Adaptations for Survival in the Sea

AIMS Multimedia is a leading producer and distributor of educational programs serving schools and libraries for nearly 40 years. AIMS draws upon the most up-to-date knowledge, existing and emerging technologies, and all of the instructional and pedagogical resources available to develop and distribute educational programs in film, videocassette, laserdisc, CD-ROM and CD-i formats.

Persons or schools interested in obtaining additional copies of this AIMS Teaching Module, please contact:

AIMS Multimedia

1-800-FOR-AIMS
1-800-367-2467

Congratulations!

You have chosen a learning program that will actively motivate your students AND provide you with easily accessible and easily manageable instructional guidelines designed to make your teaching role efficient and rewarding.

The AIMS Teaching Module provides you with a video program keyed to your classroom curriculum, instructions and guidelines for use, plus a comprehensive teaching program containing a wide range of activities and ideas for interaction between all content areas. Our authors, educators, and consultants have written and reviewed the AIMS Teaching Modules to align with the Educate America Act: Goals 2000.

This ATM, with its clear definition of manageability, both in the classroom and beyond, allows you to tailor specific activities to meet all of your classroom needs.

RATIONALE

In today's classrooms, educational pedagogy is often founded on Benjamin S. Bloom's "Six Levels of Cognitive Complexity." The practical application of Bloom's Taxonomy is to evaluate students' thinking skills on these levels, from the simple to the complex: Knowledge (rote memory skills), Comprehension (the ability to relate or retell), Application (the ability to apply knowledge outside its origin), Analysis (relating and differentiating parts of a whole), Synthesis (relating parts to a whole), and Evaluation (making a judgment or formulating an opinion).

The AIMS Teaching Module is designed to facilitate these intellectual capabilities, AND to integrate classroom experiences and assimilation of learning with the students' life experiences, realities, and expectations. AIMS' learner verification studies prove that our AIMS Teaching Modules help students to absorb, retain, and to demonstrate ability to use new knowledge in their world. Our educational materials are written and designed for today's classroom, which incorporates a wide range of intellectual, cultural, physical, and emotional diversities.

ORGANIZATION AND MANAGEMENT

To facilitate ease in classroom manageability, the AIMS Teaching Module is organized in four sections. You are reading Section 1, Introduction to the Aims Teaching Module (ATM).

SECTION 2,
INTRODUCING THIS ATM
will give you the specific information you need to integrate the program into your classroom curriculum.

SECTION 3,
PREPARATION FOR VIEWING
provides suggestions and strategies for motivation, language preparedness, readiness, and focus prior to viewing the program with your students.

SECTION 4,
AFTER VIEWING THE PROGRAM
provides suggestions for additional activities plus an assortment of consumable assessment and extended activities, designed to broaden comprehension of the topic and to make connections to other curriculum content areas.

FEATURES

INTRODUCING EACH ATM

SECTION 2

Your AIMS Teaching Module is designed to accompany a video program written and produced by some of the world's most credible and creative writers and producers of educational programming. To facilitate diversity and flexibility in your classroom, your AIMS Teaching Module features these components:

Themes

The Major Theme tells how this AIMS Teaching Module is keyed into the curriculum. Related Themes offer suggestions for interaction with other curriculum content areas, enabling teachers to use the teaching module to incorporate the topic into a variety of learning areas.

Overview

The Overview provides a synopsis of content covered in the video program. Its purpose is to give you a summary of the subject matter and to enhance your introductory preparation.

Objectives

The ATM learning objectives provide guidelines for teachers to assess what learners can be expected to gain from each program. After completion of the AIMS Teaching Module, your students will be able to demonstrate dynamic and applied comprehension of the topic.

PREPARATION FOR VIEWING

SECTION 3

In preparation for viewing the video program, the AIMS Teaching Module offers activity and/or discussion ideas that you may use in any order or combination.

Introduction To The Program

Introduction to the Program is designed to enable students to recall or relate prior knowledge about the topic and to prepare them for what they are about to learn.

Introduction To Vocabulary

Introduction to Vocabulary is a review of language used in the program: words, phrases, usage. This vocabulary introduction is designed to ensure that all learners, including limited English proficiency learners, will have full understanding of the language usage in the content of the program.

Discussion Ideas

Discussion Ideas are designed to help you assess students' prior knowledge about the topic and to give students a preview of what they will learn. Active discussion stimulates interest in a subject and can motivate even the most reluctant learner. Listening, as well as speaking, is active participation. Encourage your students to participate at the rate they feel comfortable. Model sharing personal experiences when applicable, and model listening to students' ideas and opinions.

Focus

Help learners set a purpose for watching the program with Focus, designed to give students a focal point for comprehension continuity.

Jump Right In

Jump Right In provides abbreviated instructions for quick management of the program.

AFTER VIEWING THE PROGRAM

SECTION 4

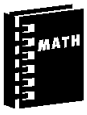
After your students have viewed the program, you may introduce any or all of these activities to interact with other curriculum content areas, provide reinforcement, assess comprehension skills, or provide hands-on and in-depth extended study of the topic.

SUGGESTED ACTIVITIES

The Suggested Activities offer ideas for activities you can direct in the classroom or have your students complete independently, in pairs, or in small work groups after they have viewed the program. To accommodate your range of classroom needs, the activities are organized into skills categories. Their labels will tell you how to identify each activity and help you correlate it into your classroom curriculum. To help you schedule your classroom lesson time, the AIMS hourglass gives you an estimate of the time each activity should require. Some of the activities fall into these categories:

Meeting Individual Needs

These activities are designed to aid in classroom continuity. Reluctant learners and learners acquiring English will benefit from these activities geared to enhance comprehension of language in order to fully grasp content meaning.



Curriculum Connections

Many of the suggested activities are intended to integrate the content of the ATM program into other content areas of the classroom curriculum. These cross-connections turn the classroom teaching experience into a whole learning experience.

Critical Thinking

Critical Thinking activities are designed to stimulate learners' own opinions and ideas. These activities require students to use the thinking process to discern fact from opinion, consider their own problems and formulate possible solutions, draw conclusions, discuss cause and effect, or combine what they already know with what they have learned to make inferences.

Cultural Diversity

Each AIMS Teaching Module has an activity called Cultural Awareness, Cultural Diversity, or Cultural Exchange that encourages students to share their backgrounds, cultures, heritage, or knowledge of other countries, customs, and language.

Hands On

These are experimental or tactile activities that relate directly to the material taught in the program.Your students will have opportunities to make discoveries and formulate ideas on their own, based on what they learn in this unit.

Writing

Every AIMS Teaching Module will contain an activity designed for students to use the writing process to express their ideas about what they have learned. The writing activity may also help them to make the connection between what they are learning in this unit and how it applies to other content areas.

In The Newsroom

Each AIMS Teaching Module contains a newsroom activity designed to help students make the relationship between what they learn in the classroom and how it applies in their world. The purpose of In The Newsroom is to actively involve each class member in a whole learning experience. Each student will have an opportunity to perform all of the tasks involved in production: writing, researching, producing, directing, and interviewing as they create their own classroom news program.

Extended Activities

These activities provide opportunities for students to work separately or together to conduct further research, explore answers to their own questions, or apply what they have learned to other media or content areas.

Link to the World

These activities offer ideas for connecting learners' classroom activities to their community and the rest of the world.

Culminating Activity

To wrap up the unit, AIMS Teaching Modules offer suggestions for ways to reinforce what students have learned and how they can use their new knowledge to enhance their world view.

VOCABULARY

Every ATM contains an activity that reinforces the meaning and usage of the vocabulary words introduced in the program content. Students will either read or find the definition of each vocabulary word, then use the word in a written sentence.

CHECKING COMPREHENSION

Checking Comprehension is designed to help you evaluate how well your students understand, retain, and recall the information presented in the AIMS Teaching Module. Depending on your students' needs, you may direct this activity to the whole group yourself, or you may want to have students work on the activity page independently, in pairs, or in small groups. Students can verify their written answers through discussion or by viewing the video a second time. If you choose, you can reproduce the answers from your Answer Key or write the answer choices in a Word Bank for students to use. Students can use this completed activity as a study guide to prepare for the test.

CONSUMABLE ACTIVITIES

The AIMS Teaching Module provides a selection of consumable activities, designed to specifically reinforce the content of this learning unit. Whenever applicable, they are arranged in order from low to high difficulty level, to allow a seamless facilitation of the learning process. You may choose to have students take these activities home or to work on them in the classroom independently, in pairs or in small groups.

CHECKING VOCABULARY

The Checking Vocabulary activity provides the opportunity for students to assess their knowledge of new vocabulary with this word game or puzzle. The format of this vocabulary activity allows students to use the related words and phrases in a different context.

TEST

The AIMS Teaching Module Test permits you to assess students' understanding of what they have learned. The test is formatted in one of several standard test formats to give your students a range of experiences in test-taking techniques. Be sure to read, or remind students to read, the directions carefully and to read each answer choice before making a selection. Use the Answer Key to check their answers.

ADDITIONAL AIMS MULTIMEDIA PROGRAMS

After you have completed this AIMS Teaching Module you may be interested in more of the programs that AIMS offers. This list includes several related AIMS programs.

ADDITIONAL READING SUGGESTIONS

AIMS offers a carefully researched list of other resources that you and your students may find rewarding.

ANSWER KEY

Reproduces tests and work pages with answers marked.

Adaptations for Survival in the Sea

THEMES

The ocean is a difficult environment in which to live. The organisms that live in the ocean have evolved many adaptations to ensure their survival. To survive, animals must develop means of feeding, defense, and reproduction. Animals' adaptations for survival include camouflage, coloration, speed, schooling, symbiosis, colonization, dangerous spines or venom, hiding, scavenging, and filtering. Each animal has its place in the food chain. The natural outcome is that survivors mate and pass on their successful genes to the next generation.

OVERVIEW

Through underwater footage shot in the wild, this program surveys some of the fascinating adaptations used by organisms who live in the ocean. Viewers get diver's-eye views of sea creatures who camouflage themselves, imitate other creatures, bury themselves, change color instantly, flash warning or mating colors, and swim in schools. The program shows several curious examples of symbiosis—different animals who live together, usually in mutual dependence. Viewers get a close look at a coral reef and at tiny, one-celled plants that live among the coral and make the coral look like plants. Tiny fish called gobies serve as the eyes of the blind shrimp, in return for living space in the shrimp's burrow. Some animals' adaptations are quite dangerous to other animals, such as sharp spines and venomous spikes. The most venomous of these fish are dangerous enough to injure sharks and human divers. Fortunately, these animals attack only when they are harassed or directly stepped on. Stinging spikes and bristles are other means of defense that sea creatures have adapted. Other ocean animals have adaptations that allow them quick retreat and escape, a means of hiding or desirable feeding time. Choice of foods is another form of adaptation. Some animals are predators, while others are scavengers or parasites. Still other animals filter their food from ocean water, feeding on plankton and other microscopic organisms. Every animal has a food source and a means of defense. The natural outcome is that the survivors mate and pass on their successful genes to the next generation, who, through evolution, will continue the cycle of adaptation for survival.

OBJECTIVES

- to explore the life forms, especially the animals, of the ocean
- to show how plants and animals have adapted to their environments by developing characteristics that enable them to protect themselves, find food, and reproduce
- to define and demonstrate camouflage, the ability to hide by blending with the back-ground
- to define and demonstrate symbiosis, relationships between two different organisms, usually to their mutual benefit
- to describe and demonstrate some of the means of defense, such as venomous spikes and painful bristles, that organisms have developed for their defense
- to show how ocean organisms survive at different levels of the food chain
- to identify the natural outcome of adaptation: animals with more favorable characteristics have a greater change of surviving and passing on their genes to the next generation.

Use this page for your individual notes about planning and/or effective ways to manage this AIMS Teaching Module in your classroom.

Our AIMS Multimedia Educational Department welcomes your observations and comments. Please feel free to address your correspondence to:

AIMS Multimedia
Editorial Department
9710 DeSoto Avenue
Chatsworth, California 91311-4409

INTRODUCTION TO THE PROGRAM

Inform students that they are about to get a fish-eye view of life in the ocean. Ask students to locate the oceans on a map or globe, and to review what they know about the plants and animals that live underwater. Ask students some "teaser" questions. Instead of answering out loud, have students write down and date their answers. Challenge them to check their answers later as they do the Vocabulary activity and watch the program.

Questions: Do fish sleep? (Answer: Yes.) The biggest creatures in the ocean are meat-eaters—true, or false? (Answer: False. Some large creatures, such as the manatee and balleen whale, are filter feeders or plant eaters.) Why do some fish swim in schools? (Answer: To confuse their enemies through sheer numbers.) In the ocean food chain, which animals are predators and which are prey? (Answer: All are both.)

The following items, arranged in a study center, would be useful in stimulating student interest in the ocean: science picture books on the oceans, coral reefs, and salt-water aquariums; a small salt-water aquarium; a collection of corals, shells, dried starfish, sand, driftwood, and other items from the ocean; travel brochures and posters offering underwater reef-watching adventures; slides, videos, and photographs from vacations or scientific explorations to ocean areas; map showing locations of oceans around the world, models of ocean-going and underwater exploration vehicles.

INTRODUCTION TO VOCABULARY

Note: The following word-study strategy helps students answer the "teaser questions." Therefore, you might want to assign the work before the program, have students check themselves during the program, and ask them to report to the class after the program. If you follow this plan, be sure to have students give examples from the program, using the key words in their group.

Have students or word-study teams define these groups of words for the class, with the help of a dictionary if needed. If a word has multiple meanings in the dictionary, students should identify the meaning they think they will see and hear in *Adaptations for Survival in the Sea*.

(a) attack, defend, protect, feed, mate; (b) symbiosis, mutualism, colony, parasite, benefit; (c) polyps, skeleton, tentacles, colonies, coral; (d) tentacles, spine, gills, claws, antennae; (e) camouflage, aposematic coloration, venom, spikes, stings

DISCUSSION IDEAS

Ask students to identify the environment that covers two-thirds of the earth: *t*he ocean. Have them share their impressions, gained from books, movies, and television of what underwater ocean life is like. If any students have visited a large public aquarium, natural science museum exhibit, or other display of live ocean animals, ask them to describe the creatures they saw. Make a chalkboard chart of ocean animals and their characteristics, and challenge students to watch for those animals in the program.

FOCUS

Suggest that students keep the title of the program in mind as they watch, since it contains the three key words: *adaptation, survival,* and *sea.* Encourage them to note and list different kinds of adaptation, how each adaptation aids survival, and how each animal uses the other creatures in the sea.

JUMP RIGHT IN

HOW TO USE THE ADAPTATIONS FOR SURVIVAL IN THE SEA AIMS TEACHING MODULE

Preparation

- Read *Adaptations for Survival in the Sea* Themes, Overview, and Objectives to become familiar with program content and expectations.
- Use Preparation for Viewing suggestions to introduce the topic to students.

Viewing ADAPTATIONS FOR SURVIVAL IN THE SEA

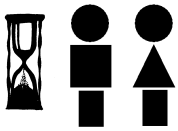
- Set up viewing monitor so that all students have a clear view.
- Depending on your classroom size and learning range, you may choose to have students view *Adaptations for survival in the Sea* together or in small groups.
- Some students may benefit from viewing the video more than one time.

After Viewing ADAPTATIONS FOR SURVIVAL IN THE SEA

- Select Suggested Activities that integrate into your classroom curriculum. If applicable, gather materials or resources.
- Choose the best way for students to work on each activity. Some activities work best for the whole group. Other activities are designed for students to work independently, in pairs, or in small groups. Whenever possible, encourage students to share their work with the rest of the group.
- Duplicate the appropriate number of Vocabulary, Checking Comprehension, and consumable activity pages for your students.
- You may choose to have students take consumable activities home, or complete them in the classroom, independently, or in groups.
- Administer the Test to assess students' comprehension of what they have learned, and to provide them with practice in test-taking procedures.
- Use the Culminating Activity as a forum for students to display, summarize, extend, or share what they have learned with each other, the rest of the school, or a local community organization.

SUGGESTED ACTIVITIES

Meeting Individual Needs



20 Minutes

In general class discussion, make sure students can define the word ocean and locate the oceans on a map or globe. Ask students to tell how ocean water is different from the water we drink—it is salty. Students who don't know these basic facts should be directed to encyclopedia articles, picture books, maps and globes, and other easy-to-understand materials on the ocean.

Cultural Awareness

30 Minutes

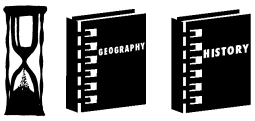
If you have students who speak Spanish, Portuguese, French, Italian, or Romanian, congratulate them on having a natural advantage in understanding the words in this program and in other scientific materials. The reason: all those languages are based on Latin, the language of the ancient Romans, from which English gets many of its scientific terms. You might want to have students who speak Romance languages add words from those languages to the exercise "Vocabulary: Latin Word Roots" on consumable page 12.

Cultural Awareness and Critical Thinking

320 Minutes

Ask the class to identify the citizens of the United States who have the longest history of living surrounded by the ocean. (Answer: Native Hawaiians, Alaskans, Samoans, Borinquens, Caribs, and other Pacific Ocean and Caribbean peoples) Elicit students' impressions of what life was like among those peoples in ancient times. How did they adapt to survive in the sea? Assign interested students to do further research and report to the class on oceanic human life. Encourage students who have emigrated from or visited their families in Japan, the Philippines, Indonesia, Puerto Rico, and other island nations to add their observations to class discussion and group reports.

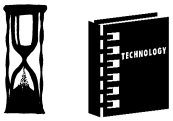
Connection to Geography and History



60 Minutes

Ask students or study groups to choose a part of the United States or another place on earth where people live on islands surrounded by the ocean, and then to choose one of these projects: (a) Research and report on traditional societies at the place of choice, focusing on how people provided themselves with food, clothing, and shelter and how they interacted with the ocean. (b) Construct a time line showing important human events at the place of choice. Time lines should include data about the first human inhabitants, later arrivals, the first European explorers and settlers, the development of industry, and the most recent new human residents.

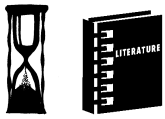
Connection to Technology



120 Minutes

Machine-minded students who might not otherwise be good readers can be lured into libraries through technological and military reference books, such as Jane's Ships. Encourage interested students to research ships used by humans for oceanic research and underwater exploration, to draw plans and pictures of such vehicles, and to design underwater vehicles of their own based on what they have learned.

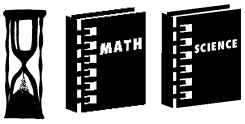
Connection to Literature



Extended Time

Encourage students to read, report on, and dramatize Jules Verne's *Twenty Thousand Leagues Under the Sea* and other stories that take place on or under the ocean. Younger students will enjoy the legends of *Davy Jones' Locker* and *The Little Mermaid*. Older students and advanced readers can tackle *Two Years Before the Mast,* by Charles Dana, and *Moby Dick*, by Herman Melville. Film or video versions of these oceangoing classics should not be overlooked.

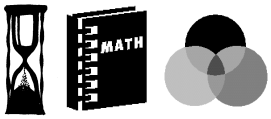
Connection to Math and Science



120 Minutes

Assign individual students or math study groups to research the weights of various ocean animals and to graph their findings so that these weights can be compared at a glance. Encourage students to imagine creative units for measuring zooxanthaellae and other microscopic organisms.

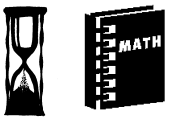
Connection to Math and Cultural Awareness



60 Minutes

Oceanic and coastal traditional societies often used shells for money. Like all early peoples, they also bartered for many of the things they needed. Encourage younger or less advanced math students or study groups to research and dramatize a traditional island market, using their role playing to present story problems to the class. Among items that can be traded are shells, coconuts, tropical fruits, various kinds of fish, feathers, hats, ropes, sandals, and other items made of palm fibers, and carved driftwood sculptures. Students need not gather the actual items: they can create picture flash cards of the items to use in the market. Encourage students to develop units of measurement as part of this barter.

Connection to Math



120 Minutes

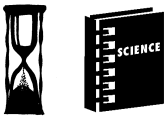
Assign older and more advanced math students or study groups to research, compare, and graph the costs of doing the following: (a) building and maintaining a state-of the-art salt-water aquarium for a house or classroom; (b) training and equipping someone to go scuba diving; (c) building and operating an oceanic research vessel, including its attached underwater research vehicles and communications equipment; (d) maintaining and operating the United States Navy and Coast Guard.

Hands-On

1/2 day

Arrange for your class to visit a large public salt-water aquarium or to see a smaller commercial aquarium in person. Tip: Check out seafood restaurants, among which salt-water aquariums are increasingly popular. A local pet store is also a good place to start looking for a salt-water aquarium enthusiast who will enjoy demonstrating the hobby to your class.

Connection to Science



60 Minutes

Have younger or less advanced science students or study groups construct and draw food chains and webs in the ocean environment. Students should display their webs on large posters or bulletin board charts, and be prepared to answer questions about their webs from the rest of the class.

Connection to Science and Critical Thinking

120 Minutes

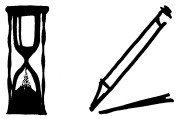
Discuss ways in which people are part of the ocean's food chains, food webs, and cycles. What earns humans the title of "the largest ocean predator"? Discuss the technology of commercial fishing and ask students to speculate on how such large-scale human efforts might affect the ocean environment. Encourage interested students to do further research, perhaps as part of a "Link to the World" study group.

Link to the World and Critical Thinking

30 Minutes

Assemble these supplies: • One or more empty, ready-to-draw-on maps of the world, large enough to fill a poster or bulletin board. You might want to have student artists make tracings from large classroom maps. • Markers in bright colors, one color per study group. • A set of encyclopedias or collection of books related to the following topics. Divide the class into study groups. Have study groups: (a) locate the major offshore oil- and natural gas-producing regions of the ocean; (b) locate the major ocean currents and shipping lanes for today's supertankers and other large ships; (c) locate the major island groups, continental faults, earthquake and volcano zones in the ocean; (d) locate major shipping ports, large river deltas, wetlands, and other geographical features along the coasts. (e) Locate the major fisheries of the oceans and identify the kinds and quantities of fish that are caught there. Complete the class map. Have each group draw what they've learned onto the large map and add a label to the map key. Draw conclusions: Lead a general class discussion on (a) reasons why oceans are threatened environments; (b) ways in which people depend on the oceans. Ask for suggestions on how human activity might change so that we might both protect the seas and meet human needs

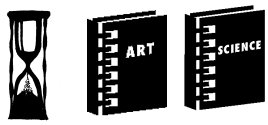
Writing



30 Minutes

Suggest that students write stories, poems, or songs about animals and plants that live in the ocean, encouraging them especially to imagine the world from another organism's point of view. What does mealtime feel like for a filter feeder? What if you got your oxygen from the plants who grew inside your wrinkles? Or had little creatures with stinging tentacles living on your back? What might fish learn in a school?

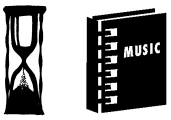
Connections to Art and Science



Extended Time

Ask a team of students to draw and paint a large mural depicting the organisms in the ocean. Student artists might want to make the mural on a long roll of paper that can be wound on scrolls, or on a series of posters that make a bigger picture, for dramatic presentations in other classrooms or at assemblies. Another art idea: Construct a giant cross-section mural in a stairwell, so that spectators can descend from the surface of an island down to the ocean floor as they climb down the stairs. Remember: the ocean floor slopes down from the beach and then drops off at the edge of the continental shelf.

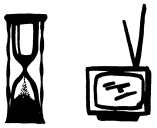
Connection to Dance and Music



120 Minutes

Encourage students to compose, practice, and perform original and folk music about the ocean. Students can learn old sea shanties and ballads from books of folk music. They might also want to set their own words to these old tunes. Don't overlook love songs, patriotic songs, and hymns with nautical themes.

In the Newsroom



120 Minutes

Ask students to imagine that a small group from your class has just returned from an ocean voyage around the world. You might want to choose the group by lottery, or have students count off. Assign this group the roles of ocean adventurers. Ask them to imagine a newsworthy vessel in which they made their voyage. If you have video equipment, have students act out and record an in-depth newscast of the event, including interviews with the adventurers. Other students can play the roles of relatives welcoming the adventurers home, people from island cultures who met the voyagers, expert scientific commentators, as well as on-camera reporters. If you don't have video equipment, have students write screenplays of newscasts, including descriptions of what the camera should see. Students might also used the maps, charts, posters, and murals from the above activities to illustrate points in their newscasts.

Culminating Activity

1/2 a Day

Plunge your classroom-or at least one wall of it-underwater and invite students from other classrooms in to see the underwater world. The trick: a clear or slightly opaque plastic curtain between the viewer and the display area. Shower curtains and plastic painter's drop sheets are excellent. String clotheslines or borrow tall metal coat racks from which to hang the curtains. Hang small glittery and iridescent paper fish and other organisms between the bulletin board and the curtain. Wrap bulletin board posters in clear but iridescent wrapping paper. Encourage imaginative ways to look at displays as if through water. In other parts of the classroom, display small salt-water aquaria, shells, driftwood, and other ocean artifacts.

Name

VOCABULARY

The words below are from *Adaptations for Survival in the Sea*. Read the words and their definitions. Then, on the back of this page or on a separate sheet of paper, write a sentence for each word, or write short paragraphs that use all the words.

1. adaptation: a change in an organism's genes that increases the chances its species will survive
2. aposematic coloration: bright coloration intended to warn predators away
3. camouflage: coloring that protects by blending into the background
4. marine: having to do with the sea
5. nocturnal: having to do with the night; active at night
6. parasite: an organism that lives on or in another organism, usually harming its host
7. photosynthesis: the process by which plants convert sunlight to oxygen and sugars
8. plankton: microscopic plants and animals that float in ocean water
9. predator: an animal that kills other animals for food
10. prey: an animal that is eaten by a predator
11. scavenger: an animal that feeds on remains left by other animals
12. symbiosis: a partnership between two or more different organisms

Name

VOCABULARY: MULTIPLE MEANINGS

These words have at least two meanings. From the list of definitions below, choose one or more meanings for each word. Write a number in each blank. Clue: All the missing definitions were seen or heard in the program *Adaptations for Survival in the Sea.*

Words with Multiple Definitions

burrow (a) _____; (b) _____
cell (a) _____; (b) a locked room for prisoners
digest (a) _____; (b) a summary or shorter version of a written work
sponge (a) _____; (b) [Slang] a person who lives unfairly off of others
school (a) a place of learning; (b) _____
skate (a) _____; (b) _____
tissue (a) _____; (b) a thin piece of paper
venom (a) _____; (b) spite or ill-will

Definitions

1. poison
2. to hide or dig down into the earth
3. a group of fish that swim together for protection
4. a hole dug by an animal
5. to break down and absorb food
6. to glide, roll, or skim smoothly along
7. a group of cells that work together
8. a filter feeder that inhales food from water
9. a triangular, gliding, burrowing relative of the shark
10. the basic building block of living things

Name

VOCABULARY: LATIN ROOTS

Many science words come from Latin, the language of the ancient Romans. This chart shows the Latin origins of some of the words in the program. Read the chart carefully. Notice how English words are formed by combining Latin prepositions and verbs. Then complete the chart by writing words from the Word Bank in the blank squares.

Latin prepositions	Latin verbs	Program verbs	Other words
ad-: toward, in the direction of	trajere; to pull or draw aptare: to fit		detract adaptations
contra-, con-: off, against	confundere: to throw off		confound
de-: out of, from	fendere: to strike		fender
ex-, e-: from, down, away	excernere: to sift out, discharge		expel
in -: within, into, in	jactare: to throw		
pro -: forward, forth before	tegere: to cover trudure: to thrust, push		detect intruder
re-: backwards	flectere: to bend		deflect
super-, sur-: over, above, on top	vivere: to live		

WORD BANK

adapt, adaptations	inject	protrude
project, projections	confuse	reflex
defend, defense	survive	excrete
protect, protection		

Name

CHECKING COMPREHENSION

Read each question. Then cross out the word or phrase that is NOT a correct answer. Cross out one or two answers for each question.

1. Which of these terms describes creatures with different ways of getting food?

   bottom feeders
   scavengers
   prey
   filter feeders
   predators

2. Which of these words mean that organisms are living together?

   antennae
   colony
   symbiosis
   school
   mutualism

3. Which of these ocean creatures are large?

   shark
   octopus
   manatee
   plankton
   human divers

4. Which of these creatures are small?

   plankton
   algae
   polyps
   manatee
   zooxanthaellae

5. Which of these ocean creatures have claws?

   hermit crabs
   blind shrimp
   remora
   northern lobster
   stonefish

Name

CHECKING COMPREHENSION (CONTINUED)

6. Which of these organisms are ocean animals?

   zooxanthaellae
   blind shrimp
   shark
   pilot fish
   sea horse

7. Which of these organisms are ocean plants?

   zooxanthaellae
   seaweed
   algae
   stonefish
   coral

8. Which of these creatures use camouflage to protect themselves?

   sea horse
   angelfish
   frogfish
   shark
   stonefish

9. Which of these ocean creatures have tentacles or sharp spines?

   stonefish
   sea urchin
   lion fish
   manatee
   jellyfish

10. Which of these animal parts does not stick out from the body?

    antennae
    spines
    tentacles
    dorsal fin
    chromatophore

Name

RECALLING DETAILS FROM THE PICTURES

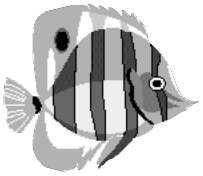
Read each general statement from the program. Think back to what you saw after those words were spoken. Complete each drawing from memory. Then watch the program again to see if your memory was correct. This is great scientific training!

PROGRAM: Among the adaptations for survival in the sea, camouflage is one of the most common and widespread.

draw an animal camouflaged against its background.

PROGRAM: Many species of fish prefer to swim together in schools.

Draw more fish like this one, to create an entire school of fish.



PROGRAM: Coral is a colonial organism.

Copy this coral polyp many times, to create an entire coral reef.

Name

RECALLING DETAILS: NAMES AND OBSERVATIONS

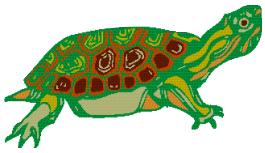
Many words and pictures flashed by you as you saw and heard how organisms have adapted to life in the ocean. How well do you remember details from the program? Match each creature to its description.

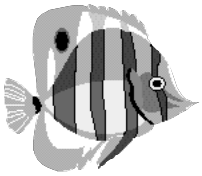
_____ 1. angelfish	a. very large predator, light on bottom, dark on top, spearlike nose
_____ 2. frogfish	b. small fish, eats shark parasites, is carried along by shark
_____ 3. goby	c. clear bloblike floating animal with stinging tentacles
_____ 4. jellyfish	d. creature with delicate gills that vanishes instantly into its hole
_____ 5. octopus	e. triangular, large, flat, shark relative, buries itself in sand
_____ 6. remora	f. egg-shaped creature, protected by armorlike spikes
_____ 7. sea anemone	g. fish that looks like sponge, fishes with built-in lure, tongue
_____ 8. sea urchin	h. world's most venomous fish, has sharp spines on dorsal surface
_____ 9. shark	i. flowerlike invertebrates with stinging cells on long tentacles
_____ 10. skate	j. small, fast fish, brightly colored to attract mates
_____ 11. tube worm	k. large, multiple armed, can change color instantly
_____ 12. stonefish	l. fish that serves as eyes for, shares burrow with, blind shrimp

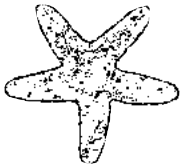
Name

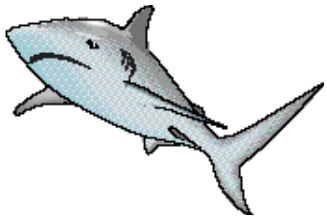
OBSERVING AND DESCRIBING ANIMALS

Here are some of the organisms that appeared in *Adaptations for Survival in the Sea*. Match each picture to one of the names from the Word Bank below. Then, on a separate sheet of paper, write a description of one of these animals, based on what you see in the picture and what you saw and heard in the program.









Word Bank		
angelfish	marine turtle	starfish
sea horse	shark	dolphin

Name

TEST

Underline the correct answer to each of these questions.

1. In order for its species to survive, an animal needs:

    a. food.
    b. protection.
    c. reproduction.
    d. defense.
    e. all of the above.

2. The sea raven, sea horse, frogfish, skate, and octopus all protect themselves by:

    a. quick escape.
    b. camouflage.
    c. chromatophores.
    d. looking like other organisms.
    e. vanishing quickly into their holes.

3. What is aposematic coloration?

    a. dyeing hair or fibers using seaweed and other ocean organisms
    b. coloring that can change instantly
    c. coloring that blends into the background
    d. coloring that warns other animals to stay away
    e. changing color to match nearby animals

4. Some kinds of fish swim in schools, which enables them to:

    a. change color quickly.
    b. be carried along by sharks and other large predators.
    c. hide at night.
    d. use sunlight to produce sugars and oxygen.
    e. confuse their predators with sheer numbers.

5. The relationship in which two different organisms live with and benefit each other is called:

    a. photosynthesis.
    b. zooxanthaellae.
    c. mutualistic symbiosis.
    d. scavenging.
    e. aposematic coloration.

Name

TEST (CONTINUED)

6. Which of these creatures is a plant eater?

    a. manatee
    b. grey reef shark
    c. northern lobster
    d. frogfish
    e. hermit crab

7. What do you call an individual coral organism?

    a. a colony
    b. a polyp
    c. a reef
    d. a tentacle
    e. a chromatophore

8. Although most coral polyps live in one place, they capture food by:

    a. cleaning parasites off of sharks.
    b. keeping in constant contact with a goby.
    c. shooting out a lure called an illicium.
    d. waving their stinging tentacles.
    e. riding on the backs of hermit crabs.

9. Which of these is NOT part of the process of photosynthesis?

    a. venom
    b. sunlight
    c. carbon dioxide
    d. oxygen
    e. chlorophyll

10. Which of these creatures is highest up in the ocean food chain?

    a. zooxanthaellae
    b. angelfish
    c. shark
    d. seaweed
    e. plankton

ANSWER KEY for page 20

ANSWERS WILL VARY

VOCABULARY

The words below are from *Adaptations for Survival in the Sea*. Read the words and their definitions. Then, on the back of this page or on a separate sheet of paper, write a sentence for each word, or write short paragraphs that use all the words.

1. adaptation: a change in an organism's genes that increases the chances its species will survive
2. aposematic coloration: bright coloration intended to warn predators away
3. camouflage: coloring that protects by blending into the background
4. marine: having to do with the sea
5. nocturnal: having to do with the night; active at night
6. parasite: an organism that lives on or in another organism, usually harming its host
7. photosynthesis: the process by which plants convert sunlight to oxygen and sugars
8. plankton: microscopic plants and animals that float in ocean water
9. predator: an animal that kills other animals for food
10. prey: an animal that is eaten by a predator
11. scavenger: an animal that feeds on remains left by other animals
12. symbiosis: a partnership between two or more different organisms

ANSWER KEY for page 21

VOCABULARY: MULTIPLE MEANINGS

These words have at least two meanings. From the list of definitions below, choose one or more meanings for each word. Write a number in each blank. Clue: All the missing definitions were seen or heard in the program *Adaptations for Survival in the Sea.*

Words with Multiple Definitions

burrow (a) ____2_____; (b) _____4_____
cell (a) ____10_____; (b) a locked room for prisoners
digest (a) ____5_____; (b) a summary or shorter version of a written work
sponge (a) ____8_____; (b) [Slang] a person who lives unfairly off of others
school (a) a place of learning; (b) ___3_____
skate (a) ___9_____; (b) ____6_____
tissue (a) ____7_____; (b) a thin piece of paper
venom (a) ____1_____; (b) spite or ill-will

Definitions

1. poison
2. to hide or dig down into the earth
3. a group of fish that swim together for protection
4. a hole dug by an animal
5. to break down and absorb food
6. to glide, roll, or skim smoothly along
7. a group of cells that work together
8. a filter feeder that inhales food from water
9. a triangular, gliding, burrowing relative of the shark
10. the basic building block of living things

ANSWER KEY for page 22

VOCABULARY: LATIN ROOTS

Many science words come from Latin, the language of the ancient Romans. This chart shows the Latin origins of some of the words in the program. Read the chart carefully. Notice how English words are formed by combining Latin prepositions and verbs. Then complete the chart by writing words from the Word Bank in the blank squares.

Latin prepositions	Latin verbs	Program verbs	Other words
ad-: toward, in the direction of	trajere; to pull or draw aptare: to fit	attract adapt	detract adaptations
contra-, con-: off, against	confundere: to throw off	confuse	confound
de-: out of, from	fendere: to strike	defend	fender
ex-, e-: from, down, away	excernere: to sift out, discharge	excrete	expel
in -: within, into, in	jactare: to throw	inject	
pro -: forward, forth before	tegere: to cover trudure: to thrust, push	protect protrude	detect intruder
re-: backwards,	flectere: to bend	reflex	deflect
super-, sur-: over, above, on top	vivere: to live	survive survival	

WORD BANK

adapt, adaptations	inject	protrude
project, projections	confuse	reflex
defend,defense	survive	excrete
protect, protection		

ANSWER KEY for page 23

CHECKING COMPREHENSION

Read each question. Then cross out the word or phrase that is NOT a correct answer. Cross out one or two answers for each question.

1. Which of these terms describes creatures with different ways of getting food?

   bottom feeders
   scavengers
   ~~prey~~
   filter feeders
   predators

2. Which of these words mean that organisms are living together?

   ~~antennae~~
   colony
   symbiosis
   school
   mutualism

3. Which of these ocean creatures are large?

   shark
   octopus
   manatee
   ~~plankton~~
   human divers

4. Which of these creatures are small?

   plankton
   algae
   polyps
   ~~manatee~~
   zooxanthaellae

5. Which of these ocean creatures have claws?

   hermit crabs
   blind shrimp
   ~~remora~~
   northern lobster
   ~~stonefish~~

ANSWER KEY for page 24

CHECKING COMPREHENSION (CONTINUED)

6. Which of these organisms are ocean animals?

~~zooxanthaellae~~
blind shrimp
shark
pilot fish
sea horse

7. Which of these organisms are ocean plants?

zooxanthaellae
seaweed
algae
~~stonefish~~
~~coral~~

8. Which of these creatures use camouflage to protect themselves?

sea horse
~~angelfish~~
frogfish
shark
stonefish

9. Which of these ocean creatures have tentacles or sharp spines?

stonefish
sea urchin
lion fish
~~manatee~~
jellyfish

10. Which of these animal parts does not stick out from the body?

antennae
spines
tentacles
dorsal fin
~~chromatophore~~

ANSWER KEY for page 25

RECALLING DETAILS FROM THE PICTURES

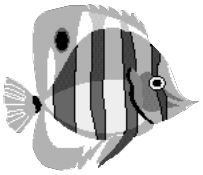
Read each general statement from the program. Think back to what you saw after those words were spoken. Complete each drawing from memory. Then watch the program again to see if your memory was correct. This is great scientific training!

PROGRAM: Among the adaptations for survival in the sea, camouflage is one of the most common and widespread.

draw an animal camouflaged against its background.

PROGRAM: Many species of fish prefer to swim together in schools.

Draw more fish like this one, to create an entire school of fish.



PROGRAM: Coral is a colonial organism.

Copy this coral polyp many times, to create an entire coral reef.

ANSWER KEY for page 26

RECALLING DETAILS: NAMES AND OBSERVATIONS

Many words and pictures flashed by you as you saw and heard how organisms have adapted to life in the ocean. How well do you remember details from the program? Match each creature to its description.

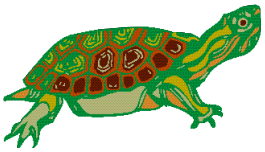
__j___1. angelfish	a. very large predator, light on bottom, dark on top, spearlike nose
__g___2. frogfish	b. small fish, eats shark parasites, is carried along by shark
__l___3. gobie	c. clear bloblike floating animal with stinging tentacles
__c___4. jellyfish	d. creature with delicate gills that vanishes instantly into its hole
__k___ 5. octopus	e. triangular, large, flat, shark relative, buries itself in sand
__b___6. remora	f. egg-shaped creature, protected by armorlike spikes
__i___7. sea anemone	g. fish that looks like sponge, fishes with built-in lure, tongue
__f___8. sea urchin	h. world's most venomous fish, has sharp spines on dorsal surface
__a___9. shark	i. flowerlike invertebrates with stingling cells on long tentacles
__e___10. skate	j. small, fast fish, brighlly colored to attract mates
__d___11. tube worm	k. large, multiple armed, can change color instantly
__h___12. stonefish	l. tiny fish that serves as eyes for, shares burrow with, blind shrimp

ANSWER KEY for page 27

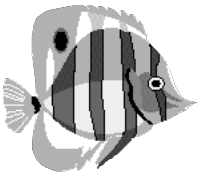
OBSERVING AND DESCRIBING ANIMALS

Here are some of the organisms that appeared in *Adaptations for Survival in the Sea*. Match each picture to one of the names from the Word Bank below. Then, on a separate sheet of paper, write a description of one of these animals, based on what you see in the picture and what you saw and heard in the program.

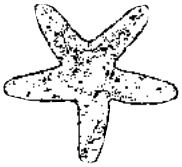
DOLPHIN



MARINE TURTLE

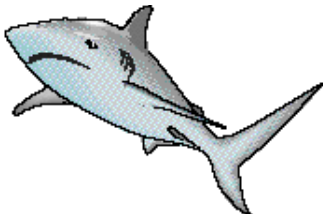


ANGEL FISH



STARFISH

SEA HORSE



SHARK

Word Bank		
angelfish	marine turtle	starfish
sea horse	shark	dolphin

ANSWER KEY for page 28

TEST

Underline the correct answer to each of these questions.

1. In order for its species to survive, an animal needs:

    a. food.
    b. protection.
    c. reproduction.
    d. defense.
    e. all of the above.

2. The sea raven, sea horse, frogfish, skate, and octopus all protect themselves by:

    a. quick escape.
    b. camouflage.
    c. chromatophores.
    d. looking like other organisms.
    e. vanishing quickly into their holes.

3. What is aposematic coloration?

    a. dyeing hair or fibers using seaweed and other ocean organisms
    b. coloring that can change instantly
    c. coloring that blends into the background
    d. coloring that warns other animals to stay away
    e. changing color to match nearby animals

4. Some kinds of fish swim in schools, which enables them to:

    a. change color quickly.
    b. be carried along by sharks and other large predators.
    c. hide at night.
    d. use sunlight to produce sugars and oxygen.
    e. confuse their predators with sheer numbers.

5. The relationship in which two different organisms live with and benefit each other is called:

    a. photosynthesis.
    b. zooxanthaellae.
    c. mutualistic symbiosis.
    d. scavenging.
    e. aposematic coloration.

ANSWER KEY for page 29

TEST (CONTINUED)

6. Which of these creatures is a plant eater?

   a. manatee
   b. grey reef shark
   c. northern lobster
   d. frogfish
   e. hermit crab

7. What do you call an individual coral organism?

   a. a colony
   b. a polyp
   c. a reef
   d. a tentacle
   e. a chromatophore

8. Although most coral polyps live in one place, they capture food by:

   a. cleaning parasites off of sharks.
   b. keeping in constant contact with a goby.
   c. shooting out a lure called an illicium.
   d. waving their stinging tentacles.
   e. riding on the backs of hermit crabs.

9. Which of these is NOT part of the process of photosynthesis?

   a. venom
   b. sunlight
   c. carbon dioxide
   d. oxygen
   e. chlorophyll

10. Which of these creatures is highest up in the ocean food chain?

    a. zooxanthaellae
    b. angelfish
    c. shark
    d. seaweed
    e. plankton