

Day 4: Phytoplankton in Your Home

On the final day, we begin with a lesson on the many uses for phytoplankton and seaweeds (often collectively referred to as algae). We discuss some of their derivatives (e.g., agar, alginic acid, carrageenan) and how common these ingredients are in our everyday lives. We discuss the variety of uses, from food to biofuels, for algae.

Prior to class, we select several items that contain algae or algae derivatives to bring to class. These items include toothpaste, shampoo, nori sheets, cupcakes, chocolate milk, juice, and candy bars. The students pass around the nonfood items. Many students are surprised to find out that several of their favorite foods, like ice cream, contain algae or algal derivatives. If this activity is conducted in a science lab, students should be instructed not to eat the food. However, we conduct this activity in a classroom, and the students, with the permission of the teacher, enjoyed sampling the cupcakes and chocolate milk. Teachers should obtain parent permission to avoid food allergies. {insert safety symbol}

For the laboratory portion of the class, students separate into their teams at each microscope.

For this program, the focus was on the oceans and marine phytoplankton.

However, the program could easily be adapted for freshwater, and a water sample could be collected from a pond, stream, or lake. Students receive a small volume of water sample collected locally. **{insert safety symbol}** The students may come in contact with a small amount of water so should be instructed to wash their hands after the laboratory exercise.

The students make their own slides from these samples, which contain both phytoplankton and zooplankton. We ask students to use their knowledge of phytoplankton shapes and sizes to help them discern zooplankton from phytoplankton. Zooplankton are animals and, relative to phytoplankton, are much larger and they often swim rapidly through the water. Furthermore, zooplankton often have visible eyes. We encourage teams to try to find the microorganism pictured on their nametags in their water sample. For example, Team Diatom located several different kinds of diatoms and correctly identified them as phytoplankton. We use a conventional

microscope with camera attachment (an inexpensive camera attachment called the PupilCAM is available from Ken-A-Vision [www.flexcam.com]) to draw the class's attention to interesting organisms. Although all of the students in this class live in an area surrounded by ocean, this is the first opportunity for most students to actually investigate what is in the water that makes up their home environment. This activity is highly engaging and successful, so successful that one student exclaimed, while observing several organisms under the microscope, "This is better than T.V.!"

The learning outcomes for Day 4 are:

Learn that phytoplankton and seaweeds (algae) are used in many ways.

Operate a microscope.

Examine phytoplankton and zooplankton from a local water sample under different magnifications.

Appreciate the diversity of microscopic organisms present in the student's local waters.