research groups and really find out what's their – whether they're experimental designs, let me see what you've got in the lab books. I'm not making red notes in their lab books.

I've already told them that those are their notes. But I look at that. I look at – I look on the knowledge form and see how many notes that they've made and how many build-ons they've done. Sometimes we'll have students draw a diagram to show me what you've learned so far. When I was talking earlier about the creation of the documentary, I mean, when I look at the students scripts for that documentary and look, okay, I can assess their scientific understanding of – so I can look in the grade 4 curriculum and I look at the science habitat understanding. I looking through the curriculum expectations. I can find things there. I can also find in their language arts, the expectations for them at this grade level. Are they forming sentences? Are they able to form themes? Are they able to express ideas? Are the communicating their ideas well, using the structures of our language? Often in our science teaching and a knowledge building classroom, we draw on authoritative sources, authoritative text. So this is language that's above the level of grade 4 or grade 5 and 6 and I remember, when we were studying the evolution of animals on islands; this was in a grade 5, 6 class. The children were moving forward so quickly that I realized I had to find articles written by Darwin and Lemarck. You know, they were having arguments about evolutionary points of view and so we had this class debate and the students took home this – and also read it in class, but also took home either Darwin's argument or Lemarck's argument, and then we met in class. And I'll still remember some of the notes that were on Knowledge Forum, after this debate, it was one of the students said, Darwin and this other guy were having an argument and one thought that, you know, giraffes that ate the leaves on the trees just for the reason that – the reason that long-neck giraffes survived was because they stretched their necks further and then he was saying, but Darwin believed that they survived because they were taller, like there were some long-neck giraffes to begin with and they were able to survive. Anyway, this was this

wonderful debate and – so the use of authoritative sources were another piece of both the assessment and the moving the knowledge forward.

Knowledge Forum has a piece on it that's about – that's called A Rise Above and so it's about, you know, moving above what the knowledge is there and trying to summarize it, categorize it, you know, and so the children, because of this piece on Knowledge Forum, and they were able to do it with technology, they then used that in a knowledge building discourse, and so that they would actually say, I think we need to rise above. We've been hearing like lots of same level learning but let's rise above and see if we can move forward. So this is the way that the technology actually infuses into our language. You know, comes into the language of the children and it actually helps become thinking tools. And, you know, changes to the way they have discourses.

SATISFYING WAY TO TEACH

BEV CASWELL: What was really interesting for me is that because of the students' responses, I really did change the way I taught science. And, you know, they moved from this into studying genetically modified foods, but also when we studied the grade 4 science curriculum light, they – you should've seen the experiments that they designed around the study of light. Like people were interested in particle theory, wave theory. It just took it to another level. It extended beyond anything I could've imagined, so I followed the children and I really did try to support their ideas and move to the next stage and I learnt so much in the process that it was a very satisfying way to teach.