



Caught You!—Using Digital Cameras to Investigate Science

Essential Question: How can we investigate questions about the environment by capturing specific elements in pictures?

Introduction/Background:

Field trips can give students important hands-on experiences that are unavailable to them in the classroom. Asking the students to record their discoveries digitally will focus their attention to small details that they would otherwise overlook. The digital record can also be used as a future reference back in the classroom, providing an easy way to capture images relevant to the curriculum.

Current digital photography technology is easy to use. Students can bring their own cameras, such as those in their cell phones, or schools may provide cameras for them to use on the field trip. Images can be downloaded to a laptop computer in the field, emailed back to the teacher for the student to use in later reports, or can be saved to the camera's memory card.

Students often believe that all science observations must be quantitative. But there is ample room in science for qualitative observations. This activity encourages students who tend to be more right-brained, aesthetic or artistic to take ownership of the observation process. It ends with a discussion of how judgments are formed about the environment.

National Science Education Standards

Unifying Concepts and Processes: As a result of activities in grades K-12, all students should develop understanding and abilities aligned with the following concepts and processes:

- Systems, order, and organization
- Evidence, models, and explanation
- Constancy, change, and measurement
- Evolution and equilibrium
- Form and function

Content Standard A: As a result of their activities in grades 5-8, all students should develop an understanding of:

- Scientific inquiry



Content Standard C: As a result of their activities in grades 5-8, all students should develop an understanding of:

- Populations and Ecosystems
- Diversity and adaptations of organisms

Student Learning Objectives

As a result of these activities, students will:

- increase their observational skills.
- Identify examples of specific patterns and relationships in the natural environment.
- Communicate and defend their choice of examples.

Materials List

Digital camera for taking pictures

Computer to download and store images.

Optional: ruler or other object for scale

Safety Considerations

As with any field work, there are plants and animals that are dangerous. Students may want to get as close as possible to get a nice shot. Remind students to be respectful of the dangers and not to get too close. Also remind students to be careful of their own footing when taking pictures. It is easy to become so involved with the framing of the “perfect picture” to forget about what is around you as you are taking the picture.

Procedures

Preparation: Make sure that the students know how to take pictures using the camera and how to download the images to a computer file.

Part I: Honing Your Visual Memory

Create teams of two students each. One is the “camera.” The other is the photographer. The student who is the camera closes his/her eyes and is lead by the photographer to something visual. The photographer tells the “camera” if it is going to take a picture that is a close-up or a picture that is in the distance. At a signal, the “camera” opens his/her eyes and looks for ten seconds.



The pair then moves to another spot. Then the “cameras” again opens their eyes and draws a picture of what they saw. Follow-up discussions can include a comparison of the drawn picture to the actual visual element and what features were missed and can be included.

Part II: Catching Nature

Students work alone or in teams depending on the number of available cameras. Student/teams will be given a specific area and timeframe within which to work. Handouts will list the objectives for their photographs.

Students move through the assigned area and identify natural objects or organisms that illustrate the concepts on their handouts.

Data/Observations

Concept	Example	Why chosen?
beauty		
ugliness		
competition		
change		
youth		
old age		
cooperation		
speed		
slowness		
contrast		

Students or teams discuss and prepare for a presentation in which they share their images with the rest of the class, explaining how each image is representative of the specific concept on the handout. Students may take more than one picture for each item, but the student/team must settle on only one picture to show in their presentation.

Conclusions

Sample answers for these categories are not given because one of the most important components of this activity is to allow students to make their own choices and to defend them. Encourage other students, however, to challenge and defend with clarity.



Evaluation

Students/teams will be evaluated on how well they defend the representation of their image. The rubric below can be used to help assess student work.

GRADING RUBRIC	4	3	2	1	0
QUALITY OF THE PICTURE	Exceptional clarity and balance of color/textures	Picture nicely focused	Some aspects of the picture out of focus	Poorly take picture - blurred or unfocused	No picture taken
DEFENSE OF THEIR CHOICE	Very unique and/or unusual example	Photo correctly portrays concept	Tenuous connection between photo and concept	Photo does not accurately portray compositional concept	No photo provided

Adaptation/Elaboration

Younger students might be asked to find geometric patterns in nature: circles, lines, and triangles.

More advanced students can be asked to find specific examples of subcategories of symbiosis such as commensalism, mutualism, and parasitism.

Sources for Related Activities

Other suggestions for using a camera on a field trip can be found at :
http://teachingtechnology.suite101.com/article.cfm/using_digital_cameras_to_investigate_science