Overview

What can we learn from worms? How the nematode *C. elegans* maintains balance in a changing environment.

Lesson	Description	Time	Nematode activities	Conceptual activities
Lesson 1. Getting to know your worms: Observing wild and mutant *C. elegans*	Students discuss familiar examples of organisms that respond to environmental changes. They learn about nematodes through a PowerPoint presentation and then observe and compare two nematode strains under a microscope.	50 min.	Students observe and draw wild type and mutant worms.	Students learn about *C. elegans* as a model organism and learn "worm facts" through a presentation and observation.
Lesson 2. Worms in a changing environment: How does high salt affect *C. elegans*?	Through a PowerPoint presentation, students learn a few more basics about *C. elegans* and the experiment they will be doing. They "chunk" (transfer) both wild type and mutant worms to low and high salt plates. After 15 minutes, students record their observations for both worm strains.	90 min.	Students transfer wild type and mutant worms to low and high salt plates and observe them after 15 minutes.	Students learn more "worm facts" through direct observation.
Lesson 3: How does *C. elegans* keep from drying up in high salt?	Students use dialysis tubing to model what might be occurring with their worms on low and high salt. Students also make 24 hour observations of the two worm strains on low and high salt.	90 min.	Students make 24 hour observations of worms on low and high salt plates.	Students set up a model system using dialysis tubing and solutions containing low and high glycerol and test the effect of salt.
Lesson 4: Using evidence to develop an explanation	Students examine worms after 48 hours and record observations. They analyze data from the scientific literature to develop an explanation for their observations of wild type and mutant worms on low and high salt plates.	50 min.	Students make 48 hour observations of worms on low and high salt plates.	Students examine graphs from the scientific literature comparing glycerol content and production in wild type and mutant worms.
Lesson 5: How does a mutation affect *C. elegans* in low and high salt?	Students learn about the genes involved in worm response to osmotic stress, and how single nucleotide mutations can result in significant changes to how worms respond to the environment.	50 min.	--	Class reviews process of transcription and translation; students translate mRNA from wild and mutant worms.
Final Assessment Developing a model to show the effect of salt on *C. elegans*	Students build a model that describes what is occurring during the experiment, and then provide evidence for their claims.	90 min.	--	Students summarize their worm observations and inferences in a paper model.

For more information, please visit: **http://gsoutreach.gs.washington.edu**