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“I took a picture of the branch because some people broke it off. Somebody burnt the part of the tree. It had garbage on the ground and the animals can’t sleep and they can’t get food. You can’t put garbage on the ground.”

—Nicole, age 6,
at the Indiana
Dunes National Lakeshore

All About Me/ All About Gary

Kindergarteners use cameras to share the results of their localized research

By Cassie Quigley, Kristin Leigh Cook, Antonia Escobedo, and Gayle Buck

Nicole took this picture she describes on one of her many field trips to the Indiana Dunes National Lakeshore. These trips are a part of her kindergarten class’s new place-based science curriculum in which the students are learning about the environment in their home. The unit, “All About Me/All About Gary,” helps the students see the connection they have to the environment near their home and focuses on improving but also showcasing the positive aspects of their environment.

Nicole attends Harmony School. It is a public school in the Midwestern United States—one of many single-sex academies across the country. These girls are fortunate to have such a special place nearby their school—the Indiana Dunes National Lakeshore. However, this unit can be extrapolated to almost any green space across the United States.

By taking photographs of their environment, the girls began asking questions and making observations about certain environmental situations. We encouraged these questions and provide activities afterward to help the girls answer the questions or continue their observations.

Photovoice Method

Photographs have been used for years by teachers, scientists, and sociologists as prompts for learning and understanding surroundings (Cook and Buck 2010). However, in this unit, the students are the ones who take the photographs and use the pictures to describe their understanding of science concepts. Developed by Wang and Burris (1994), *photovoice* is a method by which researchers provide cameras for participants, whose voices are often ignored in policy making, so that they may document issues important to them through the use of photography. Photovoice puts cameras into the hands of students to address issues from their position and point of view. It offers teachers an insightful insider perspective into the lives of their students. Photography also offers participants new and reflective ways to perceive their own world and the science around them—for example, Nicole described her perspective of the causes of environmental issues such as littering and destruction of animal habitats after taking her photograph.

Figure 1.

Unit timeline.

Week 1	Practice observing (rocks, leaves, shells, seeds, fruit all make good beginning items to observe) Practice observing outdoor objects Practice accurately describing what they see
Week 2	Practice with cameras Camera safety and discussion of appropriate pictures to take
Week 3	Field trip to local area Take pictures Upload pictures onto computer Have discussion about pictures Have students each select one picture Write narrative Print off picture
Week 4	Presentation of photos at event

Our Process

Making Observations

At the beginning of the school year, we began teaching the girls about making scientific observations and understanding how we know what we know in science. This began with simple objects such as shells, beads, sand, leaves, and rocks. We introduced the students to scientific tools such as magnifying glasses and microscopes (see Figure 1 for a complete timeline of the unit). We encouraged the students to use their five senses while observing, comparing, and contrasting items to make further observations. We also embedded simple mathematical skills during the observation time, such as counting the stripes on shells or comparing the number of stripes on one shell to another. For example, during this time we focused on colors, shapes, and texture. We prompted the students' observations by isolating certain senses by saying, "Now we are going to use our noses, what does the object smell like?" or "Now close your eyes, what does this object feel like?" During this time, we also took the context out of objects so that the students would need to use their observational skills to figure out what the object was (e.g., parts of animal furs, cracked pistachios nuts, flour, and tea leaves from the inside of tea bags). We asked the girls to focus solely on observations first and then infer from their observations.

Journaling

We also introduced students to scientific journaling. At the beginning of the year, we asked them to draw pictures

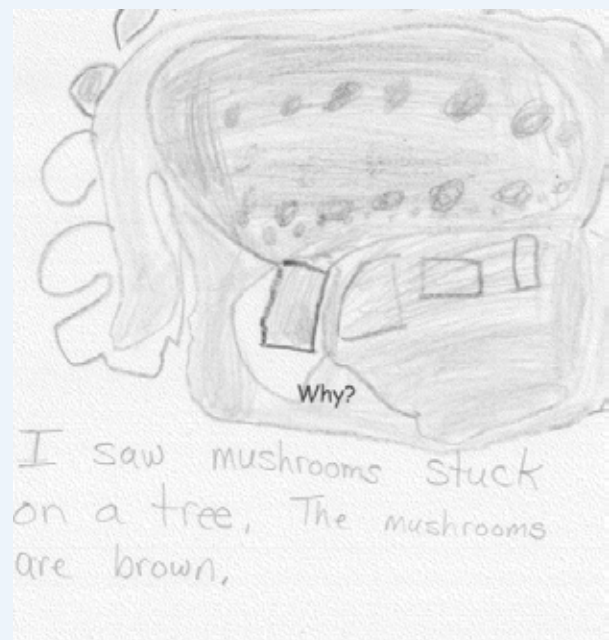
Figure 2a.

A student's "before" drawing mixing fantasy with reality.



Figure 2b.

A student's "after" drawing depicting newly gained expertise in observing.



and helped them write names for their pictures. Often the students would mix fantasy with reality during this journaling time. For example, many of the students would draw pictures of rainbows or their family members instead of the objects they had seen (Figure 2a). However, as they learned more about how to observe scientifically and gained more expertise in observing, their journal entries became more accurate (Figure 2b). This encouraged the students to observe the details of the objects.

Using Cameras

After a couple of weeks of observing inside the classroom, we took the students outside into their local environment to observe. They observed flowers, grass, trees, construction of new houses around the school, and cars. They became such proficient observers that they would often come in from recess and describe their new scientific observations. At this point, we introduced the students to digital cameras. We used Canon Powershot Digital Cameras (there are several small grants available from companies to help obtain cameras—see Internet Resource), although disposable cameras or sharing a classroom camera would also work. We wanted to use more “kid-friendly” cameras; however, the quality of the pictures on them was not adequate for printing.

First, we focused on proper handling of the cameras. Each camera had a wrist strap attached, and the students were told the importance of first putting the wrist strap on their wrist and never to grab the camera from another classmate. Each of the cameras was numbered on the bottom (this was to ease the coordination between matching the pictures back to the students) and the students were divided into groups of four. They were given basic photography lessons on how to view through the screen, how to use the on/off switch, and how to use the button to take the picture. Within 30 minutes, all of the students understood how to take a picture because many had used a digital camera prior to this lesson.

Figure 3.

Prompts during photovoice discussion.

- Why did you take this picture?
- What are your observations of this picture?
- What ideas do you have about why this _____ (tree, flower, popcorn) is here?
- What is interesting to you about this picture?
- What do you think this picture will look like during (summer, fall, winter, spring)?
- Why do you think this (land, tree, flower) is important?
- What would happen if this (river, lake, bird) did not exist?
- What are your feelings when you visit this place?



After the photography lesson, we described the purpose of the cameras: to take pictures of their observations. We allowed the students to each take three pictures. Then, we uploaded the pictures onto a computer and projected the pictures on the whiteboard. We allowed each girl to talk about her pictures. After a few more practice rounds of taking pictures of their observations, we took the students to the Indiana Dunes National Lakeshore. During this trip, we climbed the sand dunes, visited Lake Michigan, and learned about the habitat of this beautiful place. Follow your school guidelines for field trip safety. The students were encouraged to take pictures of their observations. Again, each girl was allowed to take three pictures.

Discussing Photos and Writing Narratives

After the field trip, we uploaded the pictures and projected them on the screen and discussed students' observations.

Figure 4.

Rubric for photovoice pictures.

Item Assessed	Needs Improvement	Meets Expectations	Exceeds Expectations
Picture	Picture is out of focus or does not address the ideas discussed in class	Picture addresses the ideas discussed in class	Picture is very creative and addresses the ideas discussed in class
Narrative	Narrative does not describe why you took this picture, your feelings, or scientific ideas about this picture	Narrative describes why you took this picture, your feelings, and scientific ideas about this picture	Narrative describes in a creative manner why you took the picture, your feelings, and scientific ideas about this picture

Figure 5.

Katy's picture of trees at Lake Michigan.



During this conversation, the students were asked to choose one picture that would be printed. After the students chose their pictures, we invited them back to the computer one at a time to write their narrative. Because of the young age of the students, we typed their narratives. We often asked questions to encourage discussion of the science content we were aiming to address (Figures 3 and 4, p. 49), whereas other times we began the conversation with, “Why don’t you tell me about your picture?” The students would tell wonderful stories without any prompting. For example, when looking at her picture (Figure 5) Katy told us, “I took this picture because it is interesting and I want to show my classmates. These are in autumn—green, yellow, and red. There is sand, rocks, and water. It is Lake Michigan. The leaves are changing colors because it is autumn.”

Through these conversations, we noted that the students observed many things that seemed commonplace to us. During one conversation, Molly described a picture of the reflection of a tree in water. As adults, when we first looked at the picture, it looked like a puddle. However, during Molly’s narrative, she detailed the reflection of the tree and was awestruck how the tree appeared upside-down, “I took this picture of the tree upside down in the puddle. I love how you can see the trees in the water and it is upside-down but not in the picture. I thought the puddle came from the rain and the water will feed the trees and the animals.”

This description pointed to the detail to which the students were able to observe with their pictures. In addition, these pictures served as prompts to remind them what had happened on the field trips, which led to more descriptive journal entries.

Follow-Up

Another reason this unit was successful was that it allowed the students to follow up on their inquiries throughout their several visits to the dunes through the changing seasons. For example, in the winter months, the students visited a beaver dam on a frozen pond. Many of the students took pictures of this beaver habitat and were truly enthralled by the construction of it. Before their trip in the spring, the students made predictions about whether the dam would still be there. Many of the students predicted that the dam would have fallen apart because they thought the frozen pond was holding up the dam. The students were shocked when the beaver dam was still intact and when a goose had built a nest on top of the dam and was sitting on her eggs there. This prompted much discussion about habitats and how species use each other’s resources.

Another possible way for using photovoice is to help clear up misconceptions that occur in science lessons. During the discussion times, we found these fruitful for providing the students with experiences to challenge their misconceptions. For example, when Sherri took a picture of a tree and discussed how all plants need water, sunlight, and soil to grow, we were able to discuss how sometimes plants do not need soil. Another student had taken a picture of seaweed in the pond and we were able to discuss how this plant is able to grow.

A Community Event

After the students wrote their narratives, we printed the pictures on poster backing and printed their narratives on plain paper. We bought plastic picture stands to display the pictures and placed their narratives in plastic covers to prevent wrinkling). Next, we set up an event at which the



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Ready to snap a photo

community was invited to view student's photos, read student's narratives, and listen to students share their results. We invited people who would be interested in learning more about the Indiana Dunes National Lakeshore (i.e., government officials in charge of funding for this site, environmental advocates, and park rangers) but also encouraged community members such as parents and teachers to attend. This took place at the Walton Environmental Center. The students stood beside their pictures and discussed their observations with local community members. We practiced the previous day by holding a school event in the science lab in which the different grade levels came down and asked the girls questions about their pictures. This provided an excellent way to prepare and to teach the other girls of the school about the Indiana Dunes. During the community event, the community members remarked on the detail with which the students described the pictures. Although no immediate action was taken, the Indiana Dunes has become a special place for these girls and their families. The girls often visit the Indiana Dunes with their families now. In addition, they continue to visit and document observations as a part of their school curricula. Tomi's narrative stated, "I took a picture of the tracks and the naked tree. They are important because it might be animal footprints—deer or the daddy buck or the rabbit. The tree is some animal's house."

More Questions

Overall, the experience left the students with many more questions than answers about their surroundings. Through the many visits to the field, they began to ask, "What if" questions such as, "What if the beavers come back when the goose is on its home?" or "What if there is a forest fire, what happens to the animals?" As with true scientific inquiry, we encouraged these questions and tried to provide them with experiences to continue to ask these questions.



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Students stand beside their photos, ready to discuss them with community members.

The students are often asking when they can go visit "their picture in real life" to see how the environment has changed since their last visit. There is a feeling of ownership over the area where they have visited throughout the year. It is our hope that this feeling of ownership translates into action and the students will become more involved in their community and surroundings. ■

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Internet Resource

Kids in Need Foundation
www.kinf.org/grants/

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- Cook, K., and G. Buck. 2010. Photovoice: A community-based socioscientific pedagogical tool. *Science Scope* 33 (7): 35–39.
- Wang, C., and M.A. Burris. 1994. Empowerment through photovoice: Portraits of participation. *Health Education & Behavior* 21 (2): 171–186.

Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

Content Standards

Grades K–4

Standard A: Science as Inquiry

- Abilities necessary to do science inquiry
- Understanding about science inquiry

Standard C: Life Science

- Characteristics of organisms
- Life cycles of organisms

Standard F: Science in Personal and Social Perspectives

- Changes in environments

National Research Council (NRC). 1996. *National science education standards*. Washington, DC: National Academies Press.