

Description and Narrative of Lesson

This lesson was designed to teach a part of the concept of natural selection. Specifically speaking, I intended my students to understand that even though natural selection acts on individuals, it is populations that change as a result.

*Michigan High School Content Expectation: **B5.3A** Explain how natural selection acts on individuals, but it is populations that evolve. Relate genetic mutations and genetic variety produced by sexual reproduction to diversity within a given population.*

I began the lesson by framing a class discussion around the following questions:

- Imagine you are a polar bear born with brown fur. What would your life be like?
- What caused your fur to be brown when your parents both had white fur?
- Suppose that you are not the only polar bear to be born with brown fur—there are others like you but the trait is scarce within your population. If all the snow and ice in your habitat melted and left behind a dirty brown landscape, how would that affect your population?
- After several generations have passed, how would the fur color of polar bears compare to that of the time when you were born?

Even though the lesson itself had nothing to do with polar bears, the intent of the discussion was to assess my students' prior knowledge of natural selection and to get their minds pointed in the right direction for understanding the concept. After the discussion, we went to the computer lab to use the gizmo "Rainfall and Bird Beaks" on the website www.explorellearning.com. This simulation allowed students to manipulate variables to show how environmental conditions affect individuals and cause populations to change over time. The following day, we discussed in small groups and as a class how the simulation affected the students' initial ideas of natural selection and how their understanding had changed.

Reflection

As a result of the simulation, students learned how the environmental condition of rainfall influences the survival of members of a population of finches with variations in beak size. The students also understood that those members of the finch population with beaks that give them a better chance for survival will be the ones to reproduce more, and will pass that advantageous characteristic on to their offspring. As a result of the follow-up discussion, the students were also able to apply this understanding of natural selection to characteristics in other species.

An affordance of the way information is represented in the simulation is that it shows the immediate impact of the environment on the evolution of a species as it is happening—not after the fact.

A constraint, on the other hand, is that it illustrates only one example of natural selection. However, during the class discussion, other examples were addressed.

In the lesson there were elements of constructivism, as the students built their own knowledge of natural selection based on the example in the gizmo. Social constructivism also played a role in the lesson, as we discussed the meaning of natural selection in small groups and as a class. Because of these elements and because of the self paced nature of the simulation, differences among learners were taken into account.

The intent of this lesson was to enhance the learning of natural selection, which is central to the biology curriculum.

With the population I teach, it is very common for students to be off task while working. Frequently, students will carry on non-work related conversations, fall asleep, or find some other devious way to be off task. So as an informal way to gauge student engagement, an observer noted each time I had to remind a student to stay on task. Whereas during a traditional lesson I may have to do this ten to twenty times or more, I only had to remind two students to stay on task when using the Explore Learning Gizmo. Also during the follow-up discussion, the observer recorded near 50% participation,

which is dramatically higher than during usual discussions. I used the discussion as well as the assessment questions for the gizmo to evaluate what my students learned.

The Explore Learning Gizmo used for this lesson allowed the students to actually experience an example of natural selection instead of just learning of one. A big advantage of this technology was that the simulation put the students in the midst of an evolutionary change instead of at the end looking back. This allowed them to develop their own understanding of natural selection, instead of coming to a foregone conclusion.

The point of using the chosen Gizmo for this lesson was to give the students an experience that they could use to form their understanding of the process of natural selection. When using the technology, the students were engaged and accomplished the task.

Based on responses from the small group and class discussion, the students made good sense of the content of this lesson. The technology did not distract them or overpower their cognitive capacity. It was simply a way for them to experience something that they otherwise would not have been able to experience in a classroom.