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Art and the plight of the environment: Student-created images that inform and inspire

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In this three-part activity, students examine, create, and present artistic images to explore the environmental impact of human activities. To begin, students study a work by American artist Patrick Nagatani (1945–2017). The work, called *Nuclear Enchantment*, contains 40 photographs depicting the damaging legacy of the nuclear industry in New Mexico. During our lab in fall 2021, the photographs were on display at the Fred Jones Jr. Museum of Art (FJJMA), and the class viewed them in person. However, the photographs are also readily available online (*https://www.patricknagatani.com/pages/nucenchant.html*), so access to the FJJMA is not necessary to complete this activity; in addition, with sufficient notice, FJJMA staff can facilitate a virtual event for any instructor. Regardless of the delivery method, the photographs are combined with discussion questions helping students to understand how Nagatani staged or enhanced elements of the photos to draw attention to social and environmental issues. In the second part of the activity, students have one week to create and modify their own Nagatani-style photo to illustrate an environmental issue of their choice. Along with their image, they submit a description of how they constructed their image and what it means to them. In the third part, the lab reconvenes, and groups of students who selected similar issues present their images to the class. Post-lab surveys indicated that students appreciated the opportunity to be creative and to use visual media to explain environmental problems that were important to them. In addition, nearly 75% indicated they would like their image and description to be included as part of the museum's exhibit, indicating pride and satisfaction in their work. In the conference workshop, participants explored Nagatani's work, created images with their own cameras and computers, and presented the images to the rest of the participants.

Keywords: art, environment, sustainability, photography

Introduction

Students enrolled in nonmajors biology classes often have interests that are at least somewhat related to science. For example, they may be passionate about environmental justice, or they may be concerned about climate change or any number of other topical issues. They may also be interested in the arts or enjoy creating or editing images to disseminate on social media.

To create a connection between the arts and science, our nonmajors Concepts in Biology class has for years conducted a lab at the Fred Jones Jr. Museum of Art at the University of Oklahoma. The activity consisted of a worksheet in which students learned about ecological principles by finding and describing paintings that illustrated ideas such as population ecology, community ecology, adaptations to cold climates, and human impacts on the environment (Hoefnagels, 2009). Students reportedly enjoyed visiting the museum, but as the activity consisted of a worksheet, it did not inspire creativity or a deep connection with the material.

To address this problem, we collaborated on a new lab activity that challenged students to identify environmental issues they care about, to understand how photography can highlight the intersection of environmental and social problems, and to create and share an image of their own. We implemented this activity for the first time in the Fall 2021 semester, and the resulting images were relevant and meaningful to the students, instructors, and others who viewed the work.

In this workshop, participants explored the work of Patrick Nagatani, a photographer, who used his craft to reveal the environmental and social consequences of the nuclear industry in New Mexico. Participants then had time to create an image depicting an issue that they care about and presented the image at the end of the workshop.

Cited References

Hoefnagels, Mariëlle H. 2009. Museum ecology: using fine art to reinforce ecological concepts. In: Tested Studies for Laboratory Teaching. Kari Clase, Editor. Proceedings of the 30th Workshop/Conference of the Association for Biology Laboratory Education (ABLE). June 3-7, 2008. University of Toronto, Mississauga.

Student Outline

Objectives

At the end of this activity, students will be able to:

List and describe environmental issues that are relevant to them
Describe photographic techniques and props used to bring attention to environmental and social issues
Create and explain an image depicting an issue they care about

Introduction

Addressing environmental issues requires a consideration of biology as well as social, cultural, and economic factors. Each environmental problem traces back to a cause, often with economic or national security justifications. Generating the momentum to solve these problems requires engagement with the general public in ways that they find accessible and relatable to their everyday lives.

The exhibit that we'll be viewing this week at the Fred Jones Jr. Museum of Art explores the junction between social and environmental consequences of human actions. In particular, the photos in the exhibit illustrate how the development and testing of nuclear bombs have affected the environment and people of New Mexico. Viewing the photos will help you understand ways that artists can use color, props, and other enhancements to call attention to the issues they wish to highlight. You will then create and share your own image, relating to an environmental issue that is important to you.

Pre-Lab Prompt

In preparation for viewing the exhibit, think about some environmental issues that are important to you. List **three** environmental issues that you care about, and for each, write 1-2 sentences that relate it to the biological concepts you've learned about in class. Then, in another 1-2 sentences briefly describe the potential social and economic impacts of not only the issue but also its potential solutions.

Sample response: *I care about minimizing battery waste. The heavy metals in batteries (i.e., lead and nickel) may leak out and make it into soil and water. Bioaccumulation of metals from batteries can affect the health of algae, invertebrates, fish, and higher-order predators, leading to significant harm to ecosystem function. Heavy metals can also directly harm human health, causing neurological issues or cancer if exposure is high. It's possible that lower income families are disproportionately affected if they live near a landfill. Reducing battery waste should not have major social or economic impacts. People can prioritize buying rechargeable batteries instead of single-use batteries.*

View the Patrick Nagatani Exhibit

Students were not given a handout at the museum. Instead, the museum's education specialist gave the students a brief explanation of Nagatani's background and gave the students 10 minutes to explore the work. The group then reconvened for discussion. Topics included similarities between art and science (i.e., raising and addressing thought-provoking questions), in addition to visual media as a means of communicating ideas without words. Students were asked what stood out to them the most in viewing the images, and the education specialist helped lead them to identify factors such as color, contrast, effective use of foreground/middle ground/background, and manipulation of staged objects. Students were also prompted to think about the viewer's position in relationship to each scene – were they part of it, or more of a "voyeur"?

They then examined three images illustrating different ways that Nagatani created his photographs; one showed an outdoor location, one showed an interior scene, and one showed a constructed space. The idea was that students would be inspired to think of different techniques they might use to create their own images.

After this introduction, a show of hands revealed that students were generally comfortable with the expectations of the assignment and had already thought of ways they might generate an image of their own.

Image Creation

Art can highlight environmental issues and be a vehicle for change. Patrick Nagatani's work mostly explored how the human pursuit of control and strength harms the planet and people. In particular, his photos illustrate how the development and testing of nuclear bombs have affected the environment and people of New Mexico.

Your goal in this project is to create an image that summarizes one environmental issue and underscores its effects on people.

Step 1: Select Your Topic

Choose an environmental issue that you care about. It may be one that you discussed in your pre-lab quiz, or you may pick a different environmental issue.

Step 2: Brainstorm

Think about possible ways to use an original photograph to show the impact of the environmental issue on the planet and on people. Here are some ideas to create your photograph:

1. You may want to arrange and photograph physical props, like Nagatani did. You can arrange them in a setting of your choice, including your home or outdoors.
2. You may want to take one or more photos that illustrate your environmental issue somewhere around town, showing a conflict with nature and people.
3. Do some combination of ideas 1 and 2.

Step 3: Create and Submit Your Image

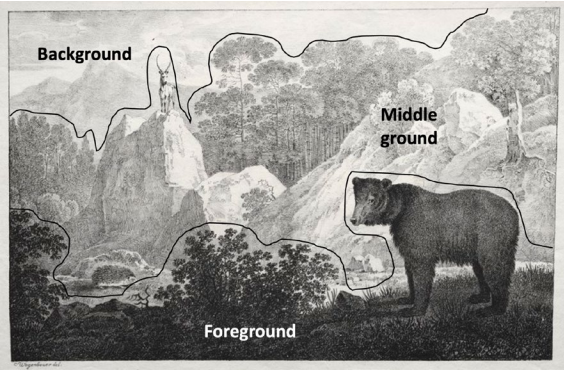
You will submit a single image, composed primarily of your own photo(s). You may incorporate content from the Internet, but it must be credited to the original source and make up less than 15% of the total area of your submitted image. If you have more than one photo, use Photoshop or a similar application to mesh the photos together into one image that shows how the issue affects nature and people.

Step 4: Describe Your Image

Write a paragraph that answers the following questions: How did you create the image? What props did you use, if any, and why? Where did you take photos? How does your image show how your selected environmental issue affects both nature and people? Then, in about three sentences, discuss one way we could begin to address the environmental issue. How could addressing the issue potentially impact society and the economy?

Read the box below to learn more about how to compose a high-quality image.

Constructing a Photograph



To create a photograph that is visually compelling, consider a few simple techniques. Think about placing elements or objects towards the front of your scene in the foreground and further back for the middle- and background to give a sense a depth. You may also want to play with objects of different sizes to change the perspective.

The angle you take a photograph from will greatly affect your image. Are you standing straight in front of your subject or are you looking down from an aerial view?

When taking a photograph outside be aware of the lighting conditions. A light source behind you will illuminate the space in front of you. A photograph facing the sun will create shadows and silhouettes of objects or people. The lighting effects and colors you choose to highlight can have a significant impact on the mood or feeling in your image and are important to keep in mind.

[Image copied from https://www.clevelandart.org/art/1940.1179 according to a Creative Commons CC0 1.0 Universal Public Domain Dedication]

Grading

Images are graded according to the following criteria:

- **Submitted image (10 points):** Does the image illustrate an environmental issue? Does it show how the environmental issue affects the planet? Does it show how the issue affects people? Does it use only the student's own photo(s)? Overall, does it look like the student put thought into the image or does it appear to be done quickly and without much thought?
- **Image description (5 points):** Does the description answer the following questions: How image was created, what props were used and why, where photos were taken, how image represents an environmental issue, how the environmental issue affects nature and people, and what humans can do to address the environmental issue to improve sustainability.

Presentation

During lab, you will be grouped with several classmates who made images about similar environmental issues. You will meet with your small group for 15-20 minutes to discuss similarities and differences among your images. Then use Google Slides to build your presentation:

- Use 1-2 slides to describe the environmental issue(s) that your group illustrated.

- Show and describe the images created by each member of your group; each image should occupy its own slide.
- How are your approaches and your images the same? How are they different?
- Does your group's collection of images comprehensively illustrate the environmental issue?
- If not, what elements are missing?

When you are done, email your Google Slides link to your TA. When it is your group's turn to present, each group member should cover at least one of the bullet points listed above, in addition to talking about their own image.

Materials

Each student should have a computer, phone, or tablet with access to patricknagatani.com (or freely available images from a similar artist). Note that staff at the Fred Jones Jr. Museum of Art have offered to facilitate virtual presentations or conversations about Nagatani's work as a part of an assignment for any instructor. Interested instructors should schedule a virtual talk at least 2 months in advance; contact museumtours@ou.edu for scheduling. Alternatively, instructors could consider pairing with art instructors or museum professionals at their home institutions.

For image creation, each student should also have a digital camera (on their phone, for example) and digital filters or computer programs for manipulating images. Props and locations will vary by student.

Notes for the Instructor

In fall 2021, students took about one hour to view and discuss Nagatani's work with the education expert. They were given one week to create their images, then the in-person lab took about another two hours, including time to form student groups, create the presentations, and share with the class. In general, the instructors were extremely impressed with the quality of student images.

Some students indicated that they would have liked more time to create their images. However, these comments might have resulted from the lab's timing at the very end of the semester, when students are generally swamped with work and preparing for finals.

Instructors associated with the class also created images, which we presented during the final lab session. From that experience, we estimate that a student can create a thoughtful, compelling image with an investment of 2-4 hours.

In the 2022 major workshop, participants were given only 1-1.5 hours to create their images, although they were not expected to write a companion narrative during that time frame. Even that short time was sufficient to create compelling images.

We included a follow-up survey in which students were invited to share thoughts about the activity and to indicate whether they wanted their work to be included with the exhibit. About ¾ of the students gave permission to display their images alongside the Nagatani exhibit, indicating a high degree of motivation and pride in their work.

This activity could easily be modified according to the needs of individual instructors. Some instructors, for example, might wish to provide students more guidance (in the form of a handout, for example) on how to generate ideas. Instructors might also want to redirect the writing assignment or presentation to include explicit connections to course content, perhaps using claim/evidence/reasoning model of argumentation to explain and defend their point of view.

For those who want to devote more time to this activity, workshop participants offered several ways to extend it. One idea was to build in time to storyboard an image, get feedback from peers or instructors on the storyboard, create draft images, and incorporate additional feedback into a final project. The narrative accompanying the image could then include information about the developmental process, including the ideas that were discarded. A second idea was to have students identify one or more appropriate artists themselves instead of relying on the Nagatani work. A third idea was to extend the activity to multiple units of the course, instead of just the ecology unit, perhaps using a different artist for inspiration each time. A final idea was to incorporate pathways to action, as the images of environmental issues tended to portray a bleak picture overall. The written assignment and/or presentation could include a description of practical things that ordinary people can do to help mitigate or solve the problem being highlighted. It could also incorporate examples of environmental success stories, such as the recovery of bald eagles after the elimination of DDT or the slowing of ozone loss after the reduction in the use of CFCs.

Our grading was largely on a completion basis (see Student Outline) because the activity was experimental and the point value was relatively low. For instructors who place a higher relative point value on the assignment, assessment could be made more rigorous by devising a rubric, especially one that matched image, narrative, and presentation criteria to the instructor's learning objectives.

Potentially Useful Links

Nuclear Enchantment photos:
https://www.patricknagatani.com/pages/nucenchant.html

Video of Amanda Boehm-Garcia talking about Nagatani's techniques for creating selected images in *Nuclear Enchantment*:
https://www.youtube.com/watch?v=PipSskx47Fk

Student work from fall 2021:
https://sites.google.com/view/fjjmabiology/work
(All students included on that site agreed for their work to be publicly posted.)

Inhabiting the Anthropocene blog post about this project:
https://inhabitingtheanthropocene.com/2022/06/16/exploring-the-intersection-of-biology-and-environment-through-art/

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About the Authors

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