Magazine

A picture is worth a thousand words: using digital cameras captivates second-grade learners at the zoo.

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[ILLUSTRATION OMITTED]

Lions, tigers, and bears, oh my! Digital cameras, young inquisitive scientists, give it a try! Many elementary schools take field trips to the zoo to learn about animals, and mine was no exception. However, I often felt like my students were zipping through the zoo without purpose--missing a variety of learning opportunities. So, this year I revitalized our traditional zoo field trip with a project using digital cameras. The project was a fantastic culmination for our animal unit and a big hit with my second graders! For every primary teacher looking for a way to put a twist on tradition for their venture to the zoo, this interdisciplinary inquiry-based science project is for you.

In this project, students create an open-ended question for investigation, capture and record their observations--data--with digital cameras, and create a digital story to share their findings. The project follows a 5E learning cycle--Engage, Explore, Explain, Elaborate/Extend, and Evaluate--and meets science learning standards as students model inquiry behaviors, such as making careful observations and using simple tools (i.e., the digital camera) to gather information and extend their senses, while learning about animal diversity and animals in their environments in a meaningful way.

In Advance

This activity can be completed in four 30-minute sessions, one lesson before the field trip and three lessons following it. Before beginning, students should have prior experience creating open-ended questions (i.e., questions that can include more than one answer). Open-ended questions encompass a big idea and engage students in higher-order thinking as students must evaluate data to answer the question. Also, because students will be working as a group and sharing a camera on the zoo trip, it is useful if students have prior experience working cooperatively, learning by exploration, and using tools safely during science.

The tools you'll need are (1) access to a computer with digital image software that offers the capability to import images, such as PhotoStory, Windows Photo Gallery, or iPhoto; and (2) one digital camera per student group of five to six students. (If you do not have the resources for enough digital cameras for your student groups, photographs from disposable cameras can be put onto a disk and then into the computer software. Or, if necessary, students can share one digital camera, rotating the camera among student groups at the zoo. Students can take turns individually adding captions as text. Or, if you have no computer, you can use the hard copy of the photographs and simply paste them to paper and have students hand write the text for captions!)

It's best to figure out in advance how to obtain the digital cameras, familiarize students with the digital camera, and practice importing and manipulating the images to create a digital story. For example, I had two digital cameras myself and borrowed the rest from colleagues (parent chaperons may be willing to allow their cameras to be used during the event as well). Then, the day before the field trip, students practiced using the camera in class. We rotated the cameras from group to group, and students took turns taking pictures of themselves, various shapes, and other objects.

Engage

Our class had been studying animal classification and animal characteristics, and the zoo trip was the unit's culmination. During the unit, students had sorted animals into groups by their traits, with a focus on reptiles, mammals, birds, and fish. We had also discussed how an animal's characteristics help it survive in its habitat and had explored zoo websites prior to beginning our field-trip activities.

A few days before our zoo field trip, I gathered the children to introduce the zoo project:

"When we go to the zoo, you will be scientists on an investigation. You will think like a scientist and create a question with your assigned group. Then, when we get to the zoo, your group will use a digital camera to take pictures of anything that may answer your group's question." Students were excited about the prospect of using a camera.

Next, I wrote "We wonder ...?" on chart paper and asked students to share some questions they wondered about the zoo. "I wonder what a zookeeper does" said one student. "I wonder if all baby animals look like their mothers!" added another.

Excitement filled the air as we discussed possible questions to investigate at the zoo. I recorded students' questions on chart paper, leaving space beside each question to record ideas for possible pictures to take as "data." After a few questions, I guided students to begin their question with the words "how or why" to create more open-ended questions to investigate, such as "How do new animals get into the zoo?"

Then, I explained the project in more detail: Each group will choose a question from the list, and together, you will take at least 10 pictures of clues that will help us answer the questions we have about animals. When we get back to school, we will make a book of our questions and answers."

Next, we discussed how pictures can help us communicate, solve problems, and figure things out just like words can. I explained that just as pictures help us figure out clues in a story when you read, pictures are also going to help us answer our questions on our trip to the zoo. Then, we went back to the chart paper and brainstormed at least two picture ideas for each question.

After we generated a list of approximately six to seven open-ended questions with ideas of photographs, I coordinated the groups, assigned one student in each group as a recorder, and had each group cooperatively decide on the one question from the chart they would choose for investigation.

Next, I passed out a group planning sheet (Figure 1, p. 37), and we went over the written directions. The recorder recorded all group members' names, the question the group chose, and ideas for possible pictures they might want to snap for their collection. Finally, I collected the planning sheets, which I would pass back to students on the day of the trip.

Explore

When zoo day arrived, I was fortunate to have several parents as chaperones, with at least one per group. Each volunteer was aware of the group's mission of exploring all areas of the zoo but also carrying out their investigation, and they were excited to help the young scientists gather their data. Follow school and district guidelines for field trip safety.

Before loading the bus, I reminded the students of our zoo trip goals and expectations, and we discussed what cooperation at the zoo should look, sound, and feel like, such as walking together as a group, sharing the camera, and speaking in calm voices so as not to scare the animals. When we arrived at the zoo, I distributed one digital camera per group and the group's planning sheet to each group's recorder.

Then I watched as each group of young scientists, armed with a digital camera and a question, eagerly strolled away on an investigation all their own!

Explain

When we returned to the school, we discussed our findings. We revisited a few of the questions on the previous days' chart paper. I called upon the group that chose, "How does a zookeeper take care of the zoo animals?" These students told us all about the photos they took and explained that they even stopped to ask one of the zookeepers about their job at the zoo!

They took photos of the zookeeper feeding seals and hauling items to the animal cages on a four-wheeler, and also of signs around the zoo that they thought a zookeeper may have written.

Another explained their question, "How do the animal cages look like animals' natural habitats?" These students took pictures of things inside the animal's cages to show how the zoo makes different habitats for the animals, such as trees in the giraffe's habitat and plants around the wandering peacocks. The students concluded that the zoo animals need certain things to survive in their environment.

The generation of ideas and explanations about the zoo photographs provided a foundation for the student text that was to be inserted with the photos for the digital story

the following day.

Elaborate/Extend

Using the photographs from the zoo, the learning experience was extended in several ways:

* Students sorted the class's zoo photos into themes such as living/nonliving items and animal classifications.

* Using two or three photographs, some students created an "I Spy" collage and wrote a rhyme about items in the zoo pictures to identify.

Evaluate

The following day, we gathered in the computer lab, and I shared a short nonfiction book with many photos and captions with the students. I explained that today students would turn their photos into a book and write captions for their stories with their groups.

Students gathered into their groups around a computer in the lab to assemble the digital stories using software (we have Macs so we used iPhoto). They imported the photos by connecting the camera to the computer with a USB cord. With a few clicks, their books were assembled and on the screen, with text boxes ready to be typed in. The layout and order of the photos were changed at that time if necessary. The students began by using their question to create the title. Once the text was inserted, students edited and revised their writing cooperatively.

Finally, when the writing process was completed, each group clicked "order a book" (within iPhoto, you can choose to print or order copies of the book, but different software will have different options). This year, I chose to print one book per group instantly, and within minutes the students' digital stories were ready for distribution and assessment. I used the one copy from the printer for my own assessment and ran multiple copies on the black-and-white copy machine for each member to take home and share. (There are numerous ways to do this; for example, you may want to print in color or print just the pictures and have students hand-write the text! The possibilities for compiling the book vary as well. You may choose to print individual group books for students to take home or order a hardbound copy if it is offered through your software and want one book with all the stories in it for your classroom. Build it to your own needs and your budget!)

While the other groups were finishing, I had students complete a self-reflection of their learning and success throughout the project (Figure 2), which I used to assist me in assessing their understanding when I evaluated them using the final assessment rubric (Figure 3).

A Snapshot of Science Success!

A few weeks following completion of the project, we held an "Author's Celebration" to share our published stories. The day of the event, parents, grandparents, and young siblings filed in, and the first group of students took the stage. A Picture Is Worth a Thousand Words had unexpectedly deepened our classroom's sense of community and provided a home-to-school connection beyond measure.

The possibilities of using images as data provide exciting learning opportunities in your classrooms and beyond. Digital images can provide a context for a rather ordinary activity to become a powerful tool for constructing meaning in your science classroom!

Connecting to the Standards

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

Content Standards

Standard A: Science as Inquiry

* Abilities necessary to do scientific inquiry

* Understanding about scientific inquiry

Standard C: Life Science

* The characteristics of organisms

Standard G: History and Nature of Science

* Science as a human endeavor

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

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Figure 1.
Zoo activity group planning sheet.

Group Member's names:

Focus question for the zoo
--

What are some things we may need to take pictures of?
--

Directions for photos:

Snap at least 10 pictures!
The group question is the title of the book.
All pages in the book will have at least two sentences
for captions telling about the picture!

Figure 2.
Student self-reflection rubric and assessment.

Mark an X the box that tells how you feel about your work.

Name	A	B	C
I helped choose a question!			
I used used digital photos to answer our question!			
I helped create a book about our question!			
I worked together with my group!			
I helped finish a neat book on time!			

Sketch a picture and write one sentence about what you learned.

Figure 3.

Individual student science learning rubric.

Student Name What it looks like in this project	Yes	No
Knows that learning can come from carefullearned from this observations and simple investigation in their experiments selfreflection		
Knows that tools can be used to gather information and extend senses	Used camera and typed or wrote text	
Knows that animals have features that help them live in differentcovering as an important environments feature to a polar bear	Following the zoo visit, they can explain body	
Knows that living things	Following the zoo visit,	

are found almost they can identify	
everywhere in the world locations of where	
kangaroos and seals are	
found	
Knows that distinct	Following the zoo visit,
environments support the they can describe penguins	
life of different types of	as needing a cold
animals	environment
Additional Information	Notes/ Score

4-Meets or exceeds
3-Satisfactory
2-Unsatisfactory/Reteach
1-Reteach