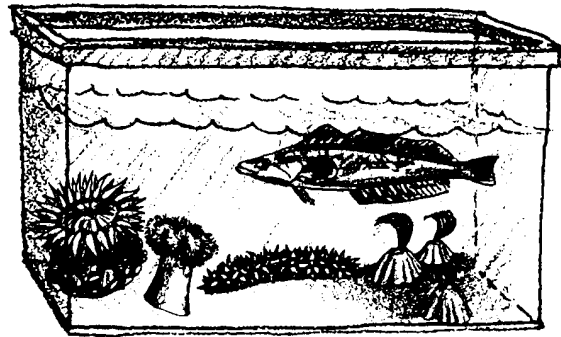


# MARINE AQUARIA IN THE CLASSROOM

From kindergarten to graduate school the marine aquarium arouses interest and enthusiasm. Traditionally, marine aquarium have been very expensive and difficult to operate. Recent technological improvements have reduced the cost and labor involved in maintaining a marine aquarium. As a teacher, you should give every consideration to the establishment



of a marine aquarium in your classroom. Before embarking on a marine aquarium project, some basic questions need to be resolved. These include: How much can I afford (do I want) to spend in time? in effort? A very simple set-up to keep hermit crabs can be had for a few dollars while an elaborate temperature-controlled aquarium can cost a thousand dollars. Regardless of the type of aquarium chosen some facts pertain to all:

## 1. Aquarium tank

Use only tanks made from all glass, plastic, epoxy-coated wood, or fiberglass. No metal edges. While a 10 gallon aquarium may be used in some cases, 20 gallon size is the preferred minimum.

## 2. Sub-gravel filter

A good sub-gravel filter should be employed to help control biological wastes.

## 3. Air pump

You can seldom have too much air. Get a pump with a capacity high enough to effectively run the sub-gravel filtration system

## 4. Gravel filtrant

Use dolomite, crushed coral rock, or crushed oyster shell. Builders gravel has iron and similar materials which will harm or kill marine organisms.

## 5. Thermometer/Hydrometer

Tools useful in determining the salinity and temperature of the water.

## 6. Seawater

Synthetic sea salts may be used to make salt water solutions if you are more than a day's drive from natural seawater.

## 7. Food

Depends upon the type of organism. Use only high quality foods and remove uneaten food from aquarium.

If you buy a marine aquarium kit, instructions for set up will be included. Otherwise, a few hints are given below:

1. Talk to people who have had marine aquaria. (e.g. other teachers, pet shops, etc.) Their assistance can be invaluable.
2. Place the aquarium in desired location, away from direct sunlight but near an electrical outlet.
3. Install sub-gravel filter.
4. Wash gravel in tap water. Spread evenly over the filter.
5. Fill tank with correct amount of water needed to make sea salt solution (follow directions of manufacturer). Or fill to 1 or 2 inches from top with natural sea water if available.
6. Run filtration system for 24 hours to mix solution.
7. Shut off filter. Check specific gravity by floating hydrometer and reading it at the water-line: it should read between 1.021 and 1.023 when the water temperature is 68-77° F (20-25° C). If necessary adjust by adding tap water to lower reading.
8. Run filter for 14 days. Some aquarists recommend placing one or two hardy specimens in the tank for this period. If available, hermit crabs or the like should be added to help condition the water.
9. Add specimens to tank. If you order the animals from a biological supply house they will come with directions. Otherwise, open each plastic bag of specimens in subdued light and float it on top of the water in the aquarium for 15 to 30 minutes. In this period trickle water from the tank into the bags to slowly equalize temperature and salinity. This is the crucial step. Now add animals to tank, one at a time. (If animals act nervous or contract, stop operation until they have adjusted.)
10. The specimens will live several months without being fed, but to keep them healthy adopt a simple, regular feeding program. Feed carnivorous invertebrates (sea anemones, crabs, horseshoe crabs, starfish, etc.) once a week: they take small minnows, shrimp, earthworms, bits of lean beef. Filter-feeders (barnacles, hydroids, sea cucumbers, clams, etc.) eat Daphnia, brine shrimp, algae, protozoa, or dried fish foods. Herbivorous species (sea hares, sea urchins, turban snails, etc.) may be fed lettuce or spinach. Avoid water pollution-remove all uneaten food.

Once the system is operating, care is easy. Each day, a person familiar with the aquarium should check filters and specimens. Dead animals must be removed at once. Add tap water as often as necessary to keep water at level marked. Do not add salt water since this will increase the salinity.

Though sea-salts don't disintegrate, specimens will stay healthier with partial water changes at regular intervals. Suggestion: once a month, add a few gallons of new seawater solution after siphoning off same amount from tank.

For algae control, scrape tank walls every two weeks.

The above suggestions apply to all marine aquarium. If you live in a northern latitude, and want to keep local cold water species, you will need a refrigeration unit of some description. Instructions for home-made units can be found in reference books on marine aquaria. Ready-made refrigerated aquaria are available and expensive.

If after reading the above, you are discouraged, take heart. Hundreds of teachers are operating successful in-class marine aquaria. The technical problems can be overcome. If you feel that it is unquestionably "out of your league" and you cannot obtain help from another source, do not completely forsake the idea. A simple aquarium for hermit crabs can be set up for a very few dollars. Solicit donations of aquarium equipment from students--all glass aquaria are plentiful. Go to a pet shop and buy a hermit crab or two and get instructions on how to keep them alive. It can be fun! At the very least, set up a freshwater aquarium with goldfish or tropical fish so that you can use a living example when you talk about aquatic organisms. Here is a real opportunity to use all that creativity that got you into teaching in the first place. Good luck!

### **Recommended Reading**

James, Daniel E.

*Carolina Marine Aquaria*. Carolina Biological Supply Co., 2700 York Road, Burlington, North Carolina 27215. 1974.

This booklet is available from the above address and offers valuable assistance as well as information for single organisms or complete kits. 24 pages.

King, John M. and Spotte, Stephen

*Marine Aquariums in the Research Laboratory*.

*Aquarium Systems Inc. 33208 Lakeland Blvd., Eastlake, Ohio 44094. 1974*

Describes tank set up and maintenance as well as offering experiments which can be performed using marine aquaria. Also advertises Instant Ocean products. 39 pages.

Straughan, Robert P. L.

*The Salt-Water Aquarium in the Home, 2nd edition. A. S. Barnes and Co. New York 1970.*

A comprehensive reference. 360 pages.