

BUILDING A PLANKTON NET

OVERVIEW

Students will build a simple *plankton* net from a nylon stocking, then (optionally) use it to collect plankton in ponds, lakes, streams, bays, oceans, or even aquariums.

CONCEPTS

- Plankton are floating or drifting plants and animals, generally microscopic, that live near the surface of the ocean or other bodies of water.
- Scientists must use special equipment to gather plankton.

MATERIALS

- Microscope (optional)
- For each net:
- 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
 - Small bottle
 - String
 - Scissors
 - Key ring
 - Image of completed plankton net

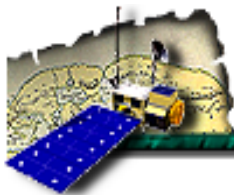


PREPARATION

The activity outlines the construction of a simple plankton net. The students can work in groups, pairs, or alone. Have them bring in the materials that they will need. They may wish to use knee-high stockings. If so, they need to make the wire circle smaller. Make a net to use as a display to help guide the students' construction.

You may choose to tow for plankton in ponds, lakes, streams, bays, oceans, even aquariums. Although you can buy plankton nets from science supply stores, it is cheaper and more fun to have the students make them. Ideally, you could organize a field trip once your nets are finished to gather plankton.

There are several methods that you can use to tow for plankton. The standard method involves pulling the net behind a slowly moving boat. Lower the net vertically into the water until the bottle (at the end of the net) is filled with water. Then pull until the net is extended and begin to tow. After a few minutes, bring the net in and let it hang for a few minutes. Wash all the plankton into the bottle by running fresh water from the outside of the net. You will capture more plankton if the boat moves slowly. If a boat is not available, you can tow the net as you walk along a dock. You can also throw the net from a bridge or a pier into a fast-moving current.



PROCEDURE

Engagement

Plankton are the plants and animals that drift on the ocean's currents and in lakes and rivers. They are abundant in the surface waters where sunlight and nutrients are readily available. *Phytoplankton* are the microscopic plants that convert sunlight and nutrients to starch and other organic matter.

In this activity, you will make a simple plankton net from wire and a nylon stocking [Fig. 1]. The net is a funnel-shaped, fine-mesh net that is towed through the water.

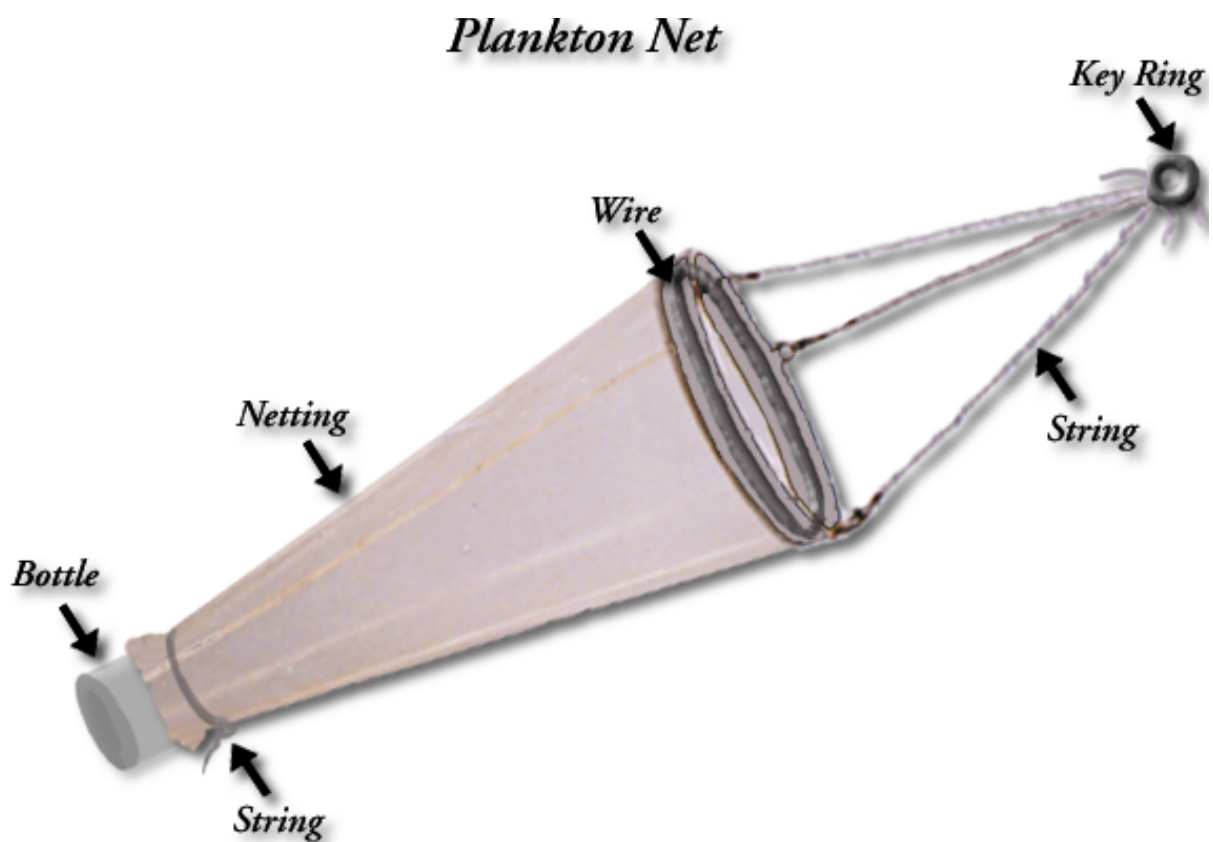
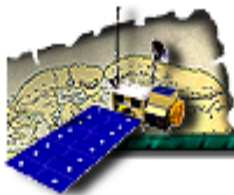


Figure 1. **Plankton net construction.** A simple net can be constructed to capture microscopic plankton. The net is towed using a key ring and three strands of string which are tied onto a wire hoop. The hoop itself holds open a cylinder of fine mesh netting, shaped like a wind sock. The bottom of the plankton net is bound to a plastic bottle with a string. After the net is pulled through seawater, the particles which do not pass through the net will be concentrated and trapped within the bottle.



Visit to an Ocean Planet

Activity

1. Bend the wire into a circle and use the electrical tape or duct tape to fasten the loose ends together.
2. Roll the mouth of the stocking several times 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 outside of the mouth of a small bottle. Use a piece of heavy string to tie the stocking securely to the top of the bottle. Use duct tape to reinforce the connection between the bottle and string.
4. Cut three pieces of string, each about 50 cm long, to make the *bridle* to tow your net. Tie them at equal intervals around your ring. Tie the three loose ends of string to a key ring. This is the bridal ring. Your plankton net is complete [Fig. 1].
5. To tow for plankton, tie a length of string to your bridal ring and pull your net through the water. The plankton will collect in the bottle. Remove the bottle by untying the string. View your plankton through a microscope.
6. Why did we use nylon stockings as part of the net? What would happen if you made a plankton net out of burlap? Why is it important to use a fine mesh when constructing a plankton net?

Explanation

Plankton are the floating or drifting plants and animals that live in the ocean as well as in fresh water. Most can only be seen under a microscope, yet they are remarkably abundant in the world's ocean. It is estimated that phytoplankton, the plant forms of plankton, *photosynthesize* more than all other land and marine plants combined; some scientists place the figure at 90% of all photosynthesis on Earth. This means they also produce most of the oxygen breathed by humans and other animals.

Phytoplankton are also the basis of the ocean *food chain*. They are grazed upon by small *zooplankton* who are in turn, eaten by small fish and other zooplankton.

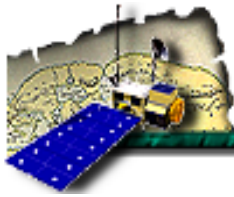
Since most plankton are barely visible to the unaided eye, scientists must use a special net to gather these small creatures. The plankton net is a funnel-shaped, fine-meshed net that is towed through the water. The net **concentrates** the plankton from hundreds of gallons of water that pass through it. Good plankton nets made from nylon or silk can cost between \$300 and \$800.

EXTENSION

During your experiment, you may want to collect another bottle (with known volume) of water without a plankton net. Filter this **non-concentrated** water sample and look at the plankton through a microscope. Compare the amount of plankton to the concentrated sample collected with the plankton net. Based on the volume of the non-concentrated sample, can students guess the volume of water that filtered through the plankton net?

Because plankton are the basis of the ocean food chain it is important to monitor natural as well as human-caused changes in plankton population. Students can adopt an area (lake, stream, or beach area) to monitor plankton concentrations over time. Try to discover which types of seasonal changes affect plankton population. What kind of non-natural processes might help or hurt plankton growth?

You can use plankton collected with these plankton nets in conjunction with the *Plankton Identification* activity.



Visit to an Ocean Planet



LINKS TO RELATED CD ACTIVITIES, IMAGES, AND MOVIES

Image of *Phytoplankton* and *Zooplankton*
Movie of *Plankton net from the R/V Sea Explorer*
Activity *Plankton Identification*

VOCABULARY

bridle

food chain

photosynthesis

phytoplankton

plankton

zooplankton

SOURCE

Adapted from Kolb, James A. Project Director. Marine Science Center. Marine Science Project: FOR SEA. *Marine Biology and Oceanography, Grades Seven and Eight*. Poulsbo, WA. Page 341 - 344.