POSTER PRESENTATION

THE MICROSCOPIC WORLD OF DIATOMS: A STREAM BIOMONITORING CASE STUDY FOR HIGH SCHOOL SCIENCE CLASSROOMS

Molly Sultany[1] and Rebecca J. Bixby[2]

[1]Northwest Academy, Portland, Oregon 97205 USA
[2] Department of Biology and Museum of Southwestern Biology, University of New Mexico, Albuquerque, New Mexico 87131 USA

For high school students interested in environmental science, diatoms offer excellent insight into watershed health and human impacts on the environment. These microscopic algae have high species diversity, intricate geometry, and, at 20–500 micrometers, a relatively large size, making them easily visible with a compound light microscope and scanning electron microscope (SEM). Studying diatoms as biological indicators immerses students in a compelling exploration of aquatic ecosystems. In this published work, we presented a novel and challenging set of activities that fosters a greater understanding of scientific phenomena aligned with the Next Generation Science Standards (NGSS). This investigation represented a two-year collaboration between a high school science teacher and a diatom researcher, who mentored projects developed by 10th-grade chemistry students in Portland, Oregon. Students designed an experiment to study water quality using diatoms as a biomonitoring tool. Working in groups, students collected benthic diatom samples and surveyed water quality parameters from local streams. Students analyzed diatoms to the genus level utilizing web resources paired with more non-traditional identification techniques including mnemonics and visual associations. With their diatom and water quality results in hand, students applied biotic indices to evaluate the quality of the streams in the context of their research questions. To facilitate success in the classroom, we provided differentiation strategies, including group sizes, timing, and guiding questions for each activity. We also discussed how to extend this lesson plan to include using a SEM in the classroom. This set of activities is aligned with NGSS HL-LS2 Ecosystems: Interactions, Energy, and Dynamics, as well as HS-ESS3 Earth and Human Activity.