

**AWARE**

# **Kids**

## **Teacher's Guide**

Explore, create and take action.  
Check out what's inside!



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A Letter from  
Project AWARE  
Foundation

Dear Educator,

The Project AWARE Foundation, a 501 c(3) nonprofit organization conserving underwater environments through education, advocacy and action, organizes hands-on environmental activities, leads public awareness and education programs and provides support for conservation efforts worldwide.



The AWARE Kids Teacher's Guide is a tool to help actively teach students about issues facing the underwater world and provide hands-on opportunities to participate in solutions. The AWARE Kids activity book covers education subjects including coral reefs, sharks, kelp forests, whales, dolphins and sea turtles. AWARE Kids Missions encourage younger generations to participate in conservation activities. The book also includes fun puzzles, post cards, an underwater poster and more.



Mare Marine Club,  
Okinawa, Japan

Project AWARE Foundation's goal with the AWARE Kids

Teacher's Guide is to integrate science, math, art, language and geography with underwater topics. The curriculum supports *National Science Education Standards* as identified.



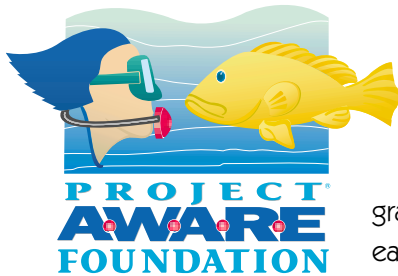
The enclosed video introduces the AWARE Kids pro-

gram and each education topic to your students prior to diving into each section. You can play the corresponding portions of the video as mentioned in this guide. Please also begin by playing the AWARE Kids feature to generate excitement about participating in the program.

Thank you for helping educate primary students about the underwater environment. Please feel free to provide us your comments and suggestions using the survey at the back of the guide. Your opinions and participation are appreciated.

Sincerely,

Project AWARE Foundation





## Preface



# Using the AWARE Kids Package

The AWARE Kids program is for elementary school aged kids who want to discover, explore and investigate the fascinating aquatic world. AWARE Kids uses the systems approach (all products are tied to one another) by design and currently consists of three products: AWARE Kids activity book; AWARE Kids video, and the *AWARE Kids Teacher's Guide*.



These AWARE Kids materials were designed for the elementary school teacher, adults who work with kids in different capacities such as a group/camp leader, councilor, or coach, (hereafter referred to as educators) and all children at the grade K through 4 elementary school level. AWARE Kids is guided by three principles of learning: 1) learning requires the active participation of the student, 2) people learn in a variety of ways and at different rates, and 3) learning is both an individual and a group process.

AWARE Kids incorporates the *National Science Education Content Standards (NSES)* for grades K through 4 and can be modified and adapted to challenge kids in grades 5 through 7. AWARE Kids draws upon the three traditional science disciplines of physical science,

life science and earth and space science. One advantage of studying the conservation of the underwater environment is that learning outcomes apply to all three of the science disciplines. In many aspects, AWARE Kids provides a broader and more complete understanding of how the traditional sciences interrelate than if they were to be studied separately. In this way, studying the aquatic environment and conservation efforts lends to an interdisciplinary science understanding.

AWARE Kids involves studying the diversity, continuity, interactions, and balance between organisms and their environments. By using the skills, processes and attitudes of science, children extend their understanding of the living world and their place within it. By making sense of how organisms live in their environments, children develop an understanding of the diversity and interactions of living and nonliving things. The edu-

## Preface



cator-led activities, provided in the *AWARE Kids Teacher's Guide*, encourage children to research animals and plants in a variety of habitats to determine the effects of structure and behavior on both individuals and species within that environment. Children demonstrate their knowledge of how animals adapt to their surroundings by completing the activities outlined in the *AWARE Kids* activity book. Students can further

demonstrate their knowledge of how animals adapt to their surroundings by completing some of the educator-led extension activities outlined in the *AWARE Kids Teacher's Guide*.

*AWARE Kids* encourages the use of simple machines or scientific tools to make tasks easier, determine their characteristics and uses. Many of the activities in the *AWARE Kids* activity book require children to use devices to measure, calculate, compare and contrast results.

*AWARE Kids* also helps children develop an understanding of the forces, processes and dynamic life-supporting qualities of the Earth. Knowledge of the Earth's fresh and saltwater resources is relevant to an understanding of our environment and our existence. Students experiment to determine how water is important to all life forms. They consider issues of water use from various perspectives and identify ways in which water is used responsibly in their community. Students demonstrate their scientific skills and processes when they use a variety of media to communicate the results of their investigations and act on their findings in a responsible manner.

Studying the conservation of the underwater environment through the *AWARE Kids* materials is more than integrating the traditional science disciplines to examine the aquatic realm. It is about studying science itself. Science as a way of thinking, as it relates to technology, its social influence and its history. Therefore, the study of the underwater environment and its conservation involves four content areas beyond the traditional science disciplines. They are science as inquiry, science and technology, science in personal and social perspectives and the historical nature of science. *AWARE Kids* interweaves the traditional science content and these four additional content areas through each of the five core topic sections, the classroom and games section and the five *AWARE* missions.

## Learning Outcomes



# The Prescribed Learning Outcomes for AWARE Kids

The United States has established as a goal that all students should achieve scientific literacy. The *National Science Education Content Standards* are designed to enable the nation to achieve this goal and AWARE Kids is written with this goal in mind. Scientific literacy enables people to use scientific principles and processes in making personal decisions and participate in discussions of scientific issues that affect society. AWARE Kids emphasizes a new way of teaching and learning about science that reflects how science itself is done, emphasizing inquiry as a way of achieving knowledge and understanding about the world.



Photo Courtesy of Megan Saunders

The prescribed learning outcomes are driven by the *NSES*. They set out the knowledge, enduring ideas, issues, concepts, skills and attitudes for elementary school science. The prescribed learning outcomes are statements of what students are expected to know and do by completing the AWARE Kids activities. The prescribed learning outcomes are clearly stated, expressed in measurable terms and have been written to enable educators to use their experience and professional judgment in planning, implementing and evaluating. The prescribed learning outcomes are bench-

marks that will permit the use of criterion-referenced performance standards. It is expected that performance will vary in relation to the learning outcomes.

## The Prescribed Learning Outcomes for AWARE Kids

It is expected that students or children will:

- predict the results of an experiment
- perform an experiment by following a procedure
- use appropriate tools to assist observations
- construct simple definitions based on experiments
- demonstrate an ability to recognize a valid interpretation of results
- present an interpretation of the results from an experiment
- use a variety of media to present information
- demonstrate responsible action when using the scientific information and skills they have developed
- relate the structure and behavior of organisms to their survival in local environments
- discuss how changes in an organism's habitat can affect the survival of individual organisms and entire species
- give examples of how the differences in individuals of the same species may give an advantage in surviving and reproducing
- relate the growth and survival of organisms to a variety of conditions
- relate the life processes of an organism to its use of nutrients, water, and oxygen
- describe the changing requirements of organisms as they grow
- relate dietary habits and behavior to an organism's health
- manipulate simple machines to determine characteristics and uses
- operate simple machines to demonstrate their usefulness in everyday life
- categorize the various uses of water
- outline the importance of water for life
- use the physical properties of water to describe or illustrate the water cycle
- compare and contrast freshwater and saltwater environments
- describe human effects on the Earth's water resources



## Learning Outcomes

### What is the AWARE Kids Teacher's Guide?

The *AWARE Kids Teacher's Guide* contains the learning objectives and support materials that apply to the development of scientific literacy in elementary school aged learners. The *AWARE Kids Teacher's Guide* includes national prescribed science standards and learning outcomes, instructional and motivational strategies, learning activities and suggested extension activities. It is intended to assist educators in delivering the materials in a way that meets the requirements of elementary school science education. The organization of the *AWARE Kids Teacher's Guide* demonstrates the connections between the learning outcomes and instruction, activity learning resources and student understanding. The *AWARE Kids Teacher's Guide* assists the inexperienced educator to teach the course materials developed for AWARE Kids.



Photo Courtesy of Wayne Brown

### Suggested Instructional Strategies for Achieving the Prescribed Learning Outcomes

Instruction involves the selection of techniques, activities and methods that can be used to meet diverse student needs and to deliver the materials. Educators are free to adapt and use the suggested instructional strategies or substitute others that they feel will enable their children to achieve the prescribed learning outcomes. The strategies found in

*AWARE Kids Teacher's Guide* have been developed by specialist and generalist teachers to assist their colleagues; they are suggestions only.

### Suggested Activities for Determining How Well Students are Achieving the Learning Outcomes

The primary activity and extension activities consist of a variety of ideas and methods to gather evidence of student understanding. Some activities relate to specific science concepts; others are general and could apply to any prescribed learning outcome. These activities have been developed by specialist and generalist teachers to assist their colleagues; they are suggestions only.

## Component Descriptions



# Component Descriptions

The AWARE Kids program is supported by a variety of components to meet individual student needs and teaching styles.

## AWARE Kids Activity Book

- The four color activity book is written in a motivating style for K through 4 elementary school-aged children.
- Comprehensive content integrates the study of the underwater environment and its conservation with the other core science disciplines.
- Using an interdisciplinary approach, children learn about their environment in context with social studies, mathematics, the arts and language arts.
- Connects the underwater environment and conservation to real world applications and opportunities.

## AWARE Kids Video

- The video supports the learning outcomes AWARE Kids addresses.
- The video has been developed considering the variety of student learning styles and abilities.
- This instructional design of this resource supports a variety of audiences, including gifted, learning disabled and English learners.
- The video is designed to complement the educator in delivering the materials.

## AWARE Kids Teacher's Guide

- Corresponds to five core topics, classroom games and five missions outlined in the AWARE Kids activity book.
- The guide provides activities, activity instructions and extension activities for both the experienced and inexperienced educator.
- Suggestions for introducing topics, organizing activities and conducting group demonstrations.
- Supports and emphasizes learning of major cognitive themes.

## NSES Standards



**Reference:** National Research Council, (1999). *National Science Education Standards*. National Academy Press, Washington, DC.

# ***National Science Education Standards (NSES) Correlations***

As the result of activities provided for students during the AWARE Kids program, the content of the standard identified is to be understood or the abilities are to be developed by the student.

AWARE Kids is developed for K through 4 elementary school aged children and can be modified and adapted to challenge grades 5 through 7 students. The check marks indicate direct correlations to AWARE Kids.



<p align="center"><b>Science as Inquiry</b></p> <p>Scientific knowledge is constantly changing. As more research is conducted and as advanced technology enhances our ability to make observations, our knowledge of the world changes. Knowing that science is a continuous process of inquiry helps students understand its dynamic nature and recognize that in science change is the rule rather than the exception.</p>	<p align="center"><b>Content Standard A K-4</b></p> <p>As a result of activities in grades K-4, all students should develop:</p> <ul style="list-style-type: none"> <li>✓ Abilities necessary to do scientific inquiry</li> <li>✓ Understanding about science inquiry</li> </ul>	<p align="center"><b>Content Standard A Grades 5-8</b></p> <p>As a result of activities in grades 5-8, all students should develop:</p> <ul style="list-style-type: none"> <li>• Abilities necessary to do scientific inquiry</li> <li>• Understanding about science inquiry</li> </ul>
<p align="center"><b>Physical Science</b></p> <p>Some of the most effective experiences for learning elementary-level physical science involve the movement or changes in objects and materials. Students learn about objects by observing them and noting similarities and differences and by acting on them by applying force.</p>	<p align="center"><b>Content Standard B K-4</b></p> <p>As a result of the activities in grades K-4, all students should develop an understanding of:</p> <ul style="list-style-type: none"> <li>✓ Properties of objects and materials <ul style="list-style-type: none"> <li>• Position and motion of objects</li> <li>• Light, heat, electricity and magnetism</li> </ul> </li> </ul>	<p align="center"><b>Content Standard B Grades 5-8</b></p> <p>As a result of their activities in grades 5-8, all students should develop an understanding of:</p> <ul style="list-style-type: none"> <li>• Properties and changes of properties in matter</li> <li>• Motion and forces</li> <li>• Transfer of energy</li> </ul>
<p align="center"><b>Life Science</b></p> <p>All living things move, seek nourishment, breathe, and reproduce and they accomplish these activities in a wide variety of ways. A plant's movement, for example, is different from an animal's; an elephant's movement is different from a monkey's. Each type of organism has structures that enable it to function in unique and specific ways to obtain food, reproduce and survive.</p>	<p align="center"><b>Content Standard C K-4</b></p> <p>As a result of activities in grades K-4, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>✓ The characteristics of organisms</li> <li>✓ Life cycles of organisms</li> <li>✓ Organisms and environments</li> </ul>	<p align="center"><b>Content Standard C Grades 5-8</b></p> <p>As a result of their activities in grades 5-8, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>• Structure and function in living systems</li> <li>• Reproduction and heredity</li> <li>• Regulation and behavior</li> <li>• Populations and ecosystems</li> <li>• Diversity and adaptations of organisms</li> </ul>
<p align="center"><b>Earth and Space Science</b></p> <p>From earliest times, humans have looked at the Earth and sky with wonder, trying to find explanations for what they saw. Today, we have learned more about our solar system from our own experiences and from the great wealth of information available to us. Together, these two ways of learning help us understand the world around us.</p>	<p align="center"><b>Content Standard D K-4</b></p> <p>As a result of their activities in grades K-4, all students should develop an understanding of:</p> <ul style="list-style-type: none"> <li>✓ Properties of earth materials <ul style="list-style-type: none"> <li>• Objects in the sky</li> </ul> </li> <li>✓ Changes in earth and sky</li> </ul>	<p align="center"><b>Content Standard D Grades 5-8</b></p> <p>As a result of their activities in grades 5-8, all students in grades 5-8 should develop an understanding of:</p> <ul style="list-style-type: none"> <li>• Structure of the Earth system</li> <li>• Earth's history</li> <li>• Earth in the solar system</li> </ul>
<p align="center"><b>Science and Technology</b></p> <p>Children are naturally interested in the human-made (designed) objects such as toys, automobiles, bridges, can openers or door knobs. Designed objects and materials are essential elements of a child's environment. Ask students to identify designed objects and their uses. This is a good introduction to technology.</p>	<p align="center"><b>Content Standard E K-4</b></p> <p>As a result of activities in grade K-4, all students should develop:</p> <ul style="list-style-type: none"> <li>• Abilities of technological design</li> <li>✓ Understanding about science and technology</li> <li>✓ Abilities to distinguish between natural objects and objects made by humans</li> </ul>	<p align="center"><b>Content Standard E Grades 5-8</b></p> <p>As a result of activities in grades 5-8, all students should develop:</p> <ul style="list-style-type: none"> <li>• Abilities of technological design</li> <li>• Understandings about science and technology</li> </ul>
<p align="center"><b>Science in Personal and Social Perspectives</b></p> <p>Scientific discoveries, technological innovations, and medical advances promise to make our lives better. They also bring resource shortages, pollution and other problems. Most of us share a vision of a better future, but projections of global trends, particularly those related to population growth, use of resources and environmental deterioration, are not encouraging. The effects of these trends will be of increasing concern in the next decades.</p>	<p align="center"><b>Content Standard F K-4</b></p> <p>As a result of activities in grades K-4, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>✓ Personal health</li> <li>✓ Characteristics and changes in populations</li> <li>✓ Types of resources</li> <li>✓ Changes in environments</li> <li>✓ Science and technology in local challenges</li> </ul>	<p align="center"><b>Content Standard F Grades 5-8</b></p> <p>As a result of activities in grades 5-8, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>• Personal health</li> <li>• Populations, resources and environments</li> <li>• Natural hazards</li> <li>• Risks and benefits</li> <li>• Science and technology in society</li> </ul>
<p align="center"><b>History and Nature of Science</b></p> <p>The common thread of the Standards for the history and nature of science is that science is a human endeavor. Indeed, the study of science is a natural intellectual and social endeavor – an attempt to understand how the world works.</p>	<p align="center"><b>Content Standard G K-4</b></p> <p>As a result of the activities in grades K-4, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>✓ Science as a human endeavor</li> </ul>	<p align="center"><b>Content Standard G Grades 5-8</b></p> <p>As a result of the activities in grades 5-8, all students should develop understanding of:</p> <ul style="list-style-type: none"> <li>• Science as a human endeavor</li> <li>• Nature of science</li> <li>• History of science</li> </ul>



## Coral Reefs



Remember to play the Coral Reef section of the AWARE Kids video.

### Vocabulary:

**Conservation** – taking care of the environment by protecting waterways and other natural resources.

**Coral bleaching** – the loss of color from a coral as it expels its *zooxanthelle*, usually happens in response to stress.

**Coral polyps** – tiny, fragile animals that compose a coral reef structure.

**Coral reefs** – a massive structure made up of tiny, fragile animals called coral polyps.

**Ecosystem** – a community of plant and animal life that interact with each other and the physical environment.

**Habitat** – the environment where a species lives or grows.

**Nursery ground** – environment where juvenile species are produced and/or developed.

**Species** – a class of organisms grouped together based on their common features.

**Zooxanthelle** – algae that live in a symbiotic relationship with coral.

# Crazy About Coral Reefs

[Page 1 of the AWARE Kids activity book.]

## Topic Discussion: Rainforests of the Sea

**Coral reefs** are the oldest, most productive *ecosystems* on earth. Existing for more than 200 million years, they're named the rainforests of the sea because they maintain the biological diversity of our world's oceans. Corals are literally teeming with life. They serve as *habitat* or *nursery grounds* for 25 percent of all known marine life and support 4000 *species* of fish and thousands more plants and animals.

Built by colonies of tiny coral animals, called *coral polyps*, these animals form huge coral reef structures. There are more than 2500 species of coral growing in clear, shallow ocean waters across the globe. Most live in the warmer waters near the equator where they use the energy from sunlight to thrive.

There are two different types of coral reefs: hard corals (such as brain, star and elkhorn coral) and soft corals (such as sea fans, sea whips and sea rods). Both hard and soft corals come in all shapes, sizes and colors. A few are even fluorescent.

Aside from their vast ecological importance, coral reefs are valued for many other reasons. For example,

- Corals support local economies because they're valuable tourist attractions. Many tropical nations base much of their economy on the worldwide appeal of these diving and snorkeling destinations.

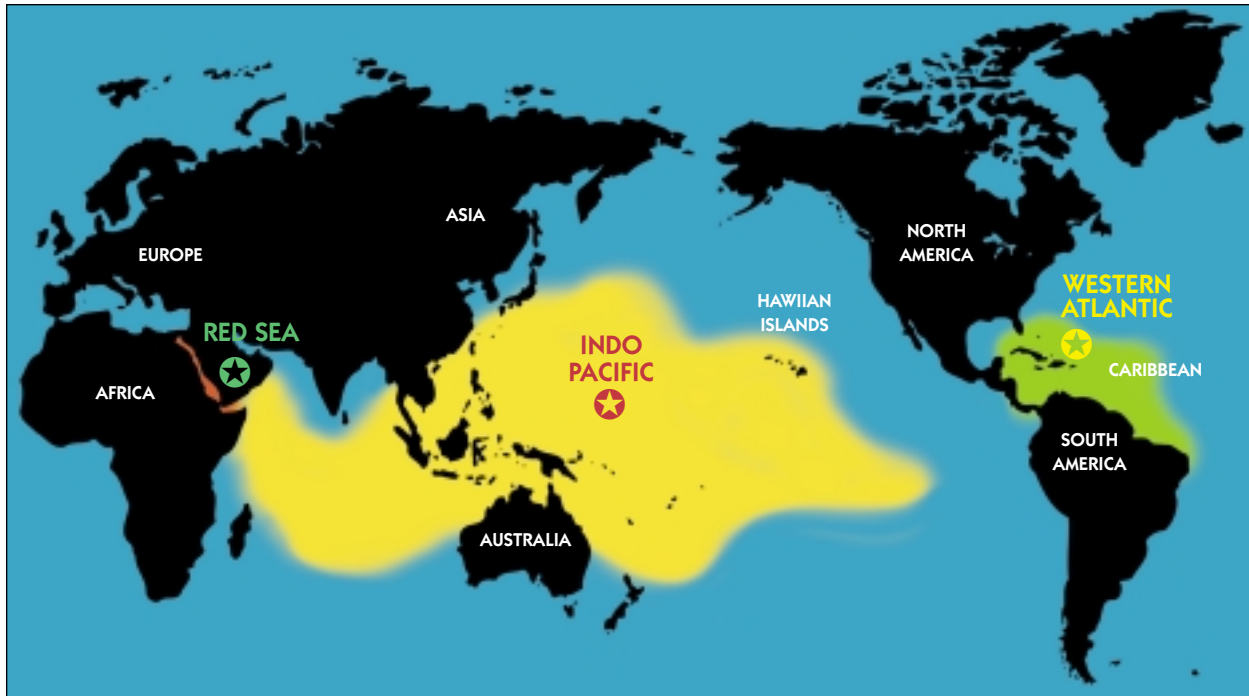
Tourism brings billions of dollars to local economies and sustains 10 percent of all jobs on earth.

- Corals also provide protection for coastal communities, defending them against storms, wave damage and erosion. It's estimated that each square meter of coral reef protects \$47,000 US in property value. Without this protection entire islands and coastal communities wouldn't exist.



## Coral Reefs

- Coral reefs are a critical resource for medical cures. Scientists have found an abundance of compounds to help fight heart disease, asthma, cancer, HIV and more. Marine biologists studying coral life have also learned many things about the human body.



Highlighted areas demonstrate where coral reefs are found.



### Conservation Discussion: Coral Reefs

Sadly, coral reefs are rapidly disappearing. Scientists estimate that as much as 25 percent of the world's coral reefs are already dead and if current trends continue this precious resource may be lost within the next 30 to 50 years.

Although environmental stress is contributing to coral decline, humans also contribute to major problems affecting coral reefs:

- **Sedimentation** from coastal development and unwise land use policies cause soil erosion inducing coral stress and blocking light necessary for coral growth.
- **Runoff** from cropland and animal feed lots introduce excessive amounts of fertilizers and untreated sewage to reef environments. These nutrients slow growth rates, reduce light and water flow to coral surfaces and induce **coral bleaching**.
- **Global warming** trends due to an increase in greenhouse gases and ozone depletion warm ocean temperatures, stressing coral reef ecosystems, often causing corals to bleach and die.

## Coral Reefs

- **Destructive fishing practices** such as the use of poisons like cyanide, explosives and fishing devices reduce coral reef ecosystems to lifeless rubble every day.
- **Pollution** from oil, petroleum products, untreated sewage and marine debris often poison and injure coral reef life.
- **Lost of discarded fishing nets** (ghost nets) entangle thousands of fish and mammals and suffocate reefs.
- Poorly conceived **coastal development** destroys vital ecosystems such as mangrove forests and sea grass beds which serve as nursery grounds for many reef inhabitants.



### How Can You Help?

Although no one can accurately predict how long coral reefs will be around, human action can improve their chances for survival. For ideas on things AWARE Kids can do to conserve coral reefs, refer the class to “Things You Can Do” on the first page of the AWARE Kids activity book and lead one or more of the following activities.

### Quick Quiz:

Q: What are the oldest most productive ecosystems on earth?

A: Coral reefs.

Q: What are coral reefs composed of?

A: Colonies of tiny coral animals called coral polyps.

Q: Why are coral reefs important?

A: They support 25 percent of all marine life, support local economies, provide protection for coastal communities and are a resource for medical cures.



© Wolcott Henry

### Activity: Caring for Coral Reefs

Challenge your students to come up with solutions to coral reef conservation issues.

Coral reefs are extremely vulnerable to all kinds of human pressures. Souvenir collecting, pollution, coastal development and careless interactions can all damage these underwater cities. AWARE Kids across the globe can help solve these problems.

## Coral Reefs

### Instructions:

1. Copy the Caring for Coral Reef Cards (page 17), cut them out and place them in a jar for student selection.
2. Create a coral reef conservation mural or bulletin board and have students paint or draw a coral reef community. Discuss the different types of corals, fish and animal life found in these rainforests of the sea.
3. Once the mural is finished, describe several problems facing coral reefs. Explain why conservation is important to the future of the underwater world.
4. Present the students with the jar of coral reef conservation problems that are in need of creative solutions. Tell them that they are going to be a conservation specialist that helps protect coral reef ecosystems.
5. Have each student or small groups of students select a coral reef conservation problem from the jar, research any unfamiliar concepts or terms, read the problem to the class and take a few minutes to discuss with the class what they know about the problem. (More than one student may work on the same problem.)
6. After the discussion, have the students independently think of a possible solution to the problem on their card. It could be an idea or an invention. Have them draw a picture of their solution and write an explanation of how it works.
7. Once the individual projects are complete, have the students explain their idea to the class. They can then attach their work to the completed coral reef mural.



### Extension Activities:

- Have students research animal life on a coral reef. Label index cards with names of animals found in coral reef ecosystems. Examples include sponges, sea urchins, starfish, sea turtles, sea fans, nurse sharks and lobsters. Have the class create a bulletin board display of a marine food chain. Then have the students choose an index card and investigate that creature's role in the food chain. Have them draw the organism on the opposite side of the card and attach their creation to the appropriate area of the display.



## Coral Reefs

- Divide students into small groups and have them research coral reef threats. Examples include water pollution, coastal development, souvenir collection and anchoring boats, etc. Have students create signs that they would post near a coral reef shoreline area, advising people against actions that can threaten the reef.
- Invite a dive professional from a local PADI Dive Center or Resort to visit the classroom. Ask them to talk about diving, demonstrate how dive equipment works and explain how sustainable dive practices can conserve the underwater environment. To find a professional, use the directory on the PADI website at [www.padi.com](http://www.padi.com).



- Have students write a news story investigating a scientist or nonprofit organization working to improve coral reef conservation. Ask them to report on their findings including who, what, where, why and how. You can also ask them to interview an individual to obtain quotes for their story.

## Caring for Coral Reef Cards

Boat anchors often injure and break coral reefs and can destroy underwater habitats.

Cruise ships legally dump sewage into the ocean near coral reef habitat – sometimes only 5 kilometers/three miles from the shoreline.

Lost or discarded fishing nets can entangle thousands of fish, marine mammals and smother coral reefs.

Emissions from cars, cruise ships and other vehicles contribute to global warming, harming coral reefs.

Seafood can be caught with fishing gear that damages coral reefs and other underwater habitats.

Commercial fisheries often capture non-target fish – up to 20 billion pounds each year.

Plastic, glass and cigarette butts are the most common items found during a beach or underwater cleanup.

Fertilizers and pesticides are washed from lawns and farms into the ocean. These substances can harm coral reef life.

Live corals and reef animals are captured to be sold as souvenirs or for personal aquariums.

Oil from city streets, boats and oceangoing tankers contaminate aquatic environments.

## Sharks Rule!



Remember to play the sharks section of the AWARE Kids video.

### Vocabulary:

**Apex predator** – creature at the very top of the food chain who has no natural predators.

**Cartilage** – tough, flexible connective tissue found in sharks.

**Extinction** – the total disappearance of a species so that it no longer exists on the planet.

**Finning** – the practice of fishing sharks solely for their fins and discarding the remainder of the shark.

# Sharks Rule!

[Pages 2 – 3 of the AWARE Kids activity book]

## Topic Discussion: What is a Shark?

Sharks rule the ocean. With their powerful, streamlined bodies and remarkable sensory systems, these creatures have remained virtually unchanged for more than 400 million years.

Technically speaking, sharks are fish. They have a skeleton, fins, live in the water and use gills to breathe. But their skeleton differs from that of other fish because it's made of **cartilage** (like humans have in their nose and ears) rather than bone. Their scales are different too. Shark scales have the same structure as a tooth, which is why sharkskin feels rough like sandpaper. [You may demonstrate this by bringing sandpaper into the classroom for students to touch.](#)

Speaking of teeth – sharks are famous for theirs. The rows of razor sharp teeth are lined up so when the outer row of teeth fall out, the row from behind it moves up to take its place. Sharks are growing teeth all the time. In fact they go through as many as 30,000 teeth in a lifetime.

There are more than 400 species of sharks and they live all over the world. You can find them in tropical lagoons, polar seas and even some freshwater rivers and lakes. But not all sharks eat large fish and marine mammals. Some, like the horn shark, live off clams and crabs while others, like the basking shark, are filter feeders that eat plankton.



Photo Courtesy of Al Hornsby

## Sharks Rule!

### Conservation Discussion: Sharks

Often, as in the fictitious movie *Jaws*, people think of sharks as human-eating monsters. But, the fact is that sharks are in much greater danger from humans than we are from them. Worldwide, less than 100 shark attacks occur each year, very few of which result in fatal injury.

But, on the flip side, humans kill at least 100 million sharks each year.



©Jeremy Stafford-Dietsch

Sharks are fished for their meat, teeth and cartilage. Sharks also fall victim to the practice of **finning**, the act of catching sharks, cutting off their fins and tossing them back into the ocean to die. The reason this can be devastating for sharks is because sharks have no natural predators and therefore populations are affected by any fishing pressure. In addition, sharks have a very slow growth rate and they produce a low number of offspring, which makes it difficult for populations to rebound from fishing activities.

It's devastating to think that humans may cause the **extinction** of shark species. Sharks play a vital role in our ecosystem as part of nature's complex system of checks and balances. Known as **apex predators**, sharks are at the top of the food chain. They keep populations of other species healthy and in balance. How? They often prey on sick, wounded and weak animals ensuring only the strongest within the species survive.

Sharks are in desperate need of our protection. [Ask children to visit page 3 of the AWARE Kids activity book for suggestions on how they can participate in shark conservation. Encourage students to learn more about sharks, how they contribute to the health of the oceans and how they can help protect them.](#)

#### Quick Quiz:

Q: How are sharks different from other fish?

A: Their skeleton is made of cartilage rather than bone.

Q: Who or what are sharks in danger from?

A: Humans.

Q: Why is it important to conserve shark species?

A: Sharks are in danger of extinction. As apex predators at the top of the food chain, sharks keep ecosystems healthy and in balance.



## Sharks Rule!

### Activity: Shark Detectives

Sharks are in danger of extinction. But the more we know about sharks, the better we're able to protect them and the habitat they depend on for survival.

1. In a class discussion on sharks, list as many shark species as necessary (older students can help you compile this list).
2. Ask the students to be shark detectives. Go around the room and have them choose a species.
3. Have the detectives research their species, collecting information on size, geographic distribution, food preferences and conservation concerns.



4. Provide materials for students to create a poster on their shark species. The poster will include the shark name, a drawing of the shark and the information they've investigated.
5. Ask the students to tell the rest of the class about their shark and what they found to be unique.
6. Hang the shark posters around the class or school for all to see.

### Extension Activities:

- Display copies of shark and fish photos for the students to see (they may assist with collecting these images). Compare the shark and fish species. Discuss and make a chart of the physical similarities and differences. Do they each have gills? Where are they located on each species? Locate the fish and shark fins. Do they appear to be the same and in the same number? What about the jaws? How do they compare?

## Sharks Rule!

- Sharks have survived on earth for more than 400 million years. Ask students to make a timeline including sharks and five to ten other species (such as dinosaurs, humans, dogs, cats, elephants, sea turtles or monkeys). Research these species and their lifespan on earth. Label them all on the timeline. Discuss the reasons for shark's success and long-term survival.
- As in page 3 of the AWARE Kids activity book, ask students to start a shark campaign. Conduct a survey with their classmates, another class, family and friends. Keep a tally of their responses to questions such as "Are you afraid of sharks?", "Are sharks only found in the ocean?", "Are sharks in danger of extinction?". Have them make a bar graph to discover the frequency of their responses. Discuss what they've learned from their campaign. Do people have the wrong idea about sharks? What can be done to educate people about the need for conservation?
- Sharks have a keen sense of smell. They can smell food up to hundreds of meters away. How fast do our food smells travel? Stand at the front of the class and slice an onion or orange. After 30 minutes, how far away can it be smelled? What has happened?



## Kelp Forests



Remember to play the kelp forest section of the AWARE Kids video.

# Kelp – It’s a Forest Out There...

[Pages 2 – 3 of the AWARE Kids activity book]

### Vocabulary:

**Algae** – unicellular or multicellular plants containing chlorophyll and lacking true stems, leaves and roots.

**Algin** – a gelatinous substance derived from giant kelp and other algae, used as a food thickener.

**Alginate** – derived from algin in brown algae. It’s used to help oil and water mix together and form smooth liquids. It can be found in many food and beverages, drugs, cosmetics, fertilizers and building materials.

**Beta carotene** – a form of carotene derived from green algae used as a food coloring in many products.

**Blade** – the leaf of the kelp where photosynthesis occurs.

**Canopy** – the top layer of the kelp forest community.

**Carrageenan** – an ingredient found in many kinds of red algae. It’s used as a clarifying and stabilizing agent in many foods, cosmetics, medicine and other products.

**Forest floor** – the bottom layer of the kelp forest, or ocean floor.

**Holdfast** – similar to the roots of a land plant, the holdfast anchors kelp to the sea floor.

**Photosynthesis** – the process where chlorophyll-containing cells produce carbohydrates using water, carbon dioxide and light.

**Stipe** – resembling the stems of land plants, the stipe provide support for the kelp blades.

**Stock** – see stipe

**Trophic levels** – a segment of the food chain in which all organisms obtain food and energy in a similar manner. From bottom to top: producers (green plants); primary consumers (herbivores); secondary consumers (carnivores); and tertiary consumers (larger consumers).

**Understory** – the area below the kelp forest canopy that comprises algae of medium height much like the shrubs, bushes and saplings found beneath the canopy of the land forest.

## Kelp Forests

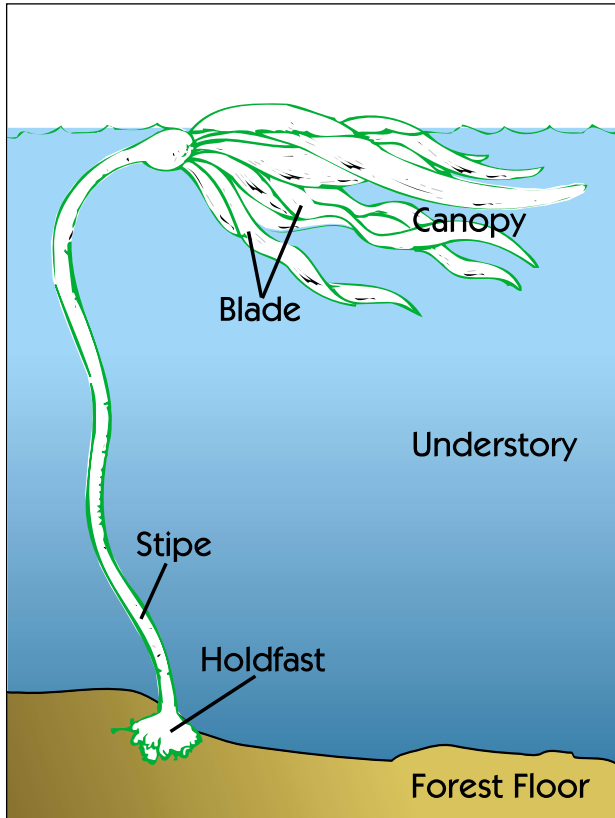
### Topic Discussion: What is Kelp?

Kelp belongs to a group of organisms called *algae*. They are classified as large brown algae to be exact. Kelp are similar to land plants but are different because they have no true leaves, stems or roots. Instead, kelp have *blades* that resemble leaves, *stipes* that resemble stems and *hold-*

*fasts* that look like roots. The holdfasts anchor the kelp *stocks* to the ocean floor and the blades take in energy from the sunlight and nutrients from the water for *photosynthesis*.

Kelp forests, similar to forests on land, are complex *ecosystems* that support a variety of food webs of ocean life. Kelp provides a variety of habitats for animals of all *trophic levels*. These levels can be divided into layers including the *canopy*, *understory* and *forest floor*. Creatures found within these various levels depend on kelp forests for food and protection. They include animals like sea stars, sea urchins, sea cucumbers, fish, sea otters, snails and more.

Kelp are found in the in the cool waters and rocky shores of North and South America, South Africa and Australia. Kelp can grow as much as 15 centimeters/6 inches per day and reach a height of 60 meters/200 feet.



### Conservation Discussion: Kelp Forests

Because kelp forests provide habitat, protection and feeding grounds for literally thousands of underwater creatures, they are a necessary component to the ecosystem. Kelp is important to humans too. Kelp forests are significant oxygen producers and nearly 70 percent of the world's oxygen comes from the ocean.

Giant kelp is harvested along many temperate coastlines for a product called algin. Algin is used in many of our processed foods, dairy products and other household items. Today, harvesting kelp for these and other commercial uses is a multimillion dollar business. Laws are in place to protect kelp forests from becoming over harvested. For example, harvesters are restricted to taking kelp from just the upper four feet of the ocean.

## Kelp Forests

But, kelp forests have other environmental concerns like pollution, overfishing and coastal development. These disturbances can affect the amount of light reaching the blades, smother the kelp, restrict its growth and wipe out these underwater forests completely. Scientists continue to research kelp's importance in the ecosystem and work to improve conservation. Many other organizations work to replant and revitalize damaged kelp forests in their local community.

### Quick Quiz:

Q: How are kelp plants different from land plants?

A: Kelp have no true leaves, stems or roots. Instead, they have blades (like leaves), stipes (like stems) and holdfasts that anchor the kelp plant to the ocean floor (like roots).

Q: What types of environmental threats damage kelp forest communities?

A: Pollution, overfishing and coastal development – to name a few.

Q: Why are kelp forests important in the ocean environment?

A: Kelp provides habitat, food and protection for many marine species. It's useful to humans in many food and other products. It's also an important oxygen producer for the planet.



### Activity: Do You Eat Kelp?

Giant kelp is harvested for a gel called *algin* that's used in a variety of common household items and foods. Chances are, you've eaten kelp today and not even known it! Algin is found in ice cream, candy bars, jelly, salad dressing, toothpaste, medicines, dog food, lipstick and more.

1. Alginate, carrageenan and beta-carotene are names for the algae products you may have in your cupboards at home.
2. Ask the students to take the Do You Eat Kelp? activity sheet home and search through their own cupboards finding food and products that contain these ingredients.



## Kelp Forests

3. Have them make a list of these household items and what room they're found in.
4. Ask them to draw the products they found in the corresponding rooms of the house.
5. Begin a discussion of all the items they discovered that contain algae at home.

*Answers include: baby food, beer, bread, breakfast bars, cake mix, canned gravy, canned sauces, chocolate milk, cookies, dog food, donuts, dyed fabric, mashed potato mix, juice drinks, lipstick, mayonnaise, paint, pancake mix, paper products, pickles, salad dressing, shaving cream, shoe polish, syrup, toothpaste, whipped cream topping and yogurt.*

### Extension Activities

- Ask students to draw a picture of giant kelp. Have them label the characteristics of the kelp including blade, stipe and holdfast. Have students write a description on the purpose of each of these structures. They may also write about animals that rely on these structures as part of the kelp forest community. Did they spot any while watching the kelp section of the video?
- Divide students into two groups. Have one group create a food chain for a kelp forest ecosystem and the other create a food chain for a land forest ecosystem. Once they're complete have them present their results to the entire class. Are there similarities in function of each food chain? Have students describe ways their food chain is connected to other food chains either on land or underwater. What would happen if their forest became damaged by human activity?
- Have students make a shoe box diorama of the kelp forest community. Using several art supplies ask them to label the canopy, understory and forest floor. They should include marine species within each trophic level.
- Kelp can grow up to 60 meters/200 feet high. The can grow as much as 15 centimeters/6 inches per day. Have students figure out how many days it would take for kelp to reach its full height. Compared to their own height, how much taller does kelp grow? How many of their own arms lengths equals the total height of a kelp forest?



## Whales and Dolphins



# Go Wild With Whales and Dolphins

[Page 4 of the AWARE Kids activity book]

### Vocabulary:

**Cetacean** - belonging to the order Cetacea, including whales, dolphins and porpoises.

**Echolocation** – to locate objects by emitting sound waves and interpreting the resulting echo.

**Mysticetes** – baleen whales that strain their food from the water.

**Odontocetes** – toothed whales that grasp, grip or tear their food.

**Pod** – a social group of whales.

### Topic Discussion: What are Whales and Dolphins?

Whales and dolphins live in all the world's oceans, but they aren't fish, they're mammals. They're warm-blooded, breathe air, give live birth, have hair and nurse their young just as all mammals do. If you're wondering about the hair – babies have sparse hair, but they shed it before reaching adulthood.

Whales and dolphins belong to the same order of marine mammals called **cetaceans**. They spend their whole lives in water, living in family groups called **pods**. Because they live in cool water, they have a thick layer of blubber just under the skin to keep them warm.

There are more than 70 species of whales, dolphins and porpoises belonging to two different groups: the suborder **mysticetes** or baleen whales and the suborder **odontocetes** or toothed whales. Dolphins and porpoises are classified as toothed whales. Sizes of these species range from the 30 metre/100 foot blue whale to the 2 metre/6 foot dolphin.

Whales and dolphins communicate with **echolocation**. When they make sounds, the sound waves travel through the water in all different directions. When the sound reaches an object, it bounces off the object and returns to the whale or dolphin. The echo that bounces back tells it where the object is located, its size and its speed.



### Conservation Discussion: Whale and Dolphin

Years ago, whales and dolphins were hunted for food, clothing and oil. Although some whales that were near extinction have recovered (such as gray whales, which were removed from the US Endangered Species List) others are still endangered.

Aside from hunting, other threats to whale populations include habitat

## Whales and Dolphins

destruction, entanglement in fishing gear, ocean pollution and an increase in boat traffic in vital whale habitat.

Protection laws have been put in place across the globe. For example, the Marine Mammal Protection Act has protected whales and dolphins in the US since 1972. The Convention on International Trade in Endangered Species (CITES) that regulates international trade of plants and animals also prohibits the trade of whale products.

### Quick Quiz:

Q: Are whales and dolphins fish or mammals?

A: Mammals. They're warm-blooded, breathe air, give live birth, have hair (at one point) and nurse their young.

Q: How do whales and dolphins communicate?

A: With echolocation. They produce sound waves that travel through the water in different directions. When the sound reaches an object, it bounces off and returns to the creature. The echo that returns tells where the object is located, its size and its speed.

Q: Many whale and dolphin species are now protected by law. Before these laws were in place, what types of threats put them near extinction?

A: Hunting, habitat destruction, entanglement in fishing gear, ocean pollution and boat traffic.



Photo Courtesy of Leszek Karczmarski

### Activity: Echolocation

1. Explain to students that whales and dolphins hear through echolocation. Describe to them how it works using the information provided above.
2. Blindfold one student at a time and have him or her stand in front of the class.
3. Ask several students to take turn clapping, blowing a whistle and making other noises. See if the blindfolded student can figure out where it came from.

## Whales and Dolphins

4. Use a round pan of water and touch the center to demonstrate the movement of waves. Explain that when whales and dolphins make sounds, the sound travels similar to waves, in all directions through the water. When the sound reaches an object, it bounces off, returning to the whale. Just as the wave in the pan does when it hits the edge.
5. Now blindfold the students again one at a time. Have them hold a bag of water over each ear and determine where sounds come from just as they've done before.
6. Is there a difference when sound travels through air and water? Discuss these concepts with the students.

### Extension Activities

- Ask students to discover the size of whales and dolphins. Explain that their sizes range from a few feet to a hundred feet. Have students work in pairs or small groups to illustrate the lengths of different species, making sure that no group graphs the same cetacean. You



Photo Courtesy of  
Leszek Karczmarski

- can either assign the length of species to each group or have them research the numbers. Students will use a ruler to determine the length of string or cord needed to represent their species, and cut the string to the appropriate length. Have one student from each team form a starting line on the playground. Have another student walk their line to the end. Have students take turns stating the name of their species and its total length.
- The average adult human brain weighs 1 kilogram/3 pounds. Sperm whales have the heaviest brain of all cetacea at 9 kilograms/20 pounds. Placing small weights in a bucket, have students measure the weight of the human brain. In another bucket do the same for the sperm whale brain. Have them lift and compare the difference.
- Discuss what toothed whales and dolphins eat. Have students play a game to illustrate the food chain. Assign a large number of students to be plankton, some students to be sea creatures that eat



## Whales and Dolphins

plankton and a small number to be different species of toothed whales. Have them create a sign to wear around their neck for what they represent, using paper and string. On an open playing field, instruct the whales to chase the sea creatures and the sea creatures to chase the plankton. Once a person is tagged, they're out of the game. After the game is over, discuss the results. Did they survive? If they did, did they capture enough food to stay healthy? Discuss the kinds of defense mechanisms the prey used for staying alive and compare that to defense mechanisms that may be used in the wild.

- Post an enlarged map of the country in which you live. Have students research the species of whales found in your country.

Have them research the details of their migration routes. Have each student or team of students draw the migration route for their species on the classroom map. Discuss reasons and seasons of migration.



## Sea Turtles



Remember to play the sea turtle section of the AWARE Kids video.

### Vocabulary:

**Endangered** – threatened with extinction.

**Poacher** – one who hunts or fishes illegally or beyond legal regulations.

**Shrimp trawler** – a large tapered and flattened or conical fishing net that's towed along the ocean floor for shrimp.



# Totally Sea Turtles

[Page 11 of the AWARE Kids activity book]

## Topic Discussion:

### The Seven Species of Sea Turtles

Like sharks, sea turtles have lived on earth since before the dinosaurs – about 150 million years! There are seven different species of sea turtles: loggerhead, green, leatherback, flatback, hawksbill, Kemp's ridley and olive ridley.

Although they're all hard-shelled, air-breathing reptiles, they each have distinct diets, behaviors and characteristics. These amazing creatures come in many sizes, shapes and colors. The olive ridley weighs up to 45 kilograms/100 pounds while the leatherback can weigh up to 600 kilograms/1300 pounds. And many sea turtles can live to be 100 years old.

Sea turtles live in the tropical and subtropical seas of the world, spending most of their lives in the open ocean traveling great distances. One olive ridley being tracked traveled 3050 kilometers/1900 miles in just 23 days. Sea turtles migrate between nesting and feeding grounds. Although it takes 20–50 years to reach sexual maturity, females return to the same beach where they were born to lay their eggs. They bury up to 180 eggs at a time and camouflage the nest site from predators.

Sea turtles don't have teeth. Instead they have powerful "beaks" with sharp edges that they use to eat jellyfish, sponges and crustaceans. Although sea turtles must breathe air like other reptiles, they're amazing divers and can hold their breath for a very long time. Loggerhead sea turtles can hold their breath for up to 30 minutes each dive. In fact, they spend 80 – 94 percent of their lives submerged.

## Conservation Discussion: Sea Turtles

Sea turtle species across the globe are **endangered**. The ratio of surviving sea turtles is about 1:1000. For every 1000 eggs laid, just one sea turtle survives. Sea turtles are under attack from the very beginning of their lives. Eggs laid and buried in the sand, face many dangers including natural predators like raccoons, coyotes and crab. They also must contend with storms, hurricanes, coastal development on nesting beaches and **poachers** collecting and selling sea turtle eggs.

## Sea Turtles

If a sea turtle survives and makes its way to the ocean, it faces a host of other dangers. Thousands of sea turtles are caught in fishing nets each year. An estimated 150,000 are caught by *shrimp trawlers* alone. Poachers illegally kill adult sea turtles for their meat, skin and shells. Ocean pollution is also a major concern for sea turtle survival. For



Photo Courtesy of Liz Luack

instance, plastic bags look like one of their favorite foods – jellyfish. The ingested bags get caught in their intestines and eventually lead to the turtle's demise.

There are many things that can be done to help. Education is the first step. Educating younger generations as well as government officials is necessary for sea turtle protection. Writing letters and articles urging stronger endangered species legislation also supports sea turtle conservation. It's also important to support environmental organizations and scientists protecting sea turtle habitat and unlocking the clues to their survival.

### Quick Quiz:

- Q: How many species of sea turtles are there and how many are endangered?  
A: There are seven species of sea turtles and all seven are endangered.
- Q: Are sea turtles mammals, reptiles or fish?  
A: Sea turtles are reptiles that breathe air and spend time above and below water.
- Q: What types of threats might a sea turtle face in its lifetime?  
A: Natural predators like sea birds and raccoons, storms and hurricanes, coastal development, poachers, pollution and fishing nets.

### Activity: Protect the Eggs

Have the students read page 11 of the AWARE Kids activity book titled, Totally Sea Turtles. Explain to the class that sea turtles are in danger. Only 1 in 1000 sea turtles reach adulthood. Lead a discussion on the dangers facing sea turtles: natural and human causes.

1. Provide each student with paper to draw and cut out 4 to 6 sea turtle eggs (depending on the number of students) so that you end up with a total of 100 eggs. Ask them to draw the egg on one side and a sea turtle hatchling on the other. You can also provide a sample drawing on the board.

## Sea Turtles

- Place all the eggs in a pile on the classroom floor – egg side up at first.
- Have students take turns taking eggs from the nest based on the predators assigned below:

Threat / Predator	Number of Students	Number of Eggs to Take
Raccoon	3	4
Coyote	2	5
Dog	4	2
Crab	5	3
Bacteria	1	5
Human	1	9
Storms/Hurricanes	3	4

- Now turn the remaining eggs over to the hatchling side. Instruct the remaining students to remove the following eggs:

Threat / Predator	Number of Students	Number of Eggs to Take
Heron	3	2
Vulture	4	3
Seagull	2	2
Bright Lights on Beach	2	3

- With one egg remaining, discuss survivorship of sea turtles. What threats will the remaining sea turtle face once at sea? What if no turtles were left how would that affect the food chain and environment?

### Extension Activities

- Write an article for the school newspaper to inform other students about sea turtle conservation. Talk about sea turtle biology, amazing sea turtle facts and why they're endangered. And don't forget to include how people can help protect sea turtle species.
- As a classroom activity, adopt a sea turtle or sea turtle nest. Research environmental organizations that have these programs online. Often they will send your class adoption certificates, a photo of the hatchlings, fact sheets about turtles, organization newsletters and updates.

## Sea Turtles

- Lead a sea turtle webbing activity. Begin by writing the word sea turtle on the board. Draw a circle around it. Ask the students to name things that are connected to sea turtles. For each new concept, draw a circle around it. Students may be prompted by asking them what sea turtles eat, what they look like, where they live, who are their predators? Finally, connect the circles with lines. The circles will be connected to the sea turtle but they may also be connected with each other. Discuss why these concepts are important when considering sea turtle conservation.







# Classroom Fun & Games

[Pages 5 – 10 of the AWARE Kids activity book]

## Fish ID/Fun Fish Facts

### Vocabulary:

**Anal fin** – the median fin located on the underside of a fish, between the anus and the caudal fin. Not all fish have an anal fin.

**Caudal fin** – the tail fin.

**Dorsal fin** – the fin on the back or top of an aquatic animal.

**Pectoral fin** – the pair of fins toward the front of the fish's body.

**Pelvic fin** – the pair of fins on the underside of the fish's body, behind the pectoral fins.

**Plankton** – small, usually microscopic, plants (phytoplankton) or animals (zooplankton) found in aquatic ecosystems.



© Wolcott Henry

### All About Fish

Just about everywhere you find water, you'll find fish. From colorful coral reef fish to enormous migrating whale sharks. Fish are found in all types of aquatic environments and they come in all sizes. The smallest fish is the tiny pygmy goby while the largest fish is the whale shark.

What makes a fish unique? They have scales, fins and strong tails that provide protection, help them steer and propel through the water. In general, most fish have **caudal**, **dorsal**, **anal**, **pelvic** and **pectoral** fins. The size and shape of a fish's fins can provide clues to where it lives and what it may eat. Fish eat everything from **plankton**, to shellfish, insects and other fish.

Like humans, fish have an internal bony skeleton. They are cold-blooded and don't need the protection of fur or hair to keep them warm. They are the same temperature as the water in which they live.

### Fisheries Conservation

Fish thrive in all types of waters. But, as with other underwater creatures, fish populations are threatened by human activities. Many fish species are depleting at a rapid rate.

Human actions such as overfishing, bycatch, pollution and habitat destruction eliminate fish populations and habitat. We have the power to reverse this trend. The first step is awareness and education. [Talk with your students about the ways in which we rely on fish across the globe.](#) [Speak about fisheries issues in your area and what can be done to help.](#)

### Quick Quiz:

Q: How are fish different than mammals?

A: Fish have scales, fins and strong tails to help propel them through the water. They're cold-blooded and don't need the protection of fur or hair to keep them warm.

Q: What kinds of human actions threaten fish populations?

A: Overfishing, bycatch, pollution and habitat destruction.

## Fun & Games

### Activity: Fish ID/Fun Fish Facts

Have students cut out the Fish ID cards on page 5 and 6 of the AWARE Kids activity book. Split the class in small groups and play a Fish ID game. Reading aloud the trivia on the back of the cards, have students guess the name of the fish from listening and looking at the picture on the front of the card.

### Extension Activities

- Have students research sustainable fish species online. Have them print out a list or wallet card of sustainable and unsustainable fish. (Examples can be found on the Monterey Bay Aquarium website



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[www.mbayaq.org](http://www.mbayaq.org), the Wildlife Conservation Society website [www.wcs.org](http://www.wcs.org) and the Marine Stewardship Council website [www.msc.org](http://www.msc.org).) Lead a group discussion and make a class list for which fish are OK to eat or order in a restaurant, which ones to choose on rare occasions and which to completely avoid. Discuss why certain species are on the avoid list. Talk about why consumers play an important role in their protection. And brainstorm other methods for protecting these fish.

- Have students create fish mosaics with recycled paper. Bring in old magazines, wrapping paper, paper bags and newspaper for students to use and incorporate a discussion on recycling. Have students tear the various papers into different sizes and shapes. Provide them each a piece of construction paper and ask them to glue recycled paper pieces onto their page in the shape of a fish. After the glue has dried, you can also ask students to label the fins and other fish parts.



© NOAA

## Fun & Games

### It's a Shore Thing!

Have students complete the maze on page 7 of the AWARE Kids activity book. They will find their way from the city street to the shoreline, picking up (circling) trash they find along the way. *Answers located inside the back cover the of activity book.*



Once complete, explain to students that even though they may not live near the beach or other body of water, their rubbish still finds its way to the shore. This rubbish not only contaminates aquatic environments, it harms underwater life.

Often marine creatures mistake trash

for food, causing serious injury to

that animal. Lead a class-

room discussion on things they can do to prevent trash

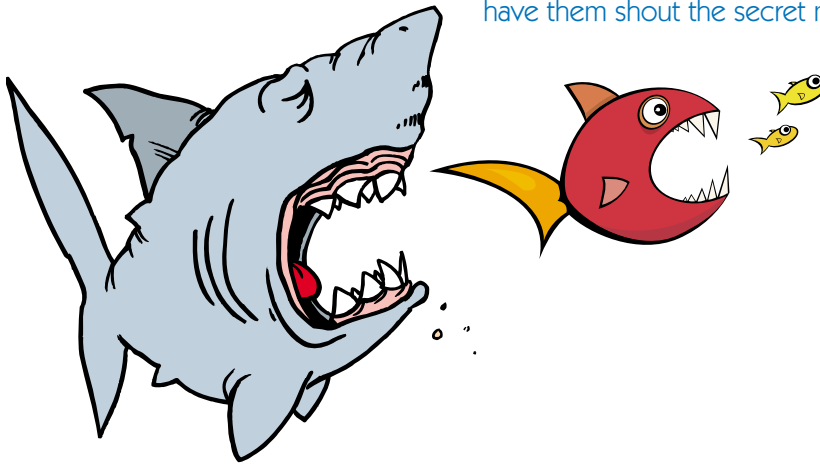
from entering waterways.

### AWARE Kids Wet-Word Game

Have students complete the word game on page 10 of the AWARE Kids activity book. Instruct them to pick from the list of words to fill in the blanks. When they are finished, they use the numbered letters to fill in the secret message. Once all the students are finished,

have them shout the secret message. *Answers located inside*

*the back cover of the AWARE Kids activity book.*



## Kids Clean Up



# AWARE Kids in Action

[Pages 12 – 16 of the AWARE Kids activity book]

## AWARE Mission 1: Kids Clean Up!

### Topic Discussion: Why Clean Up?

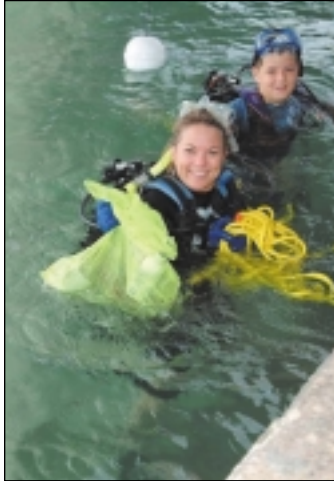


Photo Courtesy of Pura Vida Divers

Each year 100 million tons of plastics, 17 million tons of sewage and garbage make its way to our waterways. The rubbish is washed down from city streets, thrown overboard boats and cruise ships and left behind by people visiting these natural areas.

Polluted waterways are a concern for humans and underwater creatures alike. Not only does debris pollute an area, it makes it unfit for fun things like swimming, scuba diving, surfing and paddling. In 2000 there were 11,270 days of beach closings in the United States alone.

Underwater, trash can be a big problem too. Creatures like sea turtles and sea lions ingest garbage that they mistake for food, injuring and often killing them. Entanglement in discarded fishing nets, six pack rings and other waste also threatens aquatic life.

## International Cleanup Day

On the third Saturday in September each year, scuba divers and shore-line volunteers gather to remove debris from above and below the water. The first Cleanup Day was held in 1986 in Texas, USA and the

event now spans the globe. Cleanup events have been held in 127 countries and territories.

Volunteers of all ages volunteer at their local cleanup site and as they gather debris, they record information vital to conservation efforts. Data gathered is tallied by the Ocean Conservancy to



provide an overall picture of debris issues, educate the public and advocate for stronger management policies.



## Kids Clean Up

Project AWARE Foundation organizes the underwater portion of International Cleanup Day. Because divers have a view to the underwater world, they can remove trash beneath the surface that sometimes remains out of sight and out of mind. With the unique training and skills to remove debris found underwater, divers often collect thousands of pounds of trash including larger items like tires, washing machines and furniture.



Photo Courtesy of Fish N Fins

### **AWARE Mission 1: Kids Clean Up!**

Using the information found on page 12 of the AWARE Kids activity book, coordinate the activity, AWARE Mission:1, Kids Clean Up! Ask the students to read the cleanup procedures on page 12. After you choose a date for this activity, you may like to lead a class discussion on local shorelines that need cleaning and ask the students to pick one for the project.

Make copies of the AWARE Kids tally sheet provided. Divide the students into teams of 2 or 3.

One records the data and the other(s) pick up debris and hold the trash and recycling bags. Make sure the students record the type and number of debris picked up using the tally sheet.

### **Before the Cleanup**

1. Register your cleanup event with Project AWARE Foundation to receive free supplies including trash bags, certificates, decals and other items for the students. You can register online at [www.projectaware.org](http://www.projectaware.org).
2. Once you have identified a cleanup site in your area, make sure that you will have access to that site. Contact the local authority governing the site and inform them of the cleanup activity, location and number of participants.
3. Identify if there is a telephone nearby and if there are adequate facilities for your students.
4. Before the students begin, make sure that they receive or bring protective gloves, trash bags, data collection sheets, pencils and other instructions.



5. Inform the children to return to the check-in or starting point when they are finished and bring back their completed forms and collection bags.
6. Visit the cleanup site prior to the event to conduct a risk assessment. Make sure parents sign a consent form or liability release for their child's participation. For a sample copy email [information@projectaware.org](mailto:information@projectaware.org).
7. Try to gain sponsorship for food, beverage and supply donations if necessary.



### On Cleanup Day

1. Make sure you have all the necessary equipment and materials including first aid kit, emergency contact information, cleanup supplies, protective gloves and camera.
2. Conduct a briefing for team leaders and children to make sure they understand safety and procedures. Include safety guidelines, information on how to record data, what not to collect, location of facilities, where to return collection bags and the importance of the cleanup activity.
3. Make sure that all the children are paired with a team leader (five children per leader is a good ratio). Hand out the cleanup materials.
4. Make sure children stay clear of any hazards and report them to the leader including sharp, heavy or hazardous objects.
5. Make sure team leaders never leave children alone during this activity.
6. Ask team leaders to contact local animal or wildlife rescue facilities should a dead, entangled or injured animal be encountered.
7. Be sure to take photos and/or video of the cleanup!

### After the Cleanup

1. Count the children and leaders to make sure everyone has returned safely.
2. Collect all survey forms and be sure that trash is placed in the collection site.
3. Hand out certificates of appreciation and celebrate a job well done!
4. Send pictures and information to Project AWARE. Children will receive a free mission badge for completion of AWARE Kids Mission 1.



# Kids Clean Up!

Name(s): \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

Date: \_\_\_\_\_ Cleanup Location: \_\_\_\_\_

TYPE OF DEBRIS	TALLY (SAMPLE  )	TOTAL COLLECTED
Bags		
Food Wrappers and/or Containers		
Beverage Bottles (glass)		
Beverage Bottles (plastic)		
Beverage Cans		
Clothing/Shoes		
Fishing Line		
Rope		
Cigarettes		
6-Pack Holders		
Pull tabs		
Diapers		
Other _____		
Other _____		
Other _____		

What were the most common items you found? \_\_\_\_\_

\_\_\_\_\_

What were the weirdest and grossest pieces of rubbish you found? \_\_\_\_\_

\_\_\_\_\_

Estimated weight of debris collected: \_\_\_\_\_

## Recycling Rocks!



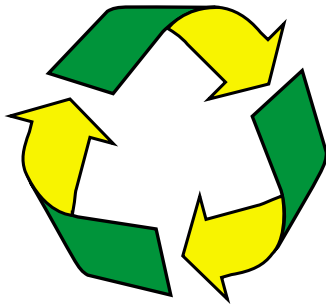
### AWARE Mission 2: Recycling Rocks!

[Page 13 of the AWARE Kids activity book]

#### Topic Discussion: Why Recycle?

Recycling is a process of treating discarded materials, often trash, so they can be used again. Among the most common types of recycled materials include paper, cardboard, aluminum, glass and certain kinds of plastics.

Why recycle? Recycling saves space, energy and natural resources. People generate millions of tons of waste each year. On top of that, the number of landfills to accommodate this waste keeps dropping. When we recycle, we reuse and keep items that would have otherwise been thrown away, saving valuable landfill space. We also save energy because the amount of energy it takes to recycle an aluminum can is less than the amount it takes to make a can from raw materials. This in turn saves natural resources. The amount of fuel, water, wood, coal or other raw materials used to make the new can are no longer needed.



### AWARE Mission 2: Recycling Rocks!

Ask the students to read page 13 of the AWARE Kids activity book. Instruct them to complete steps 1 – 3 of the recycling mission. Make copies of the enclosed Mission 2 Activity Sheet for their use.

#### Extension Activities:

1. **Conduct a poetry contest.** Ask students to write a poem about litter and recycling. The poem can be funny, serious or rhymed. Once the poems are complete, have the students read aloud or you may read a few samples for the class.
2. **Turn recycled materials into works of art.** Collect newspaper, plastic cups, boxes, wrapping paper tubes, egg cartons, etc. Use glue, tape and staples to put these pieces together and create a sculpture of recyclables. Have the students name their sculptures, paint them and mount them on cardboard or hang them from string. They can display their works with others in the classroom. You can even have the principal of the school judge for prizes.
3. **Write a list of recyclable materials on the board** (examples may include paper bag, wire hanger, glass jar, newspaper, cardboard box, milk carton, etc). Ask the students to list 3 ways to reuse each item. Once complete, lead a class discussion asking them to share their ideas. How many of them currently use these ideas at home?



## Kids to the Rescue!



### **AWARE Mission 3: Kids to the Rescue! Threatened Underwater Animals**

*[Page 14 of the AWARE Kids activity book]*

#### **Topic Discussion:**

#### **Why are underwater animals in danger?**

Threatened animals are those whose populations are becoming so small they are in danger. Often they're facing either becoming endangered or even extinct. Though some populations may be threatened in a small region, there are others that face global extinction.

A few examples of threatened underwater animals mentioned on page 14 of the AWARE Kids activity book include West Indian manatees, Hawaiian monk seals, humpback whales, coho salmon, southern river otters and all seven species of sea turtles. There are many reasons contributing to their decline: habitat loss, pollution, overfishing and disease

to name a few.



*Manatee Photo Courtesy of Robert Zimmerman*

#### **AWARE Mission 3: Kids to the Rescue! Threatened Underwater Animals**

Encourage students to read page 14 of the AWARE Kids activity book. There they will read about the problems facing underwater creatures and what is being done to protect these species and their habitat.

Lead the threatened underwater animal mission found on page 14, encouraging students to research and report on a threatened aquatic species of their choice. Encourage the students to send their report to Project AWARE Foundation as their mission indicates. They will each receive a mission badge for completing this task.

#### **Extension Activities:**

- Have the students imagine that they are an endangered underwater animal. Ask them to write a story about their life. They should include what type of habitat they live in, what they eat, why they are in danger and what they wish humans would do to help protect them.



## Kids to the Rescue!

- Ask students to imagine they are a city official where green sea turtle populations are struggling to survive. The largest local industry is fishing, providing many jobs and resources for the people in your community. But, many residents believe that the fishing gear accidentally captures and injures sea turtles. How do you solve the problem? You want to provide jobs, food and other resources for your community through commercial fishing. But, you also want to protect sea turtles and get reelected by both conservationists and fishermen.
- How do endangered species rank with other environmental concerns? Lead a discussion on various environmental problems like air pollution, water pollution, vanishing natural resources, improper

waste disposal, global warming, etc. After the discussion, divide students into groups and hold a debate on which environmental issue should be the country's primary concern. Each group should be given equal time to present. Lead a class discussion on the various points made in debate. Try to come to a class consensus on the nation's number one priority and how we should move forward.



*Humpback Whale*



*Hawaiian Monk Seal*  
Photo Courtesy of Caterina Gennaro

## Water Conservation



### AWARE Mission 4: Way Cool Water Conservation

[Page 15 of the AWARE Kids activity book]

#### Topic Discussion: Why Conserve Water?

Although more than 70 percent of the earth is covered by water, there are many places in the world where water is in short supply or unfit for drinking. Water can be made unclean by many things we can't even see. Bacteria and other organisms can grow in water, for instance. Untreated sewage and run-off from city streets and farms are other ways that waters become contaminated.

### AWARE Mission 4: Way Cool Water Conservation

Since every living thing on earth needs water to survive, it's important for students to know that water needs conserving. There are many ways we can conserve water in our own homes to contribute to the water saving

effort. Ask the students to read the water conservation section of the AWARE Kids activity book found on page 15. Provide them with the activity sheet (page 48) including water usage measurements to calculate their family's daily water usage for one week. Ask them to complete AWARE Mission 4: Way Cool Water Conservation.

Once they've added up their family's water usage and completed the chart, ask them to estimate how much water is used in a month and a year. Then lead a discussion asking the students what they discovered. Were there certain days of heavy water usage? Are there ways they can think of to conserve water? Make sure they write down their water-saving ideas and send these along with their graph to Project AWARE Foundation. They'll receive a free AWARE Kids mission badge for their completion of AWARE Mission 4: Way Cool Water Conservation.



## Water Conservation

### Extension Activities:

- Divide students into groups. Ask them to wear gloves while collecting four samples of water from different local sources (local creek, ocean, river, faucet, etc.) in a jar. Make sure they use masking tape to label the source of the water collected on each jar. Cover jar with white coffee filters and secure them to the top with rubber bands. Ask the students to tip the jar so some of the sample is poured directly onto the coffee filter. Note how the filters of each sample appear. Are they different colors? Are there organisms caught in the filter? How do they smell? Older students make like to test water quality parameters such as pH, nitrate and phosphate concentrations. They may also use a microscope to look for and identify plant and animal life in each sample. Does your local water authority regularly test these sites? What information have they collected?
- Study the continuous flow of water. Ask students to draw and label the water cycle. The cycle should include and illustrate water evaporation, cloud saturation and water falling to earth in the form of rain. It should also show rainwater carrying dirt, trash and chemicals through gutters and storm drains back into lakes, rivers and oceans. Discuss how this relates to AWARE Mission 1 and 2 of the activity book.



© NOAA



# Way Cool Water Conservation

Name: \_\_\_\_\_

Date: \_\_\_\_\_



### Consider the following:

- 10 minute shower . . . . .380 litres/100 gallons
- Full bath . . . . .150 litres/40 gallons
- Flushing toilet . . . . .20 litres/6 gallons
- Leaky faucet . . . . .1300 litres/350 gallons
- Dishwasher . . . . .95 litres/25 gallons
- Dish washing by hand . . .55 litres/15 gallons per household member
- Load of laundry . . . . .190 litres/50 gallons
- Watering the yard/plants . .1135 litres/300 gallons per hour with a garden hose

## Water Use Log

ACTIVITY	DAILY USAGE							TOTAL USAGE
	DAY 1 Date: _____	DAY 2 Date: _____	DAY 3 Date: _____	DAY 4 Date: _____	DAY 5 Date: _____	DAY 6 Date: _____	DAY 7 Date: _____	
Showers/Baths	_____	_____	_____	_____	_____	_____	_____	_____
Toilet Flushing	_____	_____	_____	_____	_____	_____	_____	_____
Faucet Leaks	_____	_____	_____	_____	_____	_____	_____	_____
Dish Washing	_____	_____	_____	_____	_____	_____	_____	_____
Laundry	_____	_____	_____	_____	_____	_____	_____	_____
Watering and Other Uses	_____	_____	_____	_____	_____	_____	_____	_____

TOTAL FOR:

A Week \_\_\_\_\_ litres or gallons    A Month \_\_\_\_\_ litres or gallons    A Year \_\_\_\_\_ litres or gallons

What are your water saving ideas to conserve more water at home? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Speak Out!



## AWARE Mission 5: Speak Out!

[Page 16 of the AWARE Kids activity book]

Speak with the students about how writing a letter can often be a good way to show your support for an issue and tell people about your concerns and ideas for protecting the underwater environment. Instruct them to complete their final AWARE Kids mission on page 16. AWARE Mission 5: Speak Out! For a Healthy Water Planet.

In this mission, students will compose a letter to a local or national government official. Ask them to write about an issue that concerns them personally. It could be something mentioned in the AWARE Kids activity book or something else they've researched. In their letter they should inform the official about the issue and suggest things that can be done to solve the problem(s). They may also ask what the government is currently doing to improve the situation.

Students must address the letter to the official directly and mail a copy to Project AWARE in order to receive their final mission badge. To find the address of local or national politicians, research online.

Date

Honorable Somebody Smith  
U.S. House of Representatives  
2222 Something House Office Building  
Washington D.C. 22222-5555

Dear Honorable Representative,

As a concerned citizen, I'm writing to express my support of shark conservation. As a 4th grade student at George Washington Elementary, I've been learning about the importance of shark species in the underwater environment.

I've learned of the many dangers facing shark populations today. Because of sharks late maturity and low number of offspring, they are vulnerable to most any fishing pressure. Today, many shark species are fished only for their fins, in a practice called shark finning.

A recent poll conducted by Science Times reports that 95 percent of people want to protect sharks. And there are many things that humans can do to protect them. One is to express our concerns and ideas to government officials. My idea is to make sure shark protection laws are in place. What kinds of protection laws have you supported and what is currently being done?

I know that you are aware of the dangers sharks are facing. Please continue to work for better shark protection and management policies.

Thank you for your support and action.

Sincerely,  
Joe Wilson  
4th grade student  
George Washington Elementary

Sample Letter



## Project AWARE International Offices

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Project AWARE Foundation (Americas)  
30151 Tomas Street, Suite 200  
Rancho Santa Margarita, CA 92688 USA  
Email: [information@projectaware.org](mailto:information@projectaware.org)

Project AWARE International  
Unit 7, St. Philips Central  
Albert Road  
St. Philips, Bristol BS2 0PD  
United Kingdom  
Email: [info@projectaware.org.uk](mailto:info@projectaware.org.uk)

Project AWARE Foundation (Europe)  
Obersilerstrasse 3 CH-8442 Hettlingen  
Switzerland  
Email: [aware@padi.ch](mailto:aware@padi.ch)

Project AWARE Foundation (Asia Pacific)  
Unit 3, 4 Skyline Place  
Frenchs Forest  
New South Wales  
Australia 2086  
Email: [info@projectaware.org.au](mailto:info@projectaware.org.au)

Project AWARE (Japan)  
1-20-1 Ebisu-Minami  
Shibuya-ku Tokyo 150-0022  
Japan  
Email: [planning@padi.co.jp](mailto:planning@padi.co.jp)



## Teacher Feedback Form

**Thank you** for using the *AWARE Kids Teacher's Guide* to help inform children about issues facing the underwater world and encouraging them to take part in solutions.

Please take a few moments to answer the following questions about AWARE Kids.

How did you use the *AWARE Kids Teacher's Guide* and activity book in your class? Did you use them as a presentation, part of a unit or other activity?

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How much time did you spend on AWARE Kids: each education section, fun and activities sections? \_\_\_\_\_

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What did you like about the *AWARE Kids Teacher's Guide* and activity book? \_\_\_\_\_

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How would you improve the AWARE Kids materials? \_\_\_\_\_

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What other types of educational materials would be useful to you? \_\_\_\_\_

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*Continued on Back*

Other comments or suggestions? \_\_\_\_\_  
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Send this form to your local Project AWARE Office listed on page 50.

**Optional Information:**

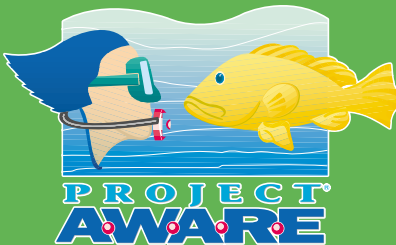
Name \_\_\_\_\_ Date \_\_\_\_\_

Phone Number \_\_\_\_\_ Email \_\_\_\_\_

Name of School \_\_\_\_\_

School Address \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_



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