

Useful Background Information

Daphnia, or the 'water flea', is one of the most common crustaceans to be found in lakes, ponds and quiet streams. They're not really fleas – in fact they're not insects at all, but crustaceans, more closely related to crabs and shrimp. Water fleas are extremely important in the food chains of ponds and lakes because they harvest the tiny algae cells that convert sun energy into food, and then they pass this energy along to other animals such as fish or other predators. These tiny animals are usually less than 3mm in size.



The Veterinary Black Bag Program

Project Goals:

- Develop Veterinarian's Black Bags (VBBs) of instructional items and pamphlets for middle school teachers to support classroom visits by local veterinarians.
- Provide professional development for veterinarians and teachers on how to use items in the VBBs
- Promote inquiry-based thinking about health-related subjects while emphasizing the value of biomedical research and promoting careers in science.



PEER

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<http://peer.tamu.edu/VBB/Summary.asp>

Heart Function Inquiry

Follow Up Lesson



The instruction in this module includes:

Presentation on *Heart Disease*

Follow-up lessons on:

Human Heart Function

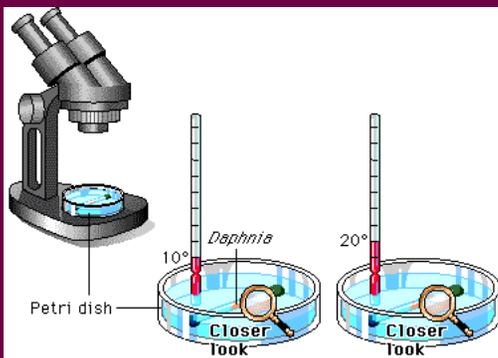
Heart Research

Heart Function Inquiry

Summary of Lesson Content

Objectives

1. Generate testable hypotheses and develop the rationale for the hypotheses
2. Design an experiment to monitor the heart function of water fleas (Daphnia)
3. Perform correct calculations and measure any substances added to the culture, expressed in mg/L
4. Write a short report of the experiment, its results, and its interpretation



Students design their own experiments, like this one that tests heart rate at different temperatures

Daphnia are small aquatic crustaceans commonly used as an environmental assay system. In this experiment, student groups will create testable hypotheses about mechanisms of heart function, design an experiment to test the hypothesis, and perform the experiment. They will then write a research report and present their study to fellow students (either orally or via Power Point or poster). The main guidance provided by the teacher should be limited to how to monitor heart function in Daphnia.



Questions to Ask:

What is the importance of this hypothesis?

Do all Daphnia respond the same to the treatment? How much variability was there?

Is the effect of treatment persistent, even if the treatment persists? For instance, if chemicals are added, does the response stay the same over time after treatment?

What do the results indicate?

Do the results generate any new ideas for other experiments?

Discuss what a biological assay is and why Daphnia is a useful organism for that.