



# Plankton Studies

## **Objective:**

While examining ocean caught plankton under microscope, the students will be able to chart the seasonal development of larval invertebrates and monitor for potentially harmful phytoplankton.

## **Concept:**

Students will gain understanding of the presence, diversity, and importance of marine plankton.

## **Materials:**

- ⊙ Net(s) for plankton tow
- ⊙ Containers for samples
- ⊙ Phyto- and Zoo-plankton ID guides
- ⊙ Dissecting microscopes
- ⊙ Compound microscopes
- ⊙ Microscope slides
- ⊙ Dissecting microscopes
- ⊙ Slide covers
- ⊙ Petri dishes
- ⊙ Pipettes/eye-droppers
- ⊙ Lens papers (for cleaning)
- ⊙ Freshwater (for cleaning)
- ⊙ Cloth rag or paper towels (for cleaning)

## **Preparation:**

Prepare microscopes and materials for use. Arrange for a class trip to the coast to tow for plankton, or obtain a sample ahead of time.

Print out Phytoplankton and Zooplankton ID Guides from the Kachemak Bay Research Reserve: [http://www.adfg.alaska.gov/index.cfm?adfg=kbr\\_educationResources.home](http://www.adfg.alaska.gov/index.cfm?adfg=kbr_educationResources.home)

It is important to set expectations for proper and careful use of microscopes and handling of samples. Having many students using microscopes at the same time can be a daunting task.

Providing them with specific directions is crucial. Similar expectations should be set for the use of the plankton nets, which can be torn easily on rocks if not properly used.

## **Introduction:**

Gather plankton net, sample containers, and students.

Ask students what they know about plankton, phytoplankton, and zooplankton.

Discuss their answers and possible misconceptions. Emphasize that plankton is a "lifestyle" of drifting and that not all plankton are microscopic. Being planktonic simply means unable to move horizontally against the currents and tides. Many planktonic organisms can move vertically throughout the water column, and even have some horizontal mobility, but they are still transported primarily by the tides and currents. Give examples like jellies and sunfish/mola mola. A great analogy to use is traveling on a plane or train: you can move around in the aisle, but you are going to end up wherever the plane is going. Similarly, plankton can move around in a section of water, but they are going to end up wherever that water is carried by the currents and tides.

## **Procedures & Activities:**

Decide as a group where to conduct the plankton tow. You may wish to collect samples at various sites. If you do, carefully label the containers with location.

To collect a plankton sample, carefully lower the net into the water until it is just below the surface. It is important that the "cod-end" or small bottle at the end of the net fills with water rather





## Plankton Studies *Continued*

than air. If it is floating, pick up the net until the cod-end fills with water.

Once the cod-end and net are submerged, move the net pole gently in a horizontal direction.

After a few moments, switch and go back the other direction. The goal with the movement is to keep the net just below the surface – too slow and the net sinks down where it can get caught on rocks, too fast and it will come above the water where you won't find any plankton (but probably a good number of small insects).

Have students carefully take turns with the plankton net, making sure to keep it moving so the net does not sink.

If you are collecting samples at multiple locations, make sure the duration and speed of the collection is consistent between locations.

When the sample has been collected, bring the net out of the water. Fill the empty container with salt water and use it to rinse the insides of the net down into the cod-end.

Reach inside the net and carefully pull the cod-end up, emptying it into the empty container. Repeat this same process in different containers for any additional locations.

Return to the microscope lab. Demonstrate the proper use of both dissecting and compound microscopes and show students how to create a slide for viewing. Divide students into groups based on the number of microscopes available.

Assign each group to begin at either a dissecting or compound microscope and provide each group with a petri dish full of plankton sample.

Groups at dissecting scopes are working to identify zooplankton, including invertebrate larvae, by using a pipette to transfer moving organisms from the sample to a clean petri dish or cavity slide.

Using the dissecting scope (and ID Guide), their goal is to identify as many zooplankton organisms from their sample as they can find.

They should sketch and record the names of these organisms in their science notebooks.

Meanwhile, students at compound scopes will examine a few drops of the plankton sample at higher magnification to identify phytoplankton.

Have students record their finds in their science notebooks with a sketch and scientific name of the organism.

Take breaks for the large group to discuss and view examples of invertebrate larvae or potentially harmful phytoplankton that are identified.

After approximately 10 minutes, have groups switch so that those identifying phytoplankton are now working on zooplankton and vice versa.

### **Wrap-up:**

Discuss the organisms students identified.

Determine what type of phytoplankton and zooplankton seem to be most prevalent in the sample.

Ask students to discuss why people might be interested in monitoring plankton. Explain that some plankton, like crab larvae, might be monitored because of their importance to subsistence and commercial fisheries.





## Plankton Studies *Continued*

Other types of plankton can be harmful to human or ecosystem health.

Be sure to record any potentially harmful phytoplankton and explain why this is important. If you see any potentially harmful phytoplankton, contact the Kachemak Bay Research Reserve's Harmful Algal Bloom Program at (907) 235-6377.

### **Extensions & Lesson Connections:**

Compare larval invertebrates discovered as zooplankton with examples of adult organisms. Ask students to identify similarities and differences and discuss why zooplankton might look so different from their adult forms.

Pair this lesson with "Plankton Races" so students can better understand the unique forms and adaptations of plankton.

This lesson also works well as an introduction or follow-up to "Feed the Whales" to help students understand more about the food balleen whales are consuming.

### **Evaluation:**

Review science notebooks for thorough, neat, and accurate plankton sketches. Observe student behavior during plankton tow and microscope lab, noting whether or not they follow directions.

