

Virtual Plankton Investigation



Teacher's Guide

Topic: Plankton

Grade level: 3-5

Partially Aligned Standards

Next Generation Science Standards (NGSS) Performance Expectations:

3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Ocean Literacy Principles:

Principle #5. The ocean supports a great diversity of life and ecosystems.

d. Ocean biology provides many unique examples of life cycles, adaptations, and important relationships among organisms that do not occur on land.

Observe microscopic life and get to the bottom of...the food web! Compare and contrast external structures of plankton. Use scientific reasoning to complete the lifecycle of a mystery animal. Make predictions, investigate, and discover!



Program at a glance

Students will observe zooplankton, investigate the life cycle of a planktonic animal, and discuss the importance of plankton.

Objectives

Students will be able to:

- Define plankton and describe the role they play in aquatic ecosystems
- Identify plankton structures and explain their function
- Draw the life cycle of a marine animal

Skills

Students will gain expertise in:

- Using scientific tools
- Sketching external structures
- Making predictions

Program features:

- Instructions for hatching and observing brine shrimp in the classroom
- Introduction to plankton and plankton research
- In-depth look at the life stages of a mystery animal

Extension activities

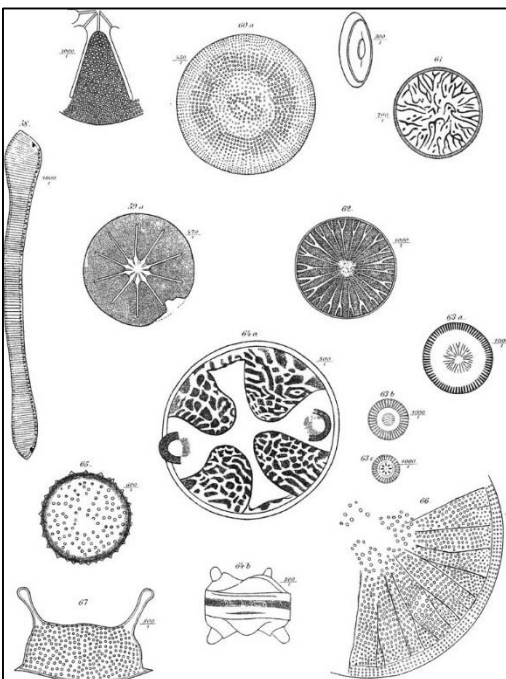
Use these prompts to facilitate further discovery before or after your Aquarium program.

In the Classroom

- Before the program, hatch brine shrimp from eggs. Instructions for hatching brine shrimp are included in this guide. Tools can be checked out from your local STEM Hub. Students can help set up the proper environmental conditions; make observations before, during, and after hatching; and use microscopes to examine brine shrimp up close.
- After the program, continue to observe and care for your brine shrimp. See the brine shrimp instructions for tips and resources. Students can introduce variables, make predictions, and document changes.

At Oregon Coast Aquarium

- Choose an animal that spends at least part of its life as plankton. Research the animal. What does it need to survive in its habitat? Do the juvenile and adult forms look the same or different? Which other animals does it interact with?
- Create a food web. Have each student make a paper chain to represent a food chain that includes an Aquarium animal. Then use yarn to make connections between the food chains. Examine the food web. Where does the energy in a specific link come from? Who are the producers? Who is an apex predator?



Get Outside

- Diatoms, a type of phytoplankton, have diverse shapes and colors. Scientists in the 1800s used to arrange these tiny plant plankton to show off their microscope skills and create works of art. (See examples in [this Smithsonian article](#).) Head outside and create your own nature art. Can you make shapes, patterns, or pictures using natural materials?
- Collect plankton from a local water source near your school (fresh or salt water). Tools can be checked out from your local STEM Hub. Examine plankton structures and discuss how those features might help them survive. How are these plankton similar to the plankton you observed during the Aquarium program? How are they different?

Hatching and Caring for Brine Shrimp

This sheet provides guidelines for hatching and raising brine shrimp. To prepare for your virtual Aquarium program, please start the process two days before your scheduled date. This will give the brine shrimp time to hatch. We've also included information to help care for your brine shrimp after the program.

Materials

¼ teaspoon brine shrimp eggs

2 tablespoons non-iodized salt

1 liter water

Clear plastic container

Microscopes (one per student group)

Petri dishes or similar (one per student group)

Eye droppers (one per student group)

Magnifying glasses (one per student)

Optional: aerator

Tip: Contact your local STEM Hub to check out microscopes and other tools.

Two days before Aquarium program

1. Prepare salt water by stirring 2 tablespoons of salt into 1 liter of warm water (about 80 degrees). Add aerator, if using.
2. Add brine shrimp eggs.
3. Mark the water level on the container. Place container somewhere safe and warm. If the water level drops below the mark (due to evaporation), add warm tap water.
4. Between now and the scheduled program, provide students time to make observations and hopefully see brine shrimp eggs hatching.

Day of Aquarium program

1. Before program starts, divide students into groups and provide each group with a microscope, petri dish, eye dropper, and magnifying glasses.
2. Assist students in using an eye dropper to transfer brine shrimp from the large container to their petri dish.
3. Encourage students to use the microscopes and magnifying glasses to make observations about the brine shrimp. (The virtual Aquarium program will include a short segment where students can make and share observations. However, we encourage you to allow students an opportunity to make extended observations before or after the program.)

After Aquarium program (optional)

1. Place containers in natural light to stimulate algae and bacteria growth. Feeding the brine shrimp is not necessary if these natural food sources are available.
2. An aerator is recommended to ensure adequate oxygen.
3. Add tap water when water drops below the original level.
4. If brine shrimp numbers become too dense (e.g. they are eating the available food too quickly), remove some brine shrimp to another container.
5. Continue to observe brine shrimp growth and changes. If conditions are ideal, brine shrimp grow and reproduce in 2-3 weeks. Individual brine shrimp can live up to six months. However, caring for brine shrimp can be difficult and unpredictable. Your brine shrimp may not survive more than a few days.
6. For more information about raising brine shrimp and experiment ideas, check out these resources:
 - a. <https://www.brineshrimpdirect.com/about-us/online-resources-original/brine-shrimp-classroom/>
 - b. <https://oimb.uoregon.edu/Documents/GK12/GK12-Fifth-BrineShrimp.pdf>