

Lesson 6: Aquarium

Program Description

A large scale, commercial aquarium is explored. Divers, feeding and cleaning are detailed.

Lesson Plans

Grade Level: 5, 7

Activity Type: Long-Term Post-Video Project

Introduction: This is a long-term project involving setting up a fish tank and analyzing its components in terms of comparing it to a genuine ecosystem. This project will require funds to establish your fish tank.

Background: An ecosystem is a balance between several different factors, both biotic and abiotic. It involves producers such as plants that produce food via photosynthesis. These are usually eaten by herbivore consumers who are then eaten by carnivore consumers. When they die, their body decomposes, aided by decomposing organisms, and recycles nutrients back into the ecosystem to provide for the producers. Water, air and inorganic nutrients are also necessary factors in an ecosystem. Each animal and plant fills an important role, without which the ecosystem would be forced to change or possibly break down. This could happen if a group dies out, if a newcomer species is introduced, or if one group increases to the point of overpopulation. In the long term, other animals would eventually evolve to fill open ecological niches (mammals taking the places that were left empty when the dinosaurs went extinct). In an aquatic ecosystem, inorganic nutrients are often provided by wind and runoff from land, as well as the decomposition of marine animals and plants. This helps both plants and animals, both in the water and on the sea floor. As plants and algae photosynthesize, they draw up CO₂ from the water and release O₂ that the fish need to breathe through their gills. These plants are also eaten by some of the fish for food. These fish, in turn, might be eaten by others. They also excrete waste, which recycles valuable inorganic nutrients back into the water for use by the plants.

Activity: Long-term aquarium set-up project. Students will first analyze what they will need to get in order to begin their aquarium, what role each plant and animal will fill, and then to set up the aquarium and observe the relationships.

Materials: list of plants and fish from a local aquarium shop (must have information about each species), aquarium starter kit (usually includes tank, filter, pump, gravel), plants, fish, gravel, salt, fish food, tank cleaning scrub, siphon, and anything else the aquarium shop recommends

Procedures:

1. Using the list from the store, students should determine what plants and animals they will need. Be sure to take into consideration how each fish acts, what each plant does and what the fish might need to feed. Have students identify each member of the ecosystem that you are setting up. Make sure to fill every niche that is possible (i.e. some sort of algae eater, some sort of bottom feeders, etc.).
2. Purchase the items the class agrees upon for the tank.
3. As the tank is established, periodically have students observe and record the relationships between the different plants and animals in the tank. Compare it with a real marine ecosystem. Which is similar? Which is different?

Modifications: Instead of actually purchasing, if funds are not available, at least get the list of plants and animals and make the analysis.

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**Grade Level:** 5, 7

**Activity Type:** Post-Video Analysis and Comparison

**Introduction:** This analysis is best done after the class has already learned about a marine ecosystem.

**Background:** An ecosystem is a balance between several different factors, both biotic and abiotic. It involves producers such as plants that produce food via photosynthesis. These are usually eaten by herbivore consumers who are then eaten by carnivore consumers. When they die, their body decomposes, aided by decomposing organisms, and recycles nutrients back into the ecosystem to provide for the producers. Water, air and inorganic nutrients are also necessary factors in an ecosystem. Each animal and plant fills an important role, without which the ecosystem would be forced to change or possibly break down. This could happen if a group dies out, if a newcomer species is introduced, or if one group increases to the point of overpopulation. In the long term, other animals would eventually evolve to fill open ecological niches (such as mammals taking the places that were left empty when the dinosaurs went extinct). In an aquatic ecosystem, inorganic nutrients are often provided by wind and runoff from land, as well as the decomposition of marine animals and plants. This helps both plants and animals, both in the water and on the sea floor. As plants and algae photosynthesize, they draw CO<sub>2</sub> from the water and release O<sub>2</sub> that the fish need to breathe through their gills. These plants are also eaten by some of the fish for food. These fish, in turn, might be eaten by others. They also excrete waste, which recycles valuable inorganic nutrients back into the water for use by the plants.

**Activity:** This is a post-video discussion comparing the Great Ocean Tank at the Riverbanks Zoo with a real marine ecosystem.

**Materials:** none

**Procedures:**

1. After watching the video, break the students into small groups.
2. Each group needs to compare the different parts of the Great Ocean Aquarium with a modern marine ecosystem, in terms of what would take the place of the filter, what takes the place of the cleaning, the feeding, etc.

**Modifications:** Students could also compare the Great Ocean Tank with a small classroom tank in terms of equipment and organisms.

## South Carolina Curriculum Standards

### 5.II. Life Science

#### B. Populations and Ecosystems

1. A population consists of all individuals of a species that occur together at a given place and time. All populations live together and the physical factors with which they interact compose an ecosystem.
  - b. Investigate and understand how plants and animals in aquatic/terrestrial ecosystems interact with one another and with the nonliving environment.
4. The number of organisms an ecosystem can support depends on the resources available.
- g. Explore and identify career opportunities in natural resource/environmental/marine science.

### 7.II. Life Science

#### D. Populations and Ecosystems

2. Populations of organisms can be categorized by the function they serve in an ecosystem. All animals, including humans, are consumers, which obtain food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers and decomposers in an ecosystem.
  - a. Analyze the role of producers, consumers and decomposers in an ecosystem.
  - b. Identify kinds of relationships organisms have with each other (predator/prey, competition).
  - c. Analyze energy flow in a food chain and its relationship to a food web.