

# Unit I Year of the Ocean

The Staff at *Project Oceanography* would like to thank the following people for their assistance in preparing this packet:

Executive Producer: Paula Coble, Ph.D.

Graphics: Chad Edmisten  
Juli Rasure

Writers: Juli Rasure  
Kim Donaldson

Edited by: Paula Coble  
Lori Huthmacher  
Kim Donaldson

Packet Distribution: Tracy Christner

Source Information sites: Center for Marine  
Conservation

National Oceanographic and  
Atmospheric Association  
The Smithsonian Institution

**Teacher Information:** This material is background information for teachers. This should be read and discussed with students before video presentation. *Student Information Sheets:* This is background material for students. They should be copied and given to students before video presentation. Activities should be done as follow up after program. Questions should be discussed after the show.

## Table of Contents

<b>Year of the Ocean Acknowledgements</b> .....	
.....pg. 11	
<b>Table of Contents</b> .....	
.....pg. 12	
<b>Year of the Ocean Packet Contents</b> .....	
.....pg. 14	
<b>Special Activity - Year of the Ocean Drifters</b> .....	
.....pg. 16	
<b>Unit 1 Year of the Ocean</b> .....	
.....pg. 19	
<b>Lesson I-Why the Oceans are Important!</b> .....	
.....pg. 19	
Year of the Ocean Information .....	
.....pg. 19	
Why is the Ocean Important? .....	
.....pg. 20	
<b>Activities</b>	
Activity I-1. Can You Calculate?.....	
.....pg. 24	
Activity I-2. Missing Mystery Vocabulary Word.....	
.....pg. 25	
Activity I-3. Preparation for Year of the Ocean Show II: The Ocean Biosphere - From Microbes to Mammals.....	
.....pg 25	
<b>Additional Internet Links to Oceanographic     Educational Materials</b> .....	
.....pg. 26	
<b>Student Information Sheet Lesson I</b> .....	
.....pg. 27	
Fun Facts I .....	
.....pg. 28	
<b>Additional Links to Oceanographic Educational Materials</b> ...	
.....pg. 28	

**Lesson II: The Ocean Biosphere: From Microbes to Mammals** .....

.....pg. 29

Our Ocean Biosphere .....

.....pg. 29

The Marine Food Web .....

.....pg. 33

Diagram 2-1. The Marine Food Web .....

.....pg. 34

**Activities**

Activity II-1. What Does the Food You Eat, and the Ocean  
Have in Common? .....

.....pg. 36

Activity II-2. Preparation for Next Weeks Broadcast .....

.....pg. 38

**Student Information Sheet II** .....

.....pg. 39

Fun Facts II .....

.....pg. 40

**Lesson III. The Water Planet at Risk** .....

.....pg. 41

Overview: The Water Planet is at Risk .....

.....pg. 41

Year of the Ocean Information .....

.....pg. 42

What is Being Done to Help? .....

.....pg. 46

What Can I Do? .....

.....pg. 47

“Top 10 Things You Can Do To Help Our Oceans” .....

.....pg. 48

**Activities**

Activity III-1. Environmental Booby Traps and Pitfalls .....

.....pg. 50

Activity III-2. Marine Debris is Trouble for Me!! .....

.....pg. 52

Activity III-3. The Dirty Dozen Exercise .....

.....pg. 53

Activity III-4. What is Your Watershed Address? .....

.....pg. 53

**Student Information Sheet Lesson III** .....

.....pg. 54

.....	What Can I do? .....
.....	pg. 55
.....	“Top 10 Things You Can Do To Help Our Oceans” .....
.....	pg. 55
.....	Did You Know? .....
.....	pg. 56

**Lesson IV. Studying the Ocean Biosphere** .....

.....	pg. 57
.....	Year of the Ocean Information .....
.....	pg. 57
.....	The Scientific Method .....
.....	pg. 58
.....	Diagram 4-1 .....
.....	pg. 60
.....	Instruments and Methods Used in Oceanographic Research .....
.....	pg. 61

**Activities**

.....	Activity IV-1. The Scientific Method .....
.....	pg. 63
.....	Activity IV-2. Scientific Method At Work .....
.....	pg. 64
.....	Activity IV-3. Visit the YOTO web site .....
.....	pg. 64
.....	Activity IV-4. Instruments and Organism study .....
.....	pg. 65

**Student Information Sheet Lesson IV** .....

.....	pg. 67
-------	--------

**Glossary** .....

.....	pg. 69
-------	--------

**Internet Sites for Teachers and Students to Reference** .....

.....	pg. 72
-------	--------

**References** .....

.....	pg. 74
-------	--------

# Year of the Ocean Packet Contents

## A. Overview

### 1. Year of the Ocean

In the next four lessons students will learn the importance of the ocean as a natural resource. Emphasis is placed on the biosphere as an entity, and the methods and processes used to study it.

### 2. Contents of Package

Your packet contains the following lessons:

- Why the Oceans are Important!
- The Ocean Biosphere: From Microbes to Mammals
- The Water Planet at Risk
- Studying the Ocean Biosphere

Your packet contains the following activities:

- Can You Calculate?
- Missing Mystery Vocabulary Word
  - What Does the Food You Eat, and the Ocean Have in Common?
- Preparation for Next Weeks Broadcast
- Environmental Booby Traps and Pitfalls
- Marine Debris is Trouble for Me!!
- The Dirty Dozen Exercise
- What is Your Watershed Address?
- The Scientific Method
- The Scientific Method At Work

## B. Program Preparation

Teacher Information: This material is background information for teachers. This should be read and discussed with students before video presentation.

Student Information Sheets: This is background material for students. It should be copied and given to students before video presentation. Activities should be done as follow up after program. Questions should be discussed after the show.

## **C. Show Time**

### **1. Broadcast Topics**

This broadcast will link into discussions on mathematics, geography, weather, chemistry, spelling and marine biology.

## Special Activity

### Year of the Ocean Drifters

You may not be able to go to sea to collect data, but you can play “armchair oceanographer” by getting real-time ocean data and pictures on the Year of the Ocean and the Data Buoy Drifter Project web pages. Drifters moving with the ocean currents are collecting the data that you can use with your students.

A plot of drifter positions over time is used to determine current speed and direction. A drifter must be built to withstand the ocean movement, but not interfere with the data that it is collecting. A drifter must also be built so that it moves with the flow of the water, and without any interference from the wind.

There are three main sections on a drifter: 1) a float package, 2) a cable and 3) a drogue. Often, only one to two meters of the drift pole, attached to the float, extends above the water, while many hundreds of feet of a subsurface **drogue** are found below the surface. The float serves many purposes for the drifter. The float provides protection for the instruments that it houses, and provides buoyancy for the entire drogue. The instruments on the float measure and transmit surface and subsurface water properties, like temperature, atmospheric pressure, light attenuation, currents and speed of water flow. Many hundreds of feet of a subsurface drogue is found below the surface. The cable is used to attach the float package to the drogue. Temperature and salinity sensors can be attached here as well. The drogue acts like an underwater sail. It helps to ensure that the buoy moves with the flow of the water, not the wind. The drogue is necessary to measure ocean currents accurately. Sometimes the elements, such as wind and waves are destructive and the drogue is lost

There are many different configurations of drogues, and some are better than others depending on application. The YOTO Drifter Project 98 is using satellite-tracked buoys. The satellite can interrogate the buoys and transfer data. For more information on this yearlong project, visit the web site at: <http://drifters.doe.com> or <http://www.yoto.com> For information about other buoy configurations, visit <http://www.yoto98.noaa.gov/>

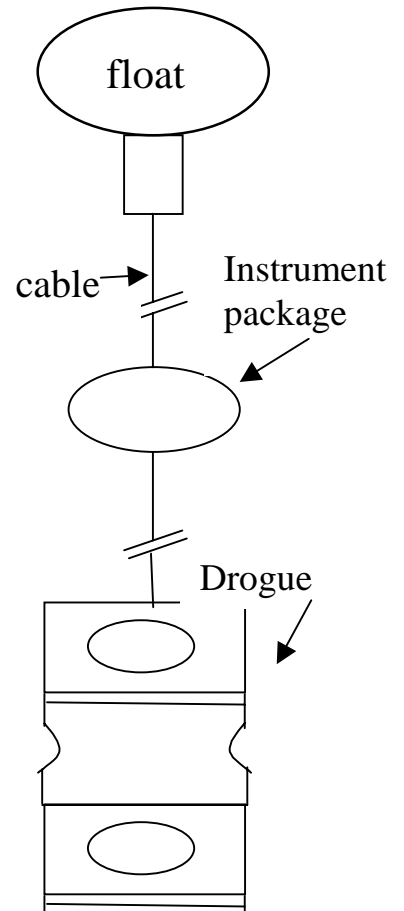


Diagram 1. An illustration of a holey sock drogue

## Track-a-Drifter



If the students have not already visited the YOTO web site, have them do so. If you do not have access to the internet, the following page contains data that the students may use for 'tracking' a drifter. Using the scientific method found in the following pages, and the data available on

the network, have the students track a drifter for several days using the locations given in latitude and longitude. Maps may be copied from the packet, downloaded from the web page, or a poster-size may be obtained through an e-mail or phone request to the YOTO office. At the time of this writing, the e-mail address and phone number were not available, but you may visit the site at: <http://drifters.doe.gov>. These maps are designed with longitude and latitude to follow a drifter through its voyage. What other information are the drifters collecting in addition to ocean currents? What other applications can we use drifters for? How do you think the scientists decided where to deploy the drifters? What questions do you think the scientists are going to answer using the data collected?

Note: you may want to follow your drifter for several weeks, as you can use the information to determine the current speeds and direction (See Unit II):  
Lesson #3: Measuring Currents from Space.



To obtain a free poster size map, call: 1-800-USA-MAPS and ask for the Year of the Ocean (YOTO) Drifter Tracking Chart