

Esther Clark Weems

**NAME**

Survival of the Fittest

**LESSON TITLE**

Fourth

**GRADE LEVEL**

Two-one hour class periods

**TIME ALLOTMENT****OVERVIEW**

This lesson plan covers the aquatic ecosystem, coral reef, plankton and underwater animals. Students will research underwater animals and integrate technology into their assignments. Students will create an aquatic ecosystem.

**SUBJECT MATTER**

Science, Reading, Social Studies, and Technology

**LEARNING OBJECTIVES**

Students will be able to:

- \*Explain the importance of an aquatic ecosystem, plankton, and the coral reef.
- \*Discuss the needs of organisms in an aquatic environment.
- \*Read about the role of living and nonliving things in the ocean.

**STANDARDS**

Georgia Quality Core Curriculum (QCC)

[www.glc.k12.atlanta.ga.us](http://www.glc.k12.atlanta.ga.us)

4.1 Asks questions, makes inferences and predictions, uses estimation and measurement, uses evidence to construct explanations, makes sketches and diagrams to explain ideas, organizes data into tables and charts for interpretation, reads and interprets various types of graphs, formulates simple hypotheses, identifies and controls a limited number of variables, and designs a simple experiment.

4.4 Actively engages in the learning process via hands-on/minds-on science activities and experiences. Uses appropriate tools to collect and analyze data and solve problems.

4.23 Describes relationships in living communities, changes that occur, and the impact of these changes. Constructs a model of a food chain/food web. Describes the impact of an interruption in the chain.

4.24 Identifies how matter and energy do or do not cycle in an ecosystem. Describes how matter cycles in an ecosystem (nutrients, producers, consumers, and decomposers) but energy must always be added.

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## MEDIA COMPONENTS

**Marine Biology: Beneath the Caribbean-#102** This PBS video features exciting footage of a tropical ocean ecosystem. The program allows students to observe the startling complexities of life in a tropical ocean ecosystem.

**Coral Reef** This website explores several coral reefs and organisms.

<http://encarta.msn.com>

**Encyclopedia Center** This website provides an enormous amount of information on animals and plants. <http://encarta.msn.com>

**Sounds of the Ocean** This website provides known and unknown sounds of the ocean, like blue whales, fin whales and humpwhales.

[http://www.pmel.noaa.gov/vents/acoustics/specs\\_all.html](http://www.pmel.noaa.gov/vents/acoustics/specs_all.html)

**Underwater Animal Photos** At this website one can view the photos of underwater animals, like bannerfish and killer sharks. <http://www.nationalgeographic.com/animals>

**Aquatic Animals of the Texas Gulf Coast** This website displays pictures of aquatic animals: Red Drum, Spotted Seatrout, Texas Crab, oysters and shrimp.

<http://www.tpwd.state.tx.us/fish/speinfo/specinfo.htm>

**Discovery** This website provides a wealth of information on science and nature.

<http://www.discovery.com>



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## MATERIALS

### LEARNING ACTIVITY 1

#### Per Class

TV with VCR  
Laptop, LCD Projector and Projector Screen

#### Per Group

Computers  
Stapler  
Chart tablet  
Markers

### LEARNING ACTIVITY 2

#### Materials for Learning Activity Two

#### Aquarium

For every four students

One or two gallon-size wide mouth jars or two clear plastic liter bottles  
Scissors  
Markers  
Shoe box  
Ruler  
Washed sand or gravel  
Water  
Dropper  
Floating plants: elodea and duckweed  
Rooted plants with floating leaves  
Submerged plants  
Water snails  
Small fish  
Fish food

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## CULMINATING ACTIVITY MATERIALS

Per Student

8 -4 X 6 index cards or 3 X 5 index cards. Staple cards on the short side.  
Crayons, colored pencils or markers  
Completed copies of Aquatic Animal Information Sheet  
Journals

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## PREP FOR TEACHERS



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## LEARNING ACTIVITY 1 PREP

Bookmark -Sounds of the Ocean and Coral Reef websites.

Staple one set of five index cards for the flip books for each student.

Make copies of Aquatic Animals Information Sheet (one for each student)

Collect models of aquatic organisms (starfish, sharks, whales, eels, seaweed, etc.)

## LEARNING ACTIVITY 2 PREP

1. Mark and cut top portion of the two liter bottles.

2. Prepare water that students will put in their aquaria. Make sure that the water is at room temperature before using it. You can use bottled spring water (not mineral water), water from a clean natural source, such as a pond, lake, stream, or spring or aged tap water. To age tap water, fill a container with cold water from the tap and let it stand uncovered for 24 to 48 hours so that the chlorine gas can escape. You will need to provide 1 to 1 ½ liters (1 to 1 ½ of water for each 2 liter aquarium. All together, that is 33 liters (approximately 8 gal) of water for the students' aquarium.

3. Rinse the gravel thoroughly in prepared water so dust does not make the water cloudy.

4. Wet the paper towels, fan them so they can be picked up easily, and stack them in a pile so they will not dry out. Each pair of students will get two paper towels.

5. Set out materials "cafeteria style" for easy pickup. Remove the lids from the algae jars. Students will use their own droppers to take the algae directly from the jars.

6. Establish a cleanup area.

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## INTRODUCTORY ACTIVITY: SETTING THE STAGE

### STEP 1

Ask your class if they are familiar with any of the following:

"Have you ever been to the ocean?"

"Have you ever been to an aquarium?"

"What animals did you see there?"

### STEP 2

Look at these animals. Hold up aquatic organisms: whales, octopus, fish, duckweed, elodea, sharks, etc. Ask students if they would find these animals in the ocean and name these animals.

Tell students that they will be talking about and looking at underwater or aquatic animals, watching and discussing a video on underwater/aquatic animals, and using the computer to research underwater/aquatic animals. We will be discussing living and nonliving things found in an aquatic ecosystem, like plankton.

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## LEARNING ACTIVITIES

### STEP 3



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Have students to close their eyes. Provide a **FOCUS FOR MEDIA INTERACTION** by telling the students that you are going to play a clip and you want them to listen and describe what they are hearing. Log onto the [http://www.pmel.noaa.gov/vents/acoustics/specs\\_all.html](http://www.pmel.noaa.gov/vents/acoustics/specs_all.html) website. Click on “View all together” Go to Volcanic Seismicity Recorded on Deep Ocean Hydrophones. Click on “Tremor” Click on “wav file” to listen to the sound. Click on “back” at the end of each sound clip. Continue the same process for the Marine Mammals: Humpback Whale Alaska; Man-Made Sounds: Airguns and Unidentified Sound: Train clips. **CHECK FOR COMPREHENSION** by asking the students to describe the sounds they heard after each sound is played.

Let’s take a look at an aquatic ecosystem. Write “Ecosystems” on the board. Ask the class, “What is an ecosystem?” (Accept all responses. “An ecosystem is a community of organisms and its interaction with its environment. Organisms in an ecosystem have dependent and interdependent relationships which can be illustrated by food webs”.)

#### STEP 4

Draw a concept map on the board. Write “ocean” in the top circle. Tell students that oceans cover over two-thirds of the earth’s surface. These salt water bodies also contain much of the world’s plant and animal life. The resources of the world’s oceans are vast, and although ocean water is too salty to drink, the plant and animal resources of the ocean are harvested for food and hundreds of other uses.

We are going to divide the ocean parts: Living and Nonliving things. Write “living” and “nonliving” in the connecting circles on the Ocean concept map. Ask the students, “What living things would we find in the ocean?” (Accept all responses) “How can we classify the shrimp, sharks, fish, and similar things?” (Animals) Write ‘Animals’ under living things on the concept map. How can we classify seaweed and similar things like this? (Plants). Write ‘Plants’ on the concept map under living things.

“What nonliving things would we find in the ocean?” (water, oxygen/air, light) Write these answers in the concept map under nonliving. “We are going to take a look at several underwater organisms in the Caribbean. One of the underwater organisms is so small or microscopic that we are unable to see it is called plankton.”

Provide students with a **FOCUS FOR MEDIA INTERACTION** by asking them to be able to explain what plankton is (the base of the food chain in all oceans) and why it is important (Plankton is microscopic plants and animals that float in seawater and provides the basis of most life in the oceans). (2:52). **START** at the beginning of the video. **PAUSE** the video at the picture of the coral reef. **CHECK FOR COMPREHENSION** by discussing the importance of the plankton in the ocean and coral reef. “What is plankton? (Plankton is microscopic plants and animals that float in seawater.) “Why is it important?” (Plankton is important because it provides the basis of

most life in the oceans.) What might happen if there were no plankton in the ocean?" (Plankton is a kind of floating soup that provides food to the microscopic ocean animals and plants. These microscopic plants and animals are eaten by larger animals, which are then eaten by fish, crustaceans, and mollusks).

## STEP 5

Teacher needs to bookmark

<http://encarta.msn.com/encnet/refpages/RefArticle.aspx?refid=761572186> website and set up laptop computer, projector screen and LCD multimedia projector. Tell students that another important part of the aquatic/underwater ecosystem is the coral reef. Let's take a look at an aquatic ecosystem in a coral reef." Provide a **FOCUS FOR MEDIA INTERACTION** by telling the students to look at the coral reefs. Describe how it looks. How it was formed? Why is it important? (Accept all responses.)" Log on to (<http://encarta.msn.com/encnet/refpages/RefArticle.aspx?refid=761572186>) website. Click on the picture of the coral reef (7 items). View the pictures of the Coral Reef in the Red Sea. Click "Expand" to enlarge the picture and read the caption. Click "back" to return to the previous frame. Continue this same procedure for the Stinging Hydroid Coral, Flamingo tongue, aerial View of Fiji Atoll, Hard Coral Reef, Bulettehead Parrotfish, Starfish and the Lettuce Coral in the Red Sea. **CHECK FOR COMPREHENSION** by having the students to describe the coral reef after each frame. (Accept all responses.).

## STEP 6

Tell students that they will be watching and listening to a video about **Marine Biology: Beneath the Caribbean** which shows several underwater organisms, like hermit crabs, puffer, seahorse, frogfish, eel, marine turtles, dolphins, sponges and other living organisms that live in an underwater ecosystem.

Provide a **FOCUS FOR MEDIA INTERACTION** about the coral reef by asking the students to listen to the description of a coral reef, its significance and how it is formed. (This complex community is centered around the coral reef itself. It is made up of thousands tiny animals called coral polyp.) **PLAY** the video at the beginning. **PAUSE** the video when the narrator says "The coral reef grows larger and larger as it adds calcium carbonate to its skeleton." **CHECK FOR COMPREHENSION** by discussing how the coral reef is formed. **REWIND** and **MUTE** this portion of the video and **REPLAY**. **CHECK FOR COMPREHENSION** by asking the students to explain how the coral reef is formed as the video plays. (In order to build a reef, the coral polyp extract calcium from the sea water and combine it with carbon to form calcium carbonate or limestone. This limestone is secreted layer by layer underneath the colony to build up a skeleton for the coral. Every year the coral reef grows larger as it adds calcium carbonate to its skeleton.)

## STEP 7

**FAST FORWARD** to the video to where the dolphin is vertical in the water. Provide a **FOCUS FOR MEDIA INTERACTION** by having the students to look for additional



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underwater/aquatic animals and select one of these aquatic animals (hermit crabs, sponges and other stationary animals, manatee, stingray, flounder, and dolphins) to research. **CUE, MUTE, AND PLAY** the video where the dolphin is vertical in the water (2:15). **CHECK FOR COMPREHENSION** by asking the students to name the animals shown in the video (hermit crabs, sponges, manatee, stingray, flounder, and dolphins).

### STEP 8

Divide the students into small groups of two to four members at the computers. Have each group select a different aquatic animal to research. Distribute one copy of the Aquatic Animal Information Sheet for each team member. Students must provide the following information on their animal or plant: name of animal or plant, phylum, habitat, food, physical traits and characteristics, life span, interesting facts, location, and special facts. Provide a **FOCUS FOR MEDIA INTERACTION** by having the students to go to the websites and select underwater/aquatic animals to research.

**Underwater Animal Photos** At this website, one can view the photos of underwater animals, like bannerfish and killer sharks. Double click on “For Kids.” Click on “More animals.” Click on Orcas, Sharks, or Dolphins. Click “Fun Facts.”

<http://www.nationalgeographic.com/animals>

**Coral Reef** This website explores several coral reefs and organisms. Type “coral reef” in the search bar. Click “Go”. Click on the picture of Coral Reef: Article-Encyclopedia. Click on “View all multimedia” Double click on the picture. View, expand, and read the captions about each picture. Click “back” to see additional pictures: (Coral Reef in the Red Sea, Stinging hydroid Coral, Flamingo tongue, Aerial View of Fiji Atoll, Hard Coral Reef, Bulettehead Parrotfish, Starfish, and Lettuce Coral in the Red Sea.

<http://encarta.msn.com>

**Encyclopedia Center** This website offers detailed information on numerous animals and plants. Click “Encarta Encyclopedia”. Type the name of the animal you want to research in the “search bar”. Click “GO”. <http://encarta.msn.com>

**Aquatic Animals of the Texas Gulf Coast** This website displays pictures of aquatic animals: Red Drum, Spotted Seatrout, Texas crab, Oysters and Shrimp. Select, click and read the information on the aquatic animals.

<http://www.tpwd.state.tx.us/fish/specinfo/specinfo.htm>

**CHECK FOR COMPREHENSION** by asking one person from each group to share their Aquatic Animals Information Sheet with the class.

### Learning Activity II

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## STEP 1

Ask students the following questions and record their responses to the second question.

“How many of you have an aquarium at home?”

“What would you put into an aquarium?”

“Why would you include those items?”

“Where would you get the supplies you need to survive?”

“Where would we get the supplies we need for the aquarium?”

## STEP 2

Divide students into groups of three or four members and allow one student in each group pick up the materials from the supply table for the aquarium.

## STEP 3

Assemble aquariums.

1. Put one cupful of gravel on the bottom of the aquarium.
2. Use the empty gravel cup to fill your aquarium with water until it is approximately three to four cm from the top.
3. Add 1 or 2 sprigs of elodea in the gravel or let it float freely.
4. Use a spoon to scoop up 10 to 15 duckweed plants.
5. Add three dropperfuls of algae.
6. Add two fish and three snails.
7. Do not place in direct sunlight.

## STEP 4

Students will draw and record their aquariums in their journals.

Students will observe and record their aquatic ecosystems weekly.

## CULMINATING ACTIVITY

Create a group or individual flip books based on the Aquatic Animal Information Sheet.

Step 1-Distribute materials and completed copies of Aquatic Animal Information Sheet.

Step 2- On the first page draw a simple picture. (For example, a frog with its tongue partly out.)

Step 3-On the next page draw the same frog in about the same position with the tongue out a little further.

Step 4-On the next page extend the tongue a little further and have a fly appear in the corner of the page.

Step 5-On the next page have the frogs eyes shift to look at the fly and have the fly move a little closer to the frog.

Step 6-Next slightly change the picture each time.

Step 7-When you are done, flip the pages quickly and you will see the objects move.

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## CROSS-CURRICULAR EXTENSIONS

Art-Students will design a mural of an aquatic ecosystem.

**Reading/Art** Students will create a diorama of their researched animal and include dependent and interdependent relationships.

**Art/Science** Students will design and create an underwater animal poster. Review the importance of ecosystems and how animals are dependent and interdependent upon each other. Students will present poster to the class.

**Technology/Science** Students will create a Powerpoint presentation on researched underwater animals.

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## COMMUNITY CONNECTIONS

Have the class research their community to locate a pond, lake, or wetland near them. If possible, arrange a field trip to visit the area. Afterwards, have groups design and paint t-shirts or bumper stickers to promote saving our underwater animals.

Invite an environmentalist, fisherman, or a scientist from the U.S. national oceanic and Atmospheric Administration to speak to the class.

Have students to research and visit community ponds, lakes or wetlands.

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Handout 1



### Aquatic Animal Information Sheet

Name \_\_\_\_\_ Date \_\_\_\_\_

Directions: Research an aquatic animal.

Name of animal \_\_\_\_\_

Phylum \_\_\_\_\_



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Habitat \_\_\_\_\_

Food \_\_\_\_\_

Physical traits and characteristics \_\_\_\_\_

\_\_\_\_\_

Life span \_\_\_\_\_

Interesting facts \_\_\_\_\_

\_\_\_\_\_

Location \_\_\_\_\_

Draw a picture of the animal.



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