

Best Practices of Technology Integration

SUBMITTED BY:

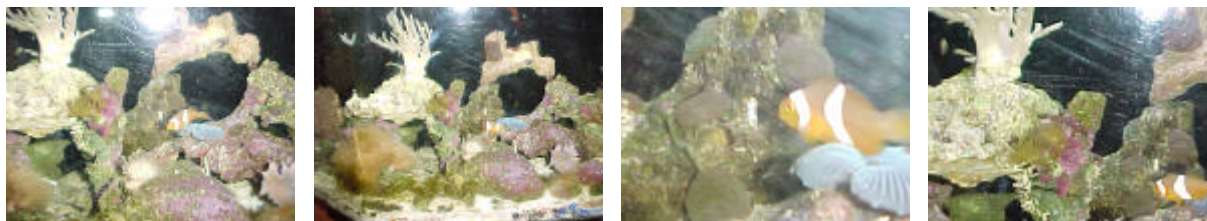
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TITLE: THE SALT WATER CONNECTION

**SUBJECTS: OCEAN/OCEAN LIFE/BIOMES/ECOLOGY/
HYDROLOGICAL CYCLE**

INTENDED GRADE LEVEL(S): 9-12 HIGH SCHOOL

DESCRIPTION: The Salt Water Connection is a culminating interdisciplinary lesson on the hydrological cycle and oceans that is a part of the Earth Science curriculum. The student will determine the factors that influence the Pacific Ocean, in particular the area around Monterey Bay, California. The student will choose an organism that lives in the Monterey Bay area and



describe the biome and ecological factors that influence the organism.

NARRATIVE: Students from the Midwest area are surrounded by the Great Lakes and tend to take water for granted. The Midwest is geographically distant from the Pacific Coast and many students may not have had the opportunity to visit the coast and observe the uniqueness of this particular area and relate to a different concept—that of salt water. This project is the second half of the HYDROLOGICAL UNIT in Earth Science and places emphasis on our AQUA PLANET. The 73% of our planet's water is salt and students need experience and comprehension of this vast amount of water that we live with.

This NaCl H₂O assignment is a success because it is student initiated. Students get to

choose the organism that they want to investigate and then use a wide variety of technology and resources to accomplish this goal.

This lesson meets Warren Consolidated Schools curricular goals by explaining relationships among the hydrosphere, human activities and ocean life.

Because students initiate the investigation by their choice, they are on task to find out how their ocean organism relates to the hydrosphere and the ocean biome

This lesson encourages Standards of Authentic Assessment in that the final product uses a style of multiple intelligence that the student has chosen to explore and present in their learning modality.

This lesson becomes very interactive with technology because the students are initiating the inquiry themselves. The technology science classroom is student driven/initiated experience. Available to them: individual DREAM WRITER laptops, SMART BOARD, two 13" TV/VCR combinations, EPSON projector, 5 classroom network/Internet computers (soon to be expanded to 20 network/Internet connections), CD ROMS, videos, classroom reference books, a scanner, 2 digital disk cameras, 2 color laser printers, 3 printers, Corel Suite presentation type software to produce their investigation.

CURRICULUM BENCHMARKS: This interactive, interdisciplinary plan will allow the students to determine the factors that influence the salt water organism that they are investigating from the Monterey Bay area of the Pacific Ocean. The student will use a variety of computer technology, software, Internet access, text, videos, reference materials, supportive accessory pages to compile data gathered in the activity and make conclusions about the data and information gathered.

MI.SCI.V.2.HS.1 Explain how water moves below the earth's surface. (Key concepts: Ground water—water table, spring, porous, saturate, filtration. Sources—snow melt, rain fall. Real-world contexts: Examples of groundwater, including springs, wells, water soaking into the ground.)

MI.SOC.II.2.HS.1 Describe the environmental consequences of major world processes and events.

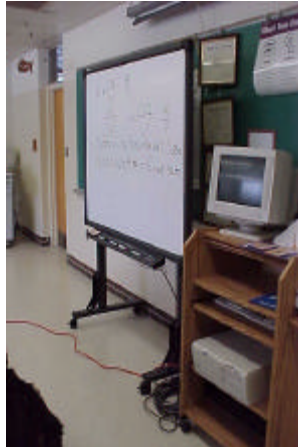
MI.SOC.II.4.HS.2 2. Explain how major world regions are changing.

TOTAL AMOUNT OF TIME FOR LESSON: This plan can take a minimum of a week to as long as your schedule allows. The going further section can lengthen the time taken on this project. As with any new project, there will be 'overrun' time. Try to utilize a weekend, so that students may use their own outside resources; ie. public library, home references, personal visitations or vacations, and home computer access.

MATERIALS/HARDWARE/SOFTWARE:

EQUIPMENT:

NETWORK/INTERNET CONNECTION
DIGITAL CAMERA
VIDEO CAMERA
VCR
TELEVISION
SCANNER
COLOR PRINTER
SMART BOARD
KARIOKI MACHINE
EPSON PROJECTOR
486 COMPUTER WITH CD ROM
DREAM WRITER LAPTOPS



MATERIALS:

TYPING PAPER
COLORED PENCILS
BULLETIN BOARD PAPER (COLORS)

SCISSORS
GLUE STICKS

SOFTWARE:

COREL WORD SUITE OR WORD PROCESSING PROGRAM
PRESENTATION
SMART BOARD SOFTWARE
WRITE BOARD SOFTWARE

VIDEOS:

A NEW HOME IN NEWPORT: THE OREGON COAST AQUARIUM.
Videocassette. Produced Oregon's 12 KPTV UPN. Oregon
Television, 1996.
JELLIES AND OTHER OCEAN DRIFTERS. Videocassette. Narrated
by Leonard Nimoy. Sea Studios. 1996.
MONTEREY BAY AQUARIUM. Videocassette. Sea Studios
Production. 1988.
MONTEREY BAY AQUARIUMS: VIDEO TOURS. Videocassette.
Video Tours Production. 1988.
OCEAN ANIMALS. Joseph Cornell. Videocassette. Nevada City: Dawn
Productions. 1994.

CD ROM:

AQUAZONE; THE VIRTUAL AQUARIUM. CD ROM. Santa Monica:
Umbrella. 1993-1997. (Multi-platform)
OCEANS. CD ROM. Redmond: Microsoft. 1995. (Multi-platform)
OCEANS BELOW. CD ROM. Novota, CA: The Software Toolworks.
1993. (Multi-platform)
SURVEY OF THE ANIMAL KINGDOM. CD ROM. (Multi-platform)
AMPHIBIANS & REPTILES.
UROCHORDATES & CRANIAT THROUGH FISH
BIRDS-CRANES THROUGH PASSERINE
BIRDS-OSTRICHES THROUGH GUINEA FOWL
MAMMALS-ECHIDNA THROUGH WALES
MAMMALS-CANIDS THROUGH SHEEP
Zane Publishing, Inc., and Educational Images, Ltd., Dallas
Texas. 1995. (Multi-platform)

GAMES:

Cornell, Joseph. OCEAN ANIMALS. Dawn publications 14618 Tyler
Foote Road, Nevada City, CA 95959. 1-800-545-7475. 1994.

WEB SITES:

<http://www.aquarium.org/home.html>
<http://www.mbayaq.org>
<http://www.neaq.org>
<http://www.seaweb.org>
<http://www.tmmc.org/dolphins.htm>

TEXT:

Prentice Hall. EARTH SCIENCE. Englewood Cliffs, NJ 07622. 1991.

BOOKS:

100 REPRODUCIBLE ACTIVITIES-EARTH SCIENCE GRADES 5-8.
Instructional Fair, Inc., Grand Rapids, MI.

Bateman III, Earl and McLean, Mary L. **THE OCEAN FLOOR: GUIDE AND TOUR BOOK TO THE MAP.** Celestial Arts. 1985.

Cousteau, Jacques. **ATLAS OF THE OCEANS.** Reed International Books Limited. 1991.

Fulkner, Douglas. **THIS LIVING REEF.** Quadrangle/The New York Times Book C. 1974. New York, New York.

Guiliani, Bob. **ILLUSTRATIONS OF MARINE ANIMALS.** Dover Publications, Inc. 1995. Toronto, Ontario.

Kimble, Evan & Lael. **UNDER THE SEA: DOT-TO-DOT.** Sterling Publishing Company, Inc. 1997. New York, New York.

Levine, Joseph S. **THE CORAL REEF AT NIGHT.** Harry N. Abrams, Inc. 1993. New York, New York.

Morris, Rick. **MYSTERIES AND MARVELS OF OCEAN LIFE.** Usbonne Publishing, Ltd. 1989. Saffron Hill, London.

Niesen, Thomas M. **THE MARINE BIOLOGY COLORING BOOK.** Coloring Concepts, Inc. 1982. New York, New York.

Norbert, Wu. **SPLENDORS OF THE SEA.** Hugh Lauter Levin Associates, Inc. 1994.

Pamphlets. **INFO UPDATES.** New England Aquarium. Central Warf, Boston, MA 02110-3399. 617.973.5200.

Time/Life Books. **THE BIG BOOK OF MOBILES: OCEAN LIFE.** Orpheus Books, Ltd. 1997. Singapore.

Wood, Dr. Elizabeth M. **CORALS OF THE WORLD.** T.F.H. Publications, Inc., Ltd. 1983. Neptune City, NJ 07753.

PUPPETS:

Folkmans Inc.

CLOWNFISH

MANTA RAY..

NAUTALIS.

SEAHORSE.

STARFISH.

Emeryville, CA 946008.

Ganz. FLOPPIE TOSS'EMS.

SHELLY CRAB.

N. Towawanda, New York 14120-2060.

Meyer, Mary. TIPPY TOES FINGER PUPPET.

CLAMBAKE-GRAY SEAL

CLAMBAKE-WHITE SEAL

ROCKY-PUFFIN.

Townshend, Vermont USA

Wildlife Artists, Inc. SMALL OF THE WILD.

GOLDFISH.

Ridgefield, CT 06877.

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TEACHER PREPARATION:

The SALT WATER CONNECTION can involve as much or as little an amount of technology that is available to the student and teacher. This unit could be run with a CD ROM INTERNET CONNECTED COMPUTER, ONLY. This however would increase the amount of time to complete the unit. Having all of the different types of technology available right in the classroom allows students to be at different technology sites and producing their final investigative product in a sequence that fits their type of multiple intelligence process.

As anyone in technology knows there is never an ending place for skills, it is a constant increase and adaptation to what is available currently and also trying to look to the future for the new innovations.

Listed are the basic skills for this project:

Word processing skills
INTERNET accessability
WEB SITE SAVY
TV/VCR

Listed below are more advanced technical skills and applications that could be used with the unit:

SMART BOARD
WHITEBOARD
PRESENTATION
EPSON PROJECTORS
SCANNER
ZIP CARDS
ZIP DRIVE
VIDEO CAM/MICROSCOPE INTERACTION

ADVANCED PREPARATIONS MATERIALS:

CALENDAR OF EVENTS.

COPY OF REQUIREMENTS OF PROJECT.

COPY OF RUBRIC FOR PROJECT.

SET UP TECHNOLOGY IN CLASSROOM, (THIS DEPENDS ON THE
AMOUNT AVAILABLE TO EACH INDIVIDUAL SITUATION-IN MY
SETTING EVERYTHING IS SET OUT AVAILABLE TO THE
STUDENTS WHENEVER THEY NEED TO USE IT).

VIDEOS ON CART.

CD ROMS ON CART.

REFERENCE BOOKS ON CART.

TIME TO PREPARE:

COPYING MATERIALS 1 HR.

ORGANIZING MATERIALS 1 HR.

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THE SALT WATER CONNECTION

| SUNDAY | MONDAY | TUESDAY | WEDNESDAY | THURSDAY |
|---|---|--|--|-------------|
| | INTRO TO UNIT: HAND OUT DITTOES VIEW VIDEO ON MONTEREY BAY. | INITIAL RESEARCH IN LIBRARY AND COMPUTER INQUIRY VIA INTERNET AND WEB SITES. | INDIVIDUAL RESEARCH USING AVAILABLE RESOURCES TO STUDENTS. | SAME AS WED |
| AT HOME WORK TO FINALIZE PROJECT. | STUDENTS TAKE TURN IN PROJECT NOTES AT BEGIN. OF HOUR. GOING FURTHER: MEET IN ZONE GROUPS AND MAKE OCEAN COMMUNITY | GOING FURTHER: MEET IN ZONE GROUPS. START BIOME BOX. | GOING FURTHER: FINISH BIOME BOX AND PRESENT TO CLASS. | |
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| | | | | |
| | | | | |

CRITERIA FOR OCEAN REPORT

COVER PAGE!

SECTION ONE:

DESCRIPTION OF MONTEREY BAY ONLY!!!!NOT OF THE AQUARIUM!!!!

HOW WIDE, DEEP AND OUT? WHAT IS IT BIGGER THAN? DESCRIBE THE DIFFERENT ZONES OF THE OCEAN-PAGE 279 TEXT, PAGE 500 WORKSHEET AND PAGE 499 PHYSICAL PROPERTIES OF THE OCEAN'S LIFE ZONE FROM YOUR ACTIVITY PAK. SHOULD BE ONE PAGE MINIMUM.

TEXT: EARTH SCIENCE. PRENTICE HALL. ENGLEWOOD CLIFFS, NJ 07622. 1991.

SECTION TWO:

DESCRIPTION OF YOUR ORGANISM THAT LIVES IN THE MONTEREY BAY AREA.

LIFE CYCLE, PHYSICAL DESCRIPTION, GENUS AND SPECIES NAME, DESCRIPTION OF THE ZONE IT LIVES IN.

WHAT DOES IT EAT, OR WHO EATS IT? ANY SPECIAL FEATURES?

SECTION THREE:

1. DRAWING, TRACING, PICTURE, COMPUTER PICTURE OF YOUR ORGANISM.

2. DRAWING IN RELATION TO WHAT ZONE IT LIVES IN!

PREREQUISITE STUDENT SKILLS:

WHAT SKILLS TO STUDENTS NEED TO COMPLETE THIS LESSON?

STUDENTS SHOULD HAVE A BASIC KNOWLEDGE OF A WORD PROCESSING PROGRAM.

USE OF A LIBRARY.

USE OF INTERNET.

BASIC RESEARCH SKILLS.

WHAT LEVEL OF SUBJECT AREA KNOWLEDGE DO THEY NEED:

NINTH GRADE EARTH SCIENCE-OCEAN UNIT.

WHAT TECHNOLOGY SKILLS DO THEY NEED?

THIS TRULY MAY DEPEND ON THE TECHNOLOGY AVAILABLE IN EACH INDIVIDUALS CLASSROOM. BASIC WORD PROCESSING, INTERNET AND WEB SITE SAVY HELPS.

HOW DO YOU PREPARE STUDENTS SO THEY HAVE THE SKILLS THEY NEED?

STUDENTS AT THE BEGINNING OF THE COURSE GET A ONE HOUR INTRODUCTION TO THE DREAM WRITER LAPTOP AND THE CONVERSION PROCESS TO PRINT AT THE ROLL A LAB STATION. FROM THAT POINT ON THE TECHNOLOGY IS ON A NEED TO KNOW BASIS AND THE TEACHER OR OTHER STUDENTS WILL HELP BRING INDIVIDUALS UP TO SPEED ON A PARTICULAR PROCESS FOR THE PROJECT PRESENTATION AND COMPLETION.

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STUDENT ACTIVITIES/PROCEDURES:

DAY ONE:

HAVE STUDENTS PICK UP CALENDAR OF EVENTS AND DIRECTIONS AND RUBRIC FOR THE SALT WATER CONNECTION.

EXPLAIN UNIT.

SHOW VIDEO ON MONTEREY BAY-STUDENTS TAKING NOTES AND THESE NOTES MAY BE USED AS PART OF THEIR INVESTIGATION. (55 MINUTE PERIOD)

DAY TWO:

AFTER VIEWING THE VIDEO ON MONTEREY BAY AREA, THE STUDENTS CHOOSE AN ORGANISM THEY WISH TO INVESTIGATE AND THE BIOME THAT IT LIVES.

THIS MAY RANGE FROM THE MICROSCOPIC PLANKTON, SEAWEEDS, PLANTS, FISH, SHARKS, BIRDS AND MAMMALS THAT ARE INDIGENOUS TO THE MONTEREY BAY AREA.

GO TO LIBRARY TO DO INITIAL RESEARCH ON ORGANISM FROM MONTEREY BAY AREA. (55 MINUTE PERIOD).

DAY THREE +:

RETURN TO CLASSROOM AND PROCEED WITH INDIVIDUAL INVESTIGATION ON MONTEREY BAY ORGANISM. AT THIS JUNCTION THE INVESTIGATION GOES WHERE THE STUDENT DIRECTS IT IN THE CLASSROOM AND TO THE TECHNOLOGY AVAILABLE TO THEM.

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ASSESSMENT/ EVALUATION:

RUBRIC

Ocean Report Score Sheet

Cover Sheet 5pts extra credit _____

Section One:

Description of Monterey Bay

How Wide, Deep and Out it is?
What is it Bigger Than? 10pts _____

Description of the Different Zones
and Their Physical Properties! 30pts _____

Section Two:

Description of Your Organism

Life Cycle, Physical Description,
Genus and Species Name! 20pts _____

Description of Zone it Lives in! 10pts _____

What it Eats, or Who it Eats? 10pts
Any Special Features? _____

Section Three:

Drawing, Tracing, Picture,
Computer Image! 10pts _____

Drawing in Relation to the
Zone it Lives in! 10pts _____

FOLLOW-UP ACTIVITIES:

ZONE MEETING:

HAVE STUDENTS GATHER IN GROUPS WITH THEIR INVESTIGATION OF THEIR ORGANISM BASED ON THE ZONE OF THE OCEAN THAT ORGANISM LIVES IN.

IN THE OCEAN ZONE GROUP HAVE STUDENTS CREATE A BIOME BOX. SCAN IN BIOME BOX INSTRUCTIONS.

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sea anemone

conch shell



fiddler crab



angelfish



tree coral

hermit crab



barnacles



Alaska king crab

horseshoe crab

clam



blue crab



cuttlefish



flying fish



bottlenose dolphin



herring gull



eel



halibut

moray eel

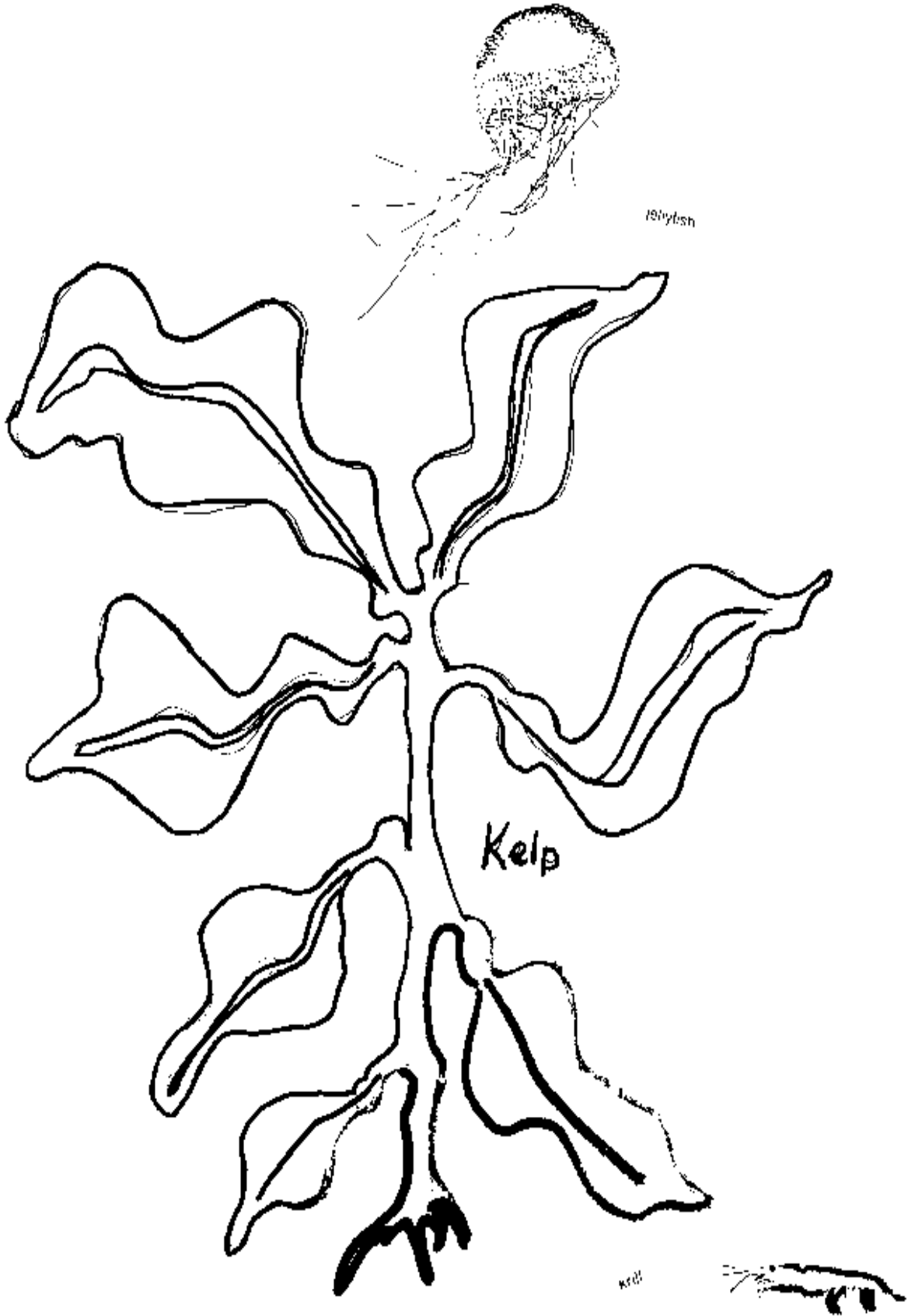


flounder



herring







lobster



mussel



oyster



narwhal

white pelican



nautilus



Portuguese man-of-war



octopus



puffer



sea otter



puffin





manta ray



shrimp



scallop



skate



sea lion

squid



starfish



sea slug



plankton

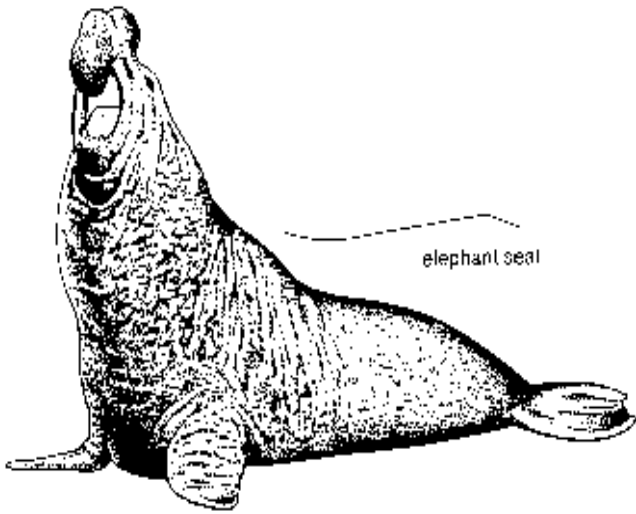
stingray



sea urchin



striped bass

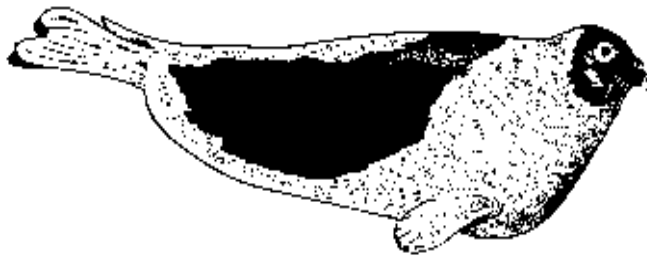


elephant seal

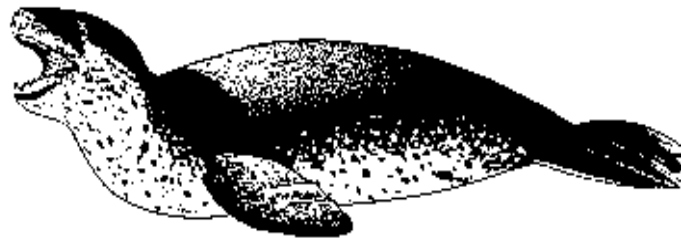
fur seal



harbor seal



harp seal



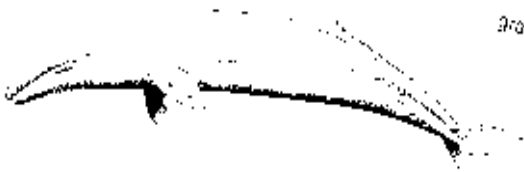
leopard seal



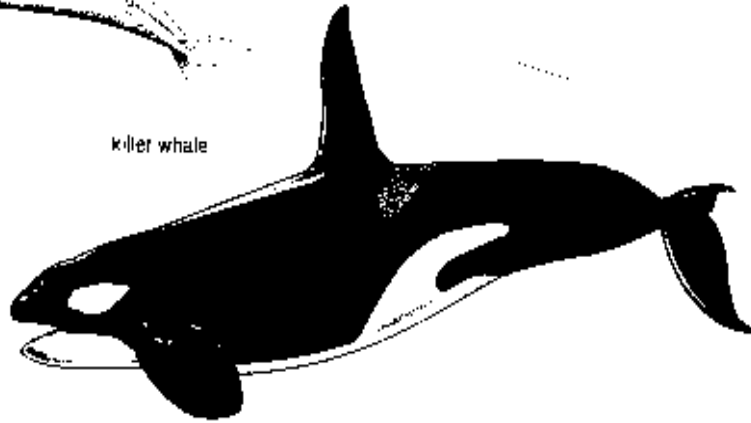
tiger shark



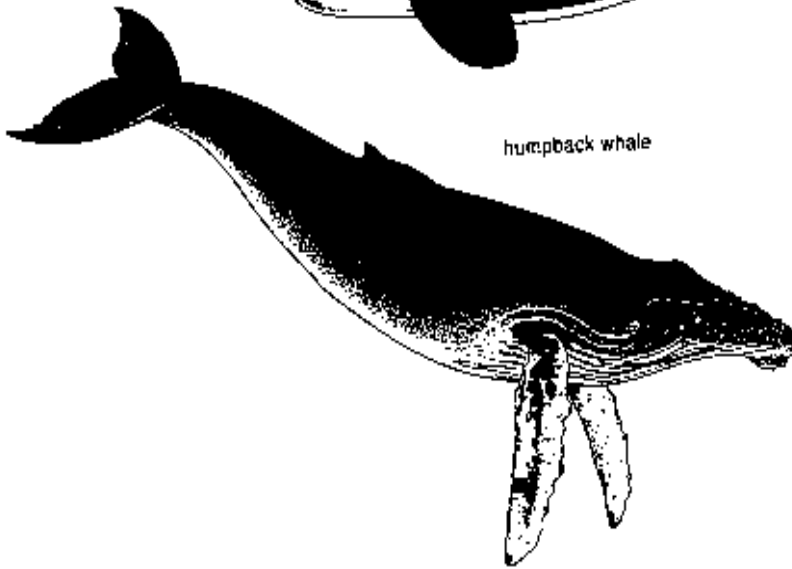
great white shark



gray whale



killer whale

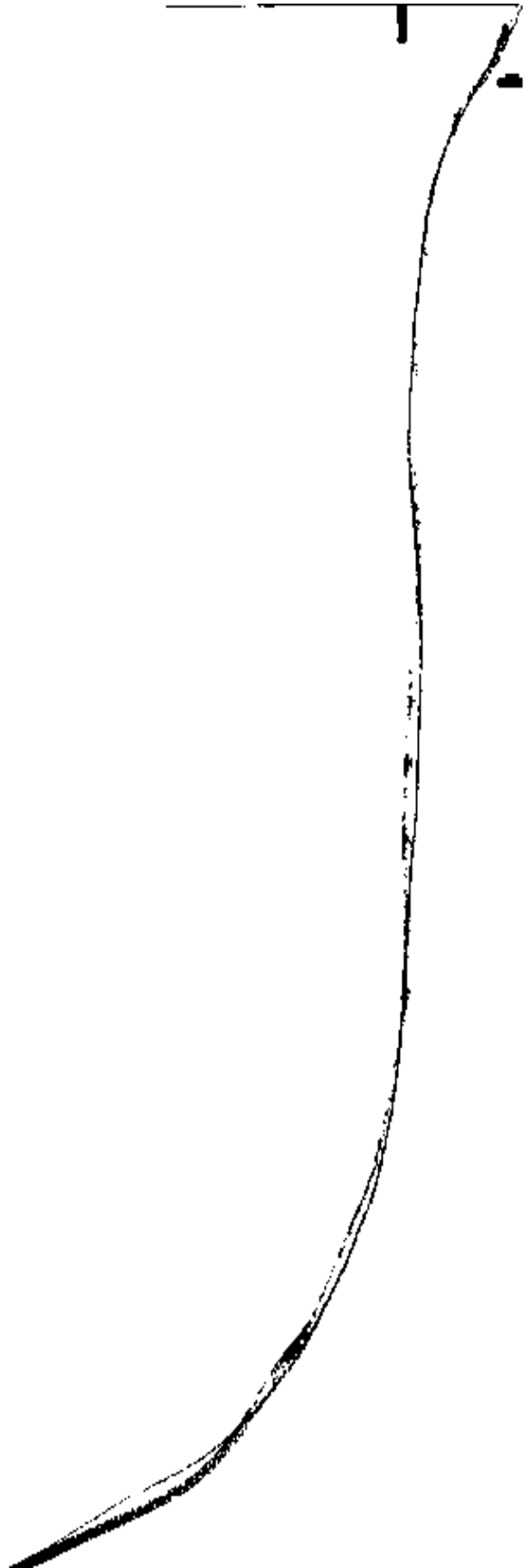
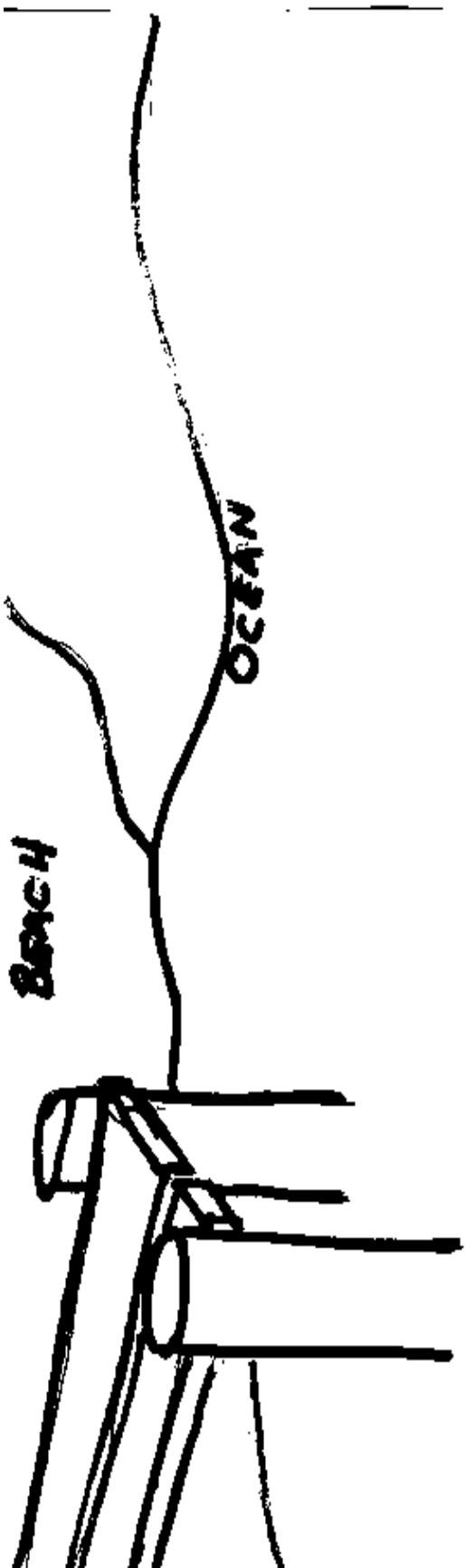


humpback whale

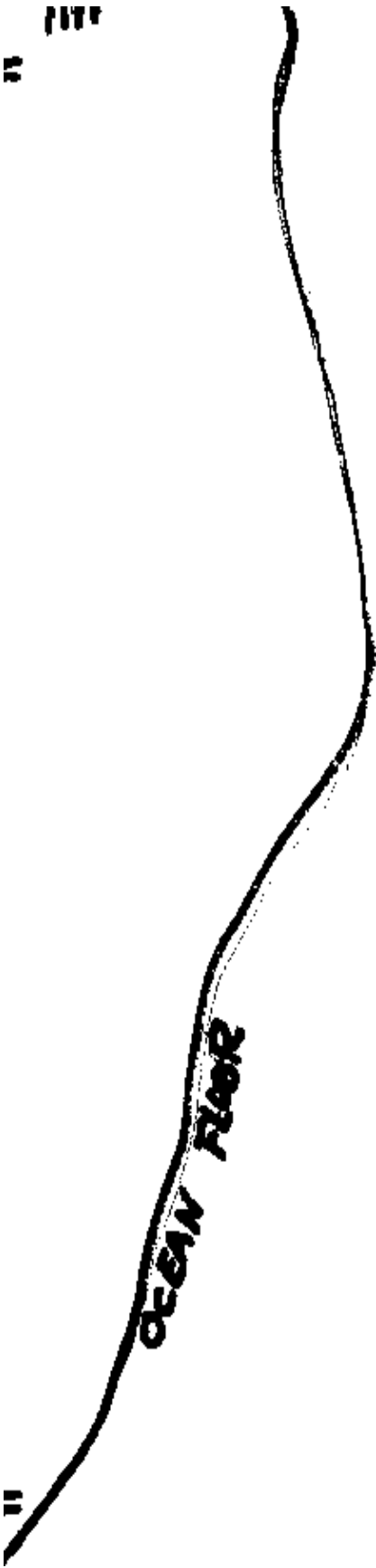


sperm whale





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OCEAN FLOOR



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CREATE A MOBILE:

HAVE STUDENTS CONSTRUCT A MOBILE WITH A MODEL OF THEIR ORGANISM, NICHE IT OCCUPIES AND POSSIBLE PREDATORS OR PREDATION THAT HAPPENS.

CREATE A SNO GLOBE:

MUSIC VIDEO:

USE KARAOKE MACHINE AND VIDEO CAMERA TO CREATE A DANCE/SONG VIDEO ABOUT THEIR ORGANISM OR OCEAN ZONE.

COVER STORY:

USE "PUBLISH" TO CREATE A NEWSPAPER ABOUT THEIR ORGANISM OR OCEAN ZONE.

WANTED POSTER:

CREATE A "MOST WANTED" POSTER INDICATING CHARACTERISTICS OF ORGANISM OR OCEAN ZONE.

BAY PLAY:

STUDENTS MAKE A MODEL OF THEIR ORGANISM-A PUPPET WOULD BE AN EXAMPLE- AND BACKDROP OF THE OCEAN ZONE THAT THE ORGANISM LIVES IN.

TAKE THE 'SETS' TO THE ELEMENTARY SCHOOL AND HAVE THE ELEMENTARY STUDENTS DO A 'DIVE' IN THE BAY AND VISIT EACH OCEAN ZONE. HIGH SCHOOL STUDENTS WOULD BE THE GUIDES OR KEEPERS AND GIVE INFORMATION OR A STORY ABOUT THE ORGANISM FROM THEIR INVESTIGATION. STUDENTS WOULD HAVE A MAP OR TOUR BOOK OF EACH OCEAN ZONE THEY VISITED AND COULD HAVE A STAMP OR STICKER OF THE ORGANISM IN THE BOOK. ANOTHER IDEA WOULD BE A 'PASSPORT' BOOK CONCEPT.

COMPLETING THE TOUR BOOK WOULD QUALIFY THEM AS AN OCEANOLOGIST.