

Science via PHOTOGRAPHY

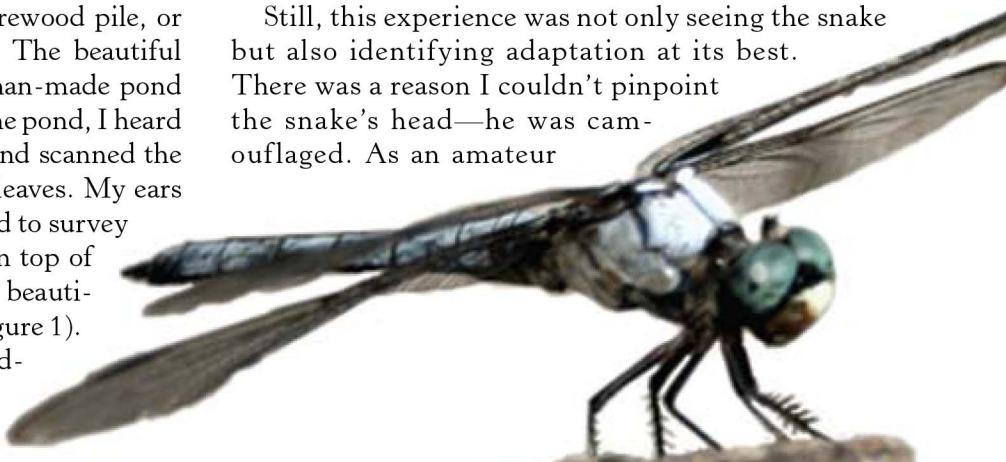
Using digital media to enhance animal adaptation and diversity lessons

By Alex D. Jones

It was a late summer morning in rural Arkansas; I had my digital single-lens reflex camera in hand strolling through my parents' flower garden. I had not decided what to photograph—maybe the dragonfly that quickly landed on the firewood pile, or the toad that jumped across my shoe. The beautiful white bloom of a water lily in the human-made pond was more appealing. While walking to the pond, I heard something rustle in the leaves. I froze and scanned the area; I saw only brown, beige, and tan leaves. My ears had not deceived me though! I continued to survey the area and noticed a decaying log. On top of the log I saw the body of a snake with beautiful tan and copper colored markings (Figure 1). This reptile had also sensed me and decided to freeze. I followed those markings down the side of the log into the multi-colored layer of leaves. My eyes began to refocus and readjust, as I asked myself "Where is the head of this snake?" I

retraced the snake and saw the front part of its body in the leaves. Slowly, I raised my camera and pushed the shutter-release button. I captured a beautiful copper-head snake in its habitat!

Still, this experience was not only seeing the snake but also identifying adaptation at its best. There was a reason I couldn't pinpoint the snake's head—he was camouflaged. As an amateur



photographer and science teacher, I would like to share how you can use digital media to enhance the study of habitat and adaptation. Even more, I'll show you how to use the camera to boost science vocabulary, especially for English language learners. I may have taken this photograph in late summer, but it wouldn't matter if my students were looking at it on a cold, snowy day in January. Your students may be indoors, but they'll still be learning about the natural habitats all around them.

Introducing the Photographs

At the beginning of each school year, I explain to my students that science is everywhere. I longed for the new school year to begin so that I could show the students the photograph of the copperhead. I used a computer and LCD projector to display the digital photograph. I asked the class, "What do you see in the photograph?"

The answers I received were, "Leaves and a log."

I told them to look closely; finally, they spotted the body of the snake on the log. As soon as students saw it there were *oohs* and *ahhs*. I asked the students whether they could spot the head of the snake. They said the head of the snake was in the log. I informed them that the head of the snake was visible and not in the log. I identified the head and again *oohs* and *ahhs* echoed through the room. "Why was it difficult to spot the head?" I asked. One student responded, "The skin matches the color of the leaves, and the snake blends in with the leaves." Another student said with excitement, "It's camouflaging!" This created an opportunity to discuss animal adaptations. I asked the students why camouflage would be an adaptation for the snake. "It doesn't want to be eaten by another animal," explained one student. "Eagles like to eat snakes," shouted someone else. The door had been opened to discuss predator and prey relationships within an ecosystem. I was bombarded with questions about the photograph and the students were totally engaged. That I had taken a photograph of a snake in my parent's yard was enthralling to students who live in an urban concrete jungle. I could tell the students appreciated the time I took to share my hobby with them.

I was amazed at the science vocabulary that I could use from this photograph: *reptile*, *predator*, *prey*, *adaptation*, *carnivore*, *camouflage*, *matter*, *decomposition*, *life cycle*. I wanted students to "look deeper" into the photograph, so I asked, "What else can you tell me about the photo?" Students came up with the following statements:

- "The snake can be a prey or predator because it hunts mice."
- "The snake is a carnivore because it eats meat."

Figure 1.

Copperhead snake.



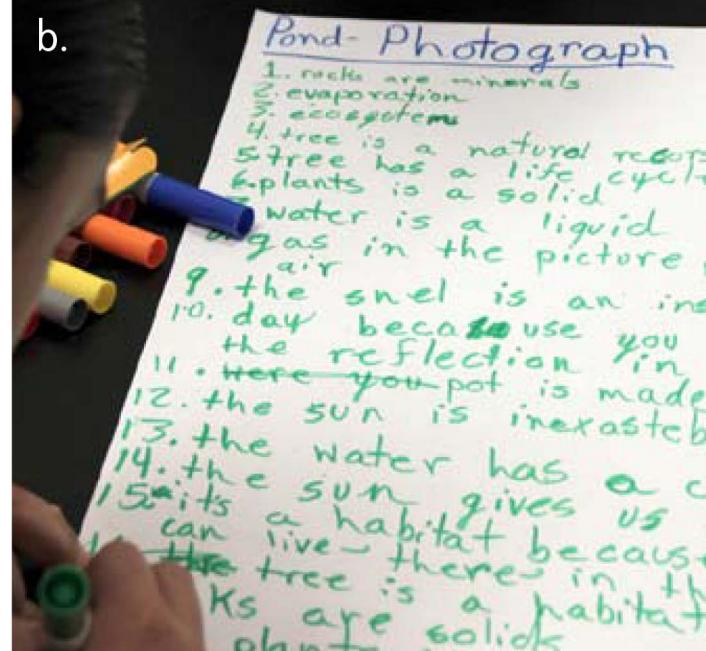
PHOTOGRAPHS COURTESY OF THE AUTHOR

Figure 2.

Pond and related science concepts.



b.



- “The snake lays eggs, and it has a life cycle.”
- “The log is a dead tree.”

The following day, I displayed a different photograph, this time a turtle sunbathing on a log in a pond. I was again amazed at how engaged the students were and how many questions arose. Students wanted to know what kind of turtle it was, where I was when I photographed the turtle, why it was on the log, and what turtles eat. I knew then that I could use my photographs to enhance lessons for my third and fourth graders. For each strand of science or concept we were studying, I would dig through my photo archives and find photographs that related to what we were studying. As we progressed through the year, I chose random photographs and asked the students to explain any science that was evident in the photograph. I explained to the students they had to use science vocabulary.

Students wanted to share what they saw in the photographs. It was a form of art and science appreciation. The photographs stirred student’s interest and curiosity while expanding science vocabulary and strengthening com-

Figure 3.
Photographs used for lesson about the monarch butterfly



munication and observation skills. Students who were reluctant to speak felt more confident speaking about the photographs. For example, when I used the photograph of the pond (Figure 2a, p. 27), I asked students to tell me what organisms were visible in the photograph. I also asked them to tell me (a) what they knew about plants, (b) how the producers in the photograph affect the ecosystem, (c) what forms of matter were visible in the picture, (d) what form of matter was not visible in the picture, and (e) for what kinds of animals the pond serves as a habitat. We also discussed the diversity of a pond habitat by describing what animals would begin their life cycle there (e.g., toads and dragonfly nymphs). We had covered: *organism, plant, producer, matter, liquid, solid, gas, habitat, life cycle*. Students viewed the picture of the pond and worked in groups of four to collaborate and come up with as many science concepts as they could within five minutes (Figure 2b, p. 27).

Language Lesson

The majority of the students I teach are Spanish speakers. Allowing English language learners (ELL) to share their prior knowledge and experience regarding the photographs opens dialogue among students and between students and the teacher. I often point to objects in a photograph and ask them to describe what they see in Spanish. For example, if I point to a flower, a student will say *flor*. We then all say *flower* and *flor*. Students should recognize shared root words and cognates in English and their own languages. There are an estimated 10,000–15,000 Spanish–English cognates. Research shows that primary language support facilitates cognitive and academic development (August and Hakuta 1998). To provide additional language practice, students collaborate in groups by writing as many science vocabulary words as they can. This leads to discussion and the students are able to learn from one another. Each group gets to share their list of words with the entire class.

Using Photographs to Assess

Teaching ELL students can present difficulty in evaluating and assessing progress. Photographs may be used as a type of informal or formal assessment. An example of informal assessment using the photograph of the copperhead snake would include showing the photograph to a class and asking the students to share what they know about reptiles. This would be an excellent way to guide your instruction on a study of reptiles. Another example would be *card sorts*, a formative assessment technique in which students group a set of cards with photographs or words on them according to a certain characteristic or category. Card sorts provide an opportunity for students to access their knowledge.



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As students work in pairs or small groups to sort the cards, they justify their own ideas, practice skills of scientific argumentation, consider others' ideas, and modify their thinking as new information persuades them to modify their original ideas. Card sorts provide a way for the teacher to elicit students' preconceptions, assess students' ability to transfer knowledge when provided with new examples or contexts, and look for areas of uncertainty or disagreement among students that may signify the need for further instructional opportunities (Keeley 2008).

After a lesson about the life cycle of the monarch butterfly, a more formal assessment example for lower-level ELL students would be to print photographs of each stage of the life cycle and have the students put them in order (Figure 3). Students could use index cards with the printed words to match with the photograph. This strategy could benefit all learners in the classroom.

Not a Photographer?

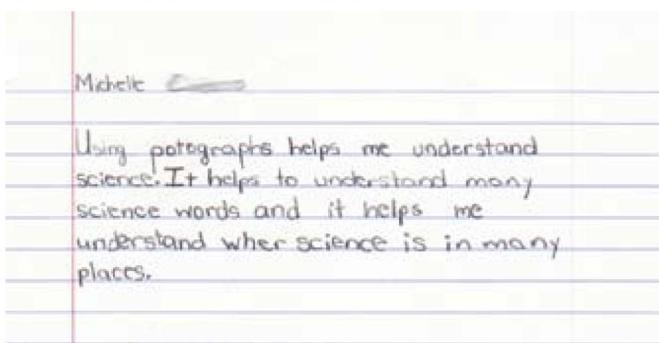
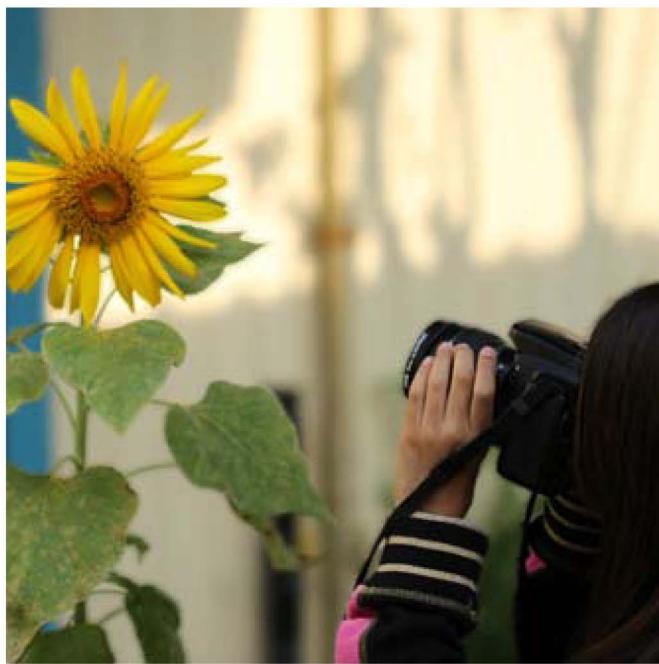
My strategy of using photographs in science class was conceived through a hobby that I enjoy. Through the course of the year, students were eager to see the photo-

graph of the day. For teachers who may not have access to a digital camera, I have the following suggestions:

1. Purchase calendars that are significantly reduced in price after the first of the year. These calendars may include landforms, scenic photography, and animals. Use the photos from the calendars and have your students glue them to a poster board. Students would then use the other half of the poster board for literacy connections. For example, if a student has a picture of a penguin, then the literacy connection could consist of research on the different types of penguins and their adaptations. Students work in groups and come up with their own vocabulary from the photographs.
2. Request old magazines from coworkers and parents. Give each group of students a science vocabulary word such as *life cycle* and have students create a collage from the photographs in the magazine.
3. Join an online photo group, such as the National Wildlife Magazine Photo Group on Flickr (see Internet Resources). This group contains thousands of wildlife photographs from amateur and profes-

Figure 4.

Students write about their own photos.



sional photographers; it is an excellent resource to use for your photo of the day. The photographs are breathtaking, the possibilities are endless, and your students will truly see that science is everywhere. I also recommend a few particular books to enhance your use of photography in the science classroom (see Resources).

Extension and Integration

Extend your use of technology by using inexpensive camcorders such as the Flip video camcorder. Let your imagination run wild—record animals at the zoo or the construction of a building. Ask your students to find the science in the video. For example, if you have video from a construction site, students will be able to see simple machines in action. If you are fortunate enough to have a technology budget at your campus, request digital cameras for students to use. Take your students out on a nature walk around your campus so students can take their

own photos. Print the photos and have the students write about their photographs, describing the science concepts in their work (Figure 4). Transform your cafeteria, hallway, or library into a gallery for other students to view. This will give the students a sense of ownership, build self-esteem, and most important, infuse literacy in their science discovery. Your student may be the next award-winning National Geographic photographer! ■

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Resources

- Dragan, P. 2008. *Kids, cameras, and the curriculum: Focusing on learning in the primary grades*. Portsmouth, NH: Heinemann.
- Good, L. 2008. *Teaching and learning with digital photography: Tips and tools for early childhood classrooms*. Thousand Oaks, CA: Corwin Press.
- Neumann-Hinds, C. 2007. *Picture science: Using digital photography to teach young children*. St. Paul, MN: Redleaf Press.

Internet Resources

- Animal Planet
<http://animal.discovery.com>
- National Geographic Photography
<http://ngm.nationalgeographic.com/photography>
- National Wildlife Magazine Photo Group
www.flickr.com/groups/nwmag

References

- August, D., and K. Hakuta. 1998. *Educating language minority children*. Washington, DC: National Academies Press.
- Keeley, P. 2008. *Science formative assessment: 75 practical strategies for linking assessment, instruction, and learning*. Thousand Oaks, CA: Corwin Press.

Connecting to the Standards

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

Content Standards

Grades K–4

Standard C: Life Science

- Characteristics of organisms
- Life cycles of organisms
- Organisms and environments

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