Ocean Animal Aquarium

Collection of Intertidal Organisms
Mini-Marine Ecosystem

Teachers' Guide: Lessons and Activities

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What can you do with an ocean animal aquarium in your classroom? How can you involve the students in its set-up and maintenance? How can you keep the students' interest level high and continue to have the aquarium be a focal point of activities, rather than neglected once the initial novelty wears off? And... *How can you use the aquarium to teach across curriculum areas?*

This teachers' guide is intended to help you with the answers to these questions. What follows are ***suggestions*** for activities and ways to integrate the aquarium into daily classroom activities.

You can pick and choose from the activities and suggestions in this guide. Use what works for you and your class. You are sure to come up with your own ideas.

Before the Tank Becomes an Aquarium: Math Activities

Younger Students K-2

Materials

- empty ten-gallon aquarium
- rulers/measuring tapes
- math materials for exploring properties of rectangles
- ten one-gallon jugs of tap water, displayed where kids can see them

Before beginning: Do not tell the students ahead of time how much water the tank holds

Activities

Students identify:

- each glass side (face) of the tank as a rectangle, with four straight sides, each pair of opposite sides being the same length.
- other objects in the room that are shaped like rectangles.

Students take measurements to find out:

- how long each side of one of the tank's sides/faces is in inches/feet/cm.

Students trace or draw:

- rectangle the same size as one of the tank faces.

Older Students 3-6

- empty ten-gallon aquarium
- rulers/measuring tapes
- several clean, empty, calibrated containers of various sizes (bottles, food tubs, cartons, jugs)
- ten empty, one-gallon water/milk Jugs or 20 two-liter soda bottles

Before beginning: Find out how much the Empty aquarium tank weighs and do not Tell the students ahead of time how much water it holds

Students identify:

- tank as rectangular prism (with a missing face).
- each face as a rectangle.
- three pairs of congruent/equal faces.
- eight edges and vertices.
- the face that will be the base that the tank will sit on to hold water.

Students take measurements calculate:

- the area of each face in square inches centimeters. (*length x width)*
- the volume of the tank in cubic in./ft./cm. (*length x width x depe of the tank in cubieach w*

Students calculate:
- the area in square inches of the rectangles they drew, using tiles or the algorithm *length x width.*

Students predict:
- how full the tank will be when one gallon jug of water is poured into it. (*they can indicate what they think the water level will be by making marks on a strip of masking tape going up the side of the tank.)*

Students observe:
- that one gallon of water is only About one inch deep in the tank.

Students predict:
- how many more gallons it will take to fill the tank with water.

Students observe:
- that it takes a total of ten one-gallon Jugs to fill the tank (*Younger children Are usually amazed that it takes this many.)*

Students test predications using jugs of tap water.

Students identify:
- the number of quarts, pints, cups, and Fluid ounces in one gallon.

Students calculate:
- capacity of tank in qt, pt, c, fl.oz.

Students determine:

Caution! Do not move the tank when it's full of water. It could spring a leak. Scoop out the water before moving it.

Additional topics to explore: Properties of liquids

Setting Up the Aquarium: The Day the Seawater Arrives

Before beginning: *Choose a location for the tank in a cool spot in the room, out of direct sunlight, away from the heater, near an electrical outlet, and where there is ample viewing room for the kids.*

Materials

- the aquarium tank
- under-gravel filter
- tubes that came with the filter
- air pump
- tubing to connect pump to filter tubes
- gang valve (air control valve)
- gravel
- aquarium thermometer

Arrange the aquarium supplies where the kids have a chance to handle them and come up with ideas about what each piece is for, and how all the pieces might go together when the aquarium is set up.

Activities

Younger Students K-2

Students discuss:
- the needs any organism has for survival *(the right habitat, space, food, oxygen, Temperature range, light conditions, Clean environment).*

Students discuss:
- what is needed to make the aquarium tank a good place for the sea organism to live.

Older Students 3-6

Students discuss:
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Students discuss:
- what is needed to make the tank a good environment for the marine organisms

Students discuss:
- the ways the undergravel filter, tubes, pump and gravel might go together to bubble the water and keep it filtered.

Students identify:
- the different pieces of aquarium equipment.

Students discuss:
- how the pieces of equipment might work together to maintain the quality of seawater in the tank.

Students observe:
- as the aquarium is set up, the seawater poured in, and the pump plugged in.

Students discuss:
- what they think is happening to the water in the tank once the pump is plugged in.

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You can explain to the students that the water temperature needs to stay around 65°, because the animals that will be arriving live in apart of the ocean where the temperature ranges from about 40° to 70° during a year. Also, the lower the temperature of water, the more dissolved oxygen it can hold. Oxygen is important to the animals and to the bacteria that make up the biological filter.

Let some volunteers stick a finger in the water to taste it and describe its saltiness.

Students discuss and learn:
- that this water comes from the sea in Woods Hole, Massachusetts.
- that the water of all the oceans of the world is salty.
- that most of the sea animals would not be Able to survive in fresh water.

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The Organisms Arrive

Hopefully, the organisms will arrive when the students can watch as they are put into the aquarium. Follow the directions in the section **Organism Care Upon Arrival.**

Suggested Aquarium Precautions:

- Keep a cover on the tank, such as clear " plexi-glas ".
- Don't let the kids put their hands or anything else in the tank.
- Check often to make sure the pump is always plugged in and running, and that no tubing has become disconnected, especially before leaving for the weekend.
-The animals will last longer if the kids don't handle them.

Younger Students K-2

Older Students 3-6

Questions for discussion while observing the animals go into the tank:
Do the organisms look the way we thought they would?
What will they do when they first are put in the tank? Will they explore?
Will they seem scared? Will they hide?
How will we know when they are hungry?

Students identify the organisms based on what they learned during the previous activities, and by using field guides.

Students create: a poster identifying the animals in the tank, using drawings or pictures cut from magazines.
This poster can be kept near the tank for reference.

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The Aquarium as a Learning Tool Over Time

Some suggested activities:

» Create a slideshow on the computer. Using an application such as *KidPix* or *Powerpoint,* each student can do research about one of the animals in the tank, make a drawing, and record a voice-over of information about that animal.

» Observation Journal. Keep a notebook next to the tank, where students can record their observations and thoughts. It could be a different student's job each day to write something in it, or students could make entries whenever they have something they'd like to write about.

A second grade class recorded the following in an observation journal:

"A starfish was ripped by a sea urchin. Its jaws came out, and pulled at the starfish."
"The seaweed disappeared. The hermit crabs ate it, I think."
"The sea cucumber divided."
"The sea cucumber puffed up."
"I saw a starfish on a clam."
"The brittle stars disappeared. Maybe they were eaten."
"Animals are dying. They're being eaten."
"There is a, dead hermit crab without a shell."
"The sea cucumber is ugly."

Among those that a second grade class came up with:

and similes based on observations of the tank animals. "As snug as a hermit crab in a snail shell."

- Come up with a list of descriptive terms for different ways the animals move; swim, scurry, *sidle, scuttle, scoot,* crawl, whip, ooze, climb. Have the kids use the words in sentences, paragraphs, stories.

- **Library/Research skills** Have students practice using the index and table of contents to find topics and information in a field guide/nonfiction book about marine life. Have them compare which is faster; thumbing through the pages until you see what you're looking for, using the table of contents, or using the index? (Game - say a topic or the name of an organism, see who can find it first in the book and explain which method was used -random thumbing, table of contents, index.)

Social Studies/Geography

- Create range maps to show where some of the organisms live, or to show migration routes of some marine animals (whales, turtles, eels and various other fish, shorebirds, terns, osprey).
- Compare oceans in different climatic areas of the world: polar, temperate, tropical.
- Learn about the effects of ocean currents on events in human history.
- Multicultural: Find out which marine organisms are eaten, and where (seaweed