AP Biology Natural Selection (Carolina, $48.95)

Overview of Product

With the release of the new Framework for AP Biology, I have found myself looking for new and innovative activities that support the Science Practices. Under the old AP Program, I could look to the "dirty dozen" labs as my guide. This is not the case anymore, and we AP teachers have more options; this is why I like Carolina's Natural Selection AP Investigation. This investigation can be used as an introduction to experimental design as I do, or as an introduction to natural selection.

The Natural Selection Investigation is broken up into two parts. The first is a Guided Activity in which the students test the effects of salt concentration on the hatching viability of *Artemia* (brine shrimp). By completing this activity, the students are able to relate the variation in brine shrimp's salt tolerance to the concept of natural selection. In the Inquiry Activity, students develop and follow an experimental plan to investigate another factor that may affect the hatching viability of brine shrimp.

Learning Goals & Standards

What is great about using Carolina products is the approach. Many times I have come across activities that say they are inquiry but really are not. With Carolina's products, the students investigate a predetermined question using an established procedure. These techniques are then used in the Inquiry Activity. Furthermore, in the Inquiry Activity, students determine the question and procedure to investigate and have the ability to really make the activity their own.

In terms of the new AP Biology Framework, the Natural Selection Investigation addresses many of the Enduring Understandings found in Big Idea no. 1. Finally, I have found that this investigation can be used in high school biology when discussing natural selection or experimental design. For those of you that teach AP Environmental Science, the kit can be modified to address concepts in toxicology.

Materials & Preparation

Carolina does a great job of providing everything you need to complete the Guided Activity. Included in the kit are the following:

- vial of brine shrimp eggs
- double-sided tape
- pipettes
- Petri dishes
- microscope slides
- paintbrushes
- sodium hydroxide, 0.2 M
- sodium chloride, 25 g
- sulfuric acid, 0.5 M
- calcium carbonate

Carolina provides a list of suggested lab equipment and materials to be used in the Inquiry. What is great about the kit is that there is really nothing that is too expensive. I do not have the budget that some of my colleagues do, but the activity is doable on a meager budget.

Most of the materials I used to modify the activities I found in my room or borrowed from my chemistry colleague. One topic of special note is the water. Spring water is ideal for this experiment. If you use tap water, it needs to be conditioned first. My municipality adds chlorine, and others add chloramines, to kill bacteria in drinking water. Both these disinfectants harm brine shrimp, so you may want to buy spring water or let the water sit for 24 hours.

Instruction

In terms of instruction and preparation, I spent the most time on collecting the materials to be used during the two activities. Carolina again does a great job of providing tips for breaking down the prep. I would caution one to be sure to freeze or refrigerate the brine shrimp eggs upon arrival. They will remain viable, and storing in this manner prevents the growth of mold.

I have done the activity three times now, and I use it as an introduction to experimental design in my AP Biology class. Depending on how comfortable you are with inquiry, you can skip the Guided Activity and do the Inquiry Activity. If you have never worked with brine shrimp, I would recommend doing the Guided Activity so that you become comfortable with working with them.

I center my Inquiry on the concept of toxicology and scientific method during the first full week of school. I would recommend setting up the lab on a Monday and running it for 3 to 5 days, depending on how your class is set up and the hatching of the brine shrimp. Some activities suggest removing the hatched shrimp. I have found this to be a challenge at times, especially if the students are not keen on the use of pipettes. I usually suggest to my students to count the eggs that have hatched. Again, this is an Inquiry so you can give as little or as much direction as you like. There are more details in the Carolina booklet. A sample of the guide can be found at http://goo.gl/uCWpVA.

Summary

This activity has become an important part of my AP Biology class. It is the first lab investigation my students perform and the first lab report they construct. I feel this is an excellent activity because not only do students collect qualitative data and quantitative data, but they can relate the concepts and apply the science. By doing this activity in the first week of school, I am able to see where my students are in terms of the Science Practices and their comfort in the lab. If you would like a modified version of the lab, please feel free to e-mail me at chris_monsour@tiffincityschools.org.

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The American Biology Teacher, Vol. 75, No. 9, page 717. ISSN 0002-7685, electronic ISSN 1938-4211.
DOI: 10.1525/abt.2013.75.9.18