

Drawing to Learn

Margaret Brooks

Jenn's first drawing

Several children gather around the table to look at the caterpillars. Jenn chooses her caterpillar and, using a graphite pencil, completes her first drawing of it.

In her sketch Jenn draws the food at the bottom of the clear plastic container. She shows just how much food is actually in the jar by shading only to a certain level. The marks seem to convey the mashed-up consistency of the crushed leaves. Her

Jenn and I have made some fascinating discoveries. Hers were about the life cycle of butterflies and mine were about role of drawing in meaning-making and the construction of knowledge. Four-and-a-half-year-old Jenn is one of 24 children in my kindergarten class. We were studying the growth and development of Painted Lady butterflies as they progress from tiny caterpillars to larger ones, then pupae, and finally emerging as butterflies.

On a large tabletop I had placed pencils, crayons, small squares of drawing paper, resource books on caterpillars and butterflies, and small plastic containers that each housed an individual caterpillar and crushed leaves for food. Jenn and several other children decided to adopt and observe a caterpillar and, through drawing, represent its growth and development.

I was particularly interested in the role drawing might play in the children's construction of knowledge. I kept a record of Jenn's participation in these events and examined her drawing from a Vygotskian socio-cultural perspective (Vygotsky 1962, 1978, 1997). By sharing this record of Jenn's drawing events, I hope to show how drawing can mediate new understanding and become a powerful tool for learning for young children.

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Figure 1. Jenn's first observational drawing

line rendering of the container suggests that it is made of clear plastic, while the ellipse of the lid suggests that it is round. I can see that Jenn has begun to adopt some visual conventions to help convey what she is seeing; she knows the lid is circular but adjusts it to her perspective.

Jenn seems particularly interested in the food the caterpillar eats. Her questions are about how the food was prepared and who put it in the container. She asks how long the food will last and how much caterpillars eat each day. She speculates about a mother caterpillar who might have left food for her baby. Jenn discusses her ideas

with other children around the table and hears many different predictions and ideas about the caterpillar's food. She finds no clear-cut answers to her questions in the reference books, but she seems intrigued that each species prefers a different kind of leaf and that the butterfly knows which leaf to lay her eggs on.

I explain to the children that the food was sent in a container with the baby caterpillars and that the person who sent it knew the right kind of crushed leaves and just the right amount to feed the caterpillars. With green marker, Jenn adds color to the food and then draws the caterpillar's head down eating it. She draws the caterpillar larger than it actually is and positions its many legs along the whole length of the body. I wonder if her questions about how much food the caterpillar needs come from her noticing that there is more food than caterpillar.

Jenn brings her own unique experiences, beliefs, assumptions, and values to the event. She also brings the beliefs, assumptions, and values of those with whom she has had meaningful contact with throughout her life. "Thinking, you see, denotes nothing less than the participation of all our previous experience in the resolution of a current problem" (Vygotsky 1997, 175). She notices representations by other children and in the reference books, with suggestions and ideas different than her own and rendered in a different way. During this shared process it seems that Jenn has elaborated and transformed some of her understanding of the caterpillar's eating habits. In this context, she draws on multiple sources of assistance and, with her drawing, she creates "a temporarily shared social world, a state of intersubjectivity" (Wertsch 1985, 161). She adapts and changes some of her original thinking and ideas to accommodate new ones. This is a transformative process that takes place in a social context. Her drawing is both the mediator and the record of this process.

Jenn's second drawing

Three days later, before working on her next drawing of the caterpillar, Jenn re-examines the previous drawing in her portfolio. As she looks at her drawing she reviews aloud for herself her

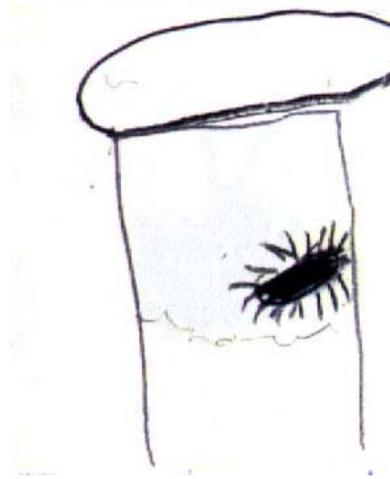


Figure 2. A fat caterpillar struggling out of its skin

cumulative knowledge about the caterpillar. She uses her first drawing as a point of reference that assists her review; she takes stock of what she has done and learned. This helps her with her comparison of the caterpillar's previous state and what it looks like now.

I hear from her comments that she notices the caterpillar is much bigger now. She also comments on a couple of tiny, black, hairy deposits in the container. The child sitting next to her has the same deposits in her jar. Together they discuss what they might be. They then ask me what I think they are and together we all look at a reference book that tells the progressive story of the caterpillar's growth. Together we read that the caterpillar's skin does not stretch as it grows like our skin does and that caterpillars split and shed the old tight skin for a new one. We deduce that the deposits must be the old skins. Jenn draws a fat caterpillar that she tells me is struggling out of its skin, while her peer draws what looks like the deposits of shed skin in her container.

This time Jenn's caterpillar is drawn with lines that are more random and energetic and give a sense of the caterpillar's struggle. The actual body of the fat caterpillar is dark brown with a faint orange stripe, but Jenn colors it black, perhaps to acknowledge that the skin deposits are black. The food is less prominent than in the last drawing, suggesting to me that perhaps it is not the main focus of her attention this time. Jenn continues to use the same elliptical convention for the lid.

In contexts like this, I believe, young children are able to set personally significant and meaningful learning goals that acknowledge what each brings to the experience, while they also extend their understanding. Learning becomes not an end in itself but rather a way of participating in a social event to master new knowledge. The knowledge is not simply factual but is also knowledge that grows out of socially and personally meaningful explorations and questions formulated by and amongst the children. Real questions move the participants to pursue an answer; they encourage the disposition to wonder, hypothesize, and discuss. Some of the best questions seem to arise from activities of current and pertinent interests.

Jenn's third drawing

A few days later Jenn's caterpillar crawls up to the lid of the container and spins a web around itself to stay secure while pupating. It no longer looks like a caterpillar, although what is inside the chrysalis sometimes wriggles and moves. At this stage there is much speculation by the children as



Figure 3. Jenn's chrysalis

to what was happening. Meanwhile, Jenn has been watching and listening as the teacher and some children try out new watercolor pencils. The novelty of the new pencils, along with the colors of the chrysalis, seems to prompt her to try out the new drawing tool. She stands for a while, carefully watching how the other children use the colorful

pencils. Some children first wet the page, and then draw. Others draw first, then put a wash over the color, or dip the pencil in water, like a brush, before drawing. Jenn asks each child why he or she did it that way. In her drawing she incorporates all three approaches (see Figure 3).

In this drawing Jenn transfers some of the new information from her observations of others using watercolor pencils into her own repertoire. Through interactions with her peers, Jenn interweaves the visual texts of others into her own visual text. In the social context of the classroom Jenn constructs new knowledge through and across the visual texts and practices of her peers. While the chrysalis is transforming, the kindergarten class takes a field trip to a butterfly house to see other species and to talk with an entomologist. The children have a chance to make some connections between what is happening in their classroom and what is happening in another context. We see many kinds of caterpillars, chrysalides, and butterflies. There are examples of each stage of development. The children see differences, but perhaps more important, they notice similarities. They learn that while each caterpillar grows and develops in a similar series of stages, the growth cycle differs with the species; each stage has similar features, but each species has its own set of peculiarities. I suspect that this new information will challenge some of Jenn's assumptions about caterpillars and butterflies and cause her to re-evaluate some of her thinking.

The children make many field sketches to take back to the classroom, where we can compare and discuss them. The children's field sketches are similar to the field notes of ethnographers and anthropologists, and we use them in a similar way. As the children review their field sketches they recall more about the visit; the drawings are prompts or mediators for memory. These memories can be shared among children and between the children and adults. This notion of a shared mental process is unique to Vygotsky's (1978) theories and is different from a more traditional Western concept of memory as something internal that only matures with age. Sharing stories about our visit to the butterfly house gives us access to more information than we might have individually.

The drawings serve as tools for remembering, while the discussion around the drawings helps the children retrieve their memories from the drawings. My guidance of the discussion aims to elevate and extend the children's thinking.

The entomologist who talked with us not only added to the children's knowledge but also helped them understand that some people devote their careers to the study of butterflies. He also helped the children understand that care and preservation of nature is something we should all be concerned about and contribute to. Some of the children who drew pictures of the entomologist as he talked refer back to these pictures to remind themselves of some of the things he said.

At the visit to the butterfly house the children experienced larger categories of butterflies as well as some of the professions and organizations concerned with butterflies and their habitats. The labels containing butterfly names introduced a whole new vocabulary: the Latin origins and the scientific language that structures one's thinking about butterflies.

Jenn's fourth and fifth pictures

The children get very excited when the butterflies begin to emerge. Jenn and the others stand transfixed as they watch the caterpillars struggle out of their chrysalides. We put the butterflies in a glass aquarium and keep them for several days so the children can continue to observe them. Jenn does two more drawings.

Apart from the exaggerated size difference, Jenn's drawings are almost identical. I thought that she drew the same butterfly from two different

And this is
how it look
to us

Figure 4. Jenn's drawing of how butterflies look to us

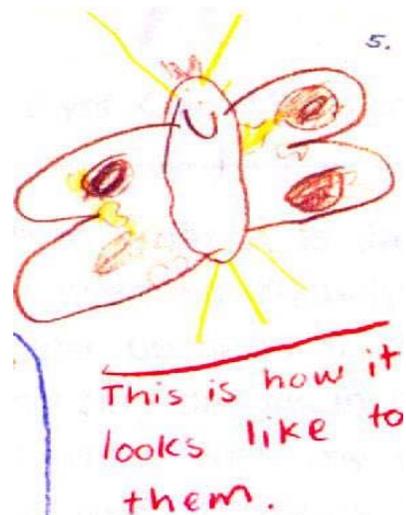


Figure 5. Jenn's drawing of how butterflies look to other butterflies

points of view, one close up and one farther away. It was only when she asked me to write the captions for her that I fully understood what she was trying to convey. One drawing is from the point of view of the child looking at the butterfly; the other is from the point of view of the butterfly looking at other butterflies. I learned the value of discussing the concept behind a drawing and was surprised that Jenn would consider points of view both visually and cognitively. I was also surprised that she would use the cultural convention of comparative size to effectively communicate her idea. I was reminded of our tendency to underestimate children's drawing abilities.

Jenn's review and reconstruction of her drawings

After we released the butterflies Jenn seemed to miss watching them. She decided to make a small book out of her portfolio of drawings. She laid out the pictures and sequenced them. Then she made a title page, stapled the pages together, and brought the book to me to read. After reading Jenn looked at me in wide-eyed amazement, as if discovering something for the very first time, and said, "Now I know what happens!" She dashed off to the writing table, where she quickly recreated the elements of her book and again brought it to me. "This happens over and over again, doesn't it?" she said.

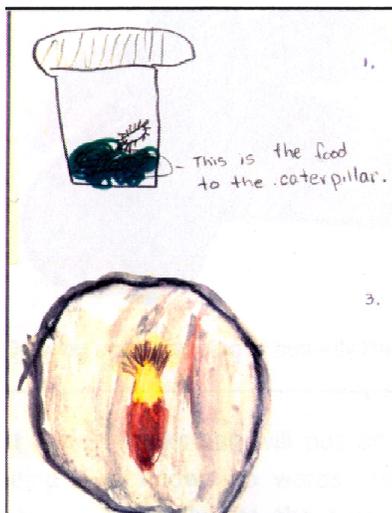


Figure 6. Drawings from Jenn's original book



Figure 7. Drawings from the reconstructed book

Jenn had not only physically ordered and put together the representations of what had occurred but she had also put together all of her prior knowledge and made a huge cognitive leap. She held in her hand a socially, culturally, and historically created artifact that contained tangible evidence of the transformation of her thinking.

Conclusions and recommendations

Drawing helps children make their ideas visible. Most preschool children already have many drawing skills that can be nurtured and extended. However, for those children who find observation drawing difficult or are new to the activity, it is important to acknowledge the complexity of the task and support their efforts. Children need many opportunities to draw, reinterpret, and then revise their drawings. The teaching and learning environment must offer support, time, and opportunity for them to pursue complexity in their drawings.

Teachers can model and discuss strategies for learning, thinking, and using drawing as a meaning-making tool individually, in small groups, and in large group discussions. This approach to learning recognizes the particular skills and experiences each child brings to the learning situation and works to involve the child in a constructive dialogue with others where the collective understanding and discussions work to support individual constructions of new knowledge.

Together teacher and children can sort through the overload of visual information by talking about what they see, what the important features are, and what a child might want to say with the drawing. Teachers can help identify where the drawing might begin and acknowledge the first tentative marks as good beginnings. Then we can encourage children to look for and continue to add the important elements and details as they are uncovered or they come into focus. The eye has to constantly shift between the drawing and the object to compare the two and choose what to include, what to change, what to

remove, and what to ignore. This kind of looking goes beyond striving for realism; instead, the child pays attention to a story or an idea, such as the life cycle of a caterpillar.

For clarity, responsiveness, and simplicity, it's best to begin with plain white paper, graphite pencils, and a good supply of erasers (just as much of a drawing tool as a pencil). I provide these materials in all learning contexts and encourage children to record many of the things we see and do. We talk about drawing as a way of gathering information, remembering, thinking, and planning.

Discussions around the drawings should focus on the meaning and information they contain rather than on drawing skill and aesthetic quality. We shift our focus from evaluating a child's drawing skills to considering what a child is trying to learn through his or her drawings. We should not only encourage children to review their drawings over the short and long term as well as in different contexts, but also encourage them to become aware of the many different ways of expressing ideas through drawing. Such an approach opens a dialogue that actively involves children at a cognitive level.

Saving children's drawings in individual portfolios allows both the child and teacher to revisit and review them. Portfolios also serve as an assessment tool and a vehicle of exchange within the wider learning community. Typically, a collection of a child's drawings represents a range of drawing repertoires and ideas, which enables us to engage with the drawings at a cognitive level and look beyond drawing as a skill or talent.

When our focus is primarily on the meanings represented through drawing we can begin to see drawing as an invaluable teaching and learning tool. Sketches like Jenn's provide valuable insight into children's thinking.

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