



# Freshwater and Marine Aquariums

## PROJECT PLANNING GUIDE

### OBJECTIVES OF THE 4-H FRESHWATER AND MARINE AQUARIUM PROJECT

1. To learn to set up and maintain freshwater and saltwater aquariums properly.
2. To observe firsthand the body structure, feeding habits, movements, and behavior of marine animals by maintaining a saltwater aquarium.
3. To learn to record daily, weekly, and monthly aquarium maintenance activities and expenses.

#### EXTENSION RESOURCE MATERIALS

Freshwater and Marine Aquariums, 4-H Member's Guide

4-H Wildlife Series - Making a Freshwater Aquarium, SW 447

Please note: Level 1 is for 4-H'ers 9 to 11 years old or for beginners of any age. Age levels are relative since not all youngsters will progress at the same rate. These are some of the things that the 4-H Aquarium Project should teach and participants should do. Other related activities will likely be suggested and are encouraged.

## KEEPING A FRESHWATER AQUARIUM

### LEVEL 1

(9- to 11-year-olds)

Things to Learn	Things to Do
1. How to set up and properly maintain a freshwater aquarium.	1. Set up a freshwater aquarium. <ol style="list-style-type: none"> <li>a. Make a list of all living things in your aquarium.</li> <li>b. Draw your tank and label each piece of equipment.</li> </ol> Keep a daily log charting the following items: <ol style="list-style-type: none"> <li>a. Date.</li> <li>b. 4-H'er responsible.</li> <li>c. Feeding.</li> <li>d. Temperature in aquarium.</li> <li>e. Color of water.</li> <li>f. Cleanliness of tank sides.</li> <li>g. Health check for fish and animals in your aquarium.</li> <li>h. Filters working properly.</li> <li>i. Deaths and births.</li> <li>j. Condition of plants.</li> </ol>
2. How to maintain cost records.	2. Keep a record of all costs. Record each item purchased or made, its use, and cost.
3. Creative writing.	3. Write a short story about a fish or other animal in your aquarium. Pretend you are the animal as you write. Illustrate your story.
4. Practice demonstration methods.	4. Demonstrate how to set up a freshwater aquarium to other 4-H clubs or your class.
5. Sharing responsibility for an aquarium.	5. Set up an aquarium in a restaurant or other public place. <ol style="list-style-type: none"> <li>a. Make a poster telling the public about your 4-H project.</li> <li>b. List the names of the fish and other animals in the aquarium.</li> <li>c. Provide instructions of your own on how to set up and take care of an aquarium.</li> </ol>
6. How to take care of fish properly.	6. Exhibit one or a pair of fish which you have cared for at least 4 weeks.

## KEEPING A FRESHWATER AQUARIUM

### LEVEL 2

(12- to 14-year-olds)

Things to Learn	Things to Do
1. How to observe problems with the aquarium and correct them.	1. Keep a record of all problems you encounter with your aquarium and its inhabitants (equipment failure, fish disease, etc.).  Explain what actions you took and the results.
2. To better understand why inhabitants die and to prevent this in the future.	2. Record all losses as well as: <ol style="list-style-type: none"> <li>a. Date.</li> <li>b. Condition of the tank.</li> <li>c. Symptoms you observed.</li> </ol>
3. Simple breeding techniques.	3. Refer to the library or pet shop for information on fish breeding. Set up a short term breeding experiment. Keep breeding records which include: <ol style="list-style-type: none"> <li>a. Type of fish.</li> <li>b. Date.</li> <li>c. Breeding habits.</li> <li>d. Protection given young and special foods required.</li> <li>e. Number raised.</li> </ol> Exhibit parents and selected young fish.
4. Advanced breeding techniques.	4. Plan a breeding program for a year or more. Breed fish for a specific trait (color or conformation). <ol style="list-style-type: none"> <li>a. Exhibit selected young fish.</li> <li>b. Report on methods for breeding a particular characteristic.</li> </ol>
5. How to raise live food.	5. Raise brine shrimp, daphnia, or other types of plankton to feed fish.  Use two groups of fish. Feed one group live foods, such as daphnia, tubifex worms or brine shrimp. Feed the second group with regular dried food. Record the results. (Important - avoid feeding experiments that deprive food.)

# KEEPING A SALTWATER AQUARIUM

## LEVEL 1

(9- to 11-year-olds)

Things to Learn	Things to Do
<p>1. How to start a saltwater world in a jar.</p>	<p>1. Make a saltwater aquarium out of a gallon jar.</p> <ol style="list-style-type: none"> <li>a. Learn how each piece of equipment is used.</li> <li>b. Collect one or two marine animals for your saltwater world.</li> <li>c. Learn to use a hydrometer. Test the salinity (saltiness) of the water.</li> <li>d. Keep a daily record of your small aquarium. Record:               <ol style="list-style-type: none"> <li>1) Water temperature.</li> <li>2) Salinity.</li> <li>3) Feeding.</li> <li>4) Any changes you see in the animals.</li> </ol> </li> </ol>
<p>2. How to set up and take care of a larger saltwater aquarium.</p>	<p>2. Set up a saltwater aquarium in your home.</p> <p>Take pictures of your aquarium before and after setting it up.</p> <p>Keep daily, weekly and monthly checklists of things you must do to take care of your aquarium and animals. (Refer to project manual for checklists.)</p> <p>Stock your aquarium with fish and invertebrates you collect at the coast or purchase at a pet store. (Avoid tropical species at first since they are more sensitive and harder to maintain.)</p>
<p>3. How to "match molts."</p>	<p>3. Collect a small crab for your aquarium and study its molting (shedding of its shell).</p> <p>Make a display board with the molts from your aquarium to show how crabs grow. Measure them and compare the age of the crab to the size of its molt.</p>
<p>4. Finicky fish.</p>	<p>4. Try an experiment with the animals in your aquarium to see what kind of food they like best.</p>

Things to Learn

5. The housing problem.

6. Hide and seek.

7. Blossoming blobs.

Things to Do

Give them dry fish food, fresh bits of clams and scallops, bits of frozen shrimp or live brine shrimp.

Find out each animal's favorite food. Find out which animals get the food first and how they eat.

Make a finicky fish food chart.

5. Collect some hermit crabs and put them in your aquarium. Put different size shells in with the hermit crabs.

Watch closely to see if they change shells and how they go about it. See if they like one kind of shell better than others.

6. Introduce some hiding places for the critters in your tank. Put in a large whelk shell or a rock with lots of barnacles.

How do the animals like the new hiding places?

Do the animals do anything with the sand or gravel at the bottom of the tank?

Which animals like to hide and which ones like to roam around?

Observe animal activities in your tank during the day. Take notes on each animal. At night, turn the aquarium hood light and room lights off for several hours. Return and observe animal activity. Are some animals more active at night?

Look up the word "nocturnal." Find out which animals in your aquarium display nocturnal behavior in the wild.

7. Put some sea anemones in your tank. Watch what they do.

Does the anemone move or stay in one place? Does it change shape?

---

---

Things to Learn

---

---

Things to Do

8. Predator - Prey - To eat and/or be eaten.

Is the sea anemone a plant or animal? How do you know? Place some food near its tentacles. What happens?

For most small sea animals, brushing against the sea anemones tentacles results in death. Yet, a special fish, called the clown fish, is able to swim and hide among the tentacles. Visit the library and read about the clown fish. Write a report about the strange relationship between the clown fish and the sea anemone. Explain to your club.

8. Do any of the animals in your tank eat each other? Make a list of all the animals in your tank. Draw a food web showing which animal depends on the other for food.

# KEEPING A SALTWATER AQUARIUM

## LEVEL 2

(12- to 14-year-olds)

Things to Learn	Things to Do
<p>1. Life histories of the animals in your tank.</p>	<p>1. Have everyone in your club select an animal in the aquarium. Find out the following facts and any other interesting items about your animal.</p> <ol style="list-style-type: none"> <li>Where it lives.</li> <li>How it is adapted to living where it does.</li> <li>How it reproduces.</li> <li>What sort of protection it has against predators.</li> </ol>
<p>2. How to maintain tropical species in your aquarium.</p>	<p>2. Talk to an aquarium shop owner about the special care required for tropical fish and invertebrates.</p> <p>Maintain an aquarium with primarily tropical saltwater species for at least 3 months.</p> <p>Demonstrate how to set up a salt-water aquarium. Provide other 4-H groups with helpful hints you have learned from this project.</p>
<p>3. How large saltwater aquaria systems work.</p>	<p>3. Visit saltwater aquaria at the NC Marine Resources Centers along our coast or Nature Science Centers across the state. Your leader has a list of centers in "Connections: a Guide to Marine Resources in N.C." Ask for a "behind the scenes" tour of the aquaria. Find out:</p> <ol style="list-style-type: none"> <li>How much work is involved in maintaining large systems.</li> <li>Where saltwater is obtained.</li> <li>How organisms are collected.</li> <li>How "touch tanks" are maintained.</li> </ol> <p>On a family vacation or as a club trip, visit the new "Coral Reef Aquarium" in Baltimore, Maryland (actual living coral, tropical fish, sharks, etc., in huge tanks).</p> <p>For more information write:            Education Department            National Aquarium in Baltimore            Pier 3, 501 E. Pratt Street            Baltimore, MD 21202</p>

Things to Learn	Things to Do
<p>4. How to teach others the art of maintaining a saltwater aquarium.</p>	<p>4. Plan your own slide presentation showing how to set up a saltwater aquarium. Photograph each step in setting up and maintaining the aquarium. Use the slide set to show other groups how to start an aquarium. Refer to 4-H photography manuals for information on how to prepare slide sets.</p>

Prepared by Jaynee Medicott, Extension 4-H Staff Associate

Published by

THE NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE

North Carolina State University at Raleigh, North Carolina Agricultural and Technical State University at Greensboro, and the U. S. Department of Agriculture, Cooperating, State University Station, Raleigh, N. C., Chester D. Black, Director. Distributed in furtherance of the Acts of Congress of May 8 and June 30, 1914. The North Carolina Agricultural Extension Service offers its programs to all eligible persons regardless of race, color, or national origin, and is an equal opportunity employer.