

Build a Plankton Net

Grades:

Grades 6-8

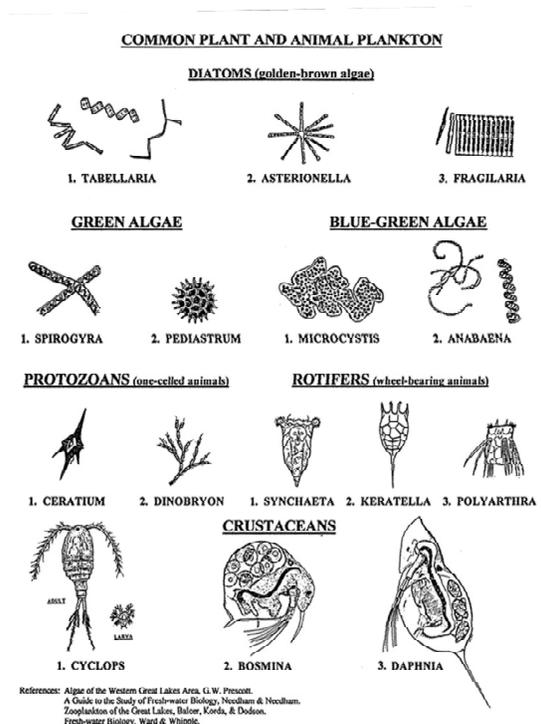
Delaware State Science Standard:

Science Standard 6 – Life Processes

Strand: Matter and Energy Transformations;

Approximate time to complete project: 3-4 hours. This can be broken into two days; 1 hour to build the net and 2 hours to do the net tow and microscopy.

Background Information: Plankton are the tiny plants and animals that drift in water. They can be classified as phytoplankton or zooplankton. Phytoplankton are microscopic plant-like organisms that form the base of the food web in the ocean and other aquatic ecosystems. Like plants, they use the sun's energy to convert carbon dioxide to carbohydrates and generate oxygen through photosynthesis. In fact, phytoplankton are responsible for about 90% of the oxygen in the Earth's atmosphere. Most phytoplankton are found on the surface of the water where they can get the sunlight and nutrients they need for growth. Zooplankton are tiny animals that eat phytoplankton. They form an important link in the food web to transfer carbon from phytoplankton to larger organisms, such as fish. In this project you will make a plankton net. The net is constructed from wire and a nylon stocking to form a funnel-shaped net that is towed through the water. Scientists use plankton nets to trap and concentrate plankton for study.



Preparation: Jewelry wire works well for this project and is very easy to bend. Initially, simply wrap the wire ends around each other and make sure that the stocking fits before sealing with tape. The tape will prevent the sharp ends of the wire from causing damage. Students should work in pairs to make the construction of the net easier, but will likely need some assistance from an adult. To prepare the students for this project, locate images of plankton on the internet or in books to give the students an idea of the different shapes and sizes of plankton. Discussion topics: (i) photosynthesis and (ii) the food web.

Fun Facts:

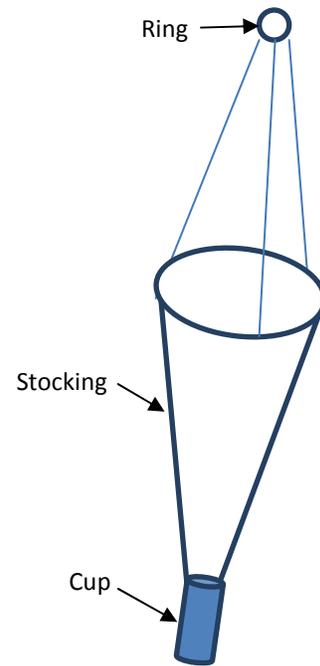
- *If all phytoplankton in oceans were placed end to end, they would form a board 3" X 12" extending from the earth to the moon.*
- *Phytoplankton divide about once per day, so to maintain the size of this board (and not get bigger each day!) the amount of phytoplankton consumed each day is equal to the size of this board.*

Materials and Equipment:

Thin wire, 50 cm (20 in) in length
 Duct tape
 Electrical tape (optional)
 Nylon stocking or a leg cut from panty hose
 Heavy thread and needle
 Top half of a plastic water bottle with cap
 String
 Scissors
 Key ring (optional)

Methods:

1. Bend the wire into a circle. Use the tape to fasten the loose ends together.
2. Roll the mouth of the stocking around the wire ring. Sew the stocking to the wire using the heavy thread and needle. Alternatively, use duct tape to secure the stocking all the way around the wire.
3. Cut off the foot of the stocking, and then place the end of the stocking around the opening of the water bottle, with the cap of the bottle pointed down. Tie the stocking securely to the bottle and use duct tape to reinforce the connection.
4. Use scissors to make 3 tiny holes near the top of the net, close to the wire. Cut three pieces of string, each about 50 cm long, to make the "bridle" to tow your net. Thread them through the holes in the net and tie them around your ring (see figure above). Tie the three strings to a key ring, or tie them together if not using a key ring. Your plankton net is complete.
5. To tow for plankton, tie a length of rope to your bridle and pull your net through the water. Remove your sample by unscrewing the cap of the bottle and drain the concentrated plankton into another container. Collect a second sample of water using a cup or bucket for comparison to the net tow. View your plankton through a microscope.



Analysis: Compare the number of plankton collected by the plankton net to the number of plankton collected by dipping a cup or bucket into the water. Draw a picture of the most abundant plankton you see in your concentrated sample.

Questions:

1. Why did we use nylon stockings to make the net? The holes in the stocking are about 0.2 mm across. Are the plankton you collected in your net larger or smaller than 0.2 mm?

The nylon stockings let water and very small plankton through the holes, but collect everything greater than 0.2 mm in size.

2. What would happen if you made a plankton net out of burlap with 1 mm holes? Would you collect more or less plankton with a net made from burlap than you would collect with the stocking?

A plankton net made out of burlap would let more plankton through and collect only large size plankton in the bottle.

3. How did the number of plankton collected in the plankton net compare to the number collected in the cup or bucket?

The plankton net concentrates the sample, so there are more plankton in the net than in the cup or bucket.

4. Why do you think scientists use plankton nets?

Scientists use plankton nets to concentrate plankton in the water sample. They do this to measure plankton size and abundance, and to see how many different kinds of plankton are in the water. Scientists use this information in many ways, such as to investigate the effects of pollution on plankton or to investigate food webs.

5. Draw a picture here of the most abundant plankton in your sample.

Extra Reading:

“Sea Soup: Phytoplankton” by Mary M. Cerullo

<http://www.youtube.com/watch?v=81hLA14zyc8>

<http://www.youtube.com/watch?feature=endscreen&NR=1&v=9N9K7Melyts>

Plankton Net - a data base of plankton with images (<http://planktonnet.awi.de/>)