

FIELDWORK

NOTES FROM EXPEDITIONARY LEARNING CLASSROOMS

MARCH 2002

VOLUME X, NUMBER 2

BREATHING IN MUSEUMS

BY LISA A. WING AND JENNIE DEBREE

IN THIS ISSUE:

Fieldwork on Fieldwork

It Wasn't the Orangutan's Fault: Lessons from Fieldwork 3

By David Philhower

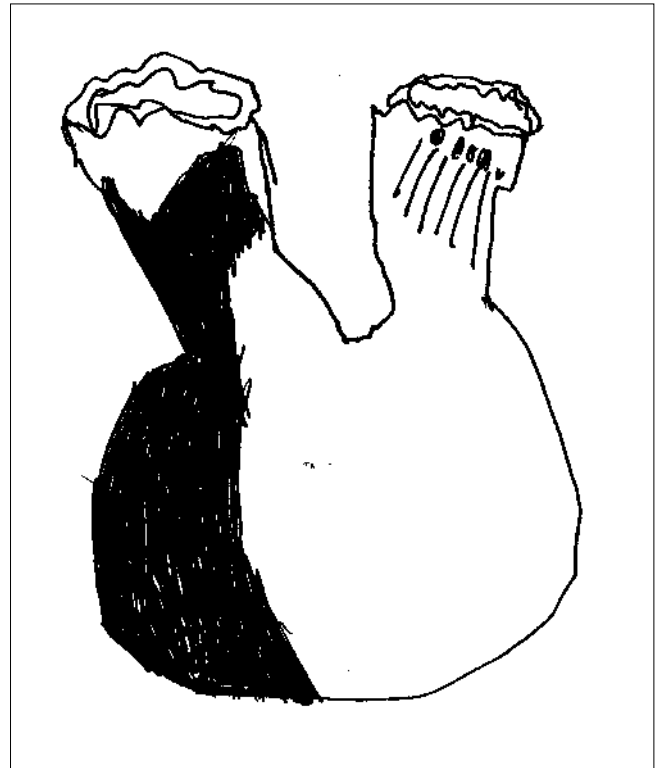
"The Having of Wonderful Ideas:"

Book Excerpt 11

By Eleanor Duckworth

Objects tell stories. There is great power in observing and learning from real objects. This is especially true in museums, where objects are specifically highlighted to draw attention and where label copy can provoke as many questions as it can answer.

But aren't museums stuffy places only for the scholar, for the art or history buff, for the nature collector, for the passive and reflective observer? Can kindergarten children experience the grip of intrigue as they look at a 500-year-old pot? Will second graders understand anything about community and identity from a diorama depicting the building of a Seneca longhouse? Will any of our students care about the Paleo point, the tiny woven basket, the tinsmith's tools? Yes! Because our children are scholars, art and history buffs, collectors, and observers, too. And museums are



This Iroquois clay vessel was sketched by Danny Ortenzi, a second grader at Genesee Community Charter School in Rochester, New York, during fieldwork at the Rochester Museum and Science Center.

continued on next page

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Breathing in Museums, continued from page 1

places to breathe.

Our school, Genesee Community Charter School, is fortunate to be housed on the campus of the Rochester Museum & Science Center in Rochester, New York. We opened in September 2001 with 120 children in grades K-3. We are surrounded by the RMSC’s rich resources, within walking distance of the Memorial Art Gallery, the George Eastman International Museum of Photography and Film, and in close proximity to the Strong Children’s Museum.

Opportunities lie all around us—RMSC alone has a research library, a planetarium, a nature center, formal gardens, interactive physical and natural science exhibits, and local history-related dioramas and displays. The challenge for our faculty is to learn how to help children discover the hidden stories of objects. We have all seen educators stand in front of exhibits, telling children what they see and asking and answering factual questions. We want to engage children’s minds with greater depth and ingenuity than traditional lecture or scavenger hunt approaches.

As the GCCS faculty begins our expedition related to Native Peoples of North America, we challenge ourselves *not* to take children on a tour of the museum’s extensive Native American exhibits. In an attempt to see everything, we would in fact see nothing. Instead we look for ways to help children make meaning from individual objects and specific scenes. We want children to wonder about, and to learn to investigate, the story of each item in the collection. We set the stage

I shut my eyes in order to see.

—Paul Gauguin

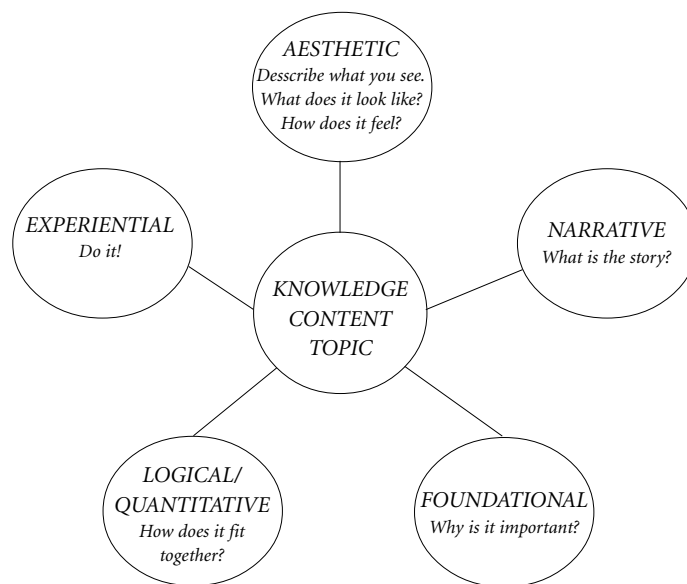
for a focused experience that leads children to come up with their own questions, and builds a foundation that helps them grasp the larger themes of the expedition.

As we plan, we consider various “entry points” to the museum’s collections. The Entry Point Approach, as described in *The MUSE Book: Building on Our Knowledge* by Jessica Davis (Cambridge, MA: President and Fellows of Harvard College, 1996), is one methodology that helps us address the curriculum that abounds in each museum exhibit. Any school, even those not located on a museum campus, can take advantage of these techniques to access museums in their fieldwork. The Entry Point Approach incorporates three essential elements: honoring the multiple intelligences, posing open-ended questions, and reflecting

continued on page 8

THE ENTRY POINT APPROACH

From *The MUSE Book: Building on our Knowledge* by Jessica Davis



IT WASN'T THE ORANGUTAN'S FAULT

LESSONS FROM FIELDWORK AT THE NATIONAL ZOO

BY DAVID PHILHOWER

The shaggy orangutan traversed the O-Line, 40 feet above the promenade, with a box in one articulated foot and 23 third-grade students running below. I felt lucky—in all my years of living near the zoo and during my visits this fall, I had never seen an orangutan cross the outdoor zipline between the Great Ape House and the Think Tank. It was a classic Expeditionary Learning moment, full of discovery, wonder, and natural curiosity, on our fourth biweekly fieldwork at the zoo.

Ironically, that was the moment when our fieldwork began to unravel. That was also the day when my understanding of fieldwork began to change. After lingering to marvel at the orangutan, we were 10 minutes late to our meeting with the lion keeper in front of the outdoor lion exhibit. “I wondered where you guys were,” she gently needed me. Then she dove into her presentation on cat teeth, diets, and animal adaptations, and handed out a variety of cat skulls and teeth, talking, and answering questions at the same time. Students clamored for her attention, called out questions, and crowded each other out in a contest for the bones. Lions basked in the sun behind her.

I circled around the group, catching students as they drifted away from her lesson. They were busy, not with her lesson, but looking at the beautiful lions, the glorious fall day, and the leaves as they spiraled

down from on high. Few of them listened to her at all; most were busy with the interpersonal drama of attaining the coveted saber-toothed tiger fossil. There was no way to keep them focused. In that moment, I felt my grand design for using our zoo fieldwork to deliver the science content of my expedition begin to dissolve in the light of reality.

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Sketching in his fieldwork journal during a visit to a Washington D.C. museum, third grader Gean Martinez titled this dinosaur drawing “Barking Deer Bones.” Martinez attends Capital City Public Charter School.

I aspired to use the zoo as I use the classroom, but had not factored in the orangutans overhead, the sunning alligator, the fall leaves, and the beauty of the golden lion tamarins. I leaned too hard on the fieldwork, trying to load too much into each experience.

Not the Orangutan's Fault, continued from page 3

THE ZOO AS A CLASSROOM

Our 2001-2002 third-grade expedition is "The Small Mammal Project." It involves a partnership with the Small Mammal House at the National Zoo in Washington, D.C., a short Metro bus ride from Capital City Public Charter School. For our showcase project, students will work in teams to create new identification labels, with sketches and text for nine of the small mammals. Unlike the current labels, our infographics will be aimed at elementary-aged children. These exhibits, which will be designed to effectively teach and entertain young children, are an authentic way to integrate service into the expedition. In order to accomplish our goal, we have an ambitious schedule of fieldwork and classroom lessons. We spent November at the zoo, December downtown at museums, and January learning the research pro-

During fieldwork at the Smithsonian Natural History Museum, Anna Russel, who attends third grade at Capital City Public Charter School in Washington, D.C., sketched this whale and noted that whales can stay under water for two hours.



cess, keyboarding, and PowerPoint©. At our showcase in April, our multimedia projects will be permanently mounted behind glass. We went to the zoo on Tuesday mornings and Friday afternoons throughout November. Each visit began at the Small Mammal House, the center of our future research. In previous meetings with the education director, exhibit writers, and the head of the Small Mammal House, I had organized small group instruction, using zookeepers and zoo educators to deliver standards-based science content on site. There were fascinating lessons on mammal characteristics, the substrate (bedding) of various animal habitats, and keeper talks about small mammals. Zoo staff brought out one-year-old armadillos, bribed otters to the front of the enclosure with food-filled toys, and explained the peculiarities of naked mole rats.

Yet, in general, children had trouble paying attention. There was too much else to see. This distractibility reached a climax on the morning of the lionkeeper's lesson. After she finished, I gathered my students and shared my frustration with them. "We need to have a class meeting," I began, "to discuss how we could best use the zoo as a place to learn. I don't feel that we can come back here until we admit to and solve some of the problems that we are having." A new guiding question had come up, one that had not entered my mind when planning the expedition: *How can we use the zoo as a classroom?*

We circled up at the "bottom" entrance to the zoo. I asked each student in turn to reflect on a problem that they had noticed that day.

Bottom of the Zoo Meeting

Reflections on misbehavior (scribbled in my journal): Not paying attention, talking out, not listening, not walking with the group, talking, skipping ahead, leaf catching, running, not paying attention to the lesson, talking during lesson, calling out, not looking at the zookeeper

While we conducted this solemn ceremony, a stranger from Charlotte came up and complimented us on our excellent behavior. He told our parent volunteer that he had never seen a school group so well behaved. That was little solace to us as we missed the next Metro bus, and had to wait 40 minutes until the next one arrived, late. We got back to school five minutes after dismissal, with no time for homework logs or clean up or reflection, and angry parents and after-care program buses waiting. It had turned into fieldwork disaster #1.

FROM CHAOS TO CALM

Sitting in reflection with my principal after school, it was obvious that my students' difficulties at the zoo were not purposeful misbehaviors. Nor was it the orangutan's fault. In my five years of teaching third grade in inclusive classrooms, I have discovered that, more often than not, my hopes and plans are largely to blame for the classroom's failures. The zoo is so stimulating, especially for those students for whom focus is an effort even inside the four walls of our classroom. Add the clickity-clack of an armadillo's toenails or a lion's tawny yawn, or the wide, wide promenades and visually interesting exhibits, and the zoo becomes a tough place for students to focus on a lesson. Also, the zookeepers are not third-grade science teachers.

There is a lesson for me in these difficulties. I wanted the zoo fieldwork to deliver science content as effectively as well designed classroom lessons. I had basically written a science unit on mammals using the zoo animals and staff as my curricular materials. I aspired to use the zoo as I use the classroom, but had not factored in the orangutans overhead, the sunning alligator, the fall leaves, and the beauty of the golden lion tamarins. I leaned too hard on the fieldwork, trying to load too much into each experience. In my well-intentioned goal of using the zoo as a classroom, I had misplaced some of the heart of fieldwork—The

How are you going to see the sun if you lie on your stomach?

—Ashanti proverb

Primacy of Self-Discovery, The Having of Wonderful Ideas, The Natural World. I asked the children to focus on my goal of delivering concepts through small group lessons. and I left little or no time for students to wander safely and discover the zoo for themselves. There was just too little time for students to deeply experience the zoo. In order to meet my curricular goals, we were rushed (see Zoowork Schedule below).

In some sense the proof was in the pudding. The self-discovery aspect was working great; the focused delivery of science content at the zoo was not. Unsure how to resolve this tension, I turned to the students for help answering the new guided question, "How can we best use the zoo as a classroom?"

On the following Monday morning, we had a class meeting in school to discuss the

continued on next page

TYPICAL ZOOWORK SCHEDULE

(Before the class adopted the new approach)

- 8:30 a.m. Arrival + morning work
- 8:45 a.m. Morning meeting
- 9:05 a.m. Get ready for fieldwork: bathroom, jackets, travel tags, expeditionary journals, pencils, split up into travel groups
- 9:20 a.m. Catch H2 Metro bus, walk to zoo
- 10:00 a.m. Two small group keeper talks: Dwarf Mongoose and Golden Lion Tamarin
- 10:30 a.m. Small group exhibit visits and analysis (Panda House & Tiger Tracks)
- 11:30 a.m. Meet at bathrooms, drinks, and back up the hill to catch the 12:01 H2 bus back to school

Lunch

Back at school we have reading, science, math, etc. in the afternoon.

challenges of fieldwork at the zoo, and to brainstorm some solutions. "Friends," I began, "in your ExJ's (Expeditionary Journals), turn to the Focus Questions section. Let's start by reflecting on what makes the Zoo a tough place to learn. What are some of the problems that we've been having? Let's reread what you told us at Friday's bottom of the zoo meeting." I read over the chart. "Take a few minutes to write about 'What are some solutions to the challenges of using the zoo as a classroom?'"

Students came up with great ideas, and it took us 45 minutes to get it all down:

Solutions:

1. Paying attention during lessons: Keep your eyes on the speaker. Take time to touch stuff first. Take time to look at the exhibit first. Ignore peer talkers. Ask questions.
2. Calling out: Tell keepers to only call on hand-raisers. Don't call on "Eww-Eww" kids. Raise hands.
3. Running/skipping/leaf-catching: Walk with your group. Stay within seven feet of your adult chaperone. Let the leaves be part of the Earth, not you.
4. So much cool stuff to see: Work in small

groups. Give us time to see the cool stuff. Don't ask kids to hold stuff and listen at the same time. Give us time to look, and then we will listen. You'll get a turn—don't hog the cool stuff. Look before listen or after.

As usual, the students taught me the most about how to teach.

5. Keepers are not elementary teachers: Feel free to tell students to be quiet. Give clear instructions. Talk and then show. Ask good questions. Teach them the signal.

FOLLOWING THE STUDENTS LEAD

As usual, the students taught me the most about how to teach. Their solutions were of two types: teach the zookeepers to be more effective teachers, and give us time to look at all of the cool stuff before we have to listen to lessons. Most of all, however, I heard them saying, "Give us time to explore and follow our own interests, before we have lessons."

I decided to give them clear activity choices, hoping to increase their involvement by making decisions about what they would like to participate in. Thanks to our "group think" session, the next day's fieldwork had a different look to it.

During the morning meeting, I set up a chart and students brainstormed on which zoo houses they would like to visit. On the other side, I listed three activities that they could choose from, and students signed up for one "Look" and one "Lesson."

Next Tuesday's fieldwork was just what I had been hoping for. We returned to the Small Mammal House, and gathered in front of the outdoor anteater statue as usual. I unfurled the poster with their "Look and Lesson" selections, and explained the plan to our parent volunteers. We split into three groups, and students got to work sketching, math hunting, or keeper talking. As my Math Hunt group walked from exhibit to exhibit, noting number of babies and family group size, I noticed every student in our class working. The students

LOOK

- Bats
- Reptiles
- Amazonia
- Apes/Think Tank
- Great Cats


LESSON

- Favorite Mammal
- Observe and Sketch
- Keeper Talk
- Small Mammal
- Math Hunt

who chose the keeper talk were engaged and curious. Other students were sitting in front of exhibits, observing closely. Pencils and colored pencils drew sloth toes, golden lion tamarins, and a rock hyrax craggy perch. Focus was certainly increased.

They spent the second half of the fieldwork “looking” at an exhibit of their choice. I spent an extremely enjoyable time in the Reptile Discovery Center, looking at a boa’s scales as one might savor a Picasso. As the three groups came back together, students chatted excitedly, telling about how the huge Amazonian fish were fed bananas and fish parts, and how the Cuban crocodiles had yellow mouths. Once again we caught sight of two orangutans crossing the O-line, but this time our bottom of the zoo meeting question was, “What’s one thing that you are proud of about our fieldwork today?”

Through our problem solving process, we have come up with an approach that increased choice, and therefore gave students a sense of ownership. Within our new “Look and Lesson” format for zoo fieldwork, students experienced central Expeditionary Learning principles. By making choices about their learning activities, they experienced The Responsibility for Learning. They better understood The Natural World by “seeing” nature through self-guided exploration of animals and habitats that interested them. Students lived the Primacy of Self-Discovery discovering, with wonder, animals that interested them, and as students formed more naturally heterogeneous learning groups through self-selection, they practiced Diversity and Inclusivity.

I learned some important lessons as well. No matter how precisely planned, fieldwork cannot always deliver the lessons that you wish it would. Instead, it gives a chance for students to apply what they are learning in the classroom, and extend their learning by asking new questions, and finding new applications. 

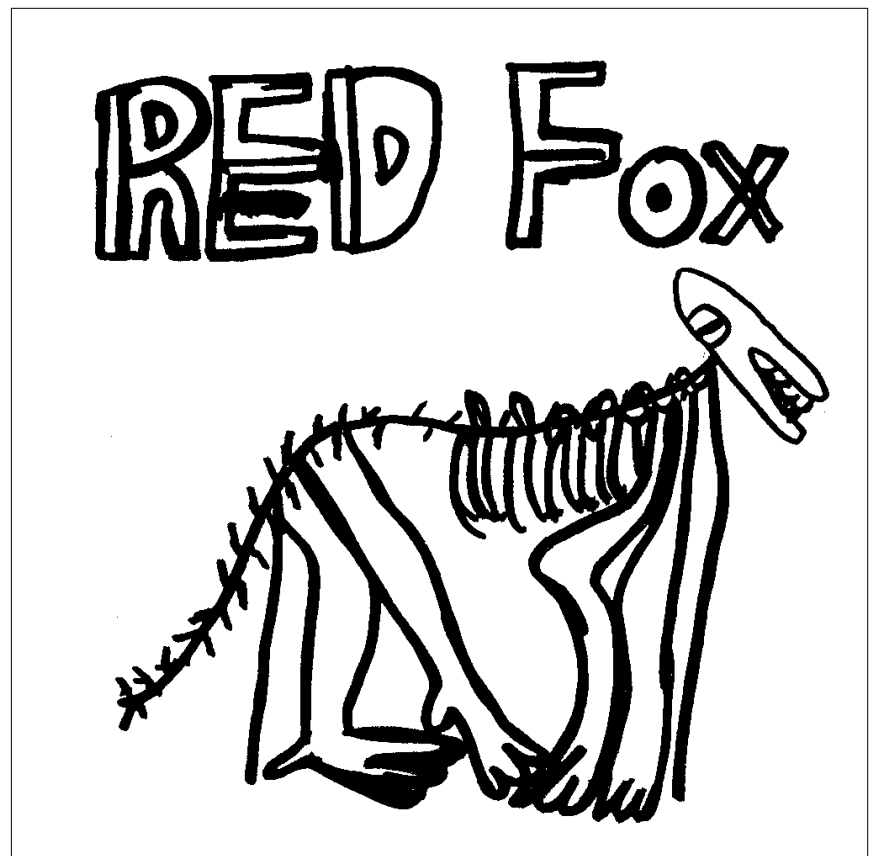
We cannot create observers by saying “observe,” but by giving them the power and the means for these observations, and these means are procured through education of the senses.

—Maria Montessori

Editor’s Note: David Philhower’s students have each selected one of the nine small mammals to research. In the coming weeks, the class will learn the research process, and create a model exhibit with a zoo exhibit writer. In pairs and trios, the students will then use sketches, animal poems, field notes, and PowerPoint to create their own child-friendly infographics to display at the Smithsonian’s National Zoo.

David Philhower teaches third grade at Capital City Charter School in Washington, D.C.

Red Fox, by third grader Keyri Diaz at Capital City Public Charter School in Washington, D.C., was sketched during fieldwork at the Smithsonian Natural History Museum.



MAKING THE MOST OF FIELDWORK

Using Entry Points Before and After the Museum Visit

The Entry Point Approach gives children with different learning styles the opportunity to experience the exhibit through five entry points: aesthetic, narrative, foundational, experiential, and logical/quantitative. This method of enhancing fieldwork is adapted from *The MUSE Book: Building on Our Knowledge* by Jessica Davis (Cambridge, MA: President and Fellows of Harvard College, 1996).

Experiential

Pre- and Post-Visit: Perform daily activities using replicas of the objects being studied.

Aesthetic

Pre-Visit: Use slides, photos, or real objects to strengthen observational skills. Describe in detail what you see.

Post-Visit: Using slides, photos, or real objects to create examples of shape, design, size, color, and texture on paper or with clay. Create similar objects using own designs.

Narrative

Pre-Visit: Read stories or poems written by or about the people of the time or the artist.

Post-Visit: Write stories or poems about the objects. Invite a storyteller to come into the classroom.

Logical/Quantitative

Pre-Visit: Complete the first two columns of a KWL (what the students KNOW, WANT to know, and LEARNED) chart. Brainstorm what children already think they know and what they want to find out. Create a list of questions.

Post-Visit: Complete the last column of the KWL chart. Answer the questions.

Foundational

Pre-Visit: Line up students' shoes and compare/contrast or categorize them. Talk about the importance of those shoes in students' daily lives. Brainstorm what can be learned about people by studying objects from their daily lives.

Post-Visit: Make a web to display the many ways the objects students explored in the museum were important to those who created and used them. Use the web to connect a single object to many aspects of daily life.

—Lisa Wing and Jennie DeBree

about our experience. This method allows children with different learning styles to approach the exhibit through five entry points: aesthetic, narrative, foundational, experiential, and logical/quantitative.

On one visit to the museum, a group of second graders spends the entire hour seated around a life-sized diorama of a Seneca family in the longhouse. A figure of a woman stands outside the doorway pounding corn. Another stirs a meal in a clay pot over a fire. A man carves a wooden bowl. A youngster shapes a small pot out of clay. A baby in a cradleboard hangs from a peg.

Teachers are tempted to point out the design on the clay pot, to tell children why the baby hangs from a peg, to describe the interior organization of the longhouse. Questions they *might* ask children loom in their minds, "What is the mother cooking in the pot? What is the child doing with that clay? What is their clothing made of?" But they know children would think, "I don't know, you're the teacher! Just tell me!" So they resist.

Instead, teachers turn those closed questions into open-ended questions. They allow children to breathe – to wonder and to experience as they engage children in a cycle of divergent and convergent thinking – breathing in as they contemplate possible stories, breathing out as they assemble evidence and focus on answers.

Teachers give children a limited amount of time to gaze at the exhibit and select an object. They begin with "What do *you* see?" Ellie focuses on the fire. Teachers say, "Come, sit down here and be the fire. Tell me about the fire. Where did you think you came from? Why do you think you are located in that spot? What might you be used for?" Willie selects the cooking pot. Teachers say "Come next to the fire, be the cooking pot. I wonder what you are made of? Who might have made you? Why do you

When you go on field studies, you see things that early people really made and used. You can learn what they ate, what they celebrated, how they played, and all about their lives from looking at real things.

—Alliyah Rutland, third grade
Genesee Community Charter School,
Rochester, New York

think the pot maker chose that shape for you? Why might you have those designs? What is your story?” Samantha chooses to be the cradleboard, Edgar becomes a deerskin, Anna imitates the woman pounding corn, Felipe selects a stone tool. By changing the questions from closed to open, the discussion and simulation encourage children to wonder, as well as clarify their thinking.

For most classes, it is then time to record their thoughts. Our children generally visit the museum with clipboards and pencils in hand. Teachers may supply children with blank paper or with prepared sheets that contain a framework for taking notes through various entry points. Using the Entry Points Approach creates an experience that reaches more children, capitalizing on their particular learning styles.

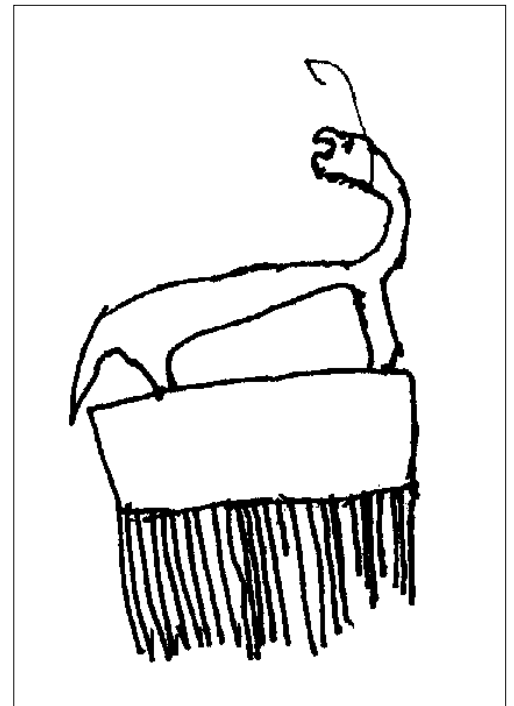
Children continue to concentrate on the object they selected. They explore that object through one or more of the entry points, breathing in details and possibilities. They might sketch, write descriptive words, or compose a story. Ellie writes phrases about why she thinks the fire is important to the Seneca family, using the foundational entry point. Willie writes a story about a typical day in the “life” of the clay pot. He favors the narrative entry point. Samantha approaches the cradleboard through the logical/quantitative entry point; she estimates the measurements of the cradleboard, makes notes about how it is constructed and adds details about how the baby

is fastened to the board and how the board is held to the wall. Anna makes a careful drawing of the implements used to pound corn, connecting to the exhibit on an aesthetic level. She adds descriptive words in the margins of her sketch.

Children are eager to stay in the “I wonder” phase. They like to imagine and make up answers. Divergent thinking enables them to speculate and to stretch without having to worry about being wrong. They are beginning to piece together elements of Seneca life, and they are seeing connections between people, objects, and the natural world.

At this point, teachers bring children to a convergent thinking phase, breathing out to focus their attention for some answers. Children are ready to build on their museum experience and wish to satisfy their curiosity. Because we have such easy access to the museum, this phase might take place back in the classroom. Off-campus schools might use the museum as a classroom for the day – spending part of their visit exploring a specific exhibit, and part of their visit engaging in individual and small group research, connecting back to the exhibit at several points during the day.

Whether on or off-campus, children can read, work with visiting experts, and use



Ian Slothover, who attends third grade at Genesee Community Charter School in Rochester, New York, drew this Native American comb during fieldwork at the Rochester Museum and Science Center.

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RESOURCE

For more information about Jessica Davis’ work on The Entry Point Approach and Project MUSE, please refer to Harvard’s Project Zero’s website (www.pzweb.harvard.edu), and search under Davis’ name. Project Zero is an educational research group at the Harvard Graduate School of Education in Cambridge, Massachusetts. Davis directs the Arts in Education Program at HGSE.

Children's Opera, continued from page 9

the Internet in their research. We might borrow objects from the museum's teaching collection to bring back to the classroom for closer examination. Children might send e-mail to curators with questions such as, "We can't find any information about why babies in cradleboards were hung on pegs in the longhouse. We know you built the diorama that way for a reason. Can you help us find an answer?" Our museum also has a terrific research library staffed by a librarian eager to help. Off-campus schools might find that curators and museum educators are eager to continue working with schools through e-mail or subsequent classroom visits.

We search for answers only if we promise to breathe again—to reflect and ask more open-ended questions, as adult researchers do. At first we looked at objects to see and to analyze. Now we ask, "Why is what I see important? What do I want to know and why do I want to know it? How can I find out?" We evaluate our thinking, we reflect on how our interpretations might change.

Further visits to the museum and more questions spur new discoveries and deeper understandings. We ask, "What have I learned about these objects, this culture? How can I share my understanding with others? What else do I need to know in order to create a model, write this book, paint this mural?" This leads to additional research and the design of a project that allows children to explain the story they have learned to others.

We take children to the museum as much to ask questions as to find answers. Their thinking diverges, then converges; it is a continual process of breathing in and breathing out. Small questions build to larger and more global ones. It is the process of experiencing, hypothesizing, finding patterns, and gathering information that leads children to the hidden story of

objects and to the big ideas those stories reveal. ✎

Lisa A. Wing is school leader of Genesee Community Charter School at the Rochester Museum and Science Center in Rochester, New York. Jennie DeBree is a museum education specialist in Rochester, New York.

EMBEDDING MUSEUM FIELDWORK

Before the visit . . .

Choose one museum exhibit related to the expedition for special focus

Engage in pre-visit activities to prepare for the field study

At the museum . . .

Breathe in:

Explore the display briefly

Ask each student to focus on one object

"Become" the object, imagine its story

Record possibilities using the five entry points; take notes, make drawings, write narratives

Back at school or at the museum . . .

Breathe out:

Pose questions for further study

Read, use the internet, examine objects from the teaching collection, work with guest experts

Begin to plan focused research question and culminating project

Breathe in:

Ask more questions

Breathe out:

Engage in additional research

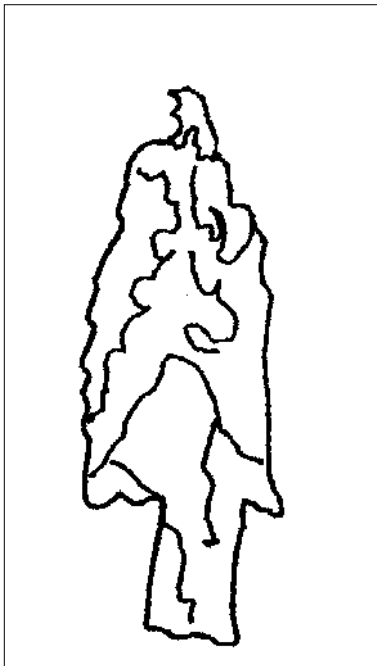
Prepare culminating project, visiting the museum regularly throughout

Breathe in:

Reflect on one's own thinking and changing interpretations

Ask more questions!

During a fieldwork assignment at the Rochester Museum and Science Center, second grader Ryan O'Malley sketched this flint arrowhead. He attends Genesee Community Charter School in Rochester, New York.



“THE HAVING OF WONDERFUL IDEAS”

AND OTHER ESSAYS ON TEACHING AND LEARNING

BY ELEANOR DUCKWORTH

“Teaching as Research,” the final essay in Duckworth’s book “The Having of Wonderful Ideas” and Other Essays on Teaching and Learning (Teachers College Press, N.Y., 1996), describes a graduate education course Duckworth teaches at Harvard University. In seemingly unorthodox fashion, Duckworth asks her class to study a specific subject matter, “the habits of the Moon,” in detail together. Students have mixed reaction. Some find it a waste of time and others relish the idea of doing something “flaky” in the middle of their graduate education. “My challenge,” Duckworth writes, “is to engage the students in such a way that they are intrigued not only by the subject we are studying . . . but by the nature of the teaching and learning phenomena they experience as they learn . . .” The chapter excerpts her student’s journal entries as they observe the Moon on a daily basis—a graduate-level independent fieldwork assignment—and marvel at their own learning process. It continues with an observation of what Duckworth hopes these educators will gain from this experiential approach.

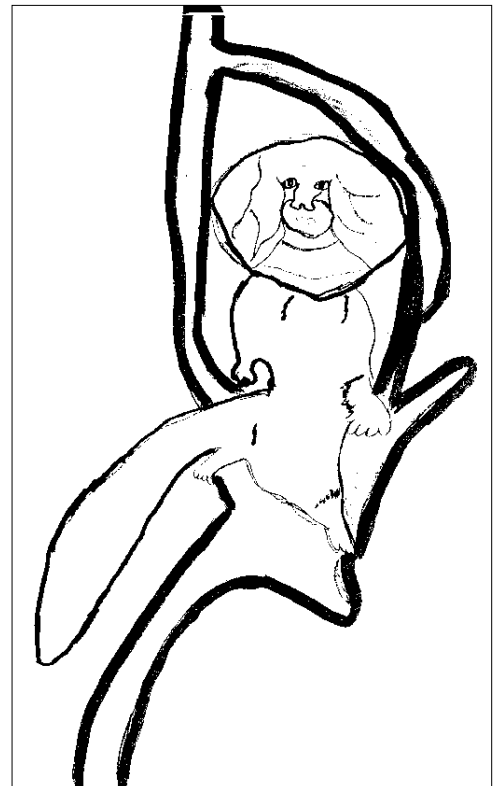
THE STUDENTS EXPLAIN: THE SECOND ASPECT OF TEACHING

Having the students watch the Moon corresponds to the first of the two aspects of teaching that I mentioned: It engages them with phenomena. It serves this purpose at two levels. With regard to engaging with the solar system, it puts them in touch with the motions of the Moon (and, it always turns out, of other heavenly bodies). With regard to engaging with teaching and learning, it puts them in touch with themselves and each other as learners, and with what I am doing as a teacher.

Similarly, the second aspect is brought into play at both of these levels. With regard

to the motions of the Moon, I continually ask them what they notice and what they make of it, and I encourage them to do the same with each other. The questions that we ask over and over again in class are: “What do you mean?” “Why do you think that?” “I don’t quite get it.” “Is that the same as what (someone else) thought they saw?” We also talk about what sense they are making of the

Emma Quander, a third grader at Capital City Public Charter School in Washington, D.C., sketched this Golden Lion Tamarin in her Expeditionary Journal during fieldwork at the National Zoo. She took the notes, “Golden Lion Tamirins jump a lot, and they live in trees. They eat gum, leaves, and sap.”



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Having of Wonderful Ideas, continued from page 11

primary subject of teaching and learning—
what do they notice about this experience
as learners and what do they make of that?
...

... The students also keep journals of
their thoughts, their reactions, and the
sense they are making of the discussions.

In some ways, it is easier to understand
how this works with respect to teaching
and learning than with respect to the solar
system. After all, what one believes about
teaching and learning is complicated,

large-scale, hard to define, and close to the
soul. If one stops to think about it, it is hard
to imagine students learning about teaching
and learning other than by working out for
themselves what they think. Of course, when
I say “working out for themselves” I do not
rule out presenting people with material for
them to make sense of, as I try to describe
here—experiences in which they learn, try to
explain what they are learning, watch others
learn, try to help other people explain, and
hear other people’s ideas. But it is the stu-
dents who make sense of all this. It could not
be otherwise. And they make sense by trying
out their own ideas, by explaining what they
think and why, and seeing how this holds up
in other people’s eyes, in their own eyes, and
in the light of the phenomena they are try-
ing to understand. *✍*

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University.*

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