COASTAL AWARENESS PROGRAM
K-3 Level Teachers' Guide

WORKING PAPER NO. 44

March 1981

Ho'i Ana Ike Kai
(Return to the Sea)

Rose T. Pfund
Principal Investigator

SEA GRANT COLLEGE PROGRAM

University of Hawaii
Honolulu, Hawaii

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Wanda Takahashi	First Grade Module
Evelyn Fukuki	Second Grade Module
Amy Ikeda	Third Grade Module

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Roy Takayama, Science Resource Teacher

Yvonne Toma, Kipapa School

TABLE OF CONTENTS

GRADE THREE

INTRODUCTION

Maili Elementary School has initiated the development of elementary level instructional modules in marine education. These modules can be used in its entirety or the teacher can select lessons that are suitable to his/her curriculum.

The modules for grades K-3 are included in this guide. The emphasis has been on sensory experiences.

Teachers who try out this guide are encouraged to write suggestions and evaluative comments in this publication which we will use as feedback for the purpose of refining and improving this draft module at the end of the current school year, 1980-1981.

OPERATIONAL DEFINITION

"An environment is a place. It is a region, setting or context, real or imagined. It may be internal to an object or organism or external to it. It may be microscopic, macroscopic. It may be immediate surroundings or rest outside the reach of human beings."*

STRUCTURE OF THE ENVIRONMENTAL EDUCATION CURRICULUM*

GOAL

The goal of environmental education is to develop an environmentally literate and enlightened society which, through its ethical commitment to

*A Framework for Environmental Education in the Public Schools of Hawaii, Department of Education, State of Hawaii, September 1977.

wise use of its resources, creates and maintains optimum quality in both human-made and natural environments.

OBJECTIVES

To achieve the goal of environmental education in Hawaii, it will be necessary to attain certain objectives during the period of formal education. No list can be assumed complete, for the dynamics of the environment suggest a need for constant re-evaluation and refurbishment. For this beginning stage, however, the following environmental education objectives can be stated and made to serve as focal points for the various school levels.

Objective 1. Students should develop awareness of themselves in relation to their environment and the need for wise use of the environment.

Objective 2. Students should develop knowledge of the various aspects of the environment--land, water, sea, air, other ecosystems--and the relatedness of human beings, environmental concerns, and the social, political, cultural, and economic structures.

Objective 3. Students should develop skills in coping with environmental problems.

Objective 4. Students should develop attitudes which will help them to live in harmony with the environment.

PERFORMANCE EXPECTATIONS, GRADES K-3

Cites examples of local marine problems.

Identifies causes of local marine problems.

Cites examples of statewide, national, or worldwide marine problems.

Identifies a variety of resources that may be used to gain information on marine matters.

Uses a variety of resources to gain information on marine matters.

Conducts simple investigations to gain first-hand information on marine matters.

Identifies recreational opportunities in both human-made and natural environments.

Describes the environmental factors which must be considered to conduct various recreational activities.

Names occupations in the community that are directly dependent on marine resources.

Describes the marine resources needed by various industries and relates the locations of those industries to available resources.

States school or home rules designed to protect the ocean.

Discusses the effectiveness of school or home rules designed to protect the ocean.

Explains the need for rules to protect the ocean.

Describes the need for beauty in one's environment.

Lists a number of environmental factors which may affect the physical or emotional health of human beings.

Discusses attitudes which contribute toward living in harmony with the ocean.

Grade K

OVERALL OBJECTIVES

To provide opportunities for children to develop an ever deepening interest in the ocean around them through self-investigation and active participation in their own learning about marine life and the ocean.

To provide independent and group investigation of what things are, how they function, and how they relate to one another.

To encourage children to use their powers of observation to develop a growing ability to reason and interpret observed phenomena.

To develop a growing sense of responsibility for group behavior and the care of materials and marine life.

TOPIC: SENSORY AWARENESS

Objectives:

1. To develop observation skills, the sensory awareness of children must be developed and strengthened.
2. To develop the language skills necessary to use descriptive terms with greater accuracy.

Procedures:

1. Children need many activities to develop sensory awareness.
2. They need varied and numerous experiences using language. The use of descriptive terms becomes more accurate and easier as it is practiced often.
3. It is easier to start with short activities and games developing the skills for more complex exercises.

SENSORY GAMES

QUESTIONS FOR DISCUSSION

To develop sensory awareness.

1. Can you tell what is cooking on the stove without looking?
2. When you get up in the morning can you tell if it is raining without looking outside?
3. How do you know what the school lunch will be? When you're outside at recess what cues do you get?
4. Can you tell when there is a fire nearby?
5. How do you know recess is over? (Beside the ringing of the bell.)

ACTIVITY ON TASTING

Objectives:

1. To draw conclusions on the bases of tasting cues.
2. To use descriptive terms to discuss their conclusions.

Materials:

Two containers per group

a. One container with salt water
b. One container with sugar water

Procedure:

1. Give each group of three to five students two containers, one with salt and one with sugar.
2. Ask them to decide what is in each container. What does it taste like?
3. Reinforce the use of descriptive terms.

ACTIVITY ON TOUCHING AND TEXTURE CARDS

Objectives:

1. To develop the tactile sensitivity of the children.
2. To have the students learn to make comparisons.
3. To draw conclusions based on cues gotten by touching.

Materials:

Velvet ribbon or cloth

Sandpaper

Aluminum foil

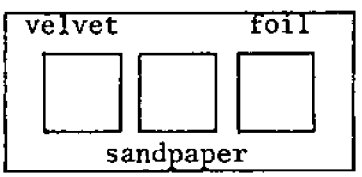
Crayons

Cardboard

Glue

Procedure:

1. Make large "feeling cards" for the bulletin board. Glue a square of velvet, sandpaper, and foil to a 9" x 12" sheet of cardboard.



2. "Close your eyes and tell me what square feels like. Which is the softest, hardest, roughest."
3. Stress the use of descriptive terms.
4. Individual touch cards can be made in school or at home as an assignment. Use 5" x 8" index cards.
5. Have the children compare the material on the touch cards to:

Desk top

Sidewalk

Grass

Wall

Moss

Tree trunk

Leaf

Door, etc.

TOUCH AND TELL

Children may be helped to develop an awareness of differences in textures, shapes and other external properties of various objects by means of the following games:

Children are seated in a circle. One child closes his eyes and another child is chosen to give him an object to feel. By touching the object he must guess what it is.

Suggested objects:

Chalk	Thread	Dish
Pencil	Spool	Tongue depressor
Cork	Jar cover	Sandpaper
Crayon	Paint brush	
Closed safety pin	Blotter	
Paper fastener	Cap	
Eraser	Can	

Teacher should encourage children to use descriptive terms such as hard, soft, rough, smooth, small, wide, narrow, pointed, etc.

GAME: IMITATING DRUM BEATS

Objectives:

1. To develop keener listening skills.
2. To develop accuracy in listening and the ability to repeat what was heard.

Materials:

Drum

Procedure:

1. The teacher or student beats on a drum a certain number of times as the rest of the class listens with eyes closed.
2. A child is called on to clap back the same pattern.
3. If the child responds correctly he may become the next drummer.
4. Begin with simple beats.

GAME: HOW MANY BOUNCES

Objectives:

1. To develop keener listening skills.
2. To develop accuracy in listening and the ability to repeat what was heard.

Materials:

Ball

Procedures:

1. The children sit at their seats with their eyes closed.
2. The teacher or a selected student will bounce the ball.
3. Children listen and count silently.
4. The teacher calls on a child who responds with the number of bounces he heard.
5. If the answer is correct the child becomes the bouncer.

GAME: STORY SOUNDS

Objectives:

1. Children repeat familiar phrases in stories.
2. Children develop keener listening skills and anticipate when the repetitive phrase will occur.

Materials:

Books like:

The Little Red Hen

Millions of Cats

Three Little Pigs

The Little Engine That Could

Procedures:

1. Children enjoy repeating animal sounds or phrases as the teacher tells or reads a story. The teacher should read the story once and on the second reading encourage the children to join in on the words and phrases such as:

"I will" said the little red hen and she did." - The Little Red Hen

"Hundreds of cats
Thousands of cats
Millions and billions and trillions of cats" - Millions of Cats

"I'll huff and I'll puff and I'll blow your house in."
"Not by the hair on my chinny, chin, chin." - The Three Little Pigs

GAME: WHAT DO YOU HEAR?

Objectives:

1. To "sensitize" children to the world around them.
2. To develop the senses of the children to focus on specific stimuli in the environment.

Materials:

None

Procedure:

1. Ask the children to sit with their heads down and eyes closed, and listen to all the sounds they hear in a given period of time.
2. List them on the board.

   Examples: Noise of an airplane
   Car
   Teacher's voice
   Birds
3. Repeat the activity and listen for different sounds. "What new sounds have you heard?"
4. List them on the board.

   Examples: Clock ticking
   Dog
   Car horn
   Fire engine, etc.
5. Discuss what sounds are important to us and why.

GAME: WHAT IS IT?

Objectives:

1. To develop keener listening skills.
2. To distinguish and describe various sounds.

Materials:

Drum	Whistle
Stick	Horn
Triangle	Clap hands
Blocks	Tonette
Bells	Blindfold

Procedure:

1. Make a sound with one of the above and ask a blindfolded student to identify it.
2. A child could be selected to make the sound out of sight of the class (behind a board) and have them guess.

GAME: WHAT ANIMAL AM I?

Objectives:

1. To develop keener listening skills.
2. To identify various animal sounds.

Materials:

None

Procedure:

1. The teacher or a student makes the sound associated with a familiar animal (cat, dog, cow, mouse, duck, donkey, pig, frog, rooster, hen, horse, turkey, etc.)
2. The class tries to identify the animal.

Follow Up Activity:

Sing "Old McDonald Had A Farm".

Variations:

1. Example: Sounds made by wild animals.
   Sounds made by farm animals.
   Sounds made by pets.
2. The game may be played by the children in two lines. One line of children will select an animal sound to do as a group. The other line will try to guess the animal. Then the activities of the two lines may be reversed and the listeners become the sound makers.

GAME: IDENTIFYING THE DIRECTION OF SOUND

Objectives:

1. To identify the direction from which the sound was made.
2. To develop accuracy and acuity in listening.

Materials:

Bell	Drum
Tonette	Clap hands
Pitch pipe	Sticks
Whistle	Triangle

Procedure:

1. Have the children shut their eyes.
2. Have another child go to a different part of the room and using one of the above instruments make a sound.
3. Children will point to the direction of the sound.
4. Children will take turns doing this.

GAME: HIGH OR LOW

Objectives:

1. To discriminate between high and low pitches.

Materials:

One or more of the following objects:

Pitch pipe	Autoharp
Tonette	Bells
Whistles	

Procedures:

1. Begin by comparing notes that have a wide range then gradually reduce the range.
2. Use a pitch pipe, whistles, bells, tonette, autoharp for this purpose.
3. Many games based on "high and low" can be devised using a song melody or any series of notes with the children demonstrating "higher" or "lower" with their hands, stand or squat, etc.
4. Children will also enjoy making the "high and low" patterns for others to compare. Therefore have opportunities for children to play a "high/low" pattern.

GAME: IDENTIFYING PEOPLE--WHO AM I?

Objectives:

1. To develop keener listening skills.
2. To develop accuracy in listening.
3. To draw conclusions and identify persons only through auditory clues.

Materials:

A blindfold

Procedures:

1. A child is sent outside the door or is blindfolded or sits where the class is not visible (behind a portable blackboard).
2. The teacher points to a child, who then calls out, "Who Am I?"
3. If the listener can identify the child he says, "I hear____".
4. If he cannot identify the speaker in three guesses he takes his seat and another child is chosen as listener.

GAME: LAST CHILD

Objectives:

1. To develop keener listening skills.
2. To develop accuracy in listening.
3. To draw conclusions and identify persons through descriptive clues.

Materials:

None

Procedure:

1. One player is the policeman.
2. Another player describes someone in the room who is his "lost child".
3. If someone in the class guesses who it is before the policeman does, the two players change places.

Variation:

1. The policeman must find the child with three guesses. If he fails the "lost child" becomes the next policeman.

GAME: HAVE YOU SEEN MY FISH?

Objectives:

1. To develop keener listening and visual skills.
2. To develop the ability to draw conclusions and identify persons through descriptive cues.

Materials:

None

Procedures:

1. The players sit in a large circle. A player is selected to be the "fisherman".
2. He goes around the outside of the circle. Suddenly, he taps someone in the circle and asks, "Have you seen my fish?"
3. The tagged player asks, "What does your fish look like?"
4. The "fisherman" then describes the clothing and appearance of someone in the circle.
5. If the tagged player correctly guesses who the "fish" is, the "fisherman" steps aside.
6. The tagged one chooses the "fish", who tries to reach the vacant space in the circle.
7. If the "fish" is caught before he can get to the vacant place, he then becomes the new "fisherman". If he does not get tagged or caught, the tagged player becomes the new "fisherman".

GAME: WHO IS MISSING

Objectives:

1. To develop memory.
2. To draw conclusions and make predictions.

Materials:

None

Procedures:

1. Children are seated in a circle, with the exception of one who is sent from the room.
2. When the player is well out of sight and hearing, the leader or teacher beckons one of the players who leaves the group and hides. If in the classroom, he may hide under the teacher's desk, in a closet or behind a portable blackboard.
3. The child is called back to guess who is missing. He has three guesses. A new guesser is chosen to leave the room.

Variations:

1. When the child leaves to hide, everyone changes seats. (Very difficult at first.)
2. Send more than one child to hide (three or four).

MORE COMPLEX ACTIVITIES

MYSTERY BAG

Children are seated in a circle on the floor or in their chairs at their seats. We will use the sense (detective) of touch to see if we can tell what things are just by feeling them.

Materials:

A collection of objects found in the children's school, home and playground environments.

Pencil (not sharpened)	Golfball	Marble
Eraser	Ruler	Jack
Chalk	Spoon	Toy car
Crayon	Chopstick	Q-tip
Clay	Cotton	Soap
Blackboard eraser	Shell	Face towel
Sponge	a piece of foil	
Pen	a piece of waxpaper	
Paperclip	a piece of plastic wrap	
Bobby pin	a piece of sandpaper	
Marsh pen	a piece of wood or stick	
Paper cup		
Foam cup		
Safety pin (glue shut)		

Activity:

In a large paper bag (grocery type) place one of the objects listed above. (Do so behind a portable blackboard or screen or otherwise out of sight of the students. Select a student to put his hand into the bag

and describe what he feels. This is to strengthen the use of descriptive terms to tell the class about the properties of the item. Maybe the student will be able to tell the class what the object is. After a reasonable length of time take the bag away and review the description given by the student. If the item has not been identified ask for predictions based on the description then reveal the item. What was the correlation between description, prediction and the actual item?

Discussion

MYSTERY JARS

The mystery jar activity may be done using covered baby food jars. Please make sure the sides of the jars are covered with a dark construction paper so the objects inside the jars are not visible.

These jars may be used for the sense of smell and taste.

The class is seated in their chairs or on the floor in a circle. Select a child and blindfold him. The jars are covered to reduce the chance of his peers yelling out answers and to increase concentration on the selected child's responses.

The teacher hands the child a jar to smell or taste. The student again experiences the use of descriptive terms to inform the class about what his senses are telling him about the item. The class is to observe and when asked may make predictions.

Once again after a reasonable length of time the jar is taken away, blindfold removed and a discussion about what the item might be using the cues of the description given. If the item is not identified ask for predictions then reveal the item.

Materials: (Suggested)

Taste

Red ginger	Catsup	Apple
Lemon drops	Peanut butter (chunky)	
Cinnamon candy	Water	
Chocolate candy	Juice	
Marshmallow (cut up)	Milk	
Salty seed	Mustard	
Banana (cut up)	Shoyu	

Smell

Cooking ginger	Rose and pikake	Catsup
Real lemon	Banana peel	
Cinnamon	Orange	
Cocoa mix	Mustard	
Kim chee	Onion	
Charsiu mix	Garlic	
Vinegar	Perfume	

MYSTERY SENSE BOXES

Activity:

We have five senses (detectives) that help us learn about our environment, (the world, things around us.)

If necessary review the concept of senses (detectives) and environment. Senses are the parts of our body that collect information from our environment. Environment is everything around us.

Ask: Who knows what our five senses (detectives) are?

Drawings or pictures illustrating the main locations of the five senses are helpful. They may be put up and labeled during the discussion as a bulletin board display and guide for the class.

A discussion of the five senses (detectives) and their locations (hearing, tasting, seeing, smelling, are only in specific places of our body but feeling or touching senses are located all-over the body.

We are going to use each of the senses (detectives) to discover the mystery sense boxes.

Show the class the boxes and demonstrate how they are to investigate each box. Once they know the procedure of investigation have them break up into small groups of five or six and form a circle with the members of their group in an area designated by the teacher. Each group will be given a number.

The teacher will then give each group a mystery sense box. Say: Place the boxes on the floor or table until I say to begin. Your job is to find out what is in each box using only the one sense (detective) drawn and/or written on the box with a number. Ask each group the number and the sense (detective) they are to use one at a time as a click.

Tell each group who they are to pass their mystery sense box to when time is called.

Now pass out the answer sheets to each child. They are to draw their answers.

Answer Sheet

I see 

Box 1
Box 2

I smell 

Box 3
Box 4

I taste 

Box 5	Container A B C
Box 6	Container A B C

I feel 

Box 7
Box 8

I hear 

Box 9

Draw on your answer sheet next to the right number (demonstrate matching number on the box to the number on the answer sheet) what you think is in the box. When I say time is up and ring my bell pass the box to the next group. (Teacher explain this earlier. Some of the boxes require us to use our ears. So, we must be very quiet. Do you have any questions? Ready, let's begin until you hear my signal.

When all of the groups have investigated each box, it is time to review. Children will keep their answer sheets and share them as each

box is discussed. The teacher may list on the board what children think is in each box. You may or may not open the boxes to show them how close their predictions were.

Please consult Science on a Shoestring, pages 9 and 10 as to the construction of the Mystery Sense Boxes.

I have made nine boxes so that groups (three or four) will be smaller. With just five boxes I would have large groups (five to seven). Therefore, once the construction of boxes is known the teacher may make as many boxes as she feels she will need.

Therefore, the answer sheet will have to be adapted to the number of boxes made by the teacher.

GROUPING OBJECTS

GROUPING

Identifying objects on the bases of a stated property.

A. Grouping Classmates

Procedure: Boy/Girl

"We are going to make groups today of things that are the same."

"Let's start one group with just the girls." Ask the girls to come up a row or table at a time rather than "all girls come up" which will lead to running and playing.

"Do we have just one group?" Answer... Two - a group of girls and a group of boys.

Procedure: Pants/Dress/Shorts

Select a smaller group (10-12) students to group.

Have the children group their peers into a group wearing pants first, then dresses and last ask them what group is left.

Discussion: How many groups? How many in each group?

Why are the children in this group alike?

Repeat for each group.

Procedure: Shoes/Slippers/Barefeet

Repeat procedure and discussion for Pants/Dress/Shorts

Procedure: Group by hair color

Repeat procedure and discussion for Pants/Dress/Shorts

B. Grouping School Supplies

Procedure: Have a collection of school supplies (pencils, paste, crayons, paper, scissors, paints, brushes, pens, chalk, etc.)

Have the children group the supplies into: a) those we use to draw with, b) those we write with, c) those we cut with, or d) those we paint with.

C. Grouping blocks by color, size, or shape

1. Grouping by Color

Procedure: Have a container of blocks (12 to 16) of the same size and three or four different colors (at least 3 or 4 blocks of each color.)

Have the children sit in a circle or square on the floor.

Empty the container of blocks in the center of the circle or square.

Ask "Do you see something about these blocks that makes them alike?" (shape/size)

Ask "Do you see something about these blocks that makes them different?" (color)

Ask "Can we put the ones that are the same together? Can we group them?"

Ask a child if he can find two blocks that are the same. Once this is done ask another child to find another block like the first two. Repeat until all of the blocks of that color have been grouped. Ask a child if he is able to start a new group of blocks who are alike. "How can we group the rest of these blocks?" Repeat until all of the blocks are grouped.

Discussion: How many groups do we have? How many blocks do we have in each group? What are the colors?

This activity may be repeated in small groups of four or five with each group having its own container of blocks. Stress: That they are to go around the group each child is to match a block once the first two in a group have been selected. The teacher may designate the first child who will select the first two blocks to

group.

2. Grouping by Shape and Size

Class Demonstration like grouping for color. Ask them to describe the objects in the container.

Ask "How are they the same?" (shape)

Ask "How are they different?" (size)

Ask "How can we group them?" (size)

The blocks are the same color but vary in size. Have them go around the square or circle like you did for grouping by color until all the blocks are grouped.

Discussion: How many groups? How many in each group?

The class may again work in small groups with each group having its own container of blocks of various sizes but the same color and shape.

You may have a group of children you observed as having difficulty grouping in the first activity. Work with them until they seem to have an understanding of grouping.

3. Group by Size, Color, Shape

Class Demonstration then breakup into smaller groups each with their own container to repeat the activity.

During the class demonstration: Ask "How are some of these blocks the same?" (size, color, shape)

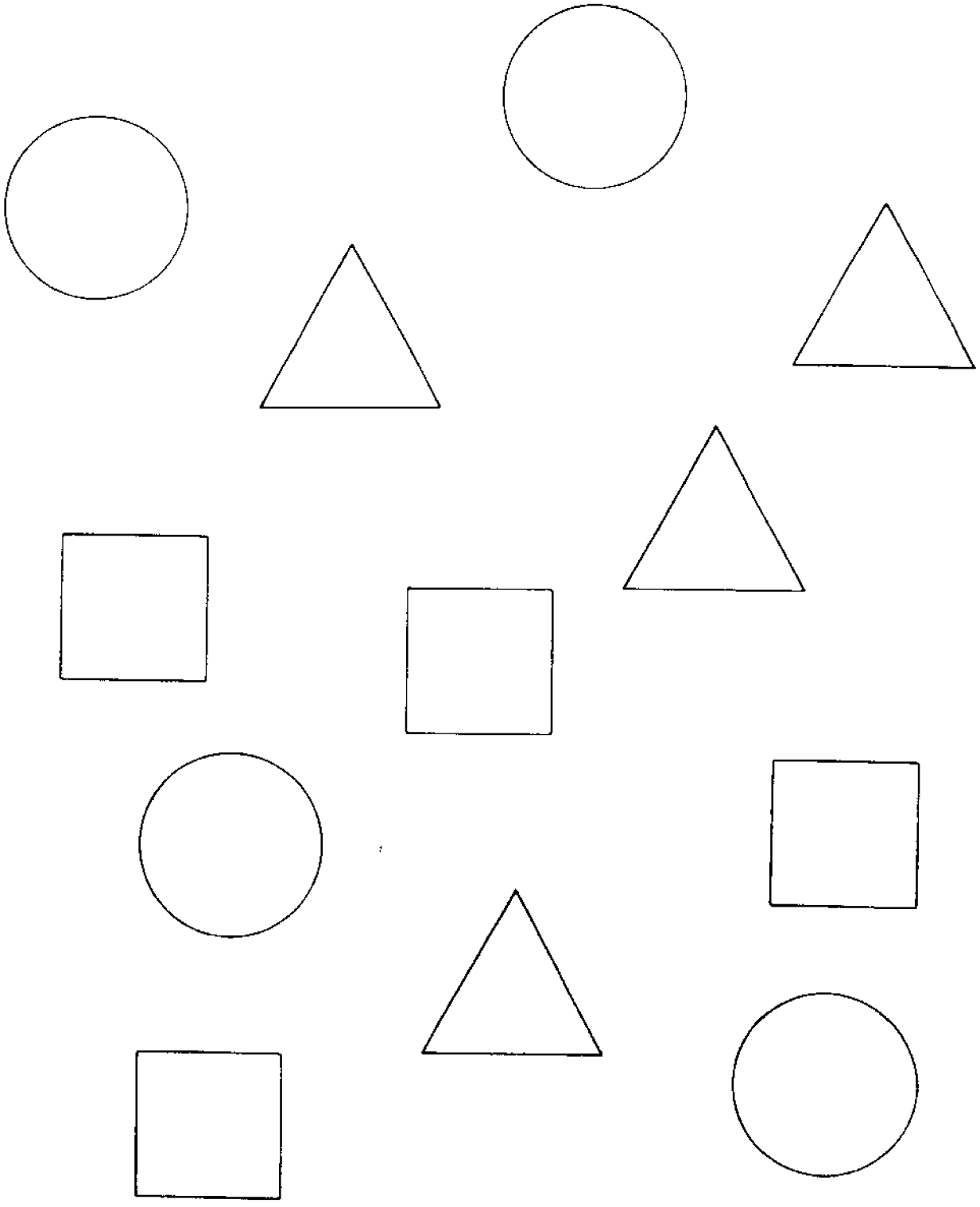
Ask "Who would like to start a group?"

Repeat the activity following the procedures of the first two grouping activities.

See worksheets as a followup activity and guide to see who needs more clarification.

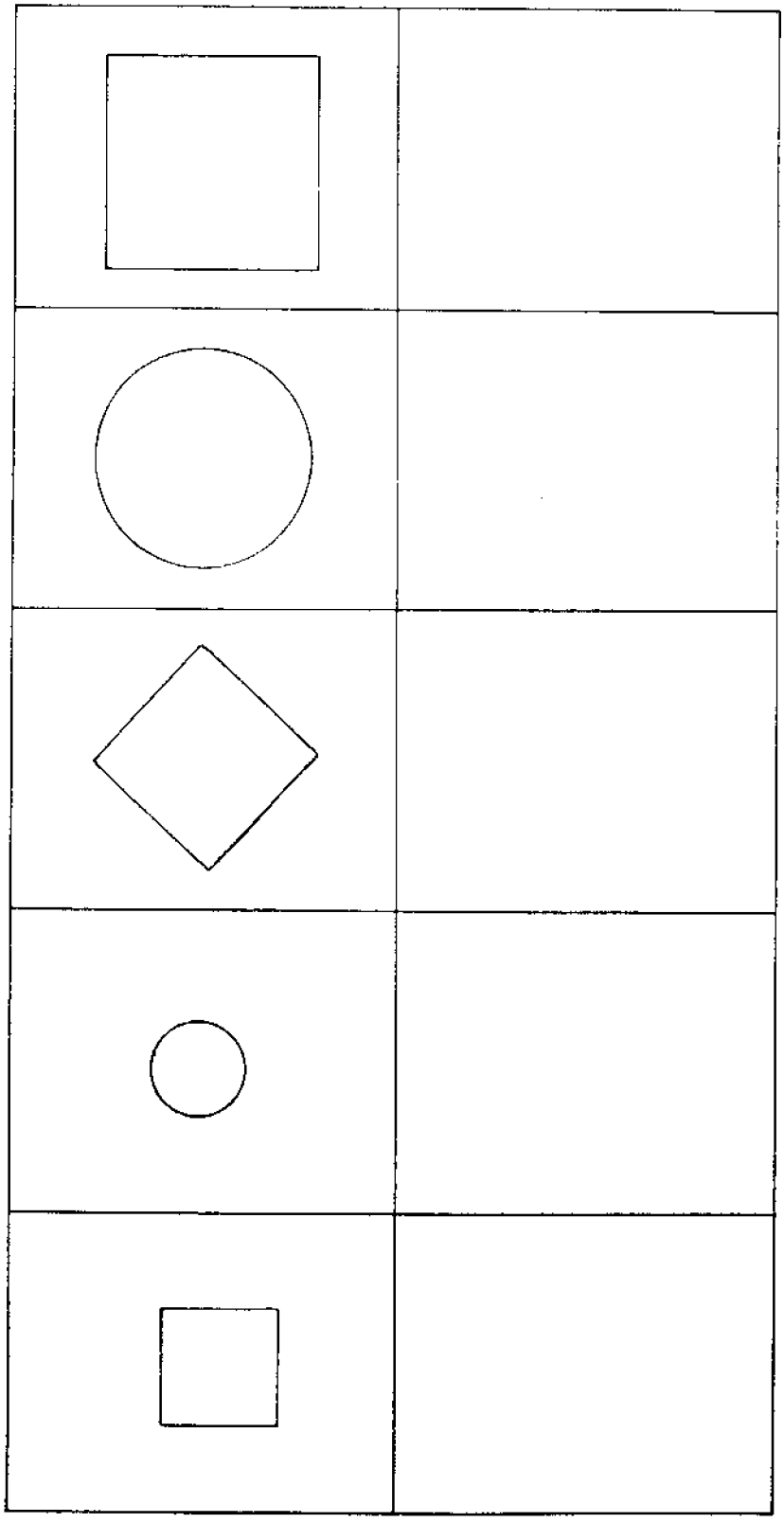
Name_____ Date_____

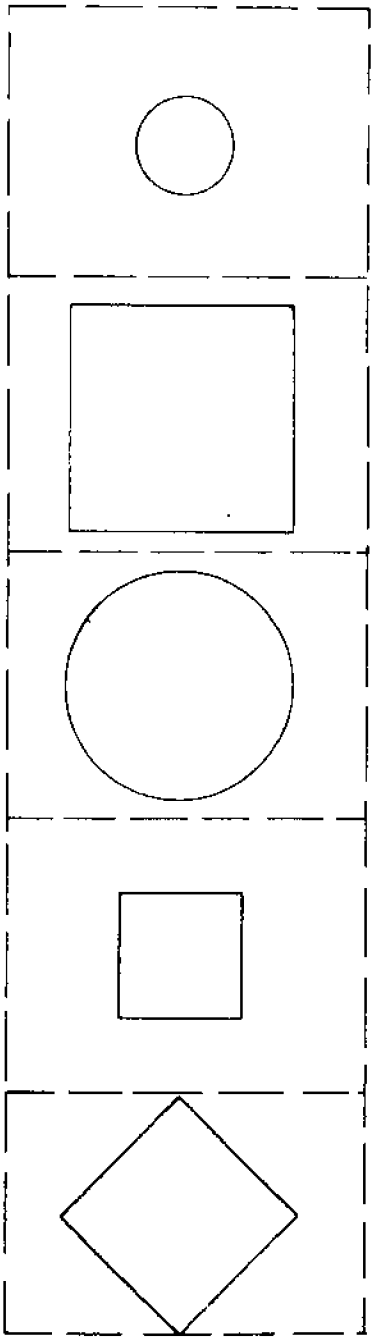
Color the shapes that are the same the same color.



Name_____ Date_____

Find the shape and size that match. Color, cut and paste.





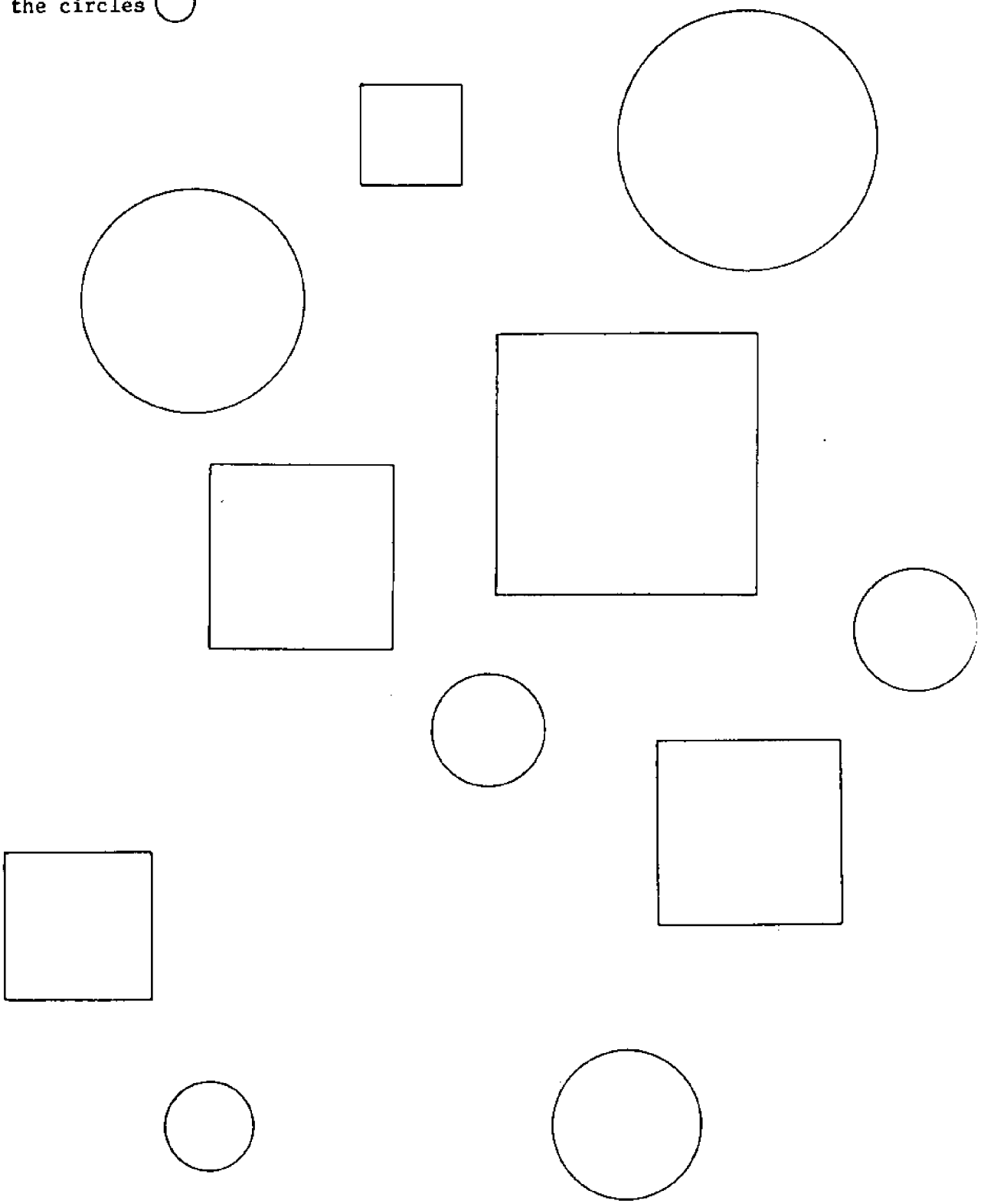
Name_____ Date_____

Choose two colors.

Color the squares

Color the circles

Teacher should guide selection with the class. Have everyone color their square one color and the circle the other color as a guide.



D. Grouping pictures and objects

Procedure:

1. Using pictures from newspaper, magazines and large pictures from the library, the SVE pictures.
2. Using various objects in containers.* Group them by:

Big/small	Land/water animals
Fast/slow	Soft/hard
Pets/zoo animal	Sweet/sour

These may be objects found around the classroom:

Chalk	Cloth
Pencils	Crayons
Erasers	Clay
Cotton	
Rulers	

E. Grouping objects into living and non-living

Procedure:

1. The teacher may start by naming an object in the room and asking the class if it is living or non-living.
2. Teacher may gather the objects into groups or list the objects on the board into groups.
3. Stress: Living things are different from things that are not alive.
4. Make a class collection of things that are not alive. Have the children bring them from home. (Stones, pieces of wood, nails, toys, books, etc.)
   Make a class collection of things that are alive. Have the children bring them from home. (Flowers, pets, plants, etc.)

Stress: Living things can move, breathe, need food, can grow and can make others like themselves.

HOW DO ANIMALS DIFFER FROM PLANTS?

Materials:

Any number of living and non-living things such as frogs, fish, caterpillar, grasshopper, plants, rocks, shells, sticks, etc.

Procedure:

1. Divide living from non-living and note differences.
2. Divide living things into plants and animals and note the differences between the two.

Result:

Students should recognize the differences between living and non-living and between plants and animals. They should understand that all living things are classified as either plants or animals.

Supplemental Information:

Living things are alike in some respects and different in others.

Non-living things have very few characteristics of living things.

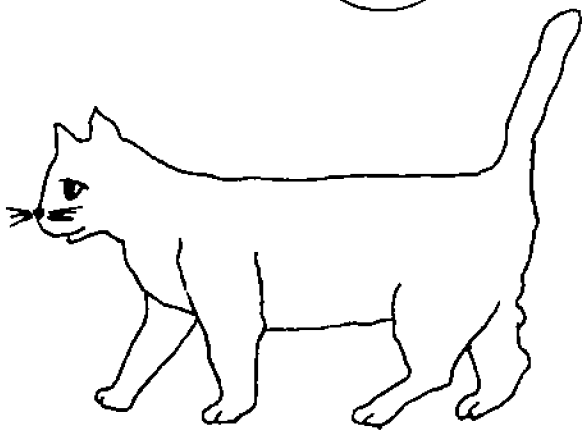
Living things are either plants or animals.

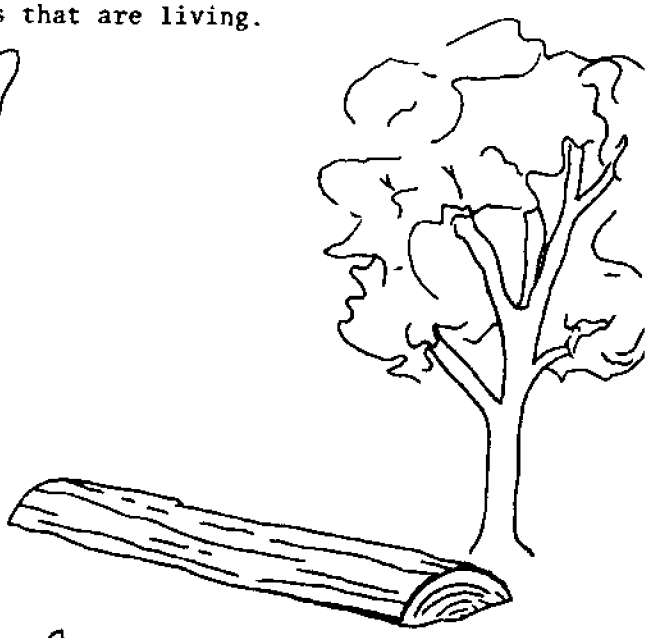
Thought Questions:

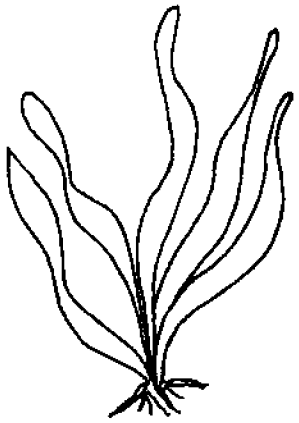
1. How do some non-living things move?
2. What is the biggest living thing you know about? Smallest living thing?
3. What is the biggest non-living thing you know about? Smallest non-living thing?

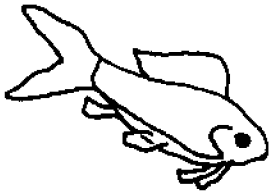
Name _____ Date _____

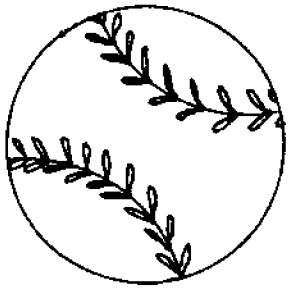
Look at the pictures. (Circle) the ones that are living.

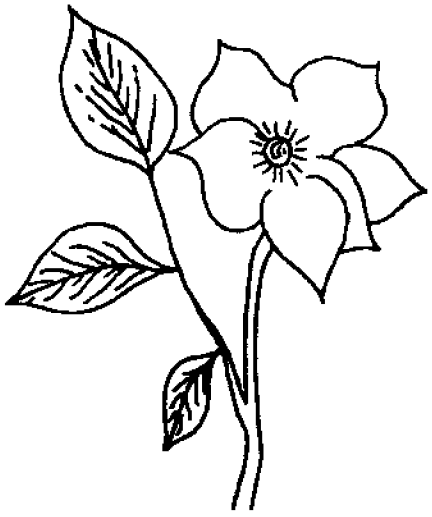










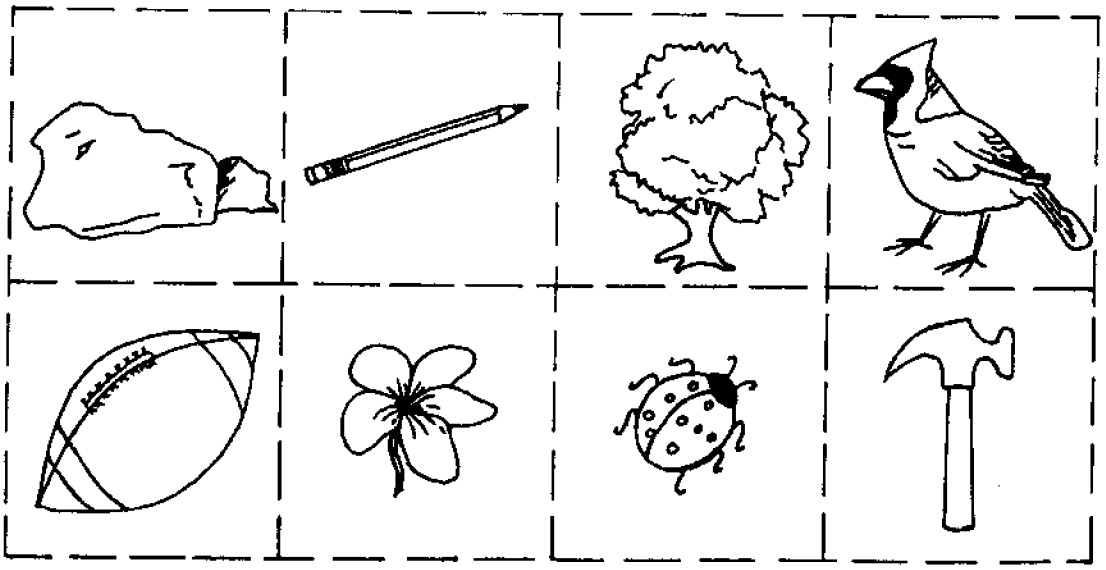


Name _____ Date _____

Color, cut and paste the pictures in the right block.

Living	

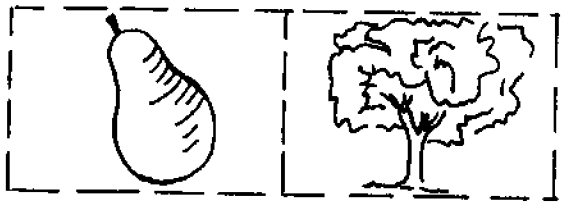
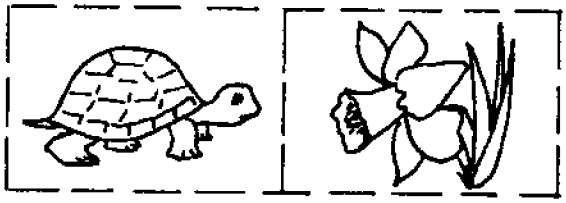
Non-living	

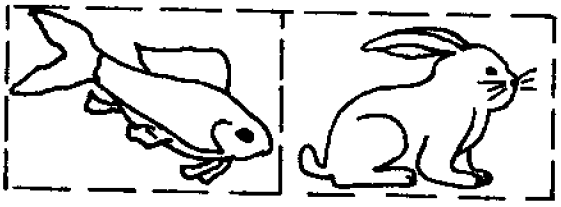
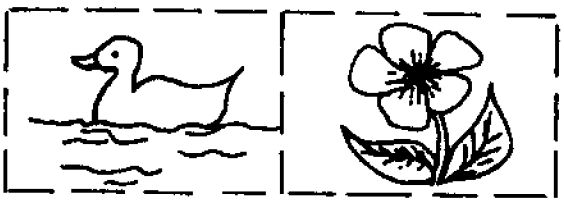


Name _____ Date _____

LIVING ORGANISMS

Plants	Animals

FUN GAMES FOR P. E.

CRAB HUNT

The players sit on the ground in a circle. One child is selected to be the crabhunter. The crabhunter walks around the circle and asks "Who would like to go with me and hunt crabs? As the crabhunter passes, the players who wish to go with him follow him in single file. Glancing back now and then, the crabhunter waits until the players are a good distance from their places in the circle. Then he turns and shouts "Scoop!" At this, all the players walk back to their places in the circle. The first one back is the next crabhunter.

EEL IN THE REEF

The players are standing in a circle, facing in, holding hands. A player is chosen to be the eel and stands in the middle of the circle. At a signal, he crawls out of the circle. The players holding hands at the spot where the eel gets out must chase him and tag him. The first one to tag him is the new eel.

FISH, FISH, CRAB

A variation of Duck, Duck, Goose.

A player is selected to be It. All the other players sit in a circle on the ground. The It walks around the outside of the circle and taps each player lightly on the head, repeating the words, "Fish, Fish, Fish". When the It taps a player and says "crab", that player jumps up and chases the tapper (It). If the player tags It, It goes into the center of the circle and the player becomes the new It. If the player fails to

tag It, he returns to his place in the circle and It goes around the circle again. The center of the circle could be called the reef tank to add to the game.

TURTLE IN THE SEA

Several players are chosen to be turtles. The rest of the players kneel in a circle to form "the sea". The turtles swim around in "the sea" chanting, "Turtle in the Sea, can't catch me". The players on the circle reach in and try to touch a turtle. If they do, they exchange places. Anyone who "falls into the sea" must leave the game to "dry off".

FISH NET SCRAMBLE

A variation of fruit basket.

All of the players except one are seated on chairs, in a circle. The teacher gives each of the players in the circle the name of a fish. Limit the names of fish to four or five such as shark, tuna, or aku, ahi, manini, butterfly fish, trigger fish or humuhumu. To start the game, the child not in the circle calls out the name of two different fish. The players representing these fish must exchange seats. The caller also tries to secure a seat. The players left without a seat becomes the new caller. When "Fish Net Scramble" is called everyone must change seats.

MARINE LIFE

What is a "habitat"?

It refers to a place where an organism lives.

Activities:

1. Children may orally describe the various habitats of organisms.

cow - pasture, barn	mynah bird
crab - beach	snake
camel - desert	fish (fresh water)
elephant	eel
shark	duck
crayfish	chicken
cat	dog
bird	frog

List them on the board. After a discussion the children can follow up with:

Create a Habitat:

Have them create a habitat for a specific child. After the discussion have the children choose one to illustrate on their own.

Class mural may be another project. They can choose a habitat to create:

stream	canal	farm	garden
pond	sea	zoo	
puddles	desert	aquarium	

Then draw the organisms to place in the habitat. Crayon drawings will be cut out and pasted in the proper place on the habitat mural.

Diorama:

Let each child choose an organism. Have them draw and cut out the things found in the habitat of the organism. Then have them paste

the cutouts upright in the shoe boxes which have been brought from home. Kleenex boxes may also be used.

Before the dioramas are started, a lesson in perspective might be taught. This will help the children when they begin to assemble their scenes.

SETTING UP AN AQUARIUM/HABITAT

Refer to Science on a Shoestring, pages 107 and 111. Also to third grade unit.

Foundation experience before setting up aquarium.

I. Differences between salt and fresh water.

Sensory awareness of differences through:

taste sight floating objects

smell touch

Activity 1

Why can we swim easier in salt water?

Materials:

1. Four clear glasses 2/3's full of water
2. Two chicken eggs (raw)
3. Two thumbtacks
4. Two pencils unsharpened
5. Two tablespoons of table salt

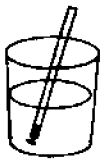
Procedure:

1. Dissolve a tablespoon of salt in each of two glasses of water.
2. Place an egg in a salted glass of water and another in a glass of fresh water.

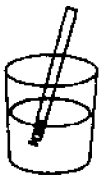
Fresh water Salt water

3. Stick a thumbtack in the eraser of each pencil.
4. Place one pencil in salted water and another in fresh water

with tack end down.



Fresh water



Salt water

Results:

1. The egg placed in salted water will float higher than the one in fresh water.
2. The pencil in the fresh water will sink, but the pencil in salted water will float higher.

Supplement Information:

The denser the water, the greater the bouyancy. Buoyancy is determined by the density of the liquid involved.

What can live in salt water?

What can live in fresh water?

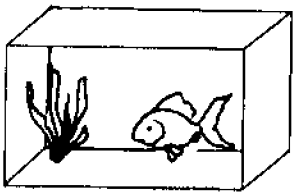
Activity:

1. Water plants with salt water. Water plants with fresh water.
2. Put seaweed in fresh water.
3. Make correlation of fish to seaweed rather than placing a fish in an unnatural habitat.

Results:

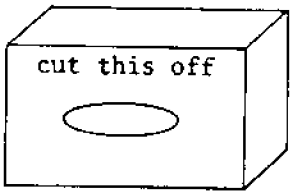
1. Plants watered with salt water died.
2. Plants watered with fresh water lived.
3. Seaweed rotted. (died)
4. Fish would die.

Shoe box



1. Paste in cutouts.
2. Cover with plastic wrap/tape it down.

Kleenex box



1. Cut off side with the slit.
2. Paste in the cutouts.
3. Cover with plastic wrap/ tape it down.

A diorama made this way is easier to work with because it requires less perspective.

Habitat Mobile:

A mobile is easy to make and much enjoyed by little children. It can be made from a tree or bush branch.

Choose a branch about two feet long, preferably one with many little branches. Paint it or leave it natural and hang it in a horizontal position. The children's crayon drawings may be cut out and hung by threads from the small branches. Children enjoy seeing the marine life turning as the wind moves them.

Building a Habitat:

Set up a classroom aquarium. Refer to third grade unit and Science on a Shoestring, pages 107 to 111.

Visit the Reef Tank at Sea Life Park:

To see how a manmade habitat really looks and functions.

See Sea Life Park parent orientation for the trip.

These are handed out at least three to four days before the field trip so it can be read thoroughly and any questions parents may have could be answered.

Run off extra to bring on the field trip someone usually forgets hers at home.

It would help if we had slides of some of the fish in the tank so parents could be made familiar with them before the trip.

It is very nice to have six or seven parents so that you can have smaller groups because they have had an orientation. Parents should be familiar with what the teacher would like to have stressed.

MAKING YOUR OWN UNDERWATER HABITAT

Cut two frames for the habitat from a piece of 12" x 8 1/2" oaktag. Make these frames 1/2" wide. Using this frame as a pattern, cut out two pieces of waxed paper. (This is the "glass" cover for the habitat.)

Next, cut out fish from different colored construction paper, in various sizes.

Green-leafed plants, rocks, coral, and etc. to be placed in the habitat. Paste the fish, plants, other organisms to one side of the waxed paper, and cover them with the second piece of waxed paper.

Color the frame and label it with paint or crayon. You are now ready to paste the frame by placing one frame to each side of the habitat.

SEA LIFE PARK

Our overall objective on this field trip is to develop and sharpen observation skills (looking at objects more carefully) of our kindergarteners. They need to look at things and see how the small parts work together.

Reef tank:

1. What fish do you see at the surface?
   a. Which ones swim alone? (Big ones)
   b. Which ones swim in groups? (Small ones)

      Small ones in groups are called a school of fish.
2. Where else can you find animals as you walk down the walkway?
   a. Along the viewing glass there are caves and small areas where eel, shrimp, crabs, lobsters, etc. can be found.
3. How do fish move through the water? What parts of their bodies move?
   a. Observe fins and tails.
4. How do the rays, eels, and turtles move through the water?
   a. Observe their fins and body movements.
5. What animals do you find at the bottom of the reef tank?
   a. Rays, crabs, sharks, butterfly fish, etc.
6. See if they can identify some of the fish by name.
   a. Puffer fish: (Balloon fish) how does it defend itself?
   b. Trumpet fish: Look at its long body and mouth and short fins.
   c. Butterfly fish: Very colorful, they move in schools.
   d. Goatfish: How does it use its whiskers?
   e. Kala: It has a horn. What do they use it for?

f. Saw fish: Has a saw-like nose.

Ocean Science Theater

1. What kind of animal is a dolphin? How is it different from the fish in the reef tank?

Dolphins are mammals. Their babies are born, not hatched from eggs. The babies look like their mothers and fathers when they are born. The babies drink milk from their mothers.

Dolphins move their tails up and down.

Dolphins can do tricks.

Dolphins do not have scales.

Dolphins must go to the surface to breathe air.

2. What is the hole on top of the dolphins head used for?

The hole is a blowhole and it is used for breathing just as we use our nose.

3. What do dolphins eat?

They eat fish and squid.

4. What does the whistle sound mean to the dolphin?

It means he did something correctly and he is going to get a fish for his reward.

5. Can a dolphin smell?

No. Dolphins have no sense of smell.

6. What islands can you see offshore?

"Manana" or Rabbit Island. Rabbit Island is a (tuff cone) volcanic island and harbors domestic rabbits which were released there. It is now a bird sanctuary and no visitors are allowed. It even looks like a rabbit's head. Can you see it?

Turtle Lagoon

1. What kind of turtle live at Sea Life Park?

Green sea turtles, hawks bill turtles, and logger head turtles.

The green sea turtles have green fat in their bodies and that's how they got their names.

2. Where do they lay their eggs?

They come out of the ocean and lay their eggs in holes they dig in the warm, sandy beaches.

Sea Lion Feeding Pool:

1. What is the difference between a sea lion and a seal?

Sea lions have outer ears-seals do not.

Sea Lions swim with their front flippers---seals use the hind (back) flippers.

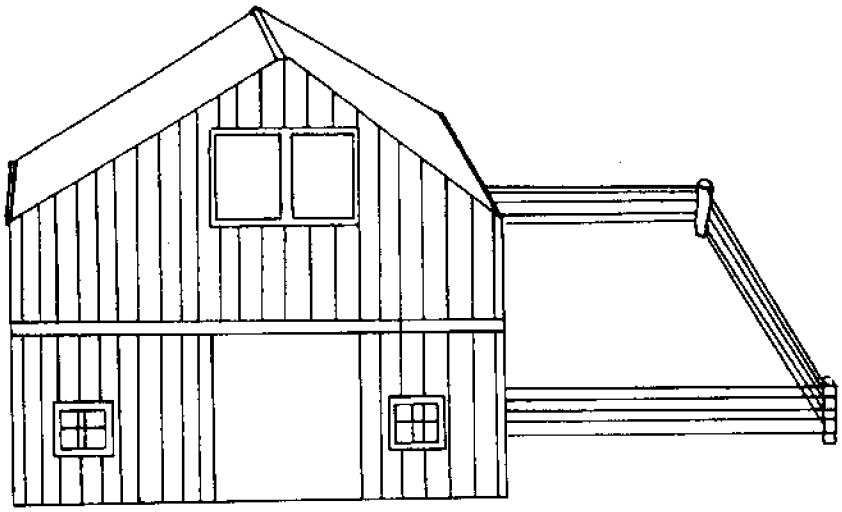
2. How do sea lions swim in comparison to dolphins?

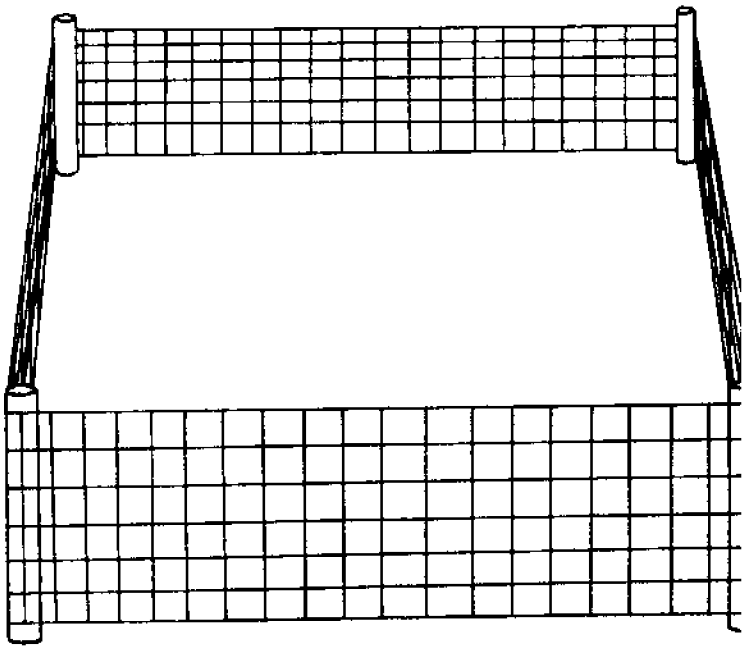
Sea lions use their flippers-dolphins use their tails.

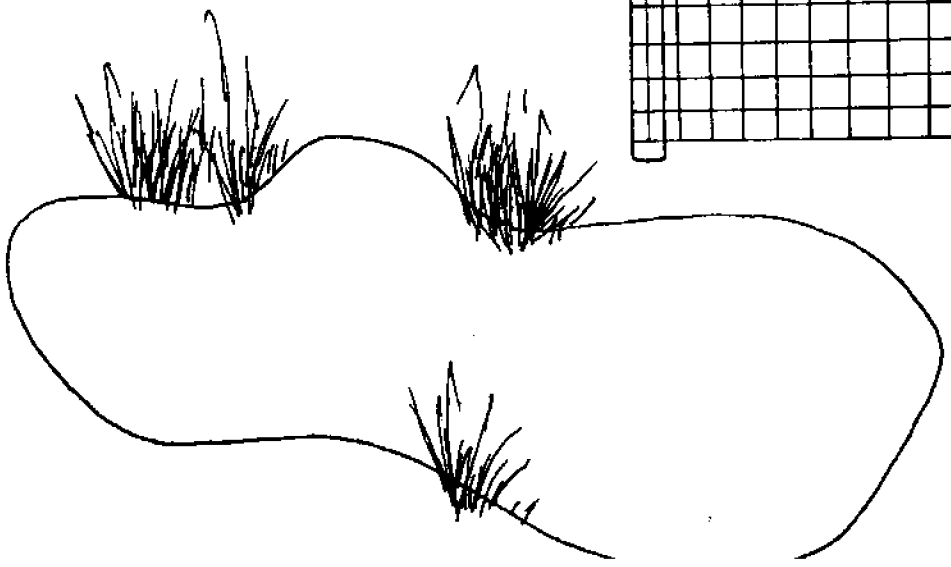
Whaler's Cove

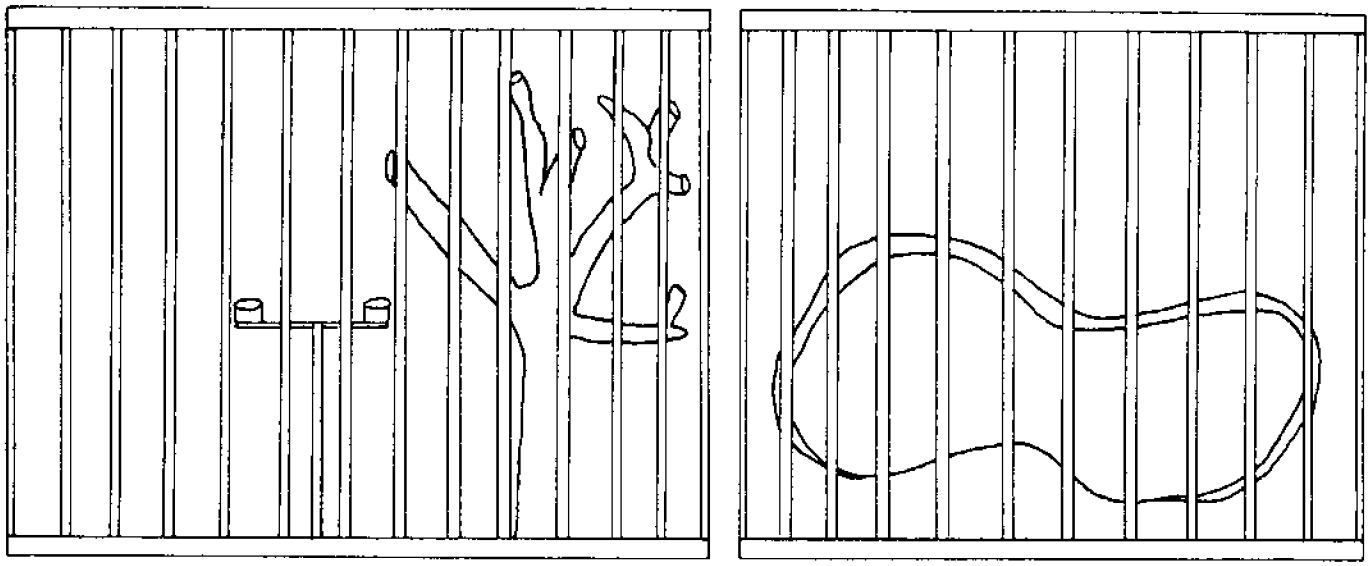
The name of the ship is the "Essex". It is a whaler.

DRAW THE ANIMALS IN THE HABITATS

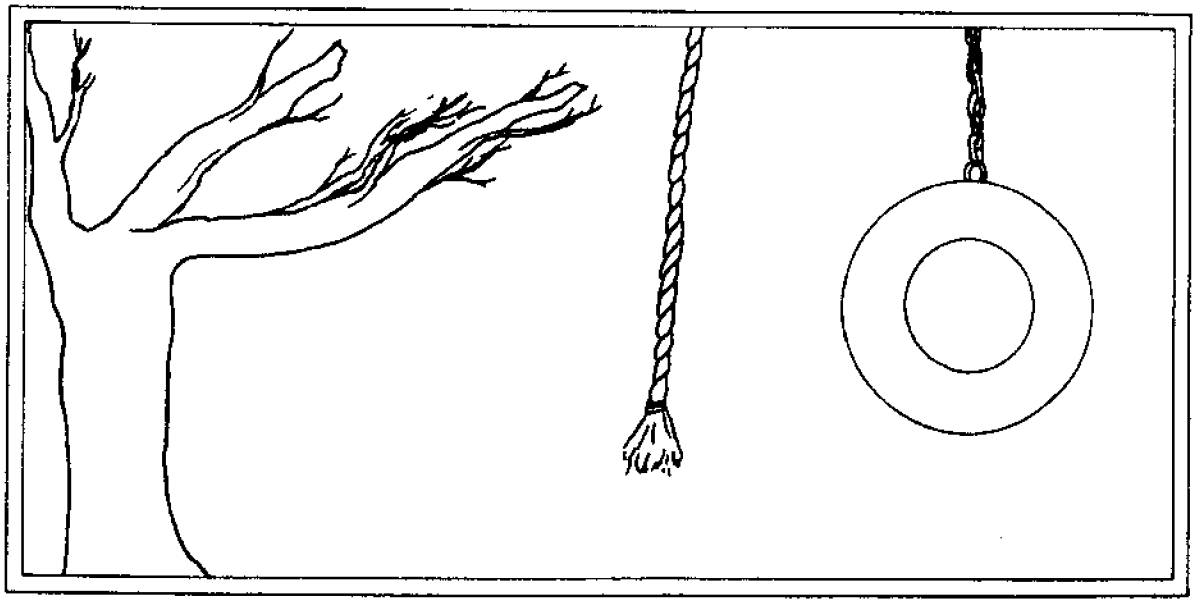








DRAW THE ORGANISM THAT LIVES IN EACH OF THESE CAGES



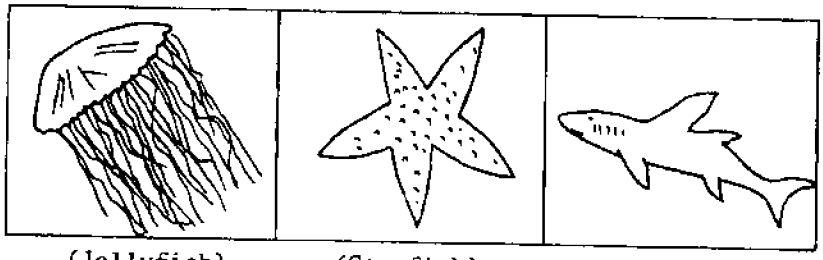
*It is better without the bars.

WHO LIVES HERE?
Draw Them

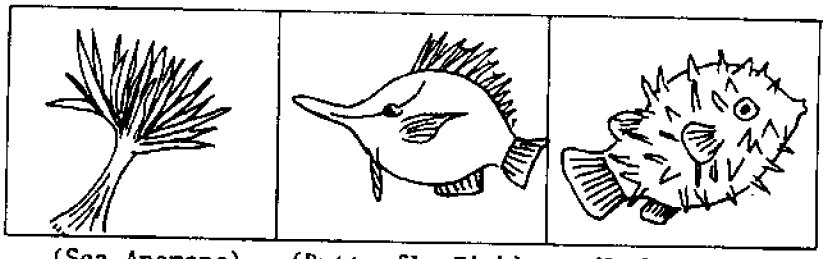
THE AQUARIUM

Name_____ Date_____

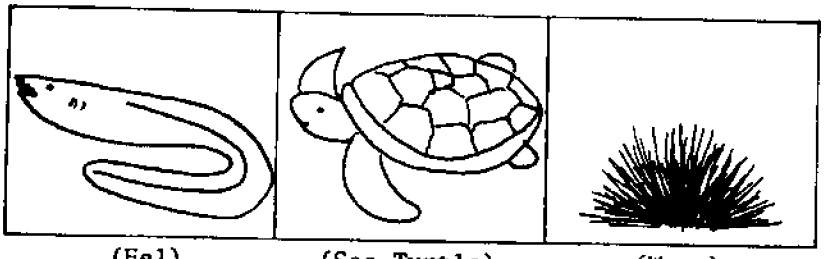
Color these pictures. Cut them out and glue them in their habitat.



(Jellyfish) (Starfish) (Shark)

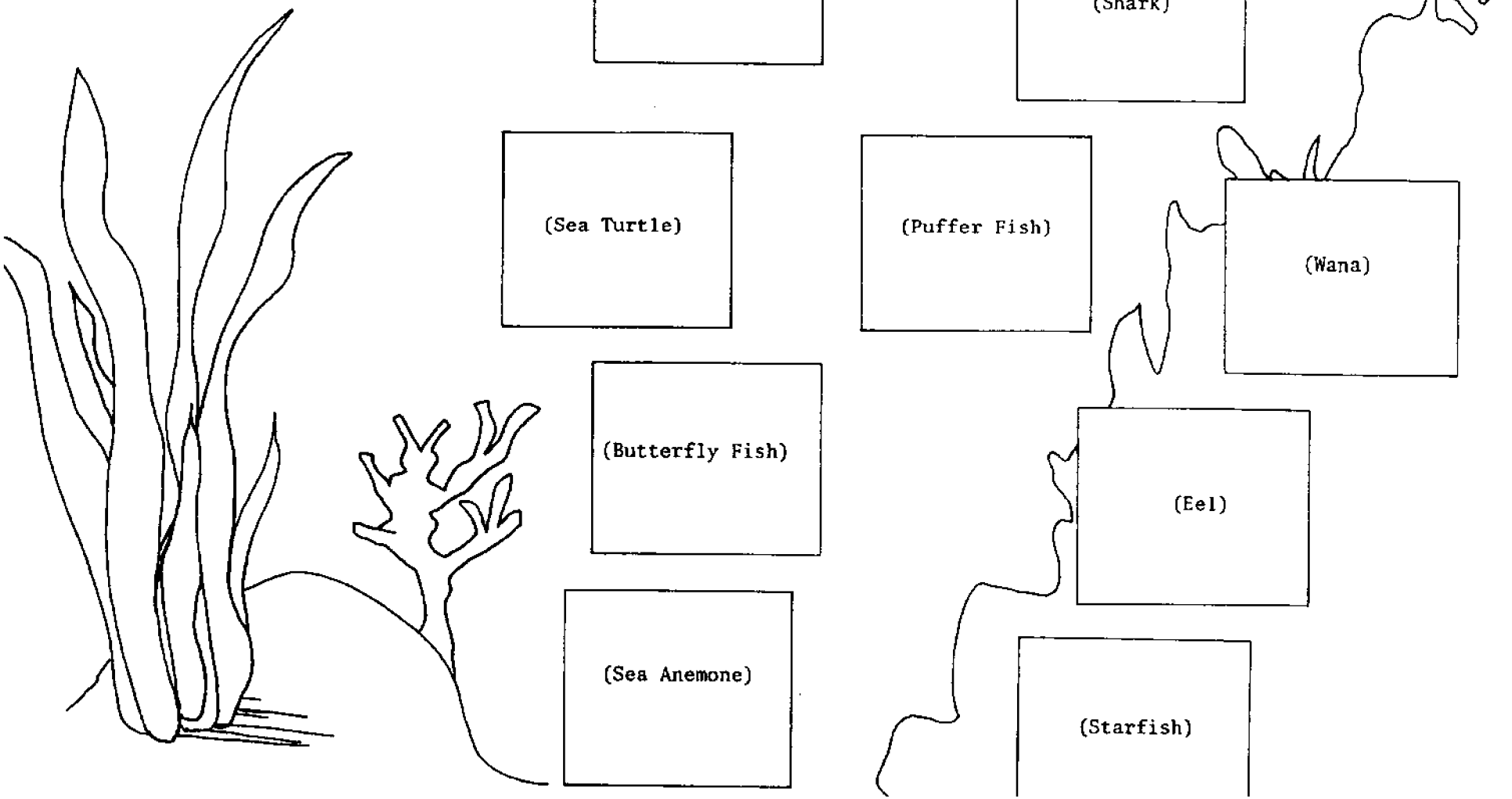


(Sea Anemone) (Butterfly Fish) (Puffer Fish)



(Eel) (Sea Turtle) (Wana)

Name _____ Date _____


(Jellyfish)
(Shark)
(Sea Turtle)
(Puffer Fish)
(Wana)
(Butterfly Fish)
(Eel)
(Sea Anemone)
(Starfish)

POLLUTION

1. Relate to classroom aquarium.
2. Observe what over feeding does to the habitat:
   a. Clouds water
   b. Water smells
   c. Plants rot
   d. Fish are at the surface, they can't breathe.
3. Relate this to the ocean
   a. Chemicals flowing into the sea
   b. Drop oil on water to show them how it covers the surface so air cannot enter the water.

ACTIVITIES

1. Match animals to their habitat.
2. Draw pictures of themselves in their habitat.
3. Add to a drawing. Draw in the organisms that live in a specific habitat.
4. Illustrate helpful and harmful changes that people make in their habitat.

LOCOMOTION AND BODY PARTS

We have observed the organisms in an aquarium and grouped them into living and non-living. Now let's look at the aquarium and see how the organisms move.

Materials:

1. Aquarium or large pictures, slides, film or filmstrip.

   A film would be the better of the media if an aquarium is not available. After viewing an organism stop the film for discussion on questions below. The children will be able to use their observation to draw conclusions. One dimensional media makes this difficult. (It may be helpful to rewind and view the film again after the discussion.)

Procedure:

1. Looking at the aquarium or other media, ask these questions:
   a. Which organisms move fast?
   b. Which organisms move slowly?
   c. Which organisms do not move at all?
2. Group the children's responses on the board.
3. Looking at the group. (Name the organisms)
   a. Why do you think they move so fast? What helps them move so fast?

      Tail, fins, shape of body, it can swim. (Squid and octopus may move quickly when frightened by sucking in water and squirting it out of a tube, like a jet.

   b. Why do you think these organisms move slowly?

      They don't have fins or tails and their body is shaped differently. They have feet (suckers) or they float.

Snails, starfish, wana (sea urchin), sea cucumber, crab. Crabs, shrimp and lobsters move slowly until they are frightened.

c. What things didn't move around the tank?

Plants, coral, sea anemones. Why don't they move? They have no feet or fins or a tail.

BOOKS CHILDREN WOULD ENJOY

Herman the Helper by Robert Kraus. Pictures by Jose Aruego and Ariane Dewey. New York, Windmill Books, 1974.

Summary: Herman the helpful octopus is always willing to assist anyone who needs his help - old or young, friend or enemy.

Fish Is Fish by Leo Leonni. New York, Pantheon Books, 1970.

Summary: When his friend, the tadpole becomes a frog and leaves the pond to explore the world, the little fish decides that maybe he doesn't have to remain in the pond either.

The Oyster's Secret by William Barrett Morris. Northbrook, Illinois, Hubbard Press, 1972.

Summary: The oyster feels he hasn't anything special to offer until the dolphin tells him a secret.

Wonder-fish From the Sea by Alvin R. Tresselt. New York, Parents Magazine Press, 1971

Summary: Yearning to see some of the world they heard the bird talk about, the leaves fall into the water and become fish.

TEACHER INFORMATION

"What Is A Fish?" an article in Sea World Magazine, Spring 1978, pages 33 to 35. It is also in the Coastal Awareness Program handout.

Tide Pools and Beaches by Elizabeth Clemons. Illustrated by Joe Gault. New York, Knopf, 1964.

Summary: Tide pools and beaches are treasure chests, if you know where to look. Sea anemones, starfish, sand dollars, tiny sponges, corals and seaweed lie in shallow waters of sandy beaches or hide in tide pools along rocky shores. This is a simple identification book of the commonest seashore treasures. (The illustrations are very good.)

The Fishes by Francis Downes Ommanney and the editors of Time/Life Books. New York, Time Inc., 1970.

Summary: (Good illustrations)

From Shore to Ocean Floor: How Life Survives in the Sea by Simon Seymour. Illustrations by Haris Petie. New York, Watts, 1973.

Summary: Discusses the characteristics that insure survival of plants and animals in the sea.

Wonders of the Pacific Shore by Tay Sloan (photos and text). Drawings by Lura Karlsson. Additional illustrations by Robert Borja (new ed.). Chicago Children's Press, 1968, 1961.

Summary: Photographs are in color and well done.

101 Questions and Answers About the Sea by Peter R. Limburg and James B. Sweeney. Maps and diagrams by William Jaber. New York, J. Missner, 1975.

Summary: Reveals some of the characteristics of the ocean and its inhabitants through answers to frequently asked questions.

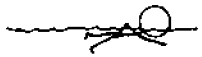
Seashell Towns by Peter Sauer. Illustrated by Mark A. Binn. New York, Coward-McCann, 1968.

Summary: Snails, mussels and barnacles live in shells by the seashore. They live between tides. At high tide they are underwater and at low tide they can be found along the shore or on rocks and docks.

Name _____ Date _____

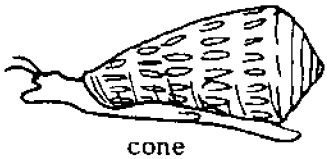
Children cut pictures from magazines or teacher may make a ditto with various animals to be color, cut and pasted in proper place.

WHAT ANIMALS:

 Sit	 Crawl	 Walk	 Swim

Name _____ Date _____

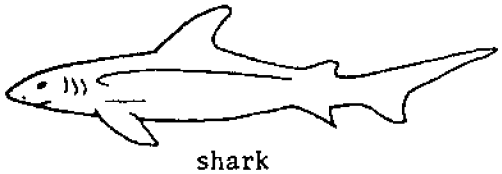
Draw a circle around the organisms that live in the sea. Color the swimming organisms blue. Color the crawling organisms orange.

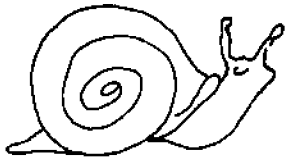

cone

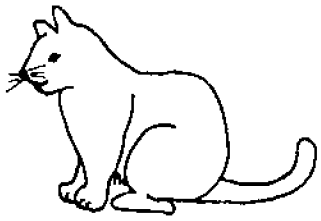

ladybug

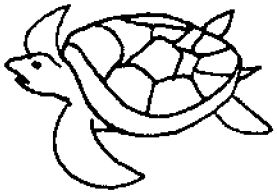

sea anemone


bird


shark


snail

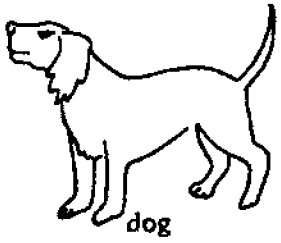

cat

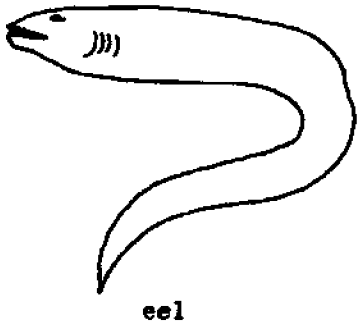

sea turtle


wana


coral


starfish


dog


eel

You may use:

Creative Dramatics

You may have small groups of children bring eels, crabs, sharks, sea anemones, puffer fish, coral, seaweed, etc.

Do one organism at a time. Then set up an underwater display with a few small groups at a time.

You may wish to have individuals demonstrate then have the whole class repeat the movement following the leader. A circle formation would be a good way to start if the children enjoy creative dramatics. If they are shy, standing in rows may be easier if they feel fewer people are watching.

The children enjoy the form of self-expression and learn to relate their body parts and their functions to that of the organisms they portray.

Large Pictures (SVE)

Children can compare their body parts to pets like cats, dogs, birds and then to those of marine organisms. Also, they will enjoy comparing their pets body parts to those of marine organisms.

The pictures may also be used to compare body shapes of organisms and how fast or slow they move.

crab/lobster

snail/sea slug/wana

shark/trigger fish

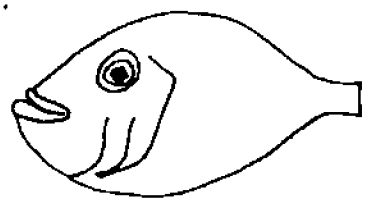
turtle/hermit crab

Also:

How are they alike?

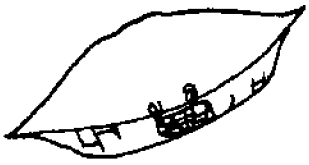
How are they different?

Teacher has a transparency made like this to make a large outline on chart paper.

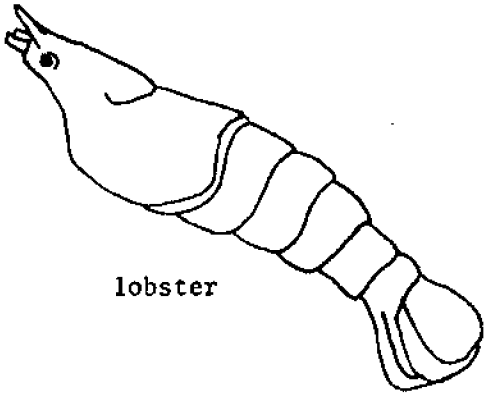


Have the children draw in what is missing. You may do this with four or five groups around the room. Have them color their fish when they are through.

Large transparencies of crabs, lobsters, etc. may be made and the children draw in the missing parts and color them.



crab



lobster

GAMES TO PLAY

What Am I?

This is an imitation game. A child imitates an animal or something he saw on the way to school. Children try to guess what he is. Good beginning for creative dramatics or as a reinforcing activity.)

Animals Are Your Friends!

At the beginning of each week or month, post pictures of animals with their names on labels. Each day as you begin the day have the children pin the labels under the correct pictures until all the children can identify the pictures.

Teachers could also use this activity as a handwriting exercise by writing a few lines about one of the animals on the board or on chart-paper for the children to copy. This may become the class reference book for identifying organisms and be read and enjoyed over and over.

Guess

"What is it?" is the most common question asked in kindergarten classrooms. A corner of a table or the top of a cubby is set aside for the display of an item, shell, rock, shark skin, coral, etc. During the day, as the children think they know what the item is they whisper it to the teacher who writes it down. At the end of the week, a short discussion about the item takes place and it is identified and the guesses reviewed.

Art

The children will become more familiar with marine organisms and their body parts after an experience with Gyotaku (pronounced ghio ta' koo), Japanese fish printing.

Seaweed Collage

For bookmarkers or cards

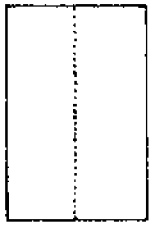
Colleen as info

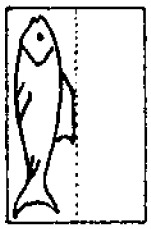
Stuffed Fish

Have the children draw a marine organism on an eighteen by twenty four inch sheet of paper folded in half

12" - 1/2 of 24"

18"





Cut the organism out of the folded sheet. When he is through he will have two cutouts of the same organism.

Have the glue the bottom and sides then they have color the organism. After the organism is dry they are to use their scraps from the cutout to stuff their fish. The teacher will staple the top of the organism closed.

Puppet Show

The children may wish to make stick puppets of their favorite marine organism.

They may make up a skit with a group.

Or have each child move his puppet across the front of the class mural telling the class what it is.

The mural may be placed behind desks or cubbyholes to hide the child.

GYOTAKU
Japanese Fish Printing

The techniques of Japanese fish printing has been used in Japan for over 100 years to record catches of sports fish and to gain ichthyological (fish biology) information. These prints have been used at the University of Washington to study how the physiology of a fish is related to its surface area.

The art of gyotaku (pronounced ghio-ta-koo) is a good way to gain an understanding and appreciation of the beauty and great variety of marine organisms. You can also use this technique for making prints of shells, rocks, flowers and other items.

Before you make a print, identify the fish. What are the distinguishing characteristics of the fish? Study the life history of the fish. Where and how was it caught?

Materials

Obtain a very fresh fish - flounders, bluegills, or rockfishes are good to study with. If you buy the fish at a market, select one that has bright red gills, clear eyes, and a fresh smell. If the fish has been gutted, make sure that it has not been cut anywhere else on the body.

You also need:

*newspaper

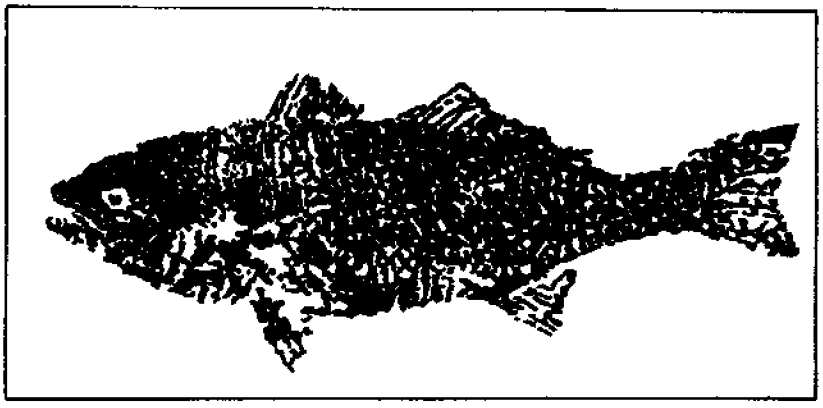
*plastic modeling clay

*pins

*water base ink (linoleum block ink is best)

*a stiff 1/2 inch brush

*a very small brush



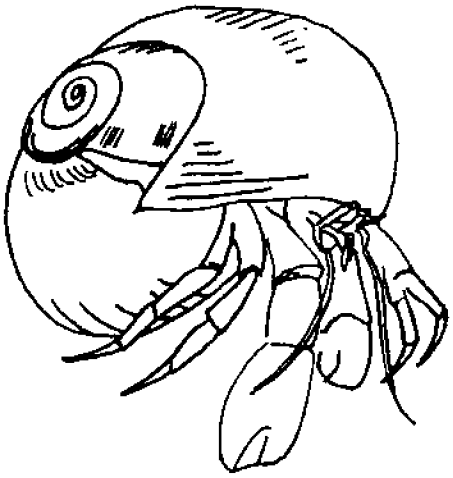
*rice paper, newsprint, or other moisture tolerant paper. Since rice paper is expensive, you might prefer to start with newsprint.

Method

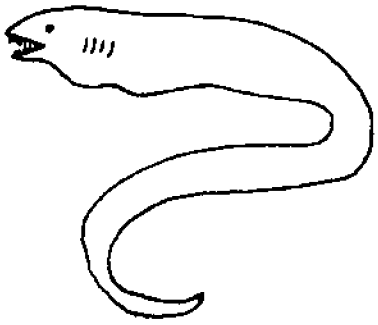
1. Use soap and water to clean the outside of the fish as completely as possible. The cleaner the fish, the better the print. Dry the fish well.
2. Place the fish on a table covered with newspapers. Spread the fins out over some clay and pin them in this position. Continue to dry the fish.
3. Brush on a thin, even coat of ink. Leave the eye blank unless you prefer to fill it in.
4. Place a piece of newspaper or rice paper over the top of the fish.
5. Carefull lay the paper over the entire fish. Use your fingers to gently press the paper over the surface area of the fish. Be careful not to move the paper too much since this results in double prints. Then remove the paper and you have a fish print.
6. Use a small brush to paint the eye.

Name_____ Date_____

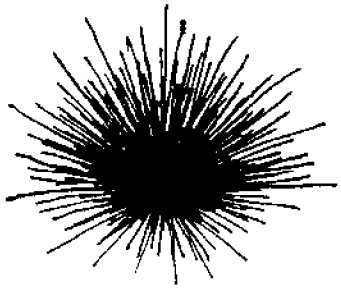
Color the animals that hide in shells, yellow.
Color the animals with spines, orange.
Color the animals with sharp teeth, red.



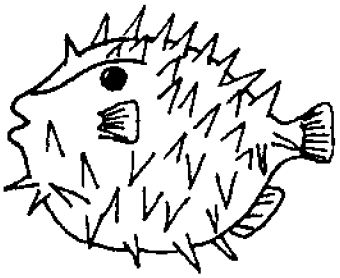
hermit crab



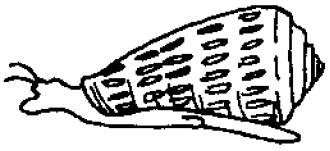
eel



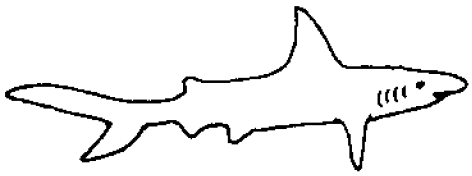
wana



porcupine puffer

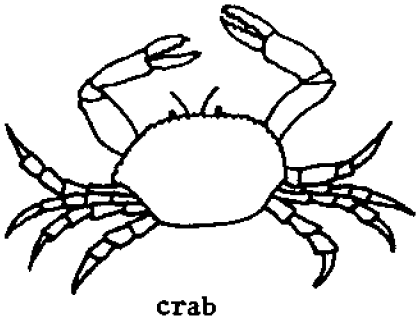


cone

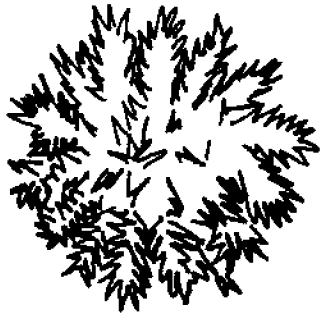


shark

helmet crab



crab



crown of thorns starfish

CONCEPT OF ISLAND AND SAND

TOPIC: CONCEPT OF ISLAND

Objectives: The students will:

1. Learn that they live on an island.
2. Identify an island and define what it is.
3. Learn how our islands were formed.

Materials needed:

Flat pan

A rock to fit in the flat pan.

Water

A piece of 3/4 inch plywood one foot square

Old window screen

Tin can - baby food size

Four pounds of plaster of Paris

Sand

Ammonium dichromate in crystal form, available from drugstores

Outline of island of Oahu

Procedure:

1. Discussion: If I go to Pokai Bay and look toward the beach, what would I see? At Kaena Point? At Sea Life Park? At Waikiki by the zoo, at Maili Point?
2. If I get on a bus or car that goes all around the island, what will I see?
3. An outline of Oahu to show the points mentioned in procedure.
   a. To present visually what an island is.
4. Place a rock in a pan of water to correlate the trip around the island and the outland of Oahu to a concrete example of an island.

a. Definition: an island is a "body of land completely surrounded by water". Childcraft Dictionary

5. Have the children draw and label a picture of an island. They can refer to the rock in the pan.

6. To demonstrate how our islands were formed, a volcano in the classroom showing the flow of lava is exciting and makes the point very clearly.

   a. From Science On A Shoestring, page 232, Activity 304, How Can We Demonstrate Volcanic Action?

ACTIVITY

1. The children can make a little booklet about the building an island.
2. Have the children draw pictures to go with the captions.
3. Cut along the dotted line and put the pages in the proper order.
4. Make a cover and staple the booklet together.

Before the island Page 1

A volcano begins building an island Page 2

The island is finished Page 3

Plants, trees, and animals grow on the island Page 4

TOPIC: WHAT IS UNDER AN ISLAND?
WHAT IS SAND?
WHERE DOES IT COME FROM?

Objectives:

1. Children will further explore the concept of island.
2. Children will predict what they think is under an island.
3. Children will "experience" sand and soil. They will make observations and comparisons.
4. Children will learn where sand and soil come from. What are the components of each.

Materials:

1. Sand
2. Soil
3. Large meat trays
4. Tablespoons
5. Measuring cups
6. Magnifying glasses

Procedure:

How does sand feel?

1. Put a cupful of dry sand on a meat tray. Take some in your hand. What happens?

   Squeeze some sand. Rub some on your hand or arm.

   New descriptive words: pointy, gritty, crumbly, scrapes.
2. Pour 1/4 cup of water onto your dry sand and mix the sand and water. Now take some in your hand. What happens? (Can mold it somewhat.) What does it feel like?

   New descriptive words: sticky, damp, etc.

What does sand look like?

1. Sprinkle a few grains of sand on a white sheet of paper. Look at the grains under a magnifying glass in good light. What do you see? Different colors, sizes shapes.

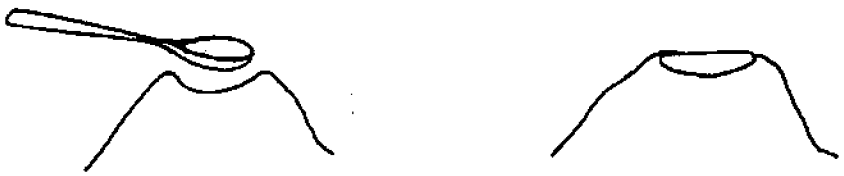
Compare sand and soil (dirt)

1. At one end of the meat tray, put a cup of sand. At the other end put a cup of soil. Look at the soil with a magnifying glass. (You will see bits of rotting wood and leaves called humus.)
2. Shift the dirt and look at it again with the magnifying glass. (You should see that the grains of soil are very tiny almost like powder. The grains of sand are bigger.)
3. Sprinkle the soil with water (1/4 cup or less) and mix well until it is as damp as the sand.

   Procedure:

   a. There should be two piles of material. A pile of sand and a pile of dirt.

   b. Use a tablespoon and carefully make a hollow with the spoon on the top of each pile.



c. Pour a tablespoon of water into each hollow. What happens? Water comes out of the sand faster than the soil. The water seems to stay in the hollow in the soil. Why? Sand grains are larger and do not fit closely together because they are of different shapes and sizes. There are many holes and the water drains through as though it were a sieve. Soil grains are very tiny and fit close together and water cannot pass through them as easily.

What happens to sand when it drys? It crumbles and falls apart.

Relate to sand castles.

Where do you find sand? Beaches, quarry, desert.

Where does sand come from? It is made very slowly from rocks and shells.

Water and wind break down the materials.

Storms, rushing water and waves grind the sand even smaller.

Streams and rivers carry sand and dirt to the sea.

After the rivers drop the sand in the sea, storm waves and ocean currents move the sand along the shore making sand bars and beaches.

Hawaiian Sands

Are formed from lava and limy skeletons of reef organisms.

Black Sand Hot lava flows into the sea and hits cold water and it cracks into fragments. These particles of black lava are carried ashore by waves and currents to form black sand beaches. The Big Island of Hawaii is the only island

that has black sand beaches because the volcanoes are still active.

White Sand Reef organisms that die and are ground against each other by the waves.

Dark Sand Fresh lava and brown sand from weathered lava are carried to the sea by rivers. Olivine is the name of the sparkling green particles in the sand.

*Hawaii have very little coral in its sand it does not have much coral.

Our sand is made up of:

a. One celled animals which paper shells are one species.

b. Mollusks (puka shells or small whole sea snails)

c. Sea urchin tests (plate-like part of urchin shells)

d. Lava

e. Red algae

f. Green algae

Art Activities

1. Class mural depicting the process of making sand from mountain to sea.

2. Sand and Plaster Sculpture

a. Half fill a shoe box with damp sand. Press a sea shell or any object with an interesting shape into the sand, and then remove it. Fill the indentation with plaster of Paris and let stand until hardened. While it is still moist, push a paper clip into the plaster. This will be a hook for hanging the finished object.

b. When the plaster is dry, remove it from the sand. Paint with tempera. If only one color is desired, add the

powdered paint to the plaster while mixing.

sculpture or sand casting can be done at the beach.

Materials:

a. Water

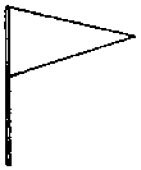
b. Plaster of Paris

c. Buckets

d. Cups to pour plaster into molds

e. Powdered paint if desired

f. Flags with child's name



1. The class will make their own flag with their name on it. A triangle cut from paper glued to a chop stick.
2. The teacher will need parent help in supervision of children.
3. Take small groups down to the sand with their flags to make their molds. The rest of the group may be collecting shells, driftwood or rocks to put in their sand sculpture. Or a story may be read about the sea or marine life.

   a. Albert the Albatross by Syd Hoff (Harper, 1962)
      In this funny picture book, a sea bird travels to the ocean on a lady's hat.

   b. Captain Kidd's Cat by Robert Lawson (Little, Brown, 1956)
      An amusing tale of the famous pirate, as seen through the eyes of his cat.

   c. The Columbus Story by Alice Dalgliesh (Scribner, 1954)

A fine, read-aloud story of the famous seaman and navigator.

d. Dolphin by Robert Morris (Harper, 1972)

The first year in the life of a dolphin is described in text and pictures.

e. How Do You Hide A Monster by Virginia Kahl (Scribner, 1971)

In this rhyming tale, a friendly sea serpent is mistaken for a monster.

f. Little Tim And The Brave Sea Captain by Edward Ardiyzone (Walch, 1955)

A young stowaway survives a shipwreck. His adventures are continued in Tim To The Rescue and other books.

g. Octopus by Evelyn Shaw (Harper, 1971)

An easy-to-read true story, with pictures, about the life of this sea animal.

h. Swimmy by Leo Lionni (Pantheon, 1963)

Swimmy the fish works out a way he and his friends can protect themselves in their beautiful but dangerous world.

i. The Underwater World Of The Coral Reef by Ann McGovern (Fourwinds, 1976)

The author, a scuba diver, describes the beauty of the undersea world.

4. Learn and experience this simple poem.

Stepping barefoot in the sand
Warm and dry and crumbly.

Digging hollows with your hand,

A million shiny grains of sand,

Sliding, soft, and tumbly.

Author Unknown

HOW DO PEOPLE USE SAND?

1. Mixing cement
2. Sandblasting to clean bricks and stone
3. Sandbags
    a. To stop flood water
    b. To put in the bottom of boats to keep them steady when the waves are high.
4. Sandpaper to rub on things to make them smooth.

Supplementary Activities:

1. Make sandpaper
    a. Spread glue on a sheet of paper.
    b. Sprinkle dry sand over the glue.
    c. When it dries, shake off the extra sand.
2. Make Sand
    a. Pieces of shells
    b. Heavy cloth
    c. Hammer
    d. Take the pieces of shells on a board and cover them with the heavy cloth. Now pound the pieces of shells with the hammer.
    e. When the shells break into bits, pound the bits (under the cloth) until you have little grains of sand.

WHAT IS UNDER THE ISLAND?

1. If you walk into the water what happens?
2. Do you fall off because the land disappears?
3. Does the island float around like soap in the bathtub?
4. How do boats and airplanes know where the island is?

Read

1. Birth Of An Island by Millicent Selsam (Harper, 1959)
   The author tells how volcanic action creates an island, and how it develops.
2. A Child's History of Hawaii by Hawaii's Children, originated and directed Edward G. McGrath, Jr. Edited by Bob Krauss. (An Island Heritage Book, 1973)
   a. Chapter - The Spurring Volcano
   b. Chapter - Born in Fire
   c. Chapter - How Plants and Animals Came (stop at page 31.)
3. Sand by Sally Cartwright. New York, Coward, McCann-and Geohegan, 1975.
   Summary: Discusses and suggests activities for discovering the properties and uses of sand.
4. Islands by William M. Stephens. New York, Holiday House, 1974.
   Summary: Describes the birth and development of the basic types of islands; inland, coastal, and oceanic.

TOPIC: HAWAII PAST AND PRESENT

Objectives:

The students will:

a. See man's relationship to the environment.

b. See the responsibility man has to care for the environment.

c. See how the ancient Hawaiians took care of their environment.

d. Draw conclusions as to how we can best take care of our environment now and in the future.

How did the ancient Hawaiians live?

1. House
2. Food
3. Clothing

House: What were they made of?

What were our houses made of?

Where did the Hawaiians get the things to make their house?

Where do we go to get the materials to build our houses?

Did the ancient Hawaiians use up all of the materials?

(Coconut trees, vines, etc.)

Did they waste materials? Do you think they did? Why?

Pictures from the library or from the Polynesian Cultural Center may be shown to aid discussion. Pictures of the houses to aid in providing information as to the materials used.

Did the ancient Hawaiians have a supermarket to shop from like we do? Pictures to aid discussion.

Did they have refrigerators like we do? Could they keep a lot of food? What did they eat?

PRE-TEST

Oral

Have six to ten objects on a table and ask the children to group them.

or

Worksheet

See next page

Oral

1. How many of you know what a fin is?
2. How many fins does a fish have?
3. What parts of the fish help it move through the water?
4. What covers the body of a fish?
5. What covers the body of a crab?
6. How many legs does a crab have?
7. Does it have hands?
8. Where does it live?
9. How does it move?
10. How do starfish or wana move?

(Have a picture of a fish and crab to relate answers to after the test.)

and or

Worksheet

See next page

Oral

Where does sand come from?

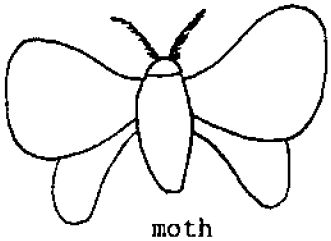
Name_____ Date_____

Pre-test Grouping Worksheet

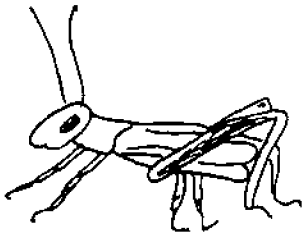
Draw red circles around the ones that fly.
Draw blue circles around the ones we eat.
(Answer: Ants don't fly--no wings
We don't eat ants)

banana

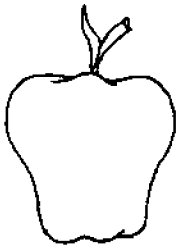
ladybug



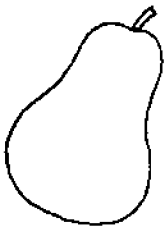
moth



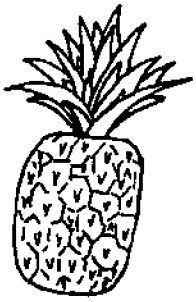
grasshopper



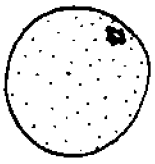
apple



pear



pineapple

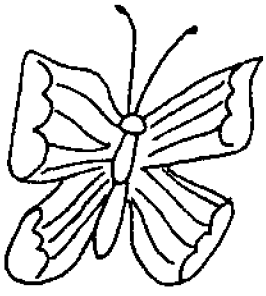


orange

strawberry

cherry

ant



butterfly

Name_____ Date_____

Body Parts Pre-test: Accuracy of Depiction of Organisms

Some animals live in water. Draw a picture of things you think live in the ocean.

POST-TEST

*Included in unit

Worksheet*

Can draw in missing parts of fish and crab

Can cut and paste organisms in proper habitats.

Will be able to group objects by stated properties.

Will be able to reasonably explain what an island is and where sand comes from.

Grade One

PRE- AND POST-TEST

1. Identify the animals. Draw a line from the name to the animals.

starfish

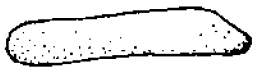
sea urchin

cowrie

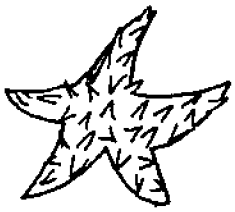
cone shell

hermit crab

sea cucumber



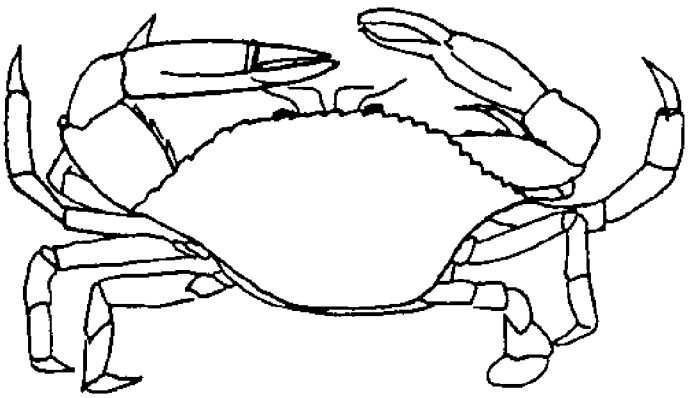
2. Circle the part of each animal that it uses to protect itself.



starfish

cone shell

sea urchin



crab

3. Discuss (or write) some safety rules to follow on tidepool fieldtrips.

GENERAL OBJECTIVES

I. There are various fish, animals and plants that live in tidepools.

II. Tidepool inhabitants have various ways of protecting themselves.

III. Safety rules must be practiced during tidepool fieldtrips to insure a safe, enjoyable experience.

IV. Tidepool inhabitants deserve respect from visitors.

V. Parents need to be oriented to tidepool safety rules and their various inhabitants.

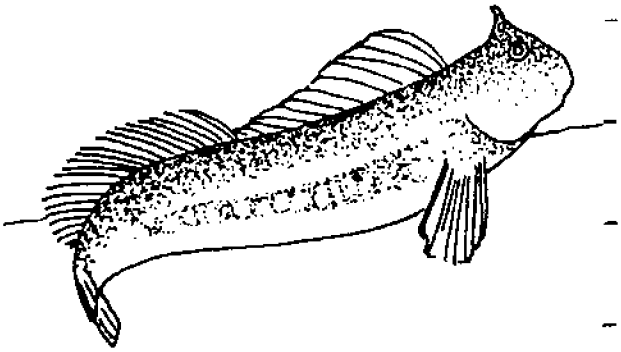
I. There are various fish, animals and plants that live in tidepools.

A. The students will be able to observe and identify tidepool animals, plants and fish in their natural inhabitant.

B. The students will be able to identify the parts of a fish.

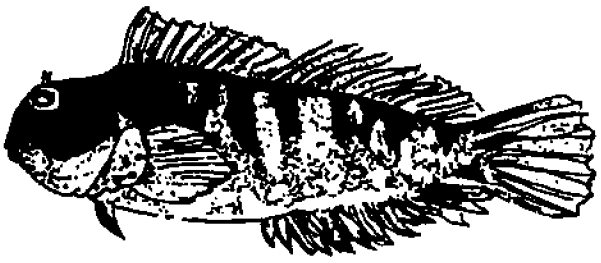
C. The students will be able to identify shells according to shape and other common characteristics.

TIDEPOOL BLENNIES



Istiblennius zebra, commonly called the rockskipper, is characterized by a fleshy flap located on the head behind the eye, and by its dusky black coloration. It is an extremely hardy fish, able to withstand extremes in both water conditions and temperature. Istiblennius gibbifrons differs from I. zebra in that it lacks the fleshy flap, and has a pronounce bulging of the forehead. Entomacrodus marmoratus, like I. zebra is found only in the Hawaiian Islands. It is greyish to green in color with distinct black markings along the dorsal surface and fins.

REEF FLAT BLENNIES

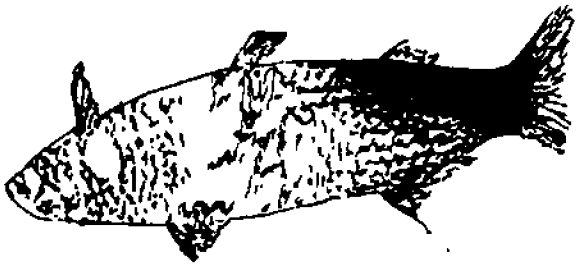


Inhabiting many of the reef flat areas in the islands are blennies of the genus Cirripectes. Of these, C. variolosus is probably most common. Extremely dark in color, this blenny can be found in nearly any area of shallow to moderate depth. C. obscurus is the largest of the local blennies, attaining a length of 16 cm. The male differs from the

female by being pinkish in color as opposed to yellow-brown. C. lineopunctatus prefers strong surge and is common along rocky shores. It can be distinguished from other Cirripectes by an unbranched tentacle over each eye.

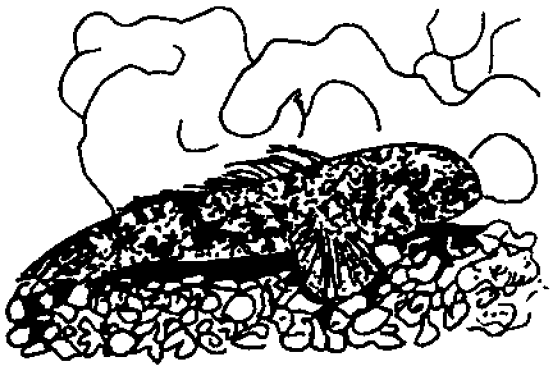
MULLETS

Juvenile mullets, Neomyxus chaptalii, are fairly common to tidepools along rock coasts. Their striking silver color and blunt bullet-shaped heads make them easy to spot as they swim in schools against the surge. Another mullet, Mugil cephalus, may be found along open coasts but seems to prefer brachish water and is cultured in ponds.



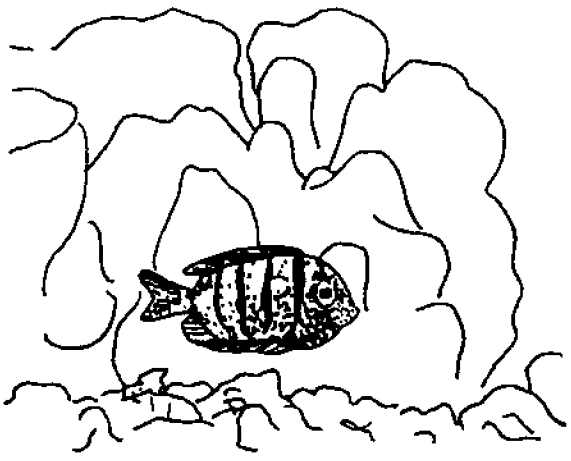
TIDEPOOL GOBIES

Two tidepool gobies of the genus Bathygobius are common to Hawaii. B. cotticeps differs from B. fuscus in that its head is flattened as opposed to the rounded head of B. fuscus. Coloration in these gobies ranges from a grainy sand-like color to dark grey.



REEF FLAT AND SAND GOBIES

Along reef flats, gobies are abundant. Gnatholepts anjerensis, the only goby with a dark band extending down from the eye, can usually be found along the sandy bottom near coral heads. Asterropteryx semipunctatus is found in holes. Females are sandy in color and males are black with blue spots. A third goby, Psilogobius mainlandi, may be seen on the sand at the entrance to snapping shrimp burrows. It is sandy in color.

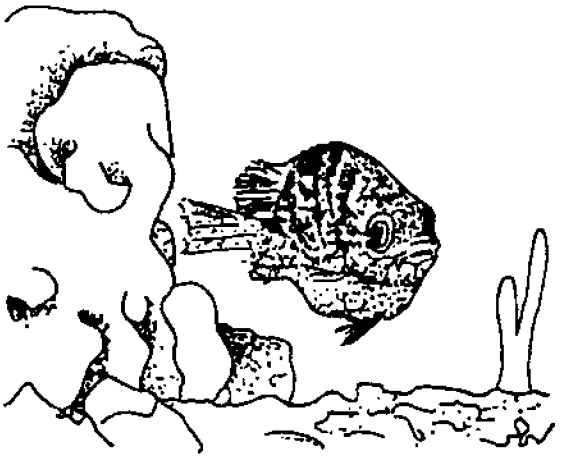


SURGEONFISHES

Many juvenile surgeonfishes may be encountered in tidepools open to surge, but perhaps the most commonly observed species is the Acanthurus triostegus, (Manini). This species is distinguished by its greyish color and black vertical stripes. Unlike other members of this family of fish, the Manini has a minute, nearly transparent "knife" at its caudal base.

DAMSELFISHES

Two extremely common tidepool inhabitants called damselfishes are characterized by being deep-bodied. Abudefduf sordidus, the Kupipi, possesses a black spot on its caudal peduncle and a greyish-green body. A larger black blotch fringed with yellow on its dorsal fin can be seen.



MAOMAO

The Maomao, Abudefduf abdominalis, differs from A. sordidus in that it lacks the black spot and its bars are prominent. Colors are yellow and black.

SILVER PERCH

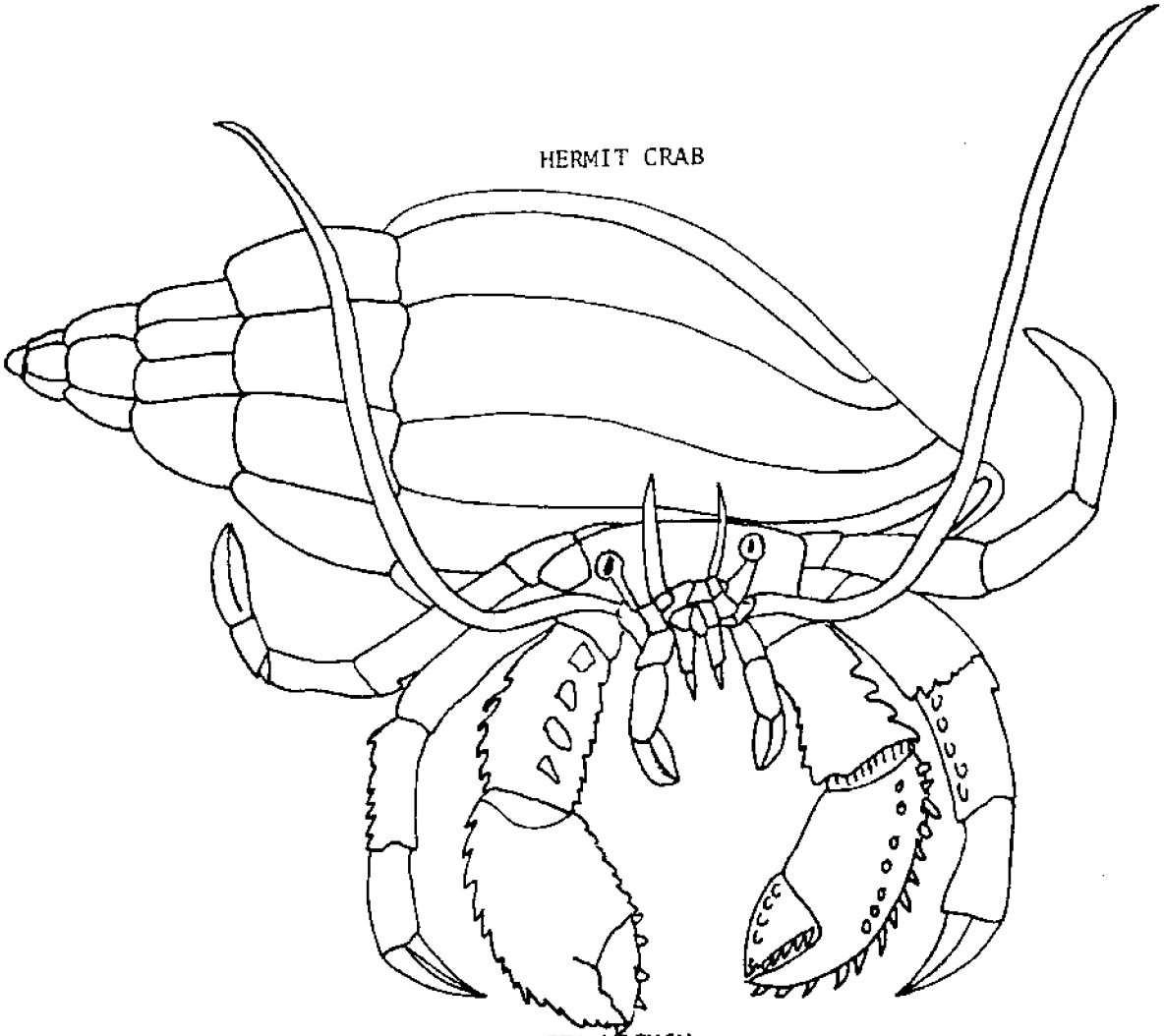
The Aholehole, Kuhlia sandvicensis, is common in all types of tidepools, those with both rocky and sandy bottoms. It seems to prefer areas of high surge and is a very hardy fish. The striking silver color and large eyes are characteristic.

IDENTIFYING TIDEPOOL INHABITANTS

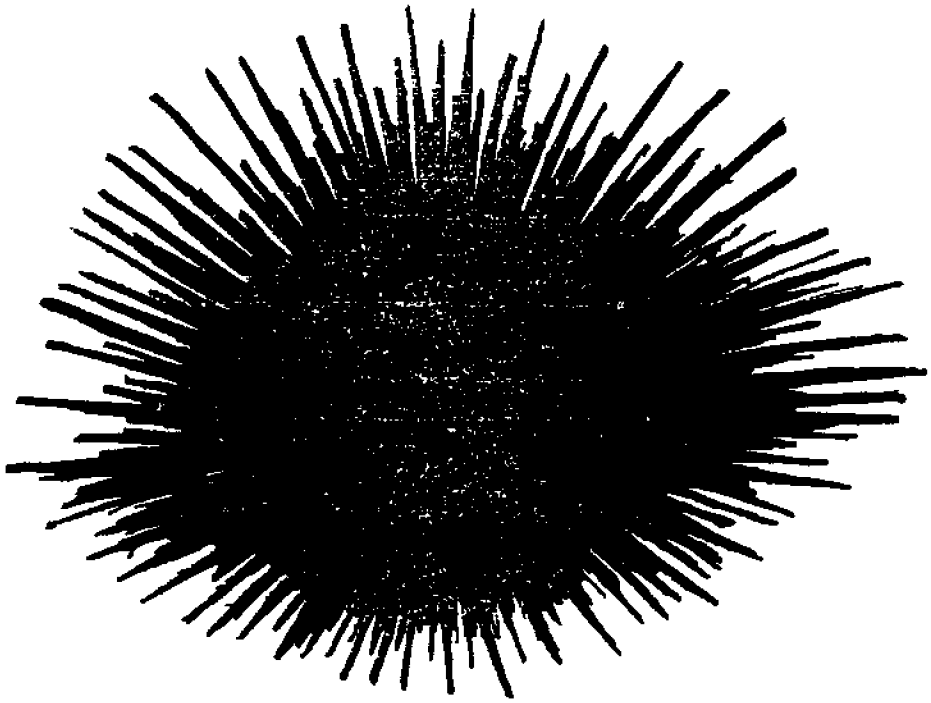
Initially the students can be exposed to tidepool inhabitants through books, pictures and filmstrips (slides).

Colorsheets could be used to reinforce observation and identification skills.

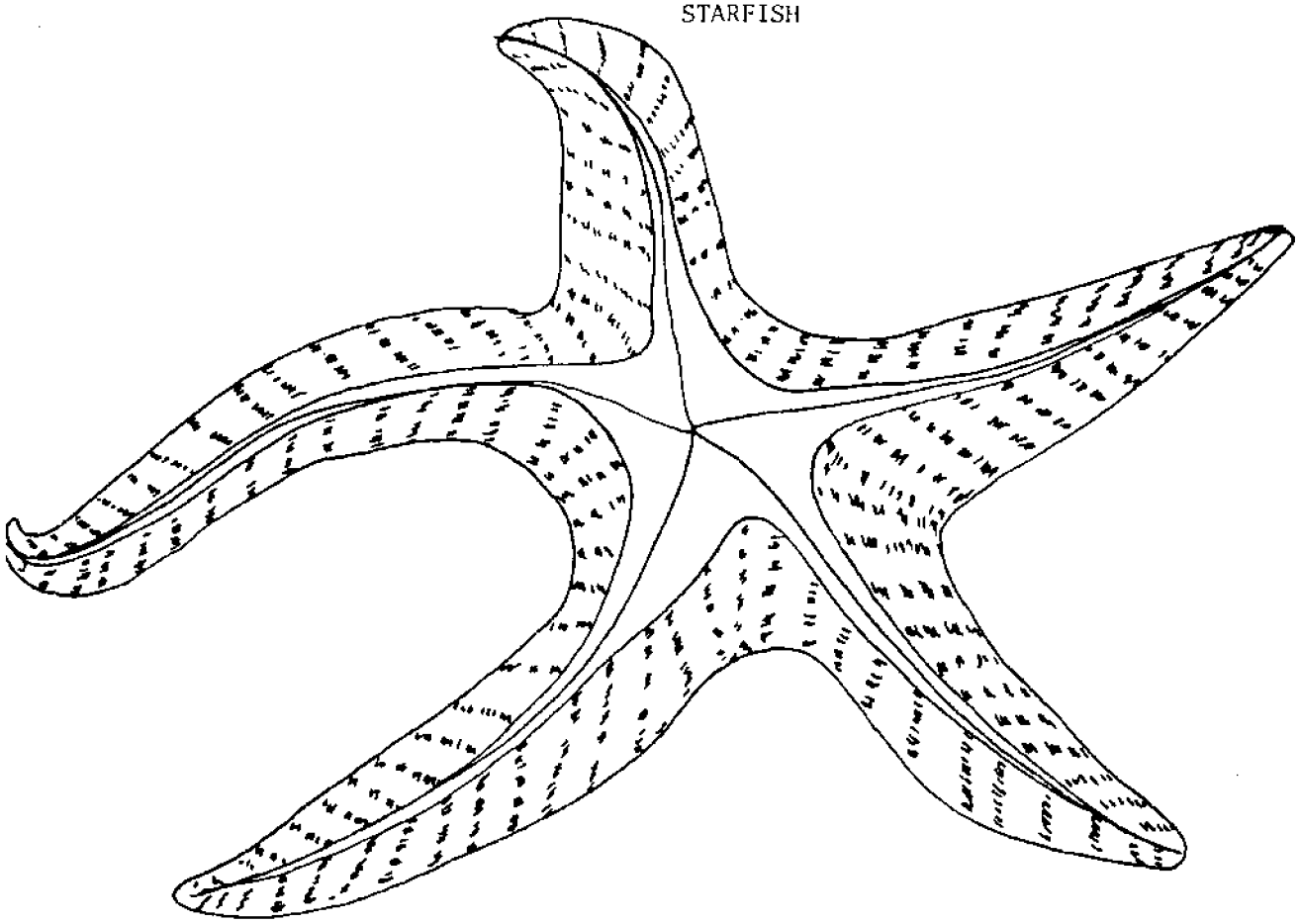
HERMIT CRAB



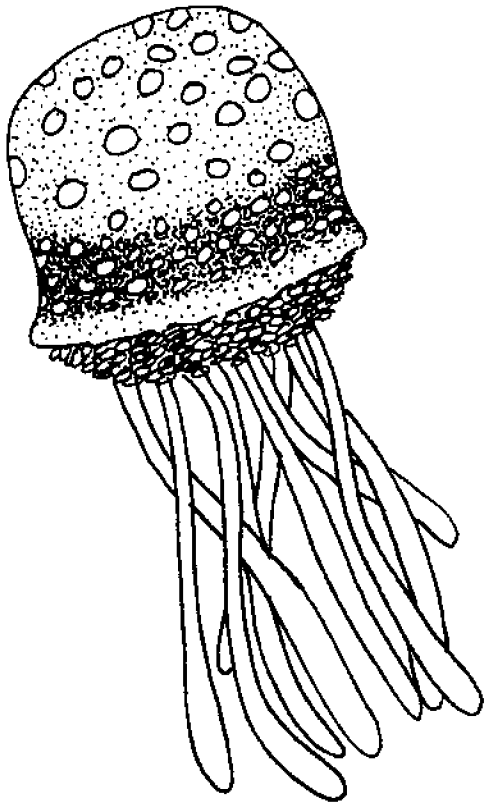
SEA URCHIN
(WANA)



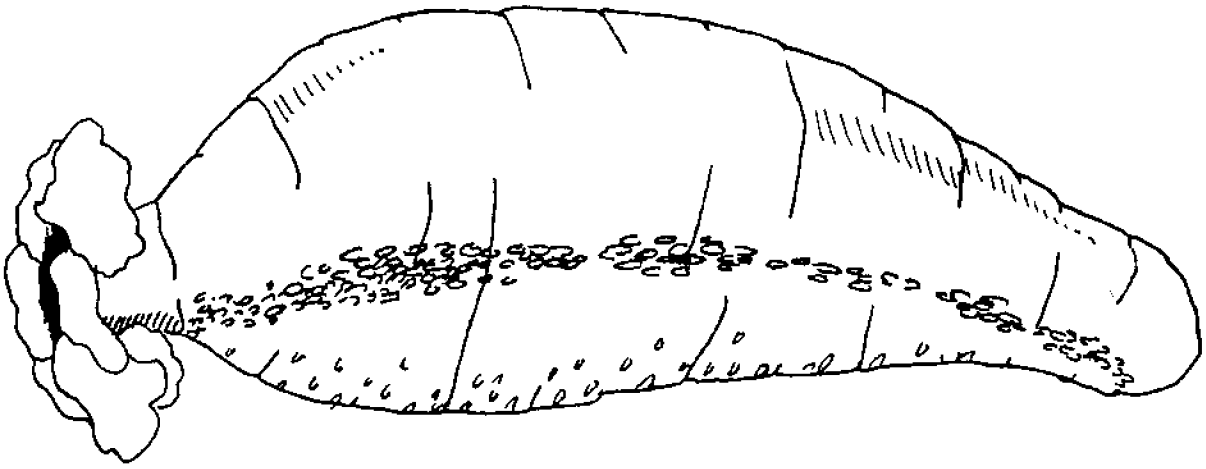
STARFISH



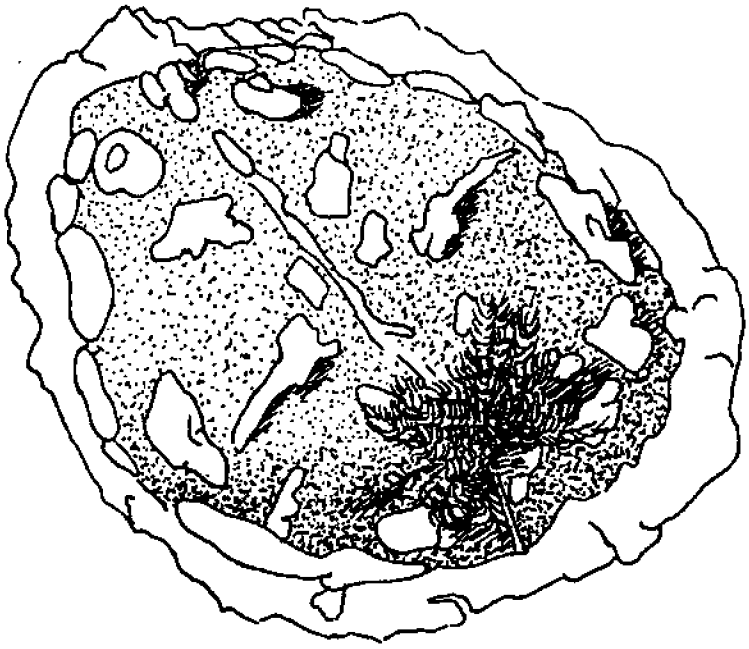
JELLYFISH



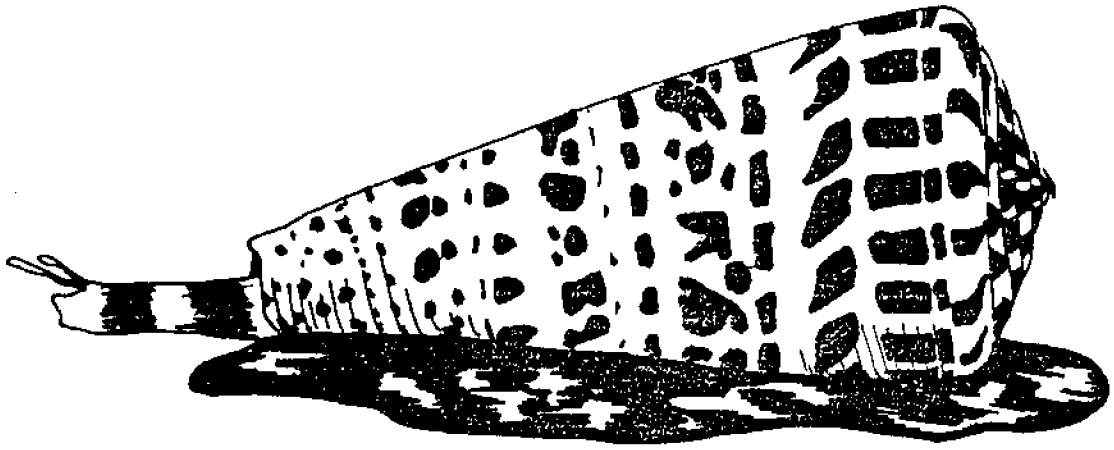
SEA CUCUMBER



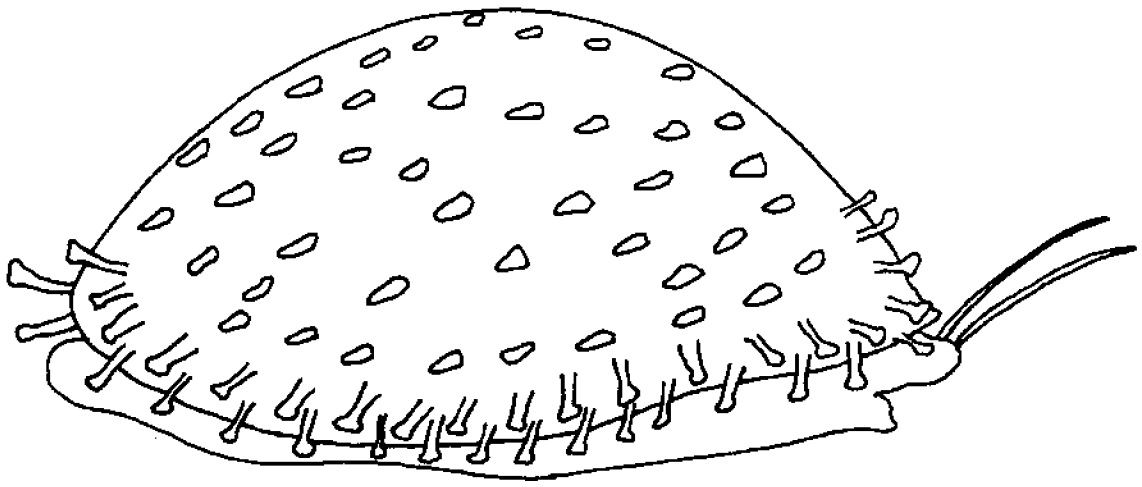
NUDIBRANCH



CONE SHELL



COWRIE SHELL

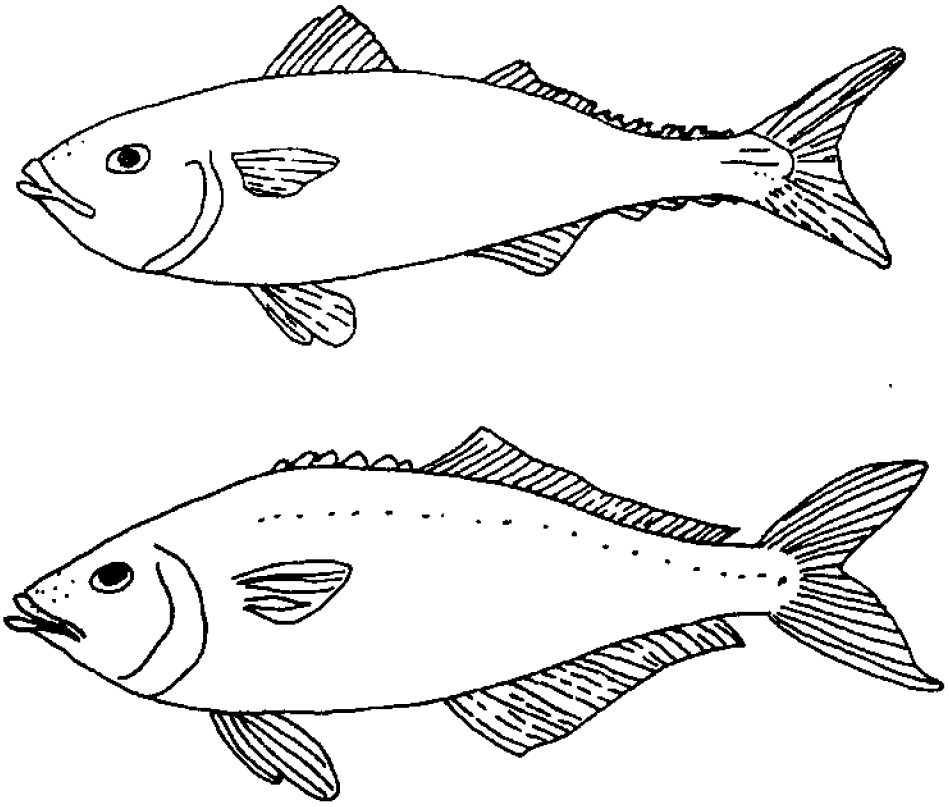


IDENTIFICATION OF THE FINS OF FISH

Collect various pictures of fish, mount them and discuss similarities and differences of the various fish.

Follow-up with the following work sheets.

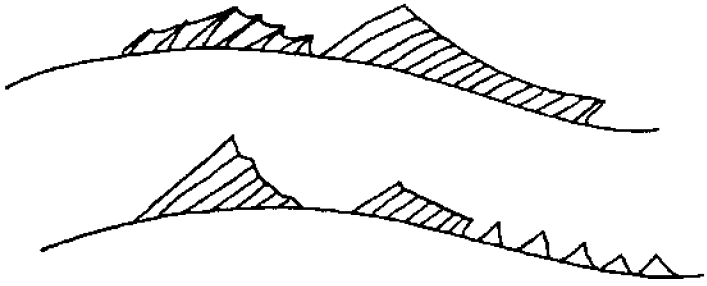
But sometimes it is hard to tell one fish from another fish just by its shape. Here are two fish. Can you tell them apart?



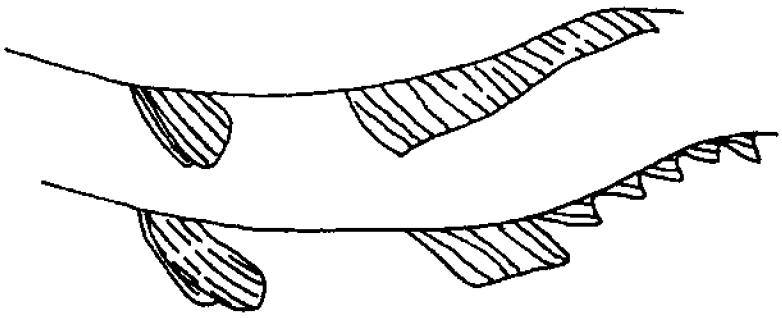
Now we have to look closely. Both fish have the same shape. But the fins are different What kinds of fins does a fish have?

Look at the tail fins. They are different, but not much.

Look at the top fins. They are different.



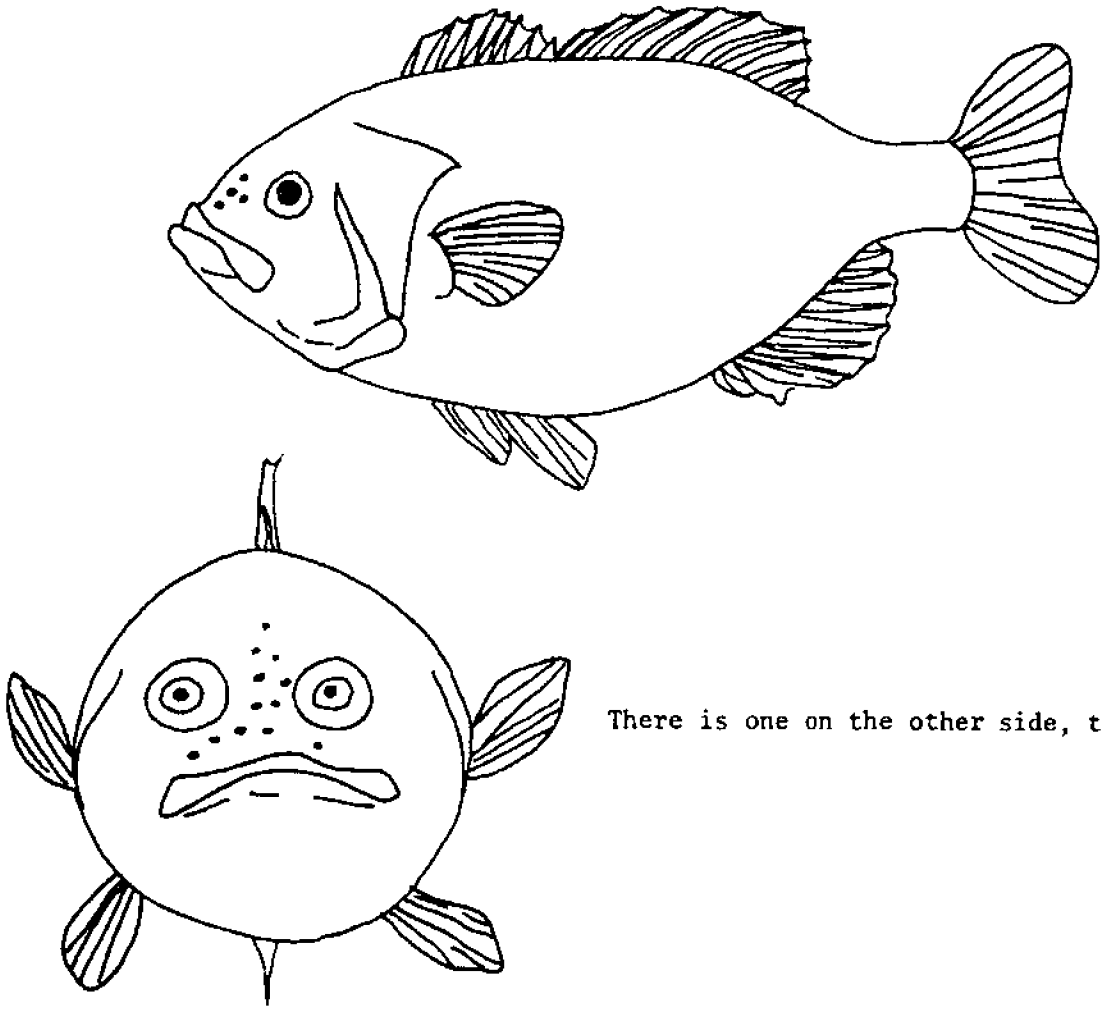
Look at the bottom fins. They are different.



Now we can tell the two fish apart.

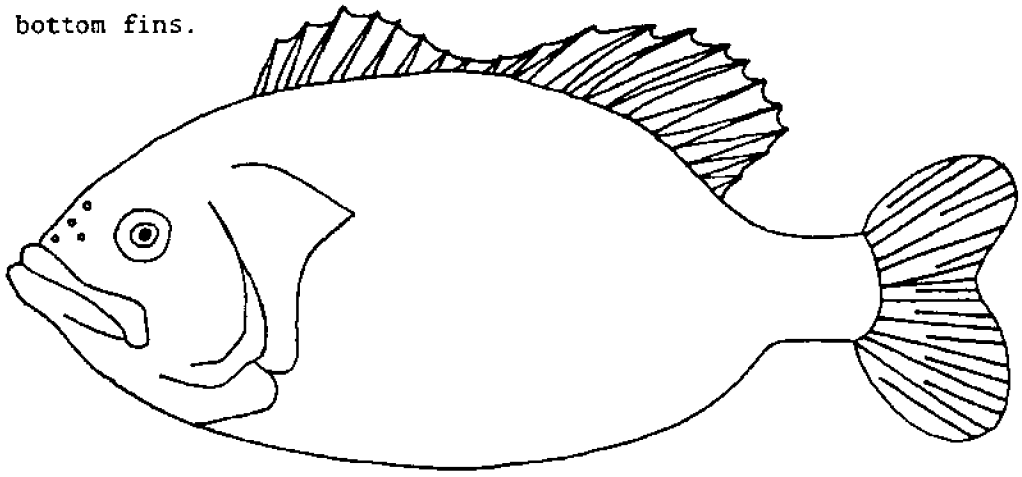
Look again.

Another fin has been added on the fishes' side, behind the eyes.

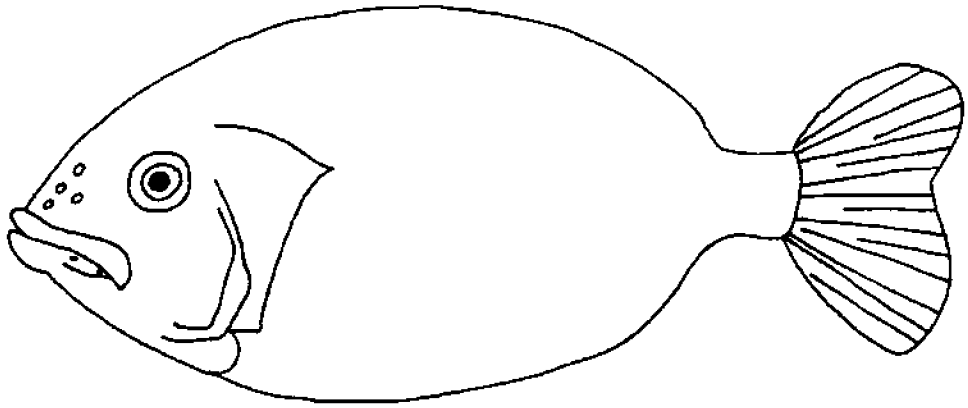


There is one on the other side, too.

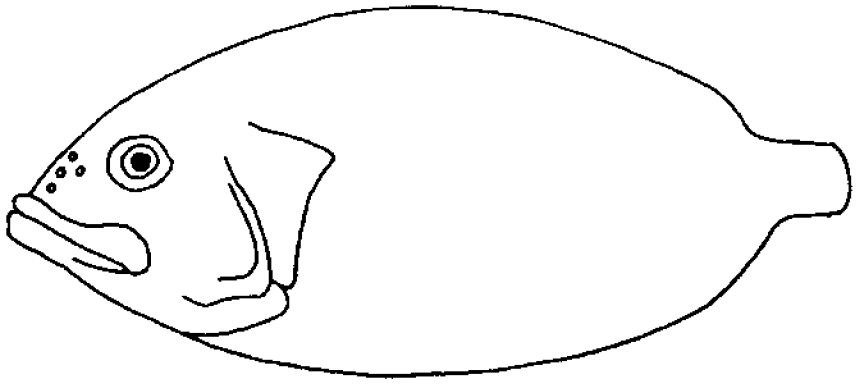
Fill in the bottom fins.



Fill in the top and bottom fins.



Fill in the top, bottom and tail fins.



Here is the same picture with something added.
Find the tail fin.

To sharpen observation skills try Gyotaku. Use two different fish and have the children make a gyotaku print of each. Follow up with a worksheet having the students fill in the top, bottom and tail fins of each fish that they made a print of.

GYOTAKU
Japanese Fish Printing

The techniques of Japanese fish printing has been used in Japan for over 100 years to record catches of sports fish and to gain ichthyological (fish biology) information. These prints have been used at the University of Washington to study how the physiology of a fish is related to its surface area.

The art of gyotaku (pronounced ghio-ta-koo) is a good way to gain an understanding and appreciation of the beauty and great variety of marine organisms. You can also use this technique for making prints of shells, rocks, flowers and other items.

Before you make a print, identify the fish. What are the distinguishing characteristics of the fish? Study the life history of the fish. Where and how was it caught?

Materials

Obtain a very fresh fish - flounders, bluegills, or rockfishes are good to study with. If you buy the fish at a market, select one that has bright red gills, clear eyes, and a fresh smell. If the fish has been gutted, make sure that it has not been cut anywhere else on the body.

You also need:

*newspaper

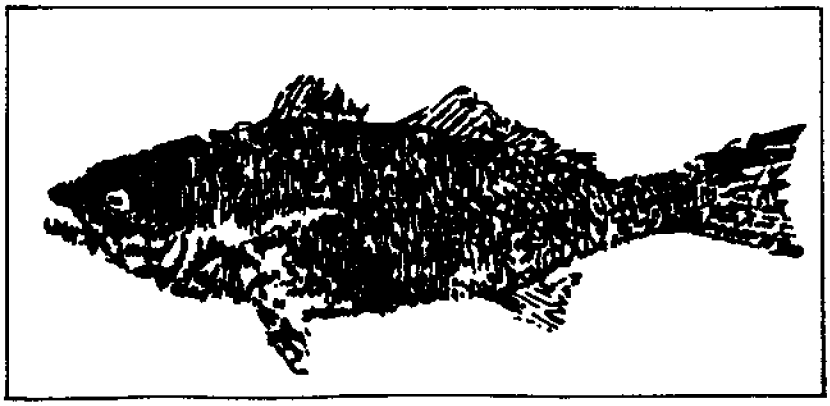
*plastic modeling clay

*pins

*water base ink (linoleum block ink is best)

*a stiff 1/2 inch brush

*a very small brush

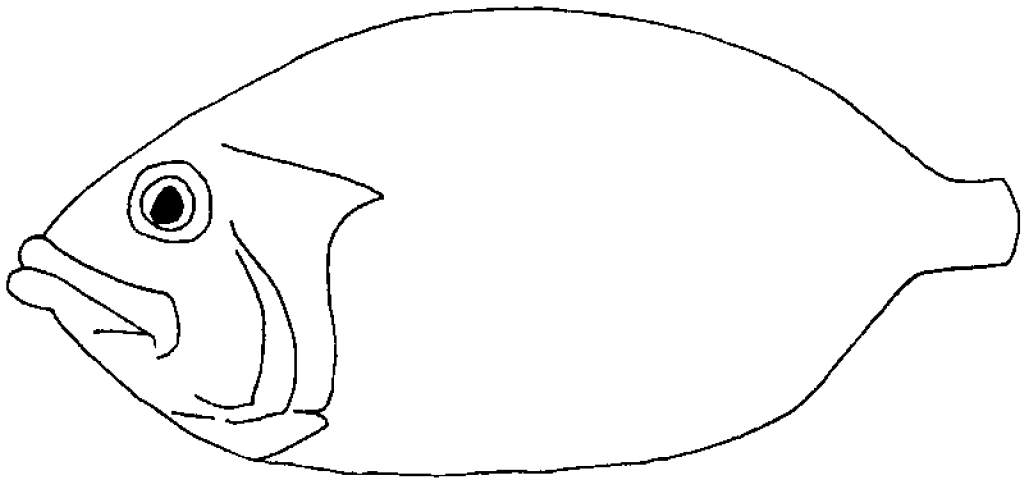


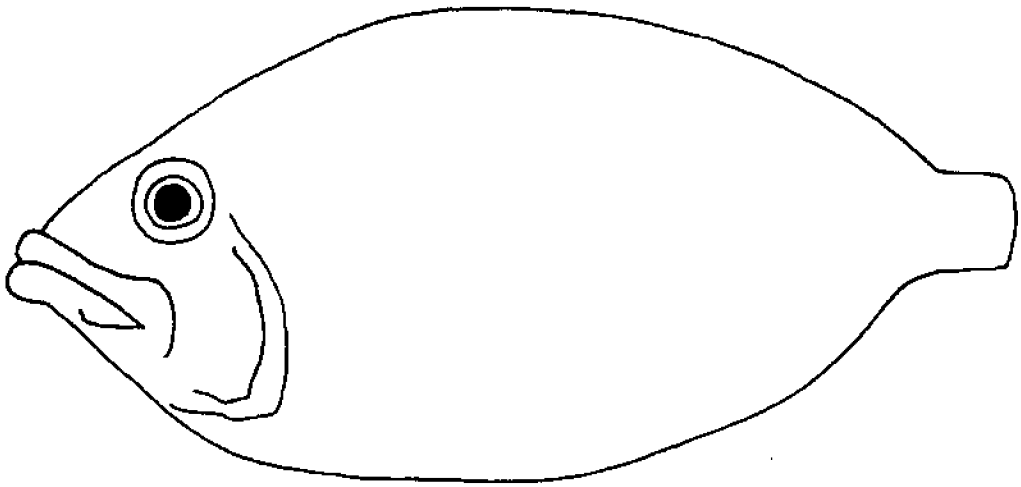
*rice paper, newsprint, or other moisture tolerant paper. Since rice paper is expensive, you might prefer to start with newsprint.

Method

1. Use soap and water to clean the outside of the fish as completely as possible. The cleaner the fish, the better the print. Dry the fish well.
2. Place the fish on a table covered with newspapers. Spread the fins out over some clay and pin them in this position. Continue to dry the fish.
3. Brush on a thin, even coat of ink. Leave the eye blank unless you prefer to fill it in.
4. Place a piece of newspaper or rice paper over the top of the fish.
5. Carefully lay the paper over the entire fish. Use your fingers to gently press the paper over the surface area of the fish. Be careful not to move the paper too much since this results in double prints. Then remove the paper and you have a fish print.
6. Use a small brush to paint the eye.

Complete each fish.





SHELLS - SENSORY AWARENESS

Ask the children to bring in any shells they may have. Let them handle them and have them observe the shells to become aware of size, shape, colors and designs.

Discussion questions:

1. Hold a shell, feel it. Is it smooth? Rough? Ridged? Grooved?
2. What color is the shell? Does it have spots, stripes, blotches of color?
3. Look at the edges of the openings. Do you see folds or ridges?

Have the children classify shells according to shape and then introduce them to the names: cone, cowrie, sea snails, triton, and miter.

CLASSIFYING SHELLS

CONE

The cone shell is shaped like an ice cream cone and is very colorful when cleaned. Some are poisonous; so all cones should be handled by the large end.

COWRIE

The cowries are very colorful and shiny shells. They are found under rocks and in holes.

SEA SNAILS

Sea snails live on rocks near the tide mark.

TRITONS

The Triton's trumpet are found in shallow water (smaller ones). They were used as horns.

MITER

The miter shells are colorful and live hidden under coral, in holes, on the reef and under sand.

USES OF SHELLS

Triton's trumpets and helmet shells were used as horns to call the villagers together or announce the coming of royalty.

Small cowries and Niihau shells were used for leis and bracelets. Cowries are also used as a lure for squid.

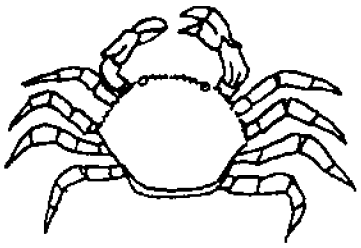
Fishermen also placed small shells in a calabash and tied it to a pole. When the fish bit the line, it would rattle the shells and warn the fisherman.

Hawaiians ate the flesh of cowries, tritons and opihis.

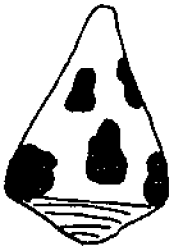
II. Tidepool inhabitants have various ways of protecting themselves.

POTENTIAL DANGEROUS ORGANISMS

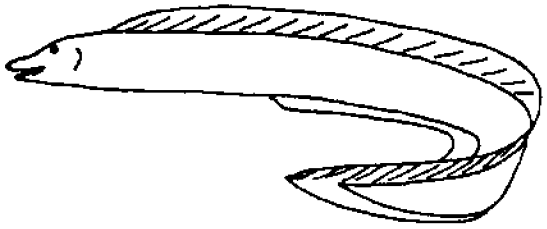
Corals - sharp or jagged surfaces often cause cuts.



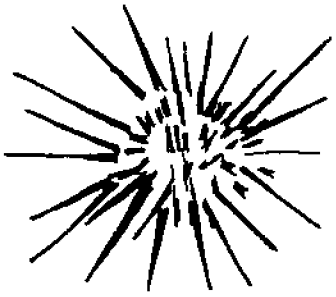
Crabs - pinchers can cause nasty cuts.



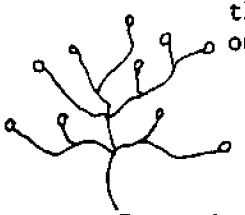
Cone shells - poisonous darts at tip.



Eels - though they usually shy away from you, there's a chance that they'll bite. Keep hands out of holes.



Wana - sharp needles causes great pain. Spines are poisonous.



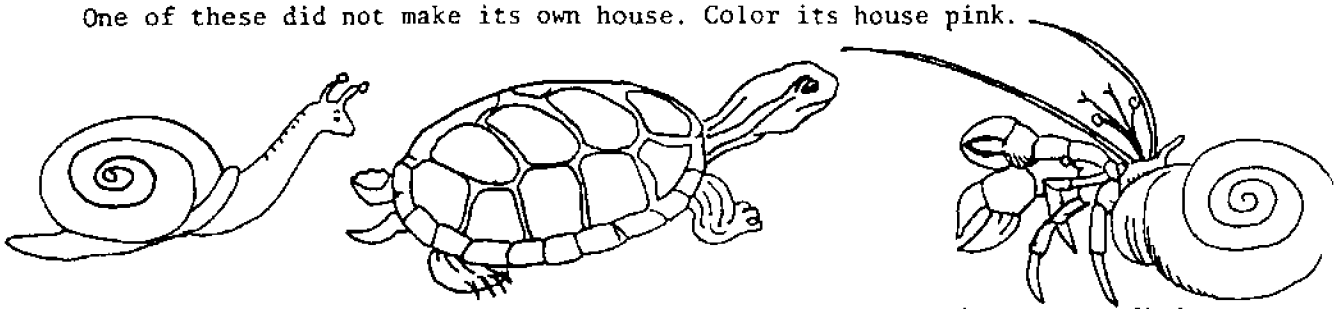
Pennaria - capable of inflicting a painful sting.

Sponges - bright colored sponges (red, blue, purple or yellow) are poisonous.

1. A sea urchin protects itself with its spines.
2. A starfish can regrow lost arms.
3. Squids shoot out ink to make a getaway.
4. Portuguese men-of-war sting.
5. Crabs are protected by claws and hard shells.
6. Cone shells have poisonous darts at the tips.

ANIMAL NESTS AND HOMES

One of these did not make its own house. Color its house pink.



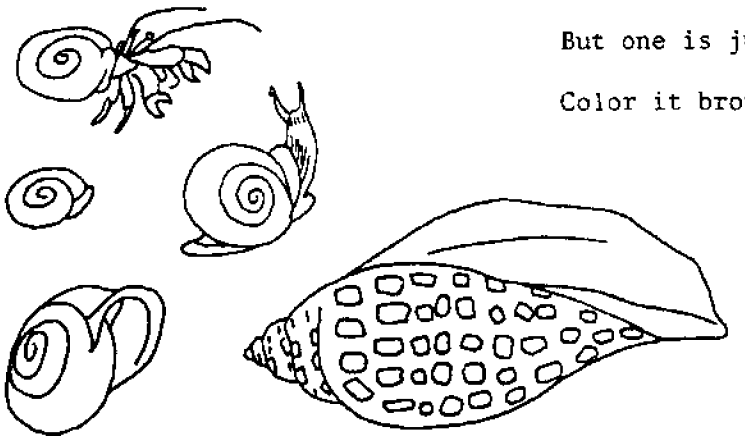
This little crab is looking for a new house. It finds these houses. One house is too small.

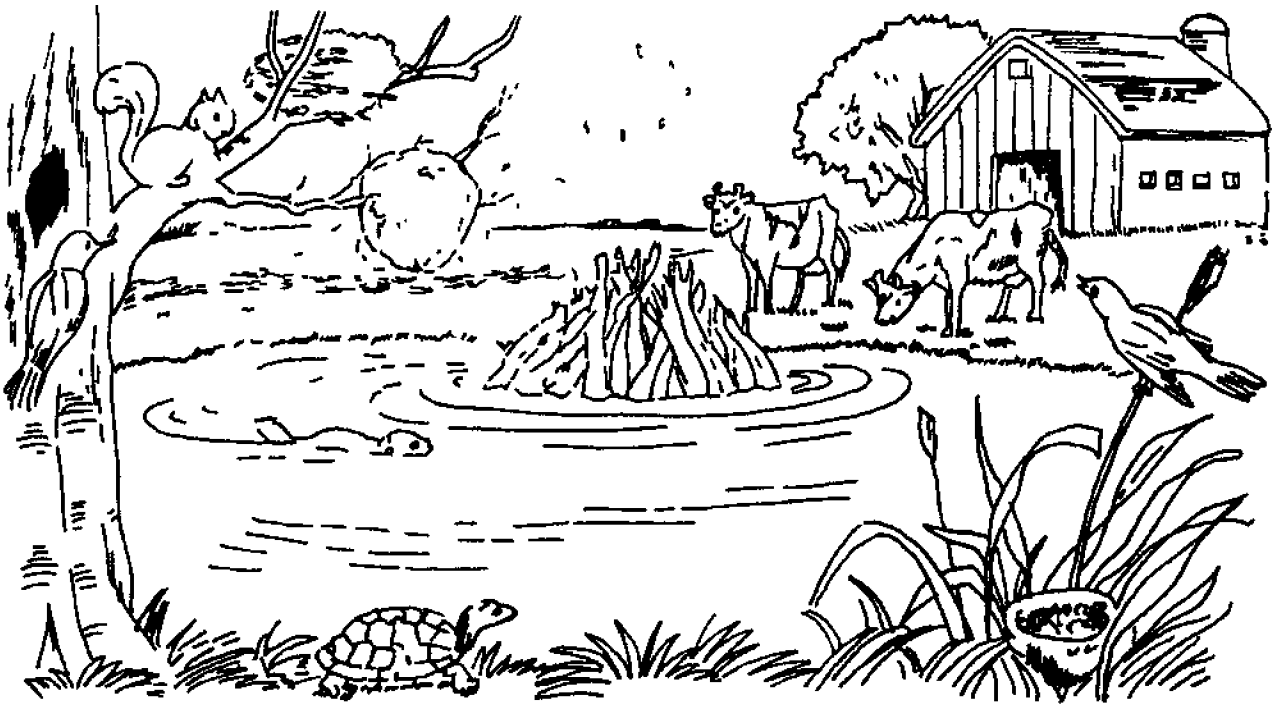
One is too big.

One is not empty.

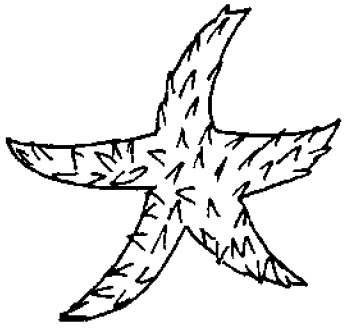
But one is just right.

Color it brown.

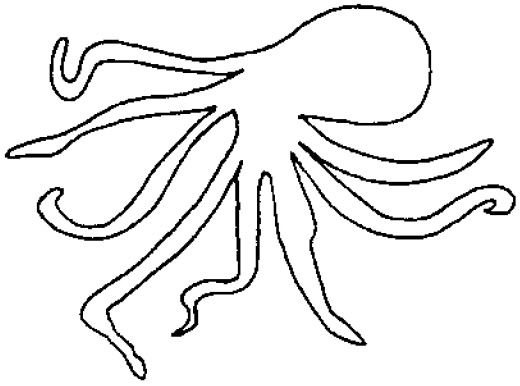




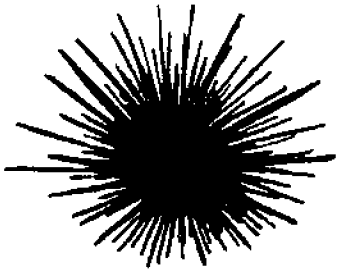
Circle the part of their bodies that these animals use to protect themselves. Or, draw what the animals do to protect themselves.



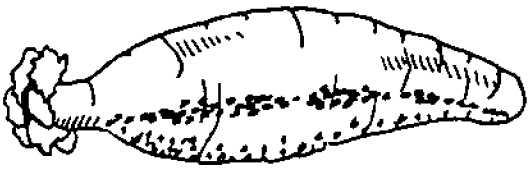
STARFISH



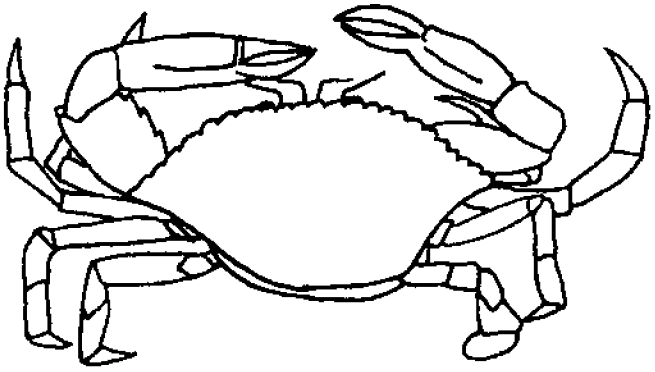
SQUID



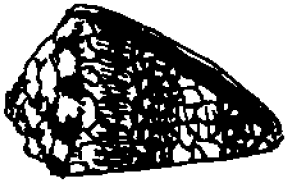
SEA URCHIN



SEA CUCUMBER



CRAB



CONE SHELL

CAMOUFLAGE

Camouflage is a way of hiding or disguising things with colors and patterns so they look like what's around them.

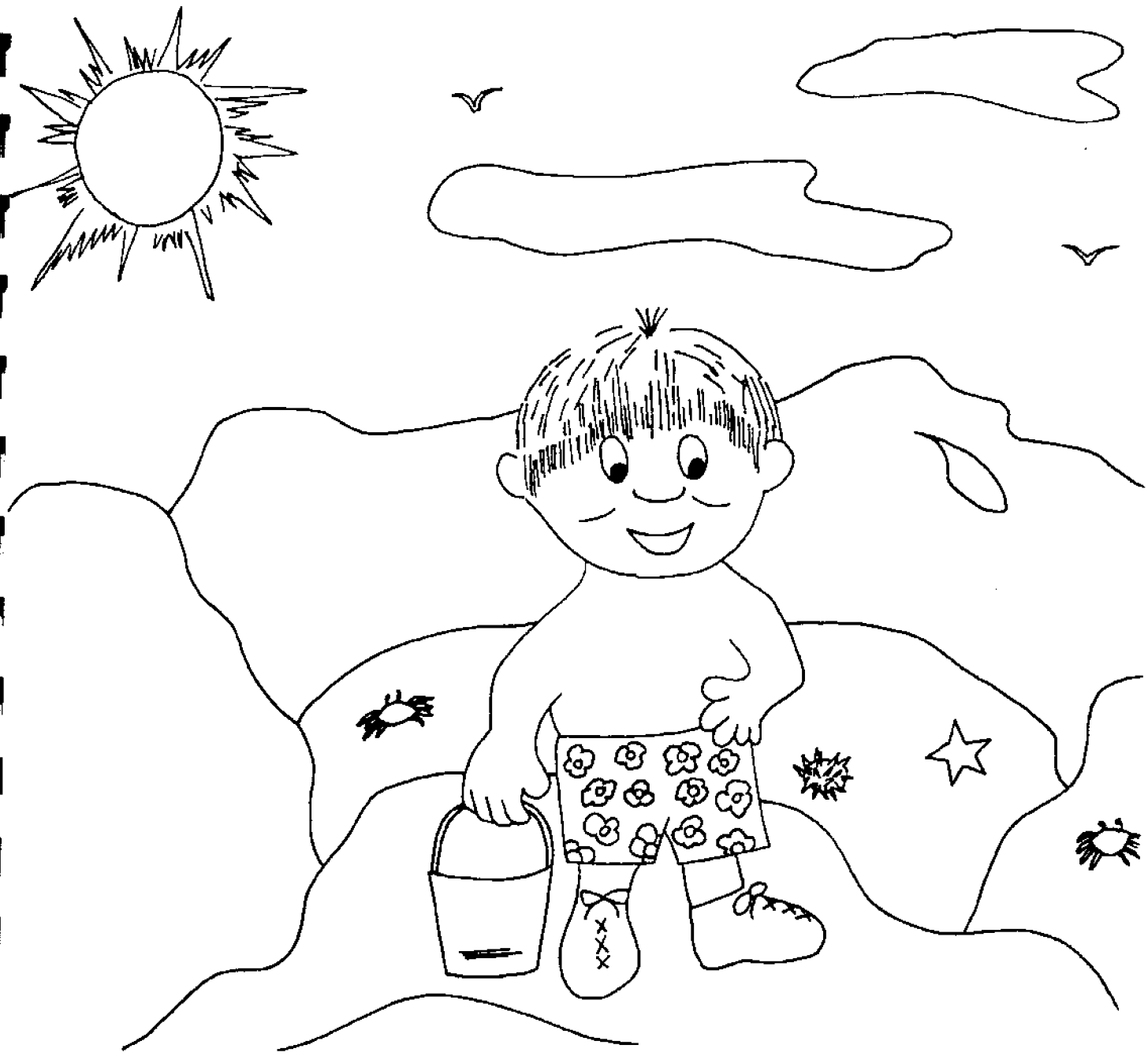
Crabs, starfish and sea cucumbers camouflage themselves for protection.

III. Safety rules must be practiced during tidepool field trips to insure a safe enjoyable experience.

As reinforcement and as a handwriting exercise have the children copy the following safety rules.

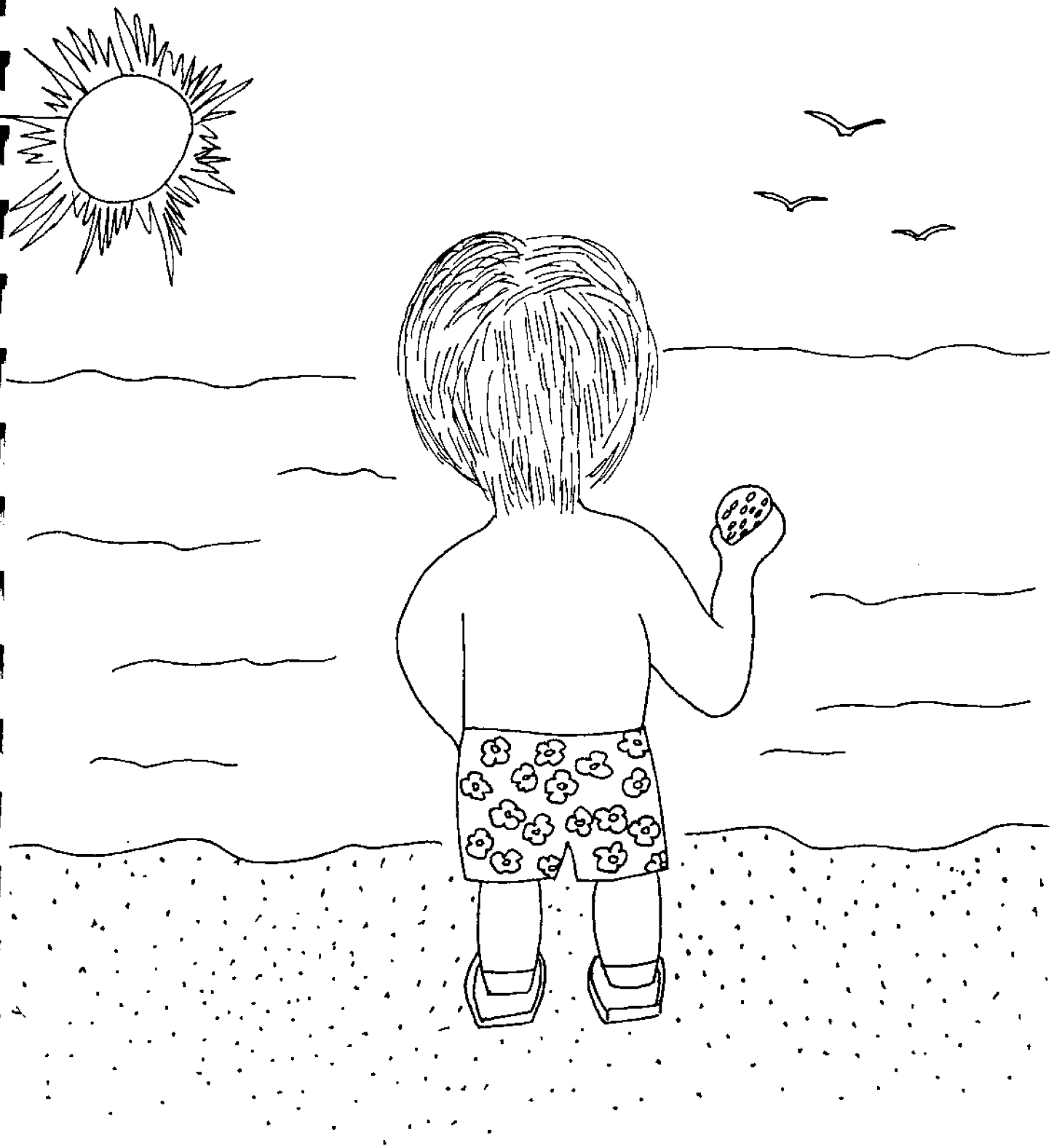
1. Stay with your group.
2. Always face the ocean.
3. Wear shoes and socks.
4. Turn rocks over away from you.
5. Don't put your hands in holes or under rocks.
6. Use tongs to pick things up.
7. Wear long pants.
8. Feel with your feet.

Compile the above list and the following colorsheets into a booklet.



"Hi! I'm Kimo and I have a few safety rules for you to follow when you're at the tidepools."

ways wear tennis shoes. Zoris and bare feet are a "no-no".



Always face the ocean as you work.

Don't put your hands in holes or under rocks.

IV. Tidepool animals deserve respect from tidepool visitors.

A. Tidepools are the home for various inhabitants.

B. The tidepool inhabitants may die if the tidepool is not left intact.

A story to share about hermit crabs from July 1978 issue of Ranger Rick.

FOR DISCUSSION: SO NEAR AND YET SO FAR

Imagine you are 100 steps from your home and you can only travel 20 steps in one day.

1. How would you feel?

2. What would you miss?

3. What might happen to you?

So what? When you release an animal away from where you found it the animals take a long time to get back home. Enemies (predators), hunger, fear are along the way. They may starve or be preyed upon.

So animals need rocks...and are helpless on sand...and may wash ashore on the next high tide.

FOR DISCUSSION: ROCKS

Imagine a giant took off your home and put it down in the next room.

1. What would it be like with no roof?

2. What would you do?

Animals make their homes under rocks.

1. They lay eggs there.

2. They hide under rocks.

3. They rest there.

4. They work hard to burrow and make their beds.

5. Eggs and babies get eaten when exposed.

After searching under rocks replace rock roofs exactly as they were found.

Remember to return living specimens to the same place where you found them.

Return rocks to their original positions as they often serve as homes for many living things.

Keep animals you collect in cool water and out of direct sunlight.

Don't litter the beach or ocean.

FOR DISCUSSION: CAN I HAVE MANGOES

How would you feel if: Some one asked you for some mangoes from your tree and you said, "okay"...and, he took the whole tree?

When picking seaweed pick a few branches, don't pull out the whole thing.

Seaweeds are food and shelter for animals.

V. Parents need to be oriented to tidepool safety rules and the various inhabitants of tidepools to reinforce their child's learning experience.

1. A parent orientation session together with the children the week of the fieldtrip could be arranged. At this time slides of the tidepool inhabitants could be shown.
2. Each parent could sit with his child and the student could share his tidepool booklet with his parent.

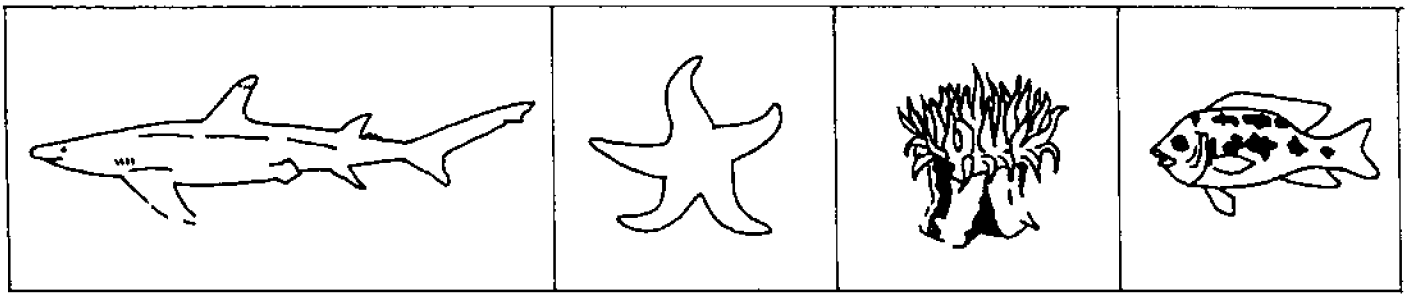
CULMINATING ACTIVITY - AN AQUARIUM VISIT

Visit the aquarium to observe and identify various animals that have been studied. The students will also be given an opportunity to handle and discuss various animals and how they protect themselves.

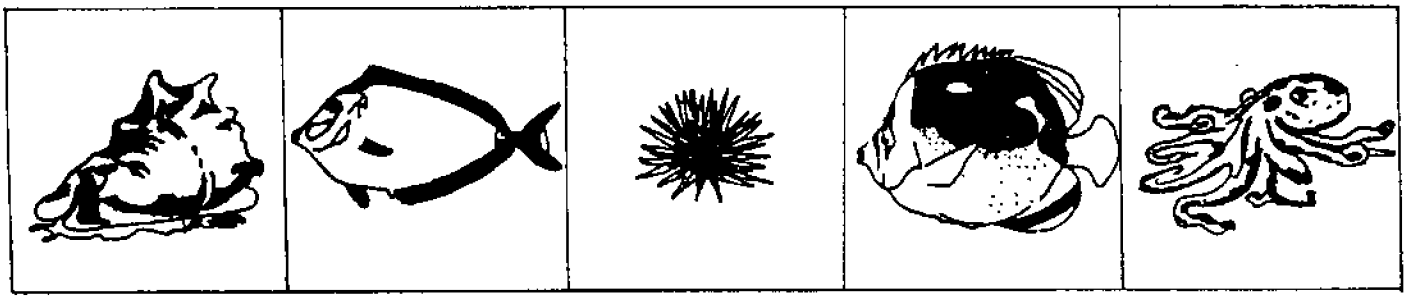
TOURING ACTIVITY

Can be reproduced for class use after tour

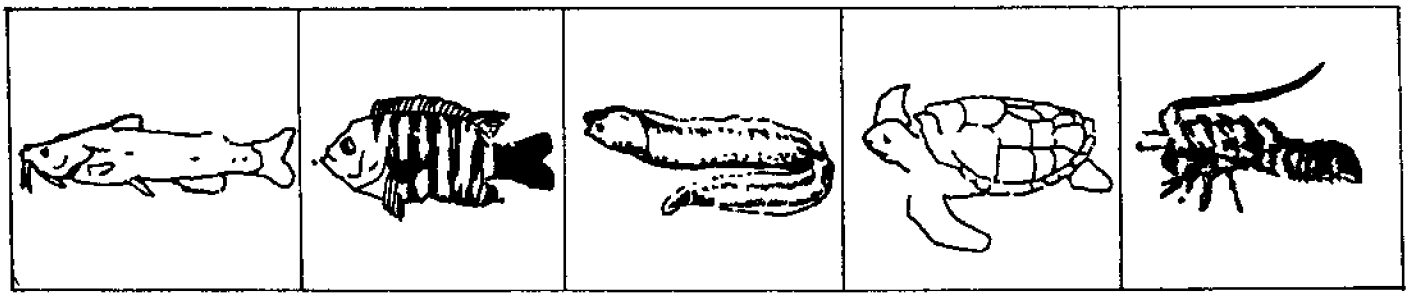
Circle the animals you can find



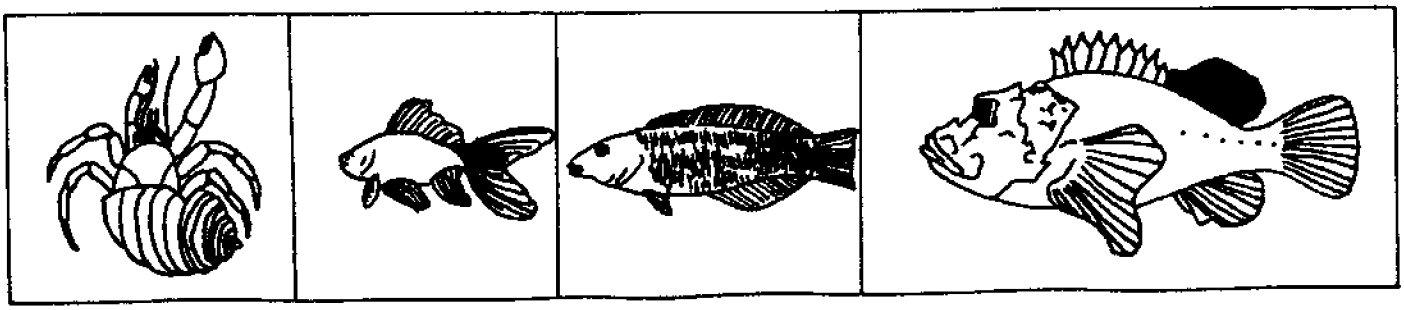
Shark | Starfish | Sea anemone | Tilapia



Helmet shell | Surgeonfish | Sea urchin | Butterflyfish | Octopus



Catfish | Damselfish | Moray eel | Sea turtle | Lobster



Name_____ Date_____

SEARCH - A - WORD

H	B	T	E	S	S	E	A	H	A	R	E	K	C	S
E	X	U	B	P	P	G	E	H	I	J	L	M	O	P
R	S	B	S	E	A	C	U	C	U	M	B	E	R	A
M	E	E	L	A	N	F	S	O	Q	R	S	N	A	G
I	A	W	K	D	I	N	T	W	U	V	P	O	L	H
T	C	O	N	F	S	F	I	R	E	W	O	R	M	E
C	U	R	M	C	H	C	D	E	Q	R	N	S	S	T
R	C	M	O	U	D	W	X	Y	O	P	G	T	E	T
A	U	Q	S	T	A	R	F	I	S	H	E	U	A	I
B	M	C	B	A	N	J	Z	N	Y	X	W	V	W	W
D	B	R	C	H	C	I	A	M	Z	D	C	A	E	O
F	E	A	T	H	E	R	D	U	S	T	E	R	E	R
E	R	B	F	G	R	K	L	B	C	Z	D	F	D	M

Seahare
Seacucumber
Spanish Dancer
Feather Duster
Tubeworm
Crab
Cowrey
Starfish
Spaghetti worm
Fire worm
Sponge
Coral
Hermit Crab
Seaweed

STUDENT ACTIVITY

Make a diorama of a tidepool and include the tidepool creatures you observed. Use a facial tissue box or a shoe box.

Grade Two

OBJECTIVES

1. Identifies recreational opportunities in the marine environment.
2. Names ways of conserving shoreline resources.
3. Identifies the two main groups of animals.
4. Defines predator--prey by giving two examples of each.
5. Describes some ways animals protect themselves from predators.
6. Names two kinds of plankton.
7. Describes the sea's food chain.
8. Lists some safety rules for tidepooling.

PRE- AND POST-TEST
GRADE 2

1. Name three ways we can keep the sea safe and clean for others to enjoy and use. Draw a line under the best answers.

   Turn over all the rocks you can find.

   Put rubbish where it belongs.

   Put animals back where you found them.

   Use chopsticks on soft-bodied animals.

   Catch or take only what you need.

   Take all the seaweeds you want.

2. Name the two main groups of animals. Choose from the Word List and write in the correct word.

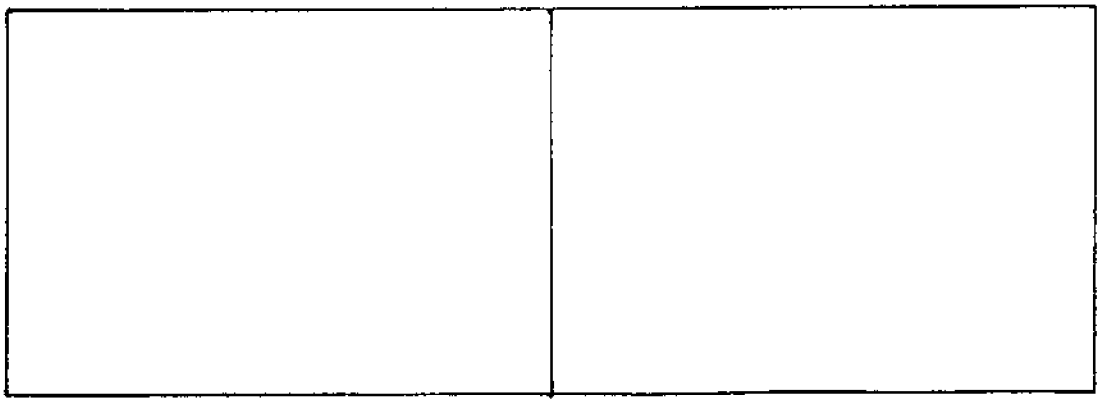
   Animals with _____. (vertebrates)

   Animals without_____. (invertebrates)

WORD LIST

mollusks plankton backbones

3. Draw one kind of animal from each group.



vertebrate **invertebrate**

4. What is a predator? Draw a line under the best answer.

   Tiny plants that live in the ocean.

   It helps the sun make food.

   Larger animals that eat smaller plants or animals.

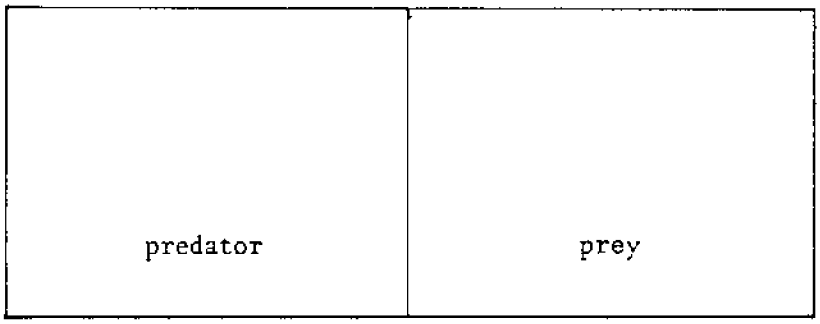
5. What is a prey? Draw a line under the best answer.

   A way to keep the ocean clean.

   Small plants or animals eaten by larger animals.

   A piece of cake.

6. Draw an example of a predator and its prey.



7. What is plankton? Draw a line under the best answer.

   A new kind of boat.

   A new way of spelling.

   Very tiny plants or animals in the ocean.

8. Plankton needs _____ to grow. Choose the correct word from the list and write it on the blank space.

   sunlight animals flowers leaves

9. Name the two kinds of plankton. Draw a line under the best answer.

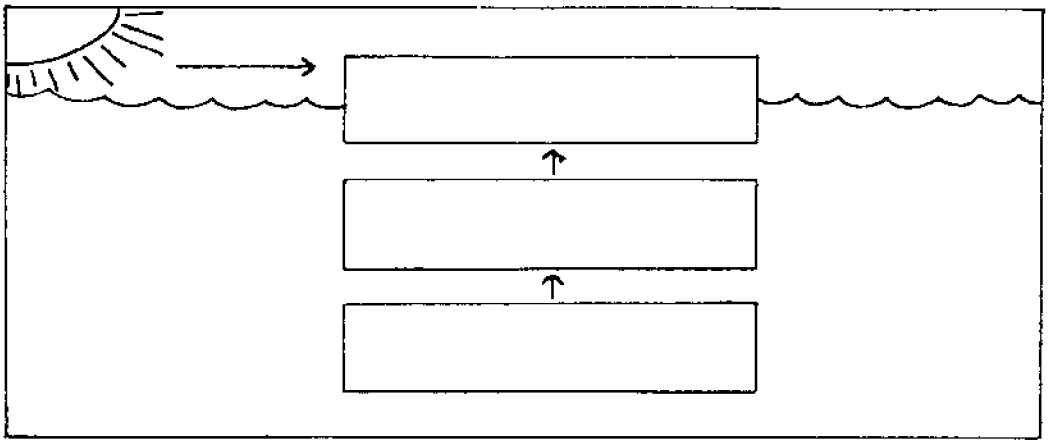
   plant plankton (phytoplankton)

   animal plankton (zooplankton)

   sea cucumber plankton

   flatworm plankton

10. Draw the sea's food chain.



Put the words in the correct boxes.

large animals plant plankton animal plankton

11. Draw a line from the animal to how it protects itself from predators.

shark	changes colors
jellyfish	hides in caves or holes
eel	has sharp spines
sea urchin	swims in schools
squid	uses ink cloud
	has sharp teeth, rough skin
	stings

12. Name three ways we can have fun using the ocean. Draw a line under the best answers.

skating bicycling sailing

fishing surfing singing

13. Choose three safety rules for tidepooling. Draw a line under the best answers.

wear shoes with socks

wear slippers

run

wear long pants

turn your back to the waves

wear shorts

put your hands in holes

watch out for deep holes

OCEAN

DIFFERENCES BETWEEN SEA WATER AND TAP WATER

Problem: Comparing sea water and tap water emphasizing properties, awareness, and appreciation of sea water.

Materials:

sea water (or salt water)

tap water

peanut butter jars or equivalent (two jars) per small group of students)

newspapers or old cloth for desks or tables

Discussion Questions:

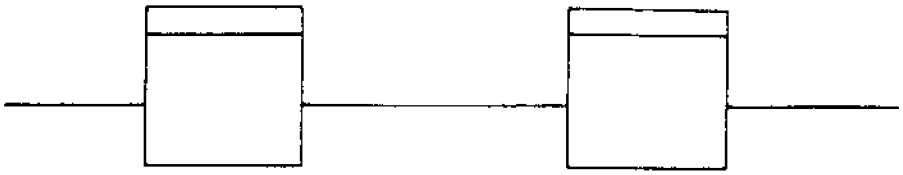
1. Do you like the "feel" of water?
2. Which do you like better, sea water or tap water?
3. What do we use fresh water for? (drink, wash, bathe, cook, gardens, swim, etc.)
4. What do we use sea water for? (swim, aquariums, fishing, ships, etc.)

Student Activities:

1. To observe the two containers of water (one of sea water, the other of tap water).
2. Can the students tell which is the sea, which is the tap water?

Suggested Procedures:

1. Divide students into groups of three or four.
2. Give two jars to each group--one containing sea water, the other tap water. (Mark jars in some way so only teacher knows which is which).



two unmarked jars; one containing fresh water, the other sea water.

3. Look at, smell, feel, taste the two waters to see if there is a difference between the two types of water. Before this activity, have students predict whether there is a difference between the two types of water.

NOTE ABOUT TASTING SEA WATER: Sea water which passes the health requirements for swimming is probably safe enough to dip one small finger in to taste a few drops. An added precaution, if desired, is to boil sea water for about ten minutes the day before the class. Let it stand to cool to room temperature or keep it in the refrigerator.

Suggested procedures continued:

4. To test for hearing through water, have the students press an ear against one side of a jar of water while someone taps the other side of the same jar.

Discussion Questions:

1. What differences did you find in the looks, smell, taste, and sounds of the two waters?
2. What do you think causes the differences between the two waters?
3. What would our world be like if we had no ocean?

(no seashore, no sea animals, etc.)

4. Should we take care of our water and our oceans? Why? How can we take care of our water?

5. What should we not do to our water and oceans?

Activity: Draw a picture of what the world would be like without the oceans.

TEACHER BACKGROUND INFORMATION: Odors of sea water are related to its many organic inclusions as well as to the various salts it contains.

WAYS THE OCEAN HELPS US--ENJOYING THE SEA

Discuss: What are some ways in which the ocean helps us? (medicine like iodine, food from fishes, fertilizer from kelp, etc.)

1. List on board as class gives ideas.
2. SAY: These are some ways of having fun with the sea around us: boating or sailing, scuba diving, snorkling, can you think of other ways? (surfing, fishing, etc.) Also list on board as class gives suggestions.

Activity: Find pictures or draw, color, cut and paste ways the ocean helps us, how we enjoy the sea.

1. Divide class into groups of five.
2. Each group will find pictures or draw, color, cut and paste on large sheet of oaktag ways to enjoy the ocean or ways the ocean helps us.
3. Emphasize the need for cooperation when working in a group--sharing, etc.

Optional Activity:

1. What is your favorite way of enjoying the sea? Write a sentence about it and draw a picture showing how you have fun in the sea.

HELPING OTHERS ENJOY THE SEA

Discuss: Can you think of some ways we can help others continue to enjoy the sea? List as many ways as you can think of. Here is a start: 1) put litter in its place, 2) catch only what you need, 3) put rocks back exactly where you found them.

List above on board, pass paper out to class to list their own ideas for a few minutes.

Have class discussion as volunteers give ideas from what they wrote down. Teacher continues to list on board.

Activity: Make a booklet of ways we can help others enjoy the sea.

1. Have class illustrate each helping rule. Make sure rule is written on the sheet of paper.
2. Design, color, chalk, or paint cover for booklet.

Suggested Helping Rules:

1. Put rocks back where you found them.
2. Put litter in its place.
3. Catch only what you need.
4. Return animals where you found them.
5. Do not take whole seaweed, take "branches."
6. Do not remove animals growing on rocks like oysters and tunicates because they can't be put back.
7. Do not toss or throw animals.
8. Do not keep animals in pails for more than two minutes--change the water or let them go.
9. Release animals as close to where you found them.

10. Be careful and gentle when turning rocks over.
11. Do not use chopsticks on soft-bodied animals like flatworms, nudibranchs, etc.
12. Remove animals with sucking feet gently like sea stars, sea cucumbers, etc.

WATER POLLUTION

"Recipe for Polluting the Ocean"

Vocabulary: Pollution

Problem: Are our oceans becoming polluted?

Materials:

paper	water
tin cans	big dish pan
oil	pieces of glass
food coloring (chemicals)	

Procedure:

1. Tell class dish pan represents ocean.
2. Throw papers in the dishpan. Tell class this represents all the paper people throw in streams, rivers, oceans (like cardboard boxes to sandwich wrappers).
3. Throw in a few tin cans.
4. Toss in glass. This represents broken bottles, crockery, dishes that people toss in the ocean.
5. Add food coloring. This represents industrial chemicals, sewage disposal, etc.
6. Ask: "Would you like to swim in this 'ocean'?"
7. Ask: "Can fish live in this 'ocean'?"

Results: Water in dish pan becomes dirtier and dirtier, more and more polluted.

Supplemental Information: Oceans becoming more polluted. As our oceans

become more polluted, fish supplies become limited. The population continues to increase and so does the need for more food.

Thought Question: How can we stop polluting the oceans?

Discuss and list ideas on board.

Activity: Creating posters for stopping the pollution of the oceans.

Creating Posters:

1. Think of one way we can stop polluting the oceans and create a poster. (Use crayons, chalk or poster paint). Share when completed, display around room.
2. Class can work in groups of two to four and make joint poster project.

   Discuss, share when completed.
3. Small group (two to four) may role-play ways of stopping the polluting of our oceans. More ambitious groups may want to create skits.

KINDS OF LIFE IN THE OCEAN

ANIMALS WITH BACKBONES (VERTEBRATES)

Background Information: The other group of animals have a backbone or spine. In this group you will find fishes, reptiles (like sea turtles and sea snakes), and mammals.

Mammals are born alive, feed their babies milk, have hair to keep their bodies warm, and have a large brain.

Some mammals are:

whales	sea lions
dolphins and porpoises	walruses
seals	

Some animals in the fish group with backbones are:

sharks	skates
rays	bony fishes

Whales, dolphins, and porpoises are mammals like we are, eat fish and small plants in the sea, are very intelligent, and cannot live on land.

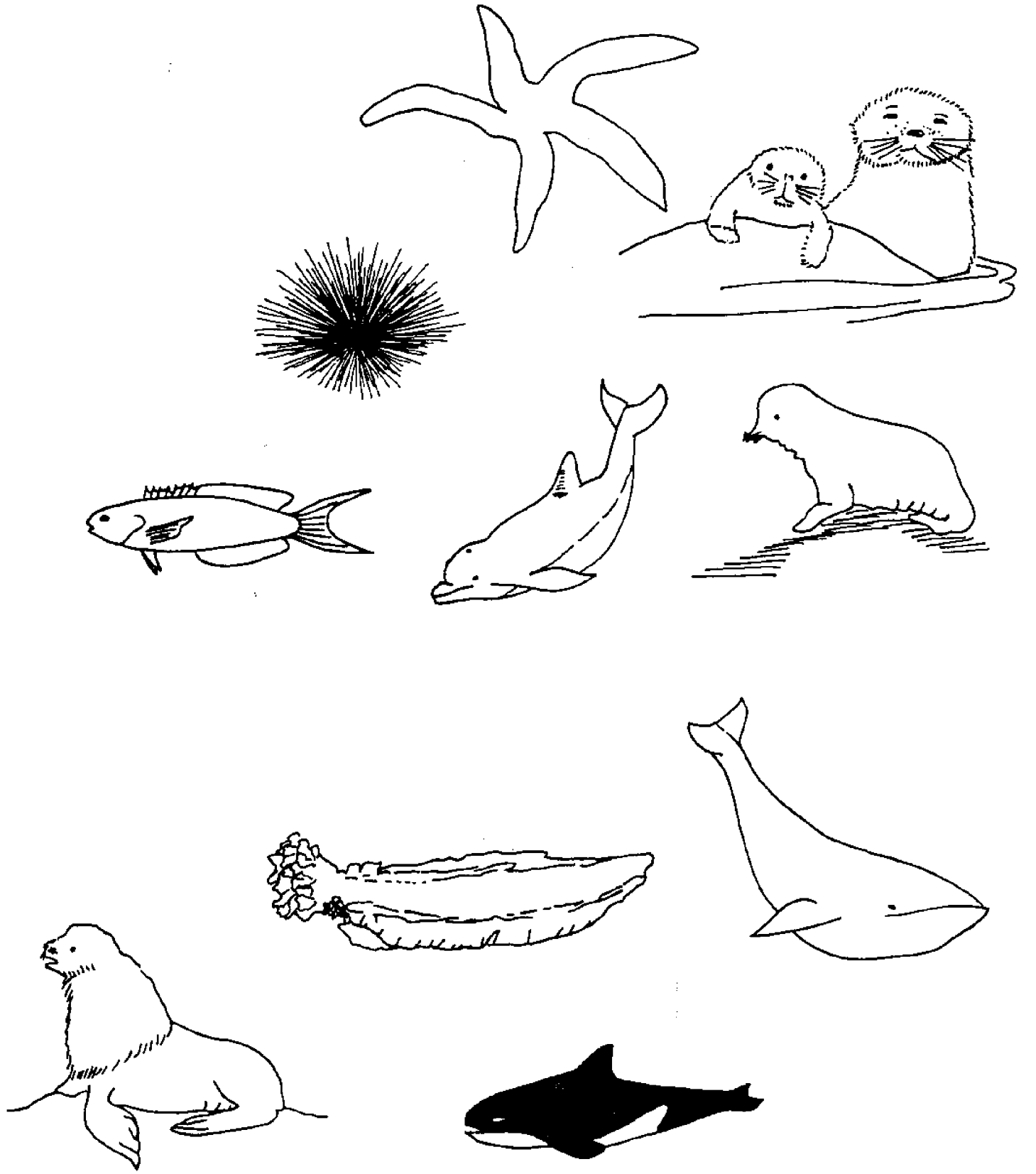
Whales are the largest animals ever to live on the Earth, are disappearing because we hunt them, don't hurt man.

Activity: Class may divide up into three groups and make a mural about vertebrates. Three groups would be "Vertebrate Fishes," "Vertebrate Reptiles", and "Vertebrate Mammals".

Do worksheet on VERTEBRATES.

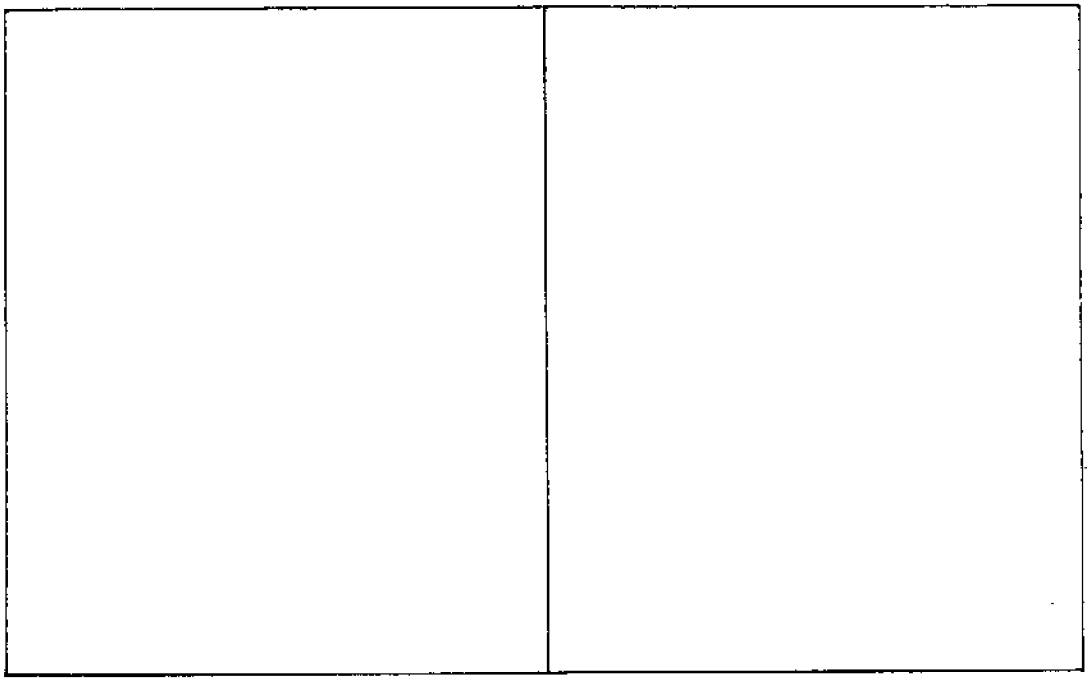
WORKSHEET--ANIMALS WITH BACKBONES

Color the animals with backbones. (Vertebrates)

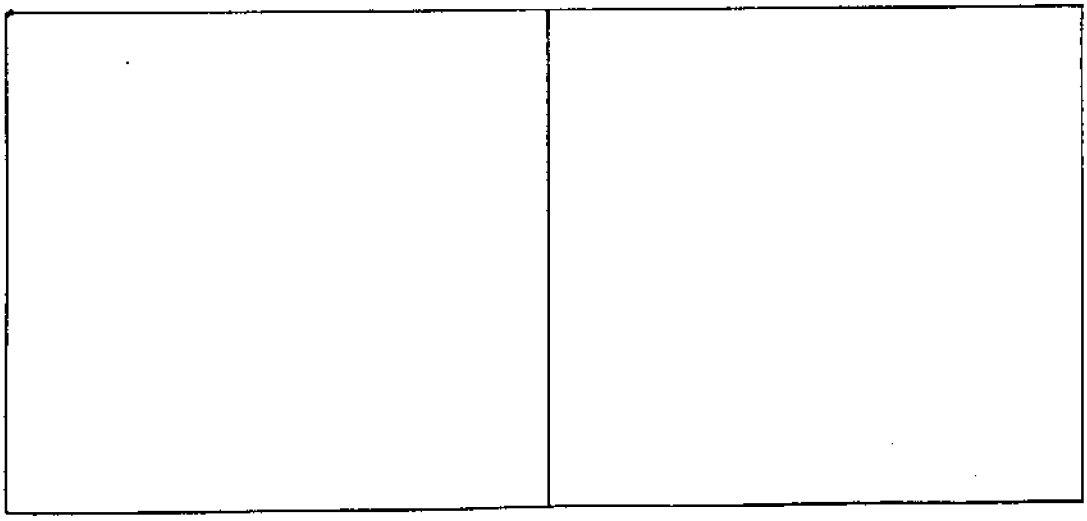


WORKSHEET--ANIMALS WITH BACKBONES (VERTEBRATES)

Draw two pictures of a sea mammal (vertebrate).



Draw two animals from the fish group of vertebrates (animals with backbones).



ANIMALS WITHOUT BACKBONES (INVERTEBRATES)

Background Information: Most animals can be divided into two kinds of groups. One group is made up of animals without a backbone or a skeleton inside of their bodies.

Another word for backbone is spine.

Animals without backbones or a skeleton inside their bodies are called invertebrates. (It is not necessary for the students to learn the word invertebrates, but you may want to introduce them to the term).

INVERTEBRATES: "Can you think of some animals without backbones?"

oyster	sea urchin	clam
snail	sponge	scallop
octopus	jellyfish	squid
starfish	sea cucumber	sea anemone

Discuss above question and add to list from students' suggestions.

Activity: Class draws or finds pictures of animals without backbones and pastes them on a mural entitled "Animals Without Backbones" or "Invertebrates" or whatever title class suggests.

Mural may be the length of the room or bulletin board size.

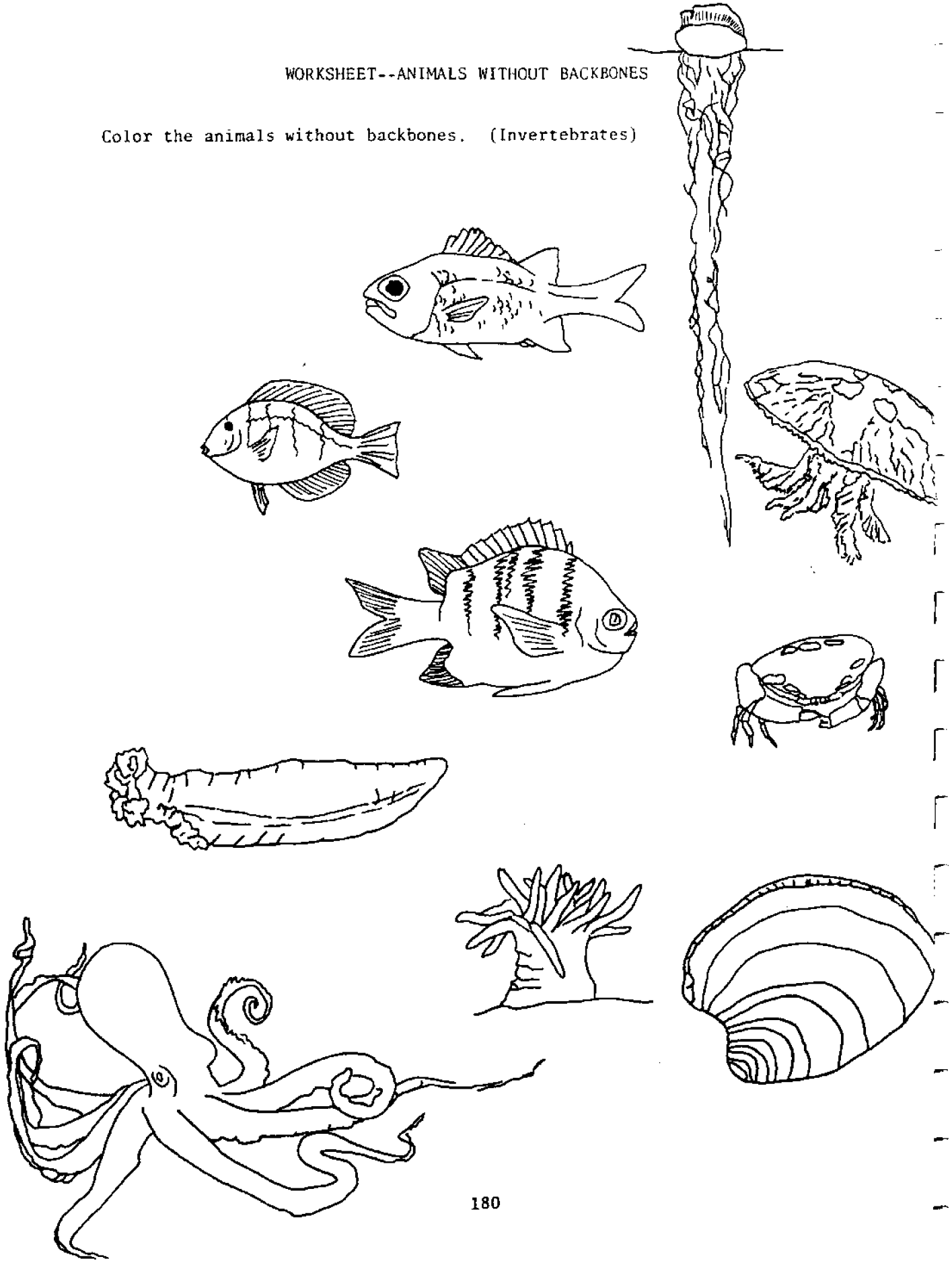
Background Information: Some animals without backbones, like crabs and shells, have "skeletons" outside their bodies. Their skeletons are the hard outer coverings on their bodies.

Can you think of other animals that have hard shells on their bodies besides crabs and shells? (shrimp, lobster)

Activity: Do worksheet on INVERTEBRATES.

WORKSHEET--ANIMALS WITHOUT BACKBONES

Color the animals without backbones. (Invertebrates)



WORKSHEET--ANIMALS WITHOUT BACKBONES (INVERTEBRATES)

Most animals can be divided into two groups. One group is made up of animals without a _ _ _ _ _ _ _ _ or a skeleton inside their bodies.

Here is a list of animals without backbones. Can you think of four more?

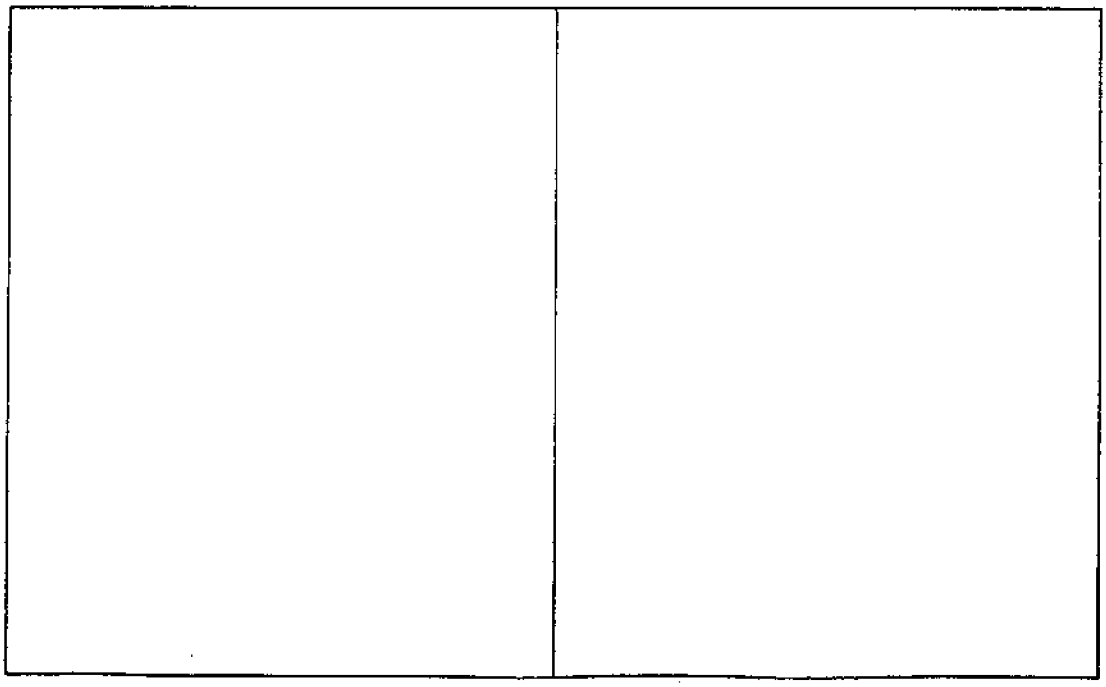
oyster	clam	sea urchin
snail	scallop	squid
octopus	jellyfish	Portuguese man-of-war

1. _____ 3. _____

2. _____ 4. _____

Some animals have "skeletons" outside their bodies. Their skeletons are the hard shells on their bodies.

Draw two animals without backbones but have hard shells on their bodies.



FOOD CHAIN

Background Information: All life in the sea needs sunlight to help make plankton (which means "drifter" because plankton drift in the ocean).

Plankton are so small that a magnifying glass or microscope is is needed to see them.

There are two kinds of plankton:

1. phytoplankton ("plant" plankton)--very tiny plants that are eaten by
2. zooplankton ("animal" plankton)--animals like the jellyfish, Portuguese man-of-war, fishes, and squids.

Larger animals like seals, sea lions, porpoises, sharks, whales eat the zooplankton.

Activity: Do worksheet on Food Chain.

1. Set up two charts: "Phytoplankton" or may use term "Plant plankton"; other chart labeled "Animal plankton" or "Zooplankton". Class contributes pictures to paste on charts.
2. Game: Like "King and Queen" with board erasers. "Phytoplankton" vs. "Zooplankton".

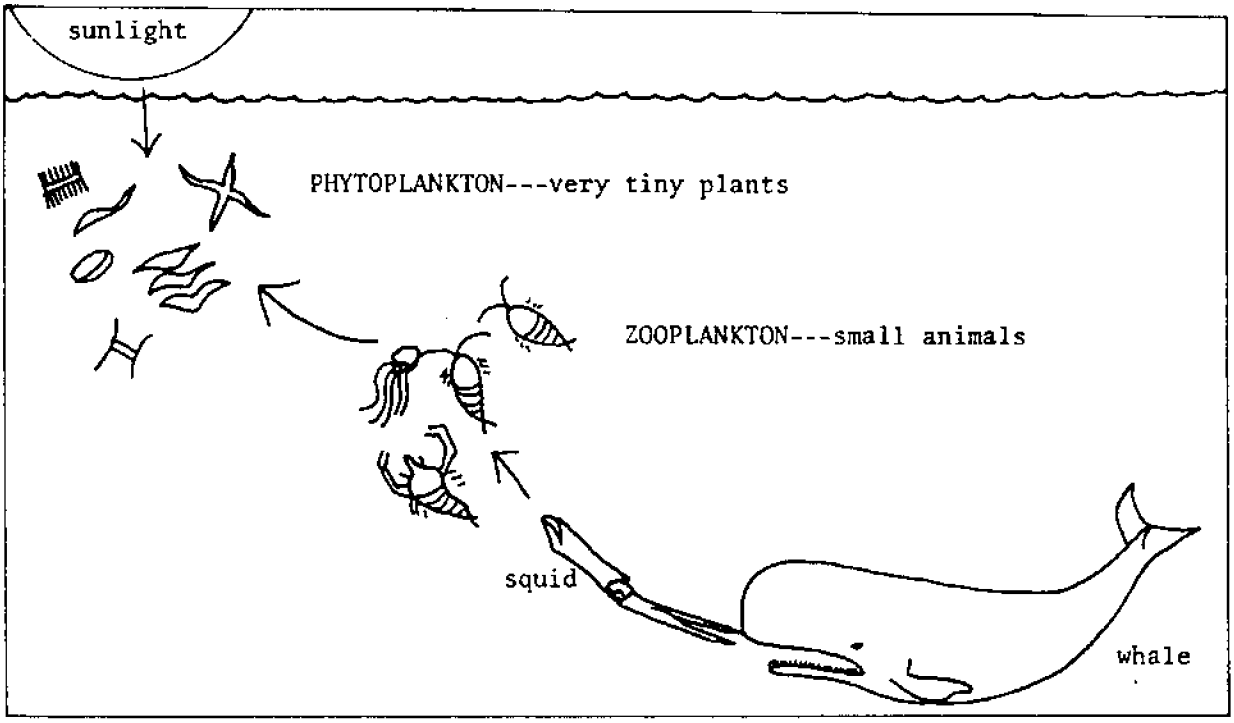
WORKSHEET--FOOD CHAIN

1. All life in the sea needs s _ _ _ _ _ _ t to make plankton (tiny plants in the sea).
2. Plankton means d _ _ _ _ _ r because these tiny plants go from place to place in the ocean.
3. Two kinds of plankton are:
   a. zoo_ _ _ _ _ _ _ _
   b. phyto_ _ _ _ _ _ _ _
4. Name two kinds of zooplankton (animal plankton) that eat phytoplankton (plant plankton).
   a. _____
   b. _____

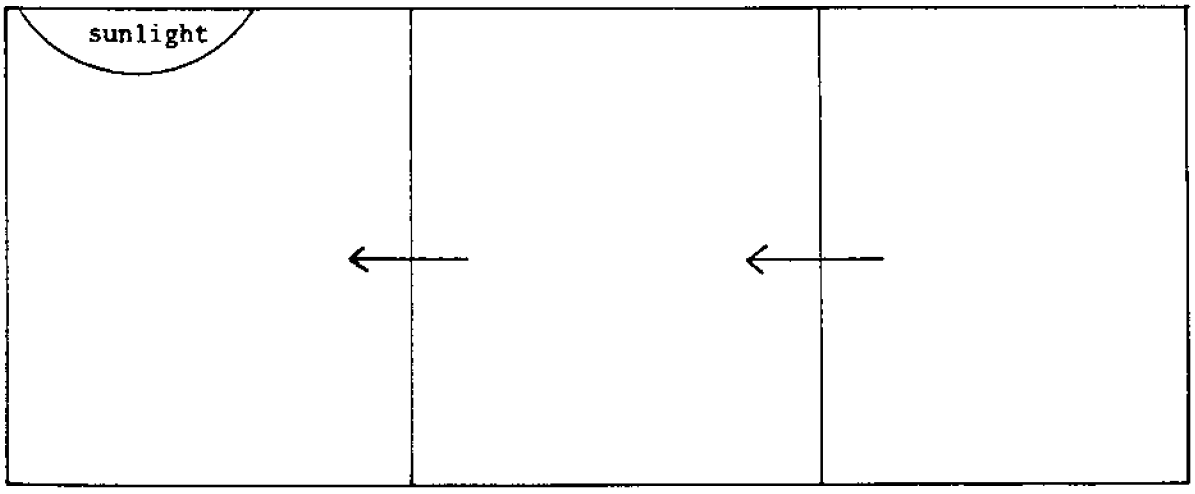
OR

Draw two kinds of zooplankton (animal plankton) that eat phytoplankton (plant plankton).

WORKSHEET--FOOD CHAIN



Make your own drawing of the Food Chain.



PHYTOPLANKTON ← ZOOPLANKTON ← LARGER SEA ANIMALS

(tiny plants) (small animals)

PREDATOR--PREY

PREDATOR--large animals looking for food.

PREY--small animals or plants that larger animals will eat.

Life in the sea is eat (predator) or be eaten (prey).

Discuss Question: Can you think of some examples of where a larger animal will eat a smaller animal or plant?

Two headings on board: PREDATOR PREY

List examples as class gives suggestions.

Activity: Pass out papers for class to draw an example of predator--prey.

Mount pictures on bulletin board appropriately labeled.

(Stress sea animals in a predator-prey situation.)

Discuss, do predator-prey worksheet.

Game: "Predator-Prey" ("King and Queen")

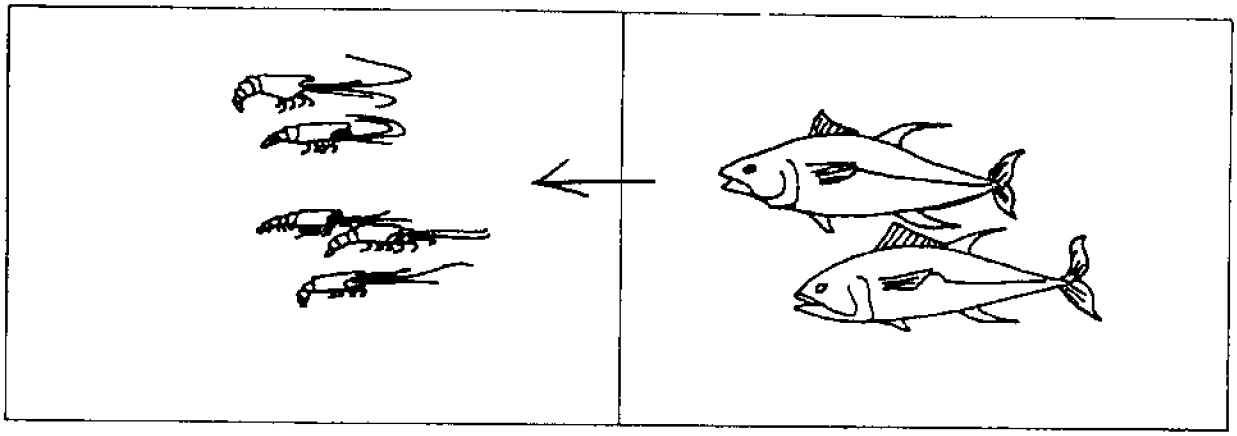
Predator chases prey.

One child will be "seal" for example; other child will be "fish" and chase is on. Game leader or teacher can call out two new predator-prey to switch chasing roles.

WORKSHEET--PREDATOR-PREY

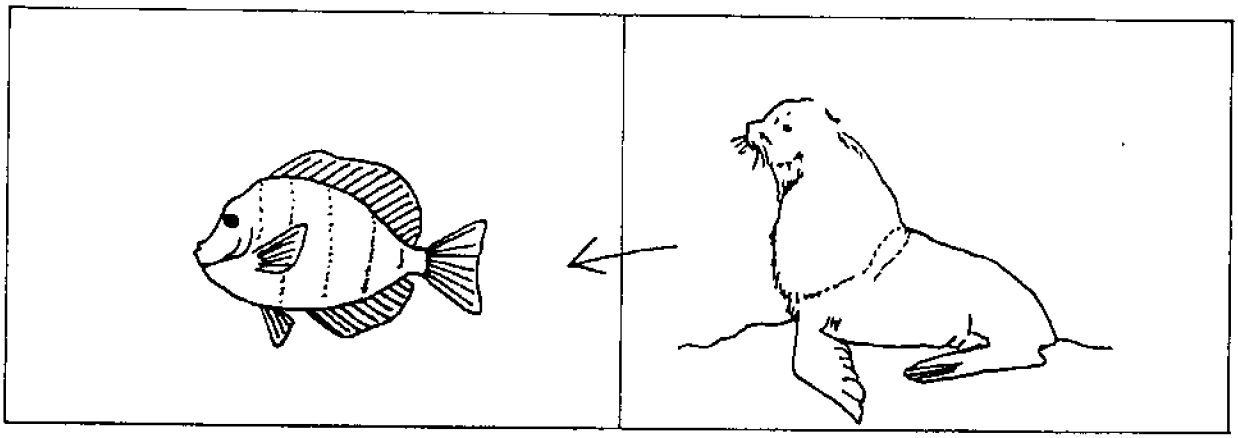
PREY

PREDATOR



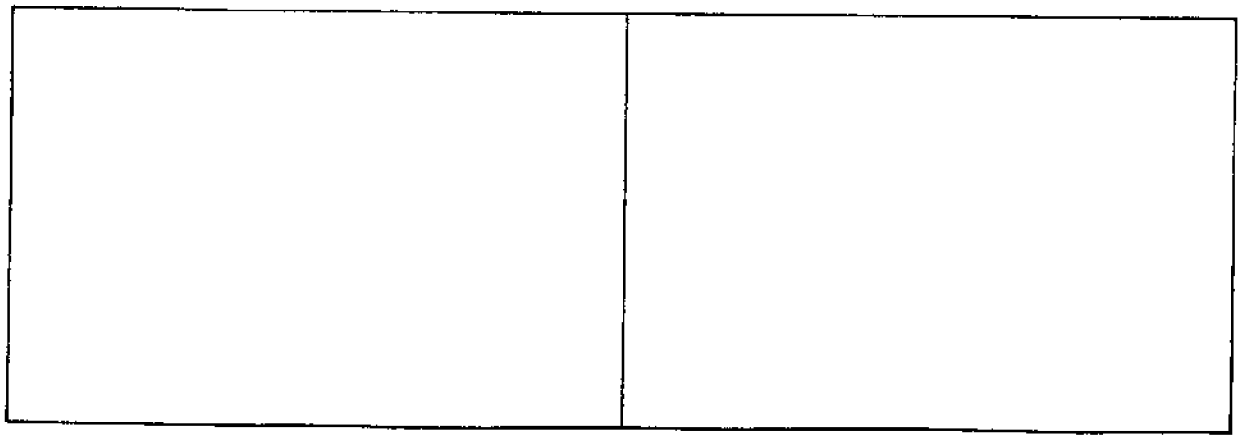
PREY

PREDATOR



PREY

PREDATOR



Draw your own predator--prey picture.

METHODS OF PROTECTION FROM PREDATORS

Background Information:

Small animals need ways to protect themselves from larger animals.

1. One way is through camouflage--hiding by changing color, shape or form. ("masking" is the term for changing form)

   COLOR--Fish, shrimps, squid, octopus are able to change their color to match their surroundings.

   SHAPE--The shape of some animals helps them to look like their surroundings so it's hard to see them.

   FORM--attaching algae, sponges or anemones to disguise the body of the animal. Crabs do this.

2. Animals (fish) also swim in large groups ("schools") to frighten away predators. (Share story Swimmy--scaring predator away.)

3. Using an ink cloud (squid or octopus) to hide an escape.

4. The teeth and jaws of some animals protect them. Example would be sharks and barracudas.

5. Hiding in caves and holes as lobsters and moray eels do. They come out to eat at night.

6. Certain animals have hard outer coverings like shells, rough skins, or scales. Oysters and clams have hard shells, fish scales help protect them, and sharks and certain starfish have tough skins. Also, some fish and sea urchins have sharp spines that poke.

7. Stinging is another way animals protect themselves like the

sea anemone, fire coral, jellyfish, Portuguese man-of-war.

Cone shells can also sting if picked up at the narrow end.

Activity: Make booklet illustrating the different ways animals protect themselves. Design cover, think of title.

Do worksheet "Animals Protect Themselves"

WORKSHEET--ANIMALS PROTECT THEMSELVES

Use the words from the WORD LIST below to help you answer the questions.

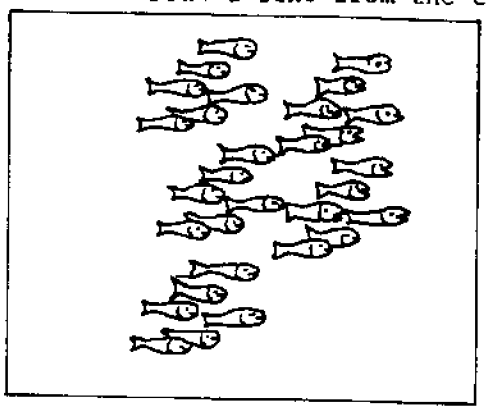
WORD LIST

camouflage	teeth and jaws	stinging
schools	caves and holes	color
ink cloud	hard outer coverings	shape

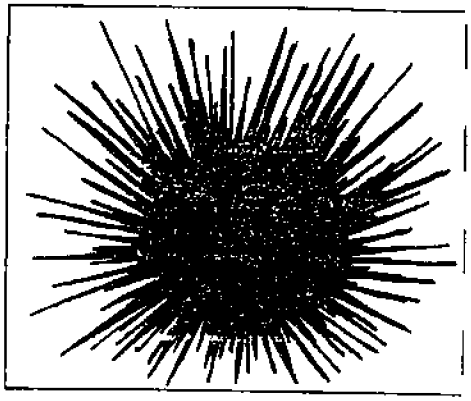
1. Hiding by changing color, shape, or form is called c _ _ _ _ _ _ _ _ e.
2. Jellyfish and Portuguese man-of-war protect themselves by s _ _ _ _ _ _ g.
3. H _ _ d o _ _ _ r c _ _ _ _ _ _ _ s like shells, rough skins, or scales also help certain animals.
4. A squid or octopus will use an i _ k c _ _ _ d to escape.
5. Lobsters and eels hide in c _ _ _ s and h _ _ _ s.
6. Sharks and barracudas have sharp t _ _ _ h and j _ _ s to help them.
7. Some fish swim in large groups called s _ _ _ _ _ s to scare away predators.
8. Fish, shrimps, squid, and octopus can change their c _ _ _ r to match where they are hiding.
9. Some animals can change their s _ _ _ e to look like where they are hiding.

WORKSHEET--ANIMALS PROTECT THEMSELVES

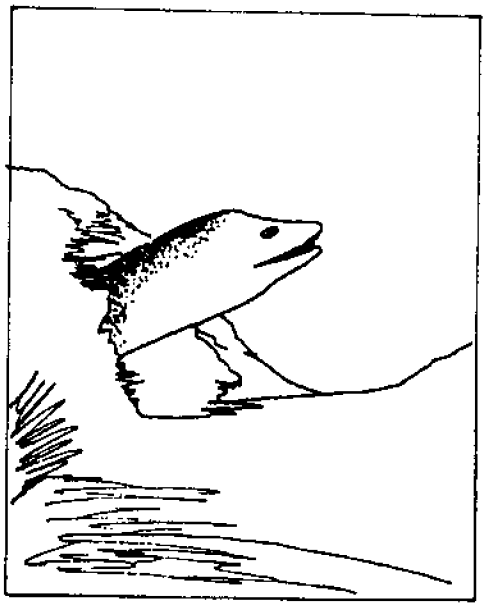
Draw a line from the correct word to the correct picture.



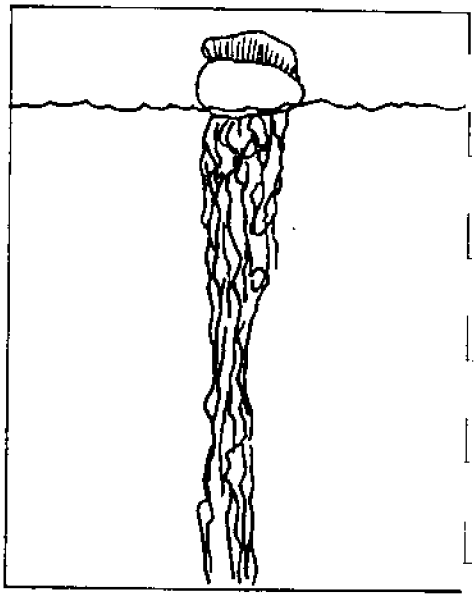
hard shells



ink cloud

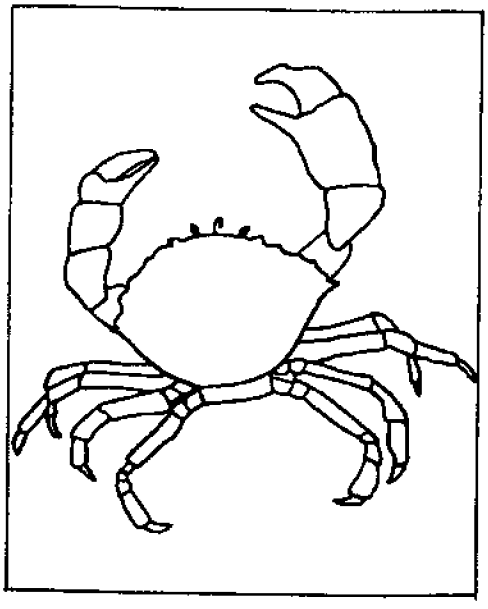


sharp spines

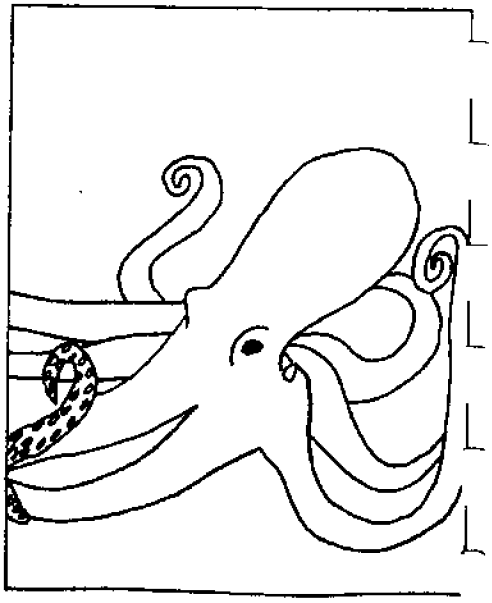


schools

caves and holes



stinging



TIDEPOOLING

THINGS YOU CAN FIND AT A TIDEPOOL (SHORELINE COMMUNITIES)

:ground Information: Things to Watch Out for

:uss:

1. Sea urchin, or wana--sharp pointed spines that can pierce your skin and break off. The long black spined wana has poisonous spines.
2. Coral--cuts can be serious if not cleaned out well.
3. Cone shells--pick them up by the wide, flat end or they can sting with a poison dart.
4. Eels, or puhi--don't poke a hand or toe into their holes or bother them.
5. Portuguese man-of-war--tentacles will sting.

also Dangerous Marine Organisms of Hawaii by Athline M. Clark.

:r things you may find at a tidepool.

1. Limu (algae or seaweed) found in Hawaii were used by ancient Hawaiians as part of their diet.

   QUESTION: What shapes, sizes, colors of seaweeds grow in tidepools?

   1. Are they growing in deep water, shallow water, or out of water?
   2. Do seaweeds grow in clumps? in patches? Feel them. Are they stiff? limp? slippery?
   3. What colors are they? (green, brown, red, other shades)

ivity: Pressing Seaweeds--see Colleen Murakami's hand-out

1. make stationery and note cards

2. pictures

3. bookmarks--laminated seaweeds on paper mounting.

Directions for pressing seaweeds can also be found in the Hawaii Nature Study Program, Reef and Shore by Sister Edna Louise Demanche under the heading "Mounting Seaweeds", pages 26-29.

Activity: SEAWEED RECIPES page 32, Hawaii Nature Study Program, Reef and Shore.

Activity: "Can I Have Mangoes?"

Discuss how you would feel if someone asked you for some mangoes and they took the whole tree.

When picking seaweed, pick a few "branches", not the whole thing. Seaweeds are food and shelter for animals.

Think of other seaweed recipes. (Limu soup? fried sargassum? tempura seaweed? besides ogo, poki, etc.)

Things you may find at a tidepool continued...(checklist to draw, color to answers questions.)

2. Sea urchins--what different sizes and colors will you find? What other animals live with or near the urchin?

3. Brittle star--are brittle stars all the same size? What color are they? How many arms do they have? Where can you find brittle stars? swimming in the water? hiding under rocks? in the sand? on the dry beach? Do brittle stars live alone or several together? What other plants and other animals live near brittle stars? Do brittle stars move fast or slow? How do they use their arms in moving?

4. Sea cucumbers--Where do you find sea cucumbers? Are they on the bare rocks? among seaweeds? in the sand? on top of the sand? in the mud? What color are they? When you pick up a sea cucumber what comes out?

Other reef animals are sponges, flatworms, feather worms, fire worms, spaghetti worms, sea squirts. Illustrations and descriptions can be found in the Hawaii Nature Study Program, Reef and Shore, pages 174-175.

PRESSING SEAWEEDS

Things you need:

Seaweed---all kinds

4" x 4" pieces of cloth (fine-grained). Lining material excellent.

Stiff paper---index cards, unlined. Botany filler paper is excellent.

Large bowl or baking pan with water

Sponge or paper towels

Phone books (old), magazines, comics, newspaper

Board (about 8 1/2 x 11)---optional

I. For stiff seaweed like "Ogo"

A. Select a branch that you like---pretty shape/unusual/"I like it".

B. Arrange it on a 4" x 4" cloth.

C. Cover it with 4" x 4" cloth.

D. Place it in phone book, magazine, comic, or sheets of newspaper. Four of these will fit on a page. Skip about 50 pages before putting in more.

E. Place on hard surface. Cover with 8 1/2 x 11 board (optional).

F. Place heavy weight on phone book. Set of encyclopedias fine.

G. Next day: change the phone book. (leave 4" x 4" paper, cloth, and seaweed together)

H. After about a week---remove cloth and admire your work.

II. For soft, fine, lacy, or stringy seaweeds

Do the same as above except for these changes:

A. Select by floating seaweed in fresh water in a pan/bowl.

B. Arrange in fresh water---and immerse the 4" x 4" paper under

the seaweed. Gently lift paper with seaweed on it. If you don't like the arrangement simply dip it all back in water and try again.

C. Cover with 4" x 4" cloth. Press down with sponge or paper towel to remove most of the water.

D.
↓ Same as above
H.

See next page for mounting into cards, stationery---

MOUNTING YOUR SEAWEEDS TO MAKE STATIONERY

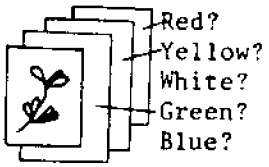
1. Trim, or crop, your 4" x 4" pressed seaweed---so it "looks nice".

(a)  too high? too left? → 

(b)  too centered? → 

(c)  too much? Cut it in half... or use only a corner...etc.

2. Match your trimmed material to colored paper so it "looks nice".

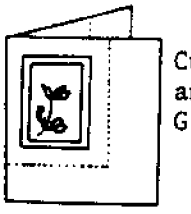


Select two colors - 1. one for the border and 2. one for the stationery.

3. Cut your border. Place trimmed material on colored "border" paper. Cut border about 1/8" larger. Then, glue.

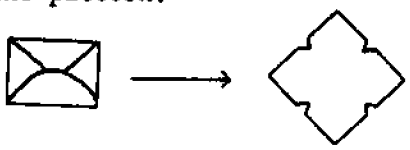
4. Inside the card you can neatly print or type:

(Grateloupia, a Hawaiian Red Seaweed)



Put your initials or "han" in corner.

5. Envelopes can be made by taking apart the "right sized" envelope to get the pattern.



6. Use the card! Write to Grandma! To schools far away! Make your own variations to this!

TIDEPOOLING CHECKLIST

Draw and color to answer questions.

SEAWEED

What shapes, sizes, colors of seaweeds grow in tidepools?

Are they growing in deep water, shallow water, out of water?

Do seaweeds grow in clumps? in patches?

Are they stiff? limp? slippery?

What colors are they? Were they green, brown, red, other colors?

SEA URCHINS

What different sizes and colors did you find?

What other animals live with or near the sea urchin?

SEA CUCUMBERS

Where do you find sea cucumbers? on bare rocks? among seaweeds? in the sand? on top of the sand? in the mud?

What color ar they?

When you pick up a sea cucumber what comes out?

BRITTLE STAR--Draw and color to help answer the questions.

Are brittle stars all the same size?

What color are they?

How may arms do they have?

Where can you find brittle stars? swimming in the water? hiding under rocks? in the sand? on the dry beach?

Do brittle stars live alone or several together?

What other plants and animals live near brittle stars?

Do brittle stars move fast or slow?

How do they use their arms in moving?

Activity: Imagine you are 100 steps from home but you can only travel 20 steps in one day. How would you feel? What would you miss? What would you meet?

When a sea animal is released away from where you found it the animal takes a long time to get home, predators look for it, the animal gets hungry, it might starve or get eaten.

How would you get home if you were left in the jungles of Africa?

Activity: Imagine a giant took the roof off your home and put it down in another town. What would it be like with no roof? What would you do?

Discuss.

Animals make their homes under rocks. They lay eggs there, hide under rocks, rest there, and eggs and babies will get eaten if left in the open.

When do people really lose their roofs? How do they feel? (hurricanes, tornadoes, fires, etc.)

When searching under rocks, put them back exactly.

Activity: Make a list of things that may seem impossible to count. (grains of sand on the beach? etc.)

SAFETY RULES FOR TIDEPOOLING

1. Watch out for deep holes.
2. Always face the ocean.
3. Do not put hands in holes or under rocks.
4. Lift rocks carefully and gently away from you.
5. Walk and place your feet so you know what you are stepping on.
6. Walk carefully on slippery rocks.
7. Wear sneakers or shoes with socks, long sleeves, and long pants when you go tidepooling.

Activity: Illustrate each rule, make a booklet after discussing each rule (why should we obey each rule?).

Activity: What can you take with you from the seashore without taking a part of the seashore?

Make a list. Possible ideas: fun, excitement, memories, smells, feelings, etc.

Write poems with your list.

Illustrate some of the ideas; write stories.

Activity: Imagine you are talking to an animal underwater. Ask the animal what rules people should follow when they visit the seashore? Write what you "heard" the animal say.

Share, discuss the rules made by seashore animals.

Activity: Discuss the most painful thing that ever happened to you. (broken bones? sprain? cuts?) Could it have been prevented?

Do animals feel pain? How would a crab feel if his pincher is broken off? Would it feel like a broken bone? A cut?

Grade Three

MARINE STUDY GRADE THREE OVERVIEW

Marine Environment and Scientists who study and protect it.

1. There is land underwater with mountains and valleys.
2. Reefs are important to us.
3. Oceanographers study the marine environment and look for ways to protect it.
4. Marine biologist study plants and animal that live in the ocean.
5. Marine physicist and geophysicists study the physical properties of the ocean. Their research may lead to more accurate prediction of the weather.
6. Marine geologists study the ocean's underwater mountains, rocks and sediment. They help to locate minerals, oil and gas.
7. Oceanographic engineers design and build instruments for oceanographic research and operations.
8. Tools that oceanographers use are:
   a) underwater camera
   b) sounding device to measure, map and locate ocean materials.
   c) ships and aircraft and underwater craft
   d) machines to record findings such as the thermometer, hydrometer (salinity readings), sand sampling instrument, plankton net, disc to test clarity of water.

Industry and the businesses that depend on them.

1. Diving:

Jewelry	Sponge
Coral	Salt
Tropical fish	Medicines
Pearls	

2. Fishing: Markets

Fish cake factories

Kelp for food and fertilizer

Restaurants

3. Aquaculture is the raising of fish and shellfish (begun in '60 on Oahu). Aquaculture does not include fishing which is more like harvesting than growing.

Marine Life

1. Coelenterata-Sea anemones, coral and jellyfish have tentacles that sting.
2. Annelids-segmented worms are divided on the inside and outside.
3. Mollusks-snails, slugs, clams, octopus and squid have soft bodies and muscular foot to move around.
4. Echinodermata-sea urchins, sea stars have spiny skins. Sea urchins, sea stars and sea cucumbers have "tube" feet.
5. Crustaceans-Barnacles, lobsters, shrimps and crabs have jointed legs and hard body covering.
6. Invertebrates are animals without a backbone.

MARINE STUDY TEST Grade Three

1. Name two things that oceanographers study. 1)_____

   2)_____.

2. Name two ways oceanographers help us. 1)_____

   2)_____.

3. Circle features you would find in the ocean.

   sky continental margin plains mountains

   volcanic island ridge trench

4. Circle the tools that oceanographers use.

   camera sounding machine iron ships thermometer

   hydrometer

5. Name two occupations that depend on the ocean.

   1)_____ 2)_____.

6. Name two kinds of businesses that depend on these marine occupations.

   1)_____ 2)_____.

7. Name at least four products that come from the sea.

   1)_____ 2)_____

   3)_____ 4)_____

8. Name two groups of marine animals and name at least one animal from each of those groups.

   1)_____ _____
   (group) (animal)

   2)_____ _____
   (group) (animal)

9. Name two groups of marine animals and name one identifying characteristic of each group.

   1)_____ _____
   (group) (characteristic)

2) _____ _____
(group) (characteristic)

10. All of these groups mentioned are _____
vertebrate, invertebrate

LESSON #1. OCEAN BOTTOM

VOCABULARY:

Marine geologist	ridge
continental margin	trench
plain	seamount

MATERIALS NEEDED FOR THIS LESSON:

Worksheet #1

Film (see resource section)

DISCUSS:

1. Marine geologists study the ocean floor. They help to locate oil, gas and minerals.
2. Geologist use sounding devices to "map" the ocean floor.
3. Explain each formation and it's characteristics.

SOMETHING TO DO:

1. Worksheet #1--Ocean Bottom
2. Make a model of the ocean floor using one of these materials:
   a) land materials such as mud, dirt, rocks, etc.
   b) paper mache
   c) modeling clay

   Don't forget to label each formation!
3. Sift sand to find out what it is made of.

RESOURCES:

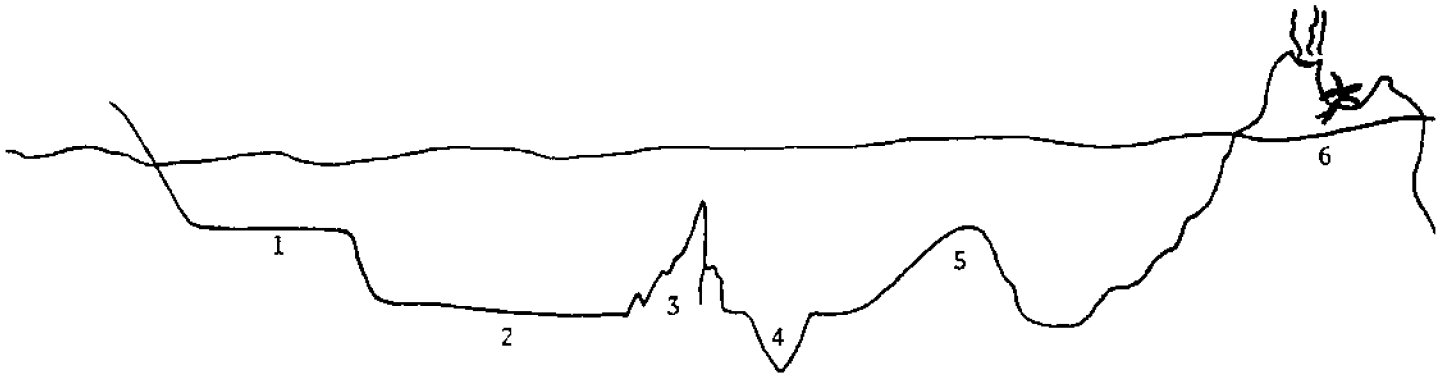
Film from the DOE: Exploring the Ocean 0853

Materials from our school library:

Other resources:

WORKSHEET #1--Ocean Bottom

MARINE GEOLOGISTS have found that the ocean floor is very much like that on land.



1. Continental margin-shelf that drops off to deep waters or plains.
2. Plains--very deep, flat land.
3. Ridge--long, narrow mountain range with steep sides and bumpy shape.
4. Trench--a valley or deep cut with steep slopes.
5. Seamount--mountain.
6. Volcanic island--a mountain formed from lava that rises above sea level.

LESSON #2. CORAL REEFS

VOCABULARY:

skeleton	algae
coral	Marine biologist
fungia	coral head (colony of coral)
colony	coral tree (type of coral found in deep waters)

MATERIALS NEEDED FOR THIS LESSON:

Samples of coral if available

Worksheet #2-Reefs are important to us

Films (see resource section)

DISCUSS:

1. Stress that coral is actually the skeleton of an animal, not a plant. (Show real samples if available.)
2. Some coral live by themselves like the fungia.

FUNGIA

3. Some coral live in colonies. Many of these coral colonies joined together with stoney seaweed skeletons called coralline algae make up a coral reef. (Film: Coral Reef)
4. Many marine animals live in these reefs for protection and feeding.
5. Marine biologists study plants and animals that live in the ocean.
6. They use underwater cameras to photograph these animals.

SOMETHING TO DO:

1. Show slides or photos of reef plants and animals.
2. Show available films (see resource section) about coral reef life.
3. Do worksheet #2.

RESOURCES:

Film from the DOE:

Coral Reefs 4148 HMKS

*500 Million Years Beneath the Sea 6761 S

*Cloud Over the Coral Reef 6099 US

Coral Jungle 5681 (food chain)

Great Barrier Reef pts I & II 5728 US

* Also available at the Hawaii State Library

Materials from the school library

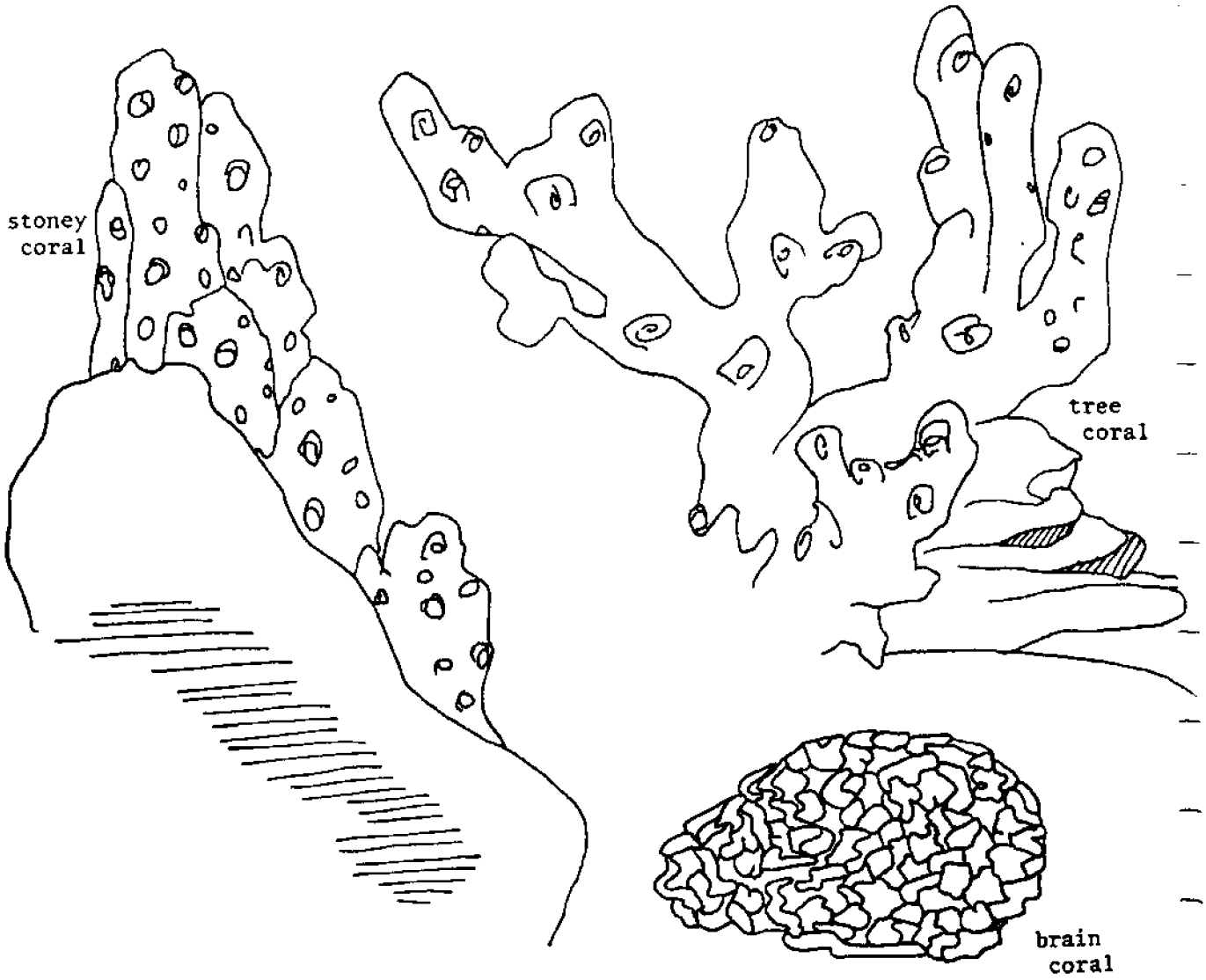
Other resources:

Book--HAWAIIAN REEFS AND TIDEPOOLS by Ann Fielding

WORKSHEET #2--Reefs Are Important To Us

Coral reefs are made by tiny animals called polyps. When polyps die they leave behind a skeleton on which new polyps grow. Many marine animals live in the coral reef community.

Draw in and label some animals that live in the reef community.



LESSON #3. OCEANOGRAPHERS STUDY THE MARINE ENVIRONMENT AND LOOK FOR WAYS TO PROTECT IT

VOCABULARY:

- marine physicist
- oceanographic engineer
- hydrometer
- plankton net
- sand sampling instrument
- thermometer

MATERIALS NEEDED FOR THIS LESSON:

Thermometer

Hydrometer

Films (see resource section)

DISCUSS:

1. Review and recall information on marine biologist and geologist--job and how they help us.
2. Introduce two new oceanographers--marine physicist and the oceanographic engineer.

   Show film: OCEANOGRAPHY-The Study of Oceans

   SCIENCE OF THE SEA
3. Talk about the instruments oceanographers use such as the ones mentioned previously and also the thermometer, hydrometer, sand sampling instrument, plankton net, disk to test the clarity of water.

   Show film: WHAT'S UNDER THE OCEAN

SOMETHING TO DO:

1. Field trip to Sea Life Park
2. Learn to use some of the oceanographic tools.

RESOURCES:

Film from the DOE:

Oceanography-The Study of Oceans 5812 K

Science of the Sea 2554 U

What's Under the Ocean 3172 H

Materials from our school library:

Other resources:

Career Information Center--UH (Phone: 948-6635)

LESSON #4. RICHES FROM THE SEA

VOCABULARY: kelp

minerals

sponge

pearls

MATERIALS NEEDED FOR THIS LESSON:

Films (see resource section)

Examples of products from the sea (other than fish)...such as natural sponge, jewelry, kelp products.

DISCUSS:

1. Talk about what divers dive for such as coral, kelp, pearls, sponge and tropical fish.

   Show film(s): ADVENTURE IN BLACK CORAL

   CONQUERING THE SEA

2. Talk about the businesses that depend on these divers and products such as jewelry stores, pet shops, medical laboratories.

SOMETHING TO DO:

1. Make a display of treasures from the sea.

RESOURCES:

Film from the DOE:

***Adventure in Black Coral 0018**

Conquering the Sea 4895 U

*** Also available at the Hawaii State Library**

Materials from our school library:

Other resources:

LESSON #5. MANY PEOPLE DEPEND ON THE FISHING INDUSTRY

VOCABULARY: fish cake

cannery

MATERIALS NEEDED FOR THIS LESSON:

Film(s) (see resource section)

Samples of food from the sea

DISCUSS:

1. Name businesses that depend on fishing such as restaurants, fish cake factory, markets, canning factory.
2. Talk about food products from the sea.

   Show film: FISHING FOR A LIVING

   FOOD FROM THE SEA

SOMETHING TO DO:

1. Make a display or bulletin board showing products from the sea.
2. Have tasting party of sea food.

RESOURCES:

Film from the DOE:

Fishing for a Living 0933

Food from the Sea 4195

Materials from our school library:

Other resources:

LESSON #6. NEW INDUSTRY-AQUACULTURE

VOCABULARY: marine farm

aquaculture

MATERIALS NEEDED FOR THIS LESSON:

Slides about aquaculture (see resource section)

DISCUSS:

1. Aquaculture or marine farms raise fish and shellfish in shallow tanks.
2. These farms are important because we need not depend on the uncertainty of a sea catch and we can control the growth and type of sea food grown.
3. Show slides on aquaculture in Hawaii. Talk about kinds of marine life that could be grown on these farms.

SOMETHING TO DO:

1. Visit an aquaculture farm (49-139 Kam Hwy, Phone: 237-8515)

RESOURCES:

Film from the DOE

Materials from our school library:

Other resources:

Slides with script on aquaculture in Hawaii (Aquaculture Development Program, call Debbie-Phone: 548-5495)

Aquaculture Consultants, 49-139 Kam Hwy., Phone: 237-8515

LESSON #7. MARINE ANIMALS

VOCABULARY:

Coelenterata	spiny
Annelids	Crustaceans
segmented	jointed
Mollusks	invertebrate
Echinodermata	

MATERIALS NEEDED FOR THIS LESSON:

Worksheets #3-8

Checklist for tidepooling

Films (see resource section)

DISCUSS:

1. Review animals studied in previous grades.

   Show slides or film:

   MARINE BIOLOGY: Life in the Tropical Sea

   BEHAVIOR AND ECOLOGY OF CORAL REEF FISHES

   HUNTERS IN THE REEF

   LIFE UNDER THE SEA

   BEACH AND SEA ANIMALS

2. Have children become familiar with the names and characteristics of each group studied.

SOMETHING TO DO:

1. Tidepooling (see next section)

RESOURCES:

Film from the DOE:

*Beach and Sea Animals 0229 MKS

Behavior and Ecology of Coral Reef Fishes 6208 U

Hunters in the Reef 6171 U

Life Under the Sea 5428

* Also available at the Hawaii State library

Film from the State Library:

Marine Biology: Life in the Tropical Sea

Underwater Hawaii

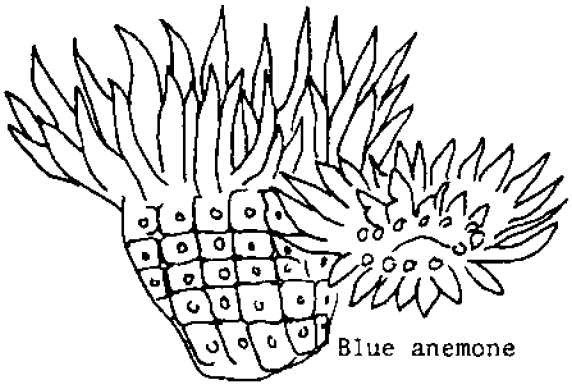
Materials from our school library:

Other resources:

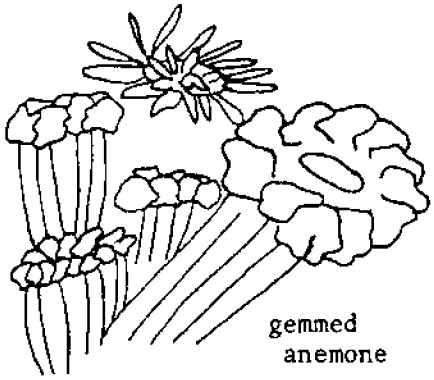
WORKSHEET #3--Coelenterata

Sea anemones, coral and jellyfish have tentacles that sting. They have soft bodies.

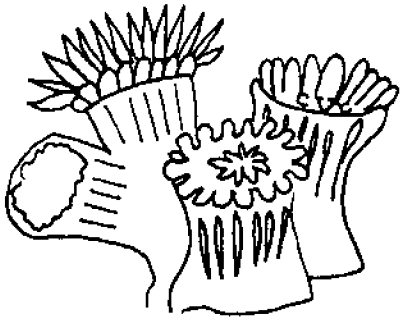
Label the parts that tell you these are coelenterata.



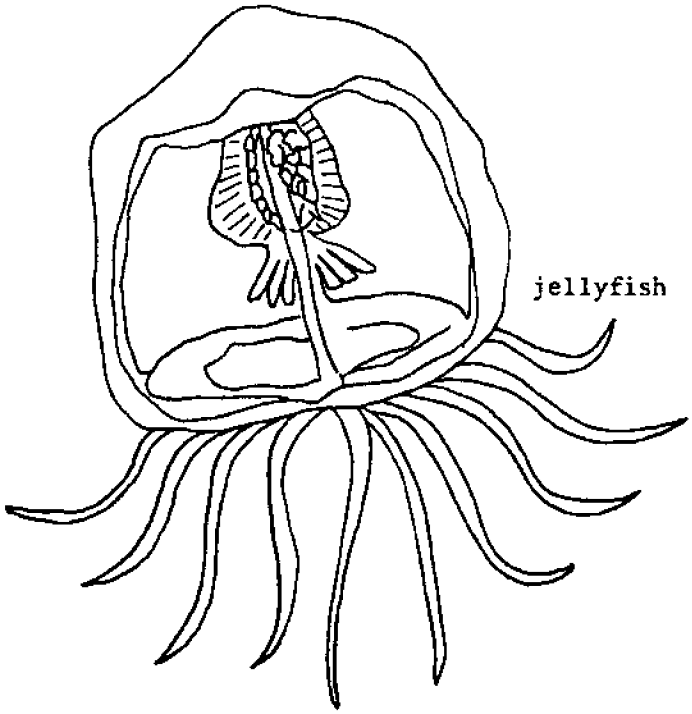
Blue anemone



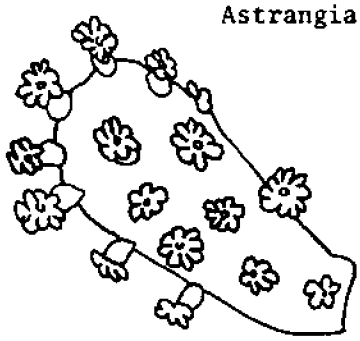
gemmed anemone



Astrangia coral



jellyfish



Blue coral

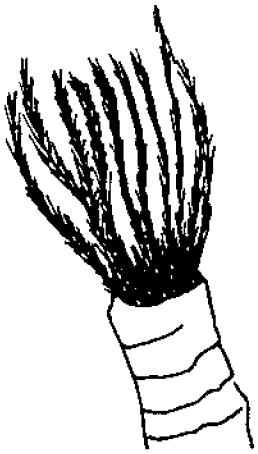
WORKSHEET #4--Segmented Worms

Feather duster worm, spaghetti worms, Christmas tree worms, fireworms have bodies that are ringed on the outside and divided on the inside.

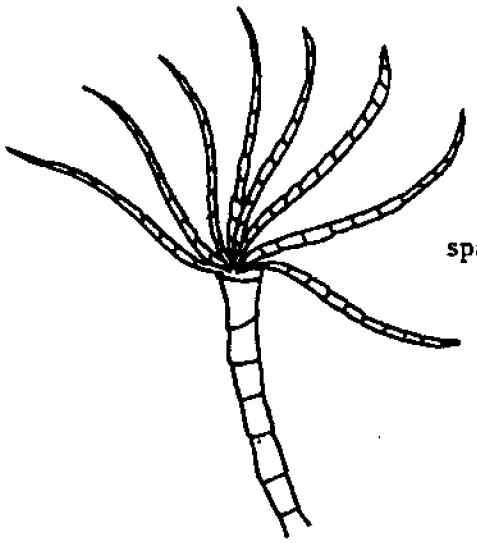
Each segment has spines or bristles along both sides to help them move, to hang on to things or to protect them.

Outline the parts that tell you each is a segmented worm.

Bristle worm



feather duster



spaghetti worm

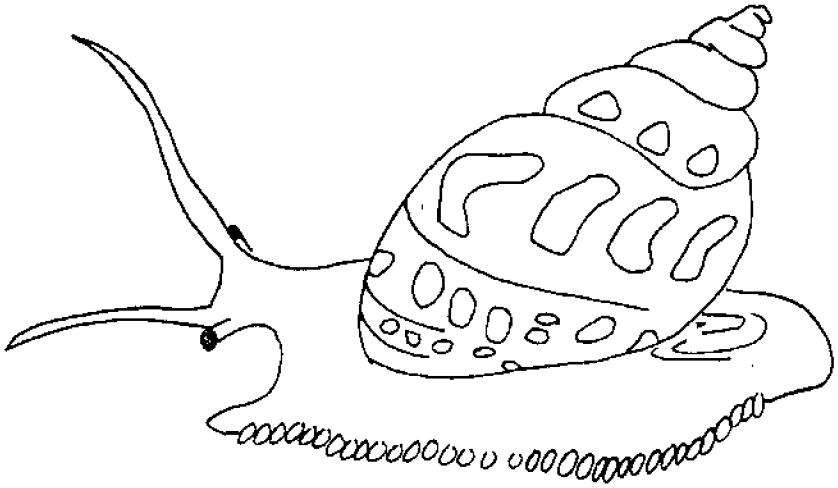
WORKSHEET #5--Mollusks

Snails, slugs, clams, oysters, octopus and squid have soft bodies and a muscular foot used to move around.

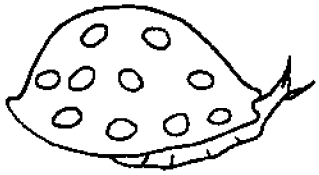
Mollusks may have shells to protect them.

Color the muscular foot that tells you these are mollusks.

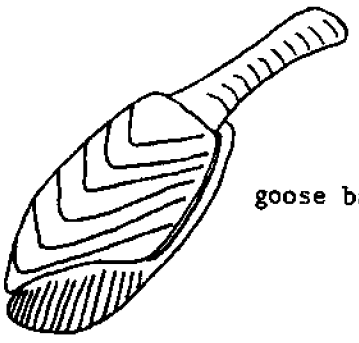
pipipi



Ivory shell



cowry



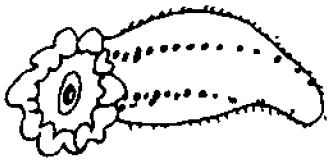
goose barnacles

WORKSHEET #6--Echinodermata

Sea urchins, sea star, have spiny skins.

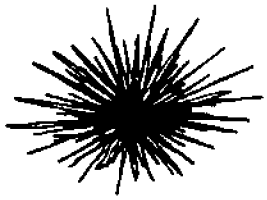
Sea urchins, sea stars, and sea cucumbers all have "tube feet" that help them move.

Color the spines red.



sea cucumber

brittle star

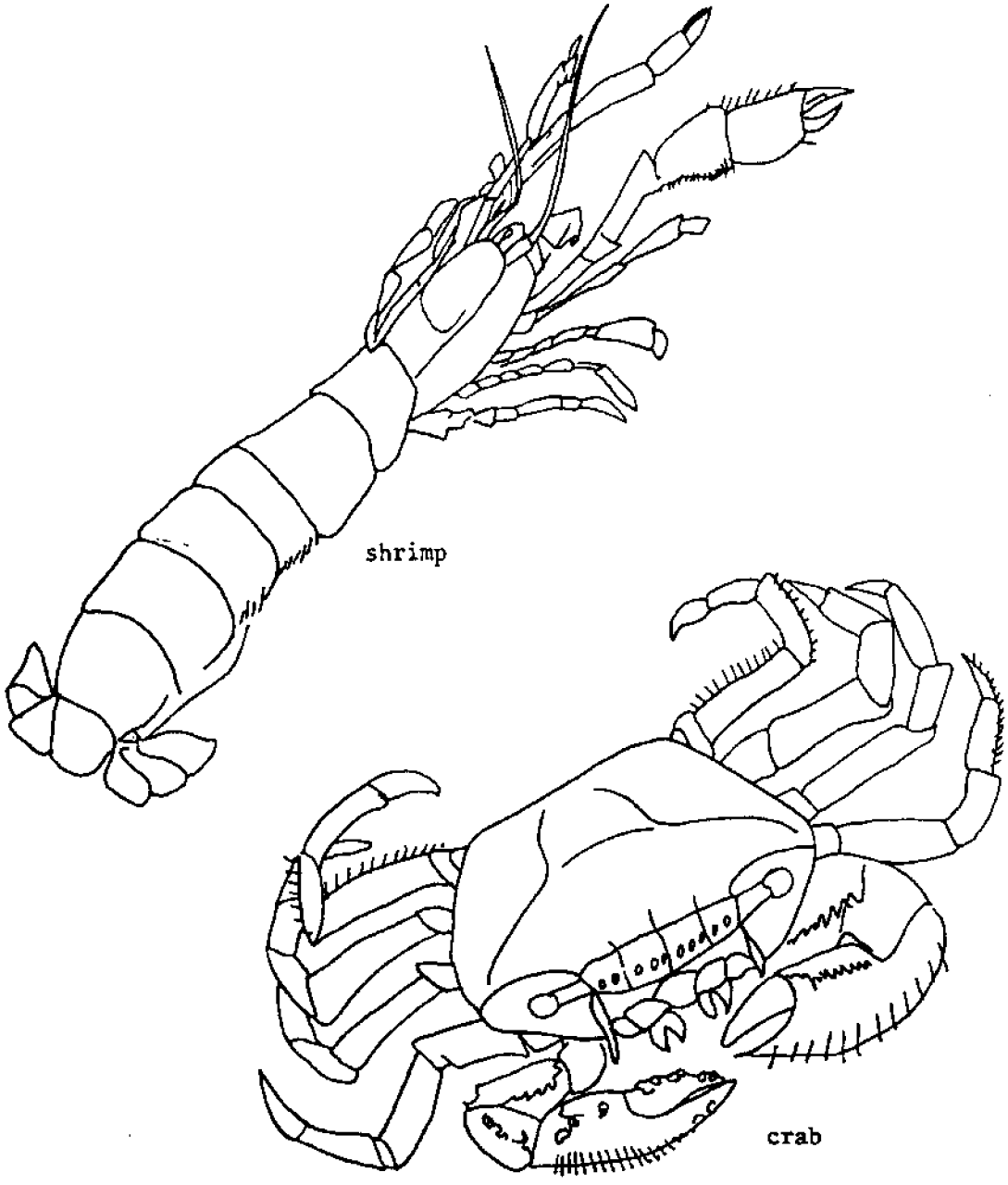


sea urchin

WORKSHEET #7--Crustaceans

Barnacles, lobsters, shrimps and crabs have jointed legs and a hard body covering.

Label the jointed legs that tell us these are crustaceans.

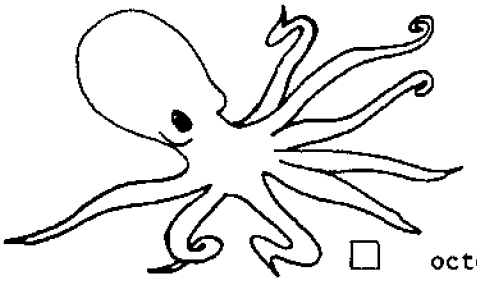


WORKSHEET #8--Invertebrates

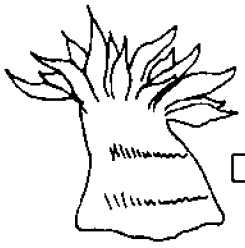
Invertebrates are animals without a backbone or skeleton inside their bodies. Some invertebrates like crabs and shells, wear their skeleton outside their bodies.

Place a check mark in the square of all the invertebrates below.

☐

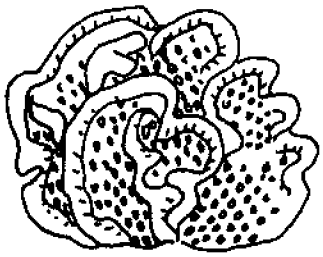


☐ octopus

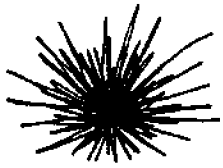


☐ sea anem

☐ sea cucumber



☐ coral



☐ sea urchin

TIDEPOOLING CHECKLIST

BEFORE YOU GO:

1. Permission of school principal.
2. Student permission slips
3. Permit from the Department of Parks and Recreation for use of ocean site:
   a. If the group contains less than 50 persons no permit is needed.
   b. Otherwise apply to:

      Department of Parks and Recreation

      Honolulu Municipal Building

      650 S. King Street

      Honolulu, Hawaii 96813

      Send the following information:

      Name of park to be visited

      Date and hours of visit

      Number of persons in group

      Name of person in charge
4. Arrange for transportation.
5. Determine field equipment needed.
6. Gather equipment and assign student monitors to inventory equipment before and after visit.
7. Arrange for chaperones. Brief chaperones on what to expect.
8. Check on first aid kit.
9. Arrange with one parent to have a private car available in the event that a student becomes ill or is in an accident.

10. Check on tide: Dillingham Corporation, Box 3468, Honolulu, Hawaii 96801, has a free calendar. Daily newspaper also has a tide chart.
11. Clarify the study problems to be pursued. Prepare student data sheets and explain each one.
12. Group students.
13. Do activities 1, 3, 7, 16, 17 from the handout: Some seashore/class assignments. (safety and conservation)
14. Go over safety, conservation, consideration rules: A Study of the Ecosystems of Tidepools-Tips and Reminders.

AT THE BEACH:

1. Activity #2 from the Seashore Assignments handout.
2. Prepare one aesthetic experience during the day such as poems, sketching, storytelling, etc.

BACK HOME: (OR BEFORE YOU LEAVE THE BEACH)

1. Discuss data:
   a. Did your pool contain more plants or animals?
   b. Can you think of any uses for tidepool plants? (food for people, food and hiding places for the tidepool animals.)
   c. What animals did you find in your pool?
   d. Were there many animals of any one kind? What kind?
   e. Do you think you missed seeing any of the animals?
   f. If you were a tidepool animal, which animal would you prefer to be? Why?
2. Write a letter or a poem to a seashore animal you met.

A STUDY OF THE ECOSYSTEMS OF TIDEPOOLS: TIPS AND REMINDERS

PRACTICING GOOD ECOLOGY

1. Tip rocks toward you. Look under them first, then on them. Return rocks to their original position as they serve as homes for living organisms.
2. Please, no collecting. Look at an animal, pick it up to show the class, then it should go back in the same place it came from. Other classes will be coming to these same areas and we hope there will be something for them to see.
3. The small amount of water in your collecting bucket warms up rather quickly, and this is not conducive toward keeping your specimens alive and healthy. Change the water periodically.
4. Do not litter the beach or ocean. The lives of hundreds of marine organisms depend upon their having a relatively clean environment.

REMINDERS FOR REEF WALKERS

1. Respect plant and animals -- We're invading their homes:
   a. Return rocks to their original position.
   b. Change water in buckets periodically.
2. Play it safe -- Personal welfare:
   a. Always have a buddy and stay with the person at all times.
   b. Watch out for deep holes.
   c. Always face the ocean/horizon.
   d. Do not put hands in holes or under rocks. Eels, wana (long-spined sea urchins) or bristle worms are unpleasant contacts!
   e. Keep your gloves on. Some animals have toxic substances or irritating spines or spicules.

f. Walk carefully on slippery rocks.

g. Field gear. Wear sneakers or reef tabis (not slippers) on walking field trips.

3. Signals

a. Short whistle -- PAY ATTENTION.

b. Long whistle -- END OF ACTIVITY.

c. Several long whistles -- GET OUT OF THE WATER QUICKLY.

d. Anyone who doesn't abide by these rules will be "beached".

4. Stay in your assigned section of study until the end of each activity. Your group will work in each zone and section.

PLANTS AND ANIMALS IN THE TIDEPOOL

Draw your animal	Name and class of animal	Location found	How many?	What is it doing?	Other observation

TIDEPOOL DESCRIPTION

Team members: _____

_____

_____

_____

Time of day _____

Sunny or cloudy _____

Wind _____

Describe or Draw Shape	Measure How deep?	Sand, mud, rocks, other Type of Bottom	Measure Temperature	Smooth, flat, rugged, jagged, steep sides Type of rock surrounding pool	Special Features

SOME SEASHORE/CLASS ASSIGNMENTS

These activities were designed to allow students to develop attitudes and values about sea sanimals...a philosophy about caring/not caring about them.

DO NOT TELL THE STUDENTS HOW TO THINK OR FEEL ABOUT THE ANIMALS. LET THEM FORM/INVENT THEIR OWN ATTITUDES AND VALUES.

These activities are aimed at bringing more meaning to the rules listed on the last page. Hopefully the students can come up with some of these rules...then, you won't have to use the last page.

INSTRUCTIONS TO THE TEACHER

Teacher: Give the assignment and then be quiet and wait.

Do the assignment with the children..

Allow time for students to "invent" their meaning of the assignment...

Sharing answers is important...AND, DO NOT FORCE STUDENTS TO SHARE THEIR ANSWERS.

Accept all answers...DO NOT JUDGE... Let them explain.

Participate with the students...you have an equal voice and an equal vote.

Teacher: You might not like some of these...choose those you like...and maybe none at all.

MORE: Where does a happy, responsible adult come from?

If age 18 means "adult"...then he/she comes from a happy responsible 17 year old...and he/she comes from a happy, responsible 16 year old. So, a seven year old will probably give seven year old responses.

Some of these assignments were taken from ESSENCE I (Addison-Wesley).
Some were from John Hawkins (Marine Science--McKinley High).
Some were written by me (for fun).

If you like these, look further into ESSENCE I.

ACTIVITY #1. SUFFER-CATION

The assignment: Imagine we (the class) are locked in this classroom. The water and electricity are turned off. The windows and doors are locked shut. The sinks are plugged.

a. After two hours what will the room be like? And, how will you feel?

b. After six hours?

c. After 24 hours? (you will be brought food once ...a huge steak, rice, vegetables, ice cream, soda).

d. What will it be like on Monday after spending Saturday and Sunday in the room. (On Friday you will get three portions of food).

e. If your parents could bring you one thing each ...what would you like?

For the Teacher: Discuss the five questions above...one at a time. Some reactions students may have:

The room will get hot...air stale and smelly (need fan).

It'll be dark...Where is the bathroom? (closet?) ...The room will really stink..pollution...dizzy... nauseated...sick...boredom...miss parents...I'll get sick of the same food...The food will rot by Sunday and more stink...

SO WHAT? Don't keep too many animals in a container.

Change the water often for more oxygen, cooler temperatu

to get rid of "shi-shi" and "do-do". (This also ap

to aquariums, terrariums, cages, pets).

MORE: The class may wish to try shutting the doors, windows, d

and turning off the water and electricity for a while.

MORE: At the seashore...take the temperature of water in a con

...and the temperature of open ocean water.

MORE: Do tests to determine the amout of oxygen in water. (Ha

MORE: Investigate how the following gets rid of waste and poll

An Amoeba...Human body...Your school...the city...this i

...earth.

MORE: List questions that arise during this assignment...write

letters...invite resource people..."invent" ways to answ

your questions and do it.

ACTIVITY #2. STEAL NOTHING AND TAKE A LOT

(or...I'VE GOT PLENTY O' NUTHIN'...AND NUTHIN'S PLENTY FOR ME)

The assignment: What can you take with you from the seashore without taking part of the seashore?

Make a list.

For the Teacher: Read the question to the class and then be quiet... try not to give hints. Give them time, as they must "invent" what the question means to them.

After they have had enough time...ask them to share their lists. Write their contributions (sharings) on a large sheet of paper.

Here are some examples of what "nuthin's" you might find:

Fun/excitement/scared/cold/sadness/happy/memories/ warm sun/photos/pain/knowledge/sounds/tastes/smells/ feelings/caring/friendship/squishy/wanting to return/ sharing/

PEACE/LOVE/JOY

Your list could easily reach into the hundreds. Keep this list for the future...add to it after the fieldtrip...Use it for vocabulary lessons/creative writing (poetry, cinquain, etc.), categorizing, prioritizing (ranking), etc.

MORE: Do this at the seashore...a good time is just before you leave ...Don't forget to bring a large sheet of paper and a "fat" felt pen!

MORE: Record it on tape...let a student transcribe it onto ditto masters for homework...print it for each student.

MORE: Write poems with your list. Send your poems to poets for their reactions. Send your list to poets and ask them to write poems with it (and you react to them).

MORE: Categorizing: Let students select secret categories and re-group the list into two groups. Put this on the wall and let students try to guess the rule(s) used. (Examples: Good/Bad ...Natural/Man-made).

MORE: Prioritizing (ranking): Which nuthin's on the list are most important, and which are least important to you.

MORE: Which nuthin's did you learn from? Which nuthin's taught you something new about yourself?

MORE: Play the song "I've got plenty o' nuthin'...if appropriate (I can't remember the words so I don't know about this MORE... it might be a NUTHIN.

ACTIVITY #3. LUV-A-DUB-DUB

The assignment: What does a Hermit crab love most of all?

For the Teacher: List everything said on the chalkboard.

(The answer I want is "LIFE" or "TO LIVE")

The students do not come up with "life" unless they've discussed this question before. You'll get answers like: water/food/rocks/other crabs/parents/friends/ocean/sand/seaweed/oxygen/etc.

A hint you may soon give them is: Hermit Crabs love the same thing you love most of all.

MORE: Make rules to help animals live.

MORE: So, now you know what Hermit crabs like (food, friends, love, etc.). Bring gifts when you visit their homes.

MORE: Have a scavenger hunt for things animals love. Prepare a CARE package for an animal(s) and take it to the seashore with you.

MORE: Do all animals love the same things? In Science class we learn about things animals love but we call these things "Requirements for Life."

MORE SCIENCE: Find one thing that loves another thing. Make a list of as many "love-pairs" as you can. (example: Manini loves seaweed...and shrimp loves sea urchins spines...Barracuda loves mullet). In Science, we have words for these loves...Food Chain... Commensalism...Predator-prey...etc.

IN SOCIAL STUDIES we have other words...Economy, Medicare, Free enterprise, competition, etc.

SO WHAT? Students seem to relate very well when they can personalize (or

become) the subject being studied. So, using human feelings with non-human subjects makes understanding easier for them. (love/ hate/trust/expect/anger/happy)

ACTIVITY #4. ANIMAL TALK

The Assignment: Imagine you are talking to an animal underwater. Ask this animal: "What laws/rules would you like to have for people to follow when they visit the seashore?"

Listen for at least three minutes. Insist on quiet for three minutes.

Write what you felt/heard the animal say.

For the teacher: Share and discuss the rules made by the seashore animals. Discuss whether the class should follow these rules.

MORE: A fun way to do this is through guided fantasy (also called guided imagery or guided dreams).

MORE: Listen to recording of song "Talk To The Animals..." (Dr. Doolittle).

MORE: Look at traffic signs for hints...or make signs. Or, the Ten Commandments? Thou shalt not...Do unto others as you...

ACTIVITY #5. OWW!

The Assignment: What was the most painful thing that ever happened to to you? Broken bones? Sprain? Cut?

For the Teacher: Discuss with students as they share stories.

Could it have been prevented?

Do animals feel pain? Does a crab cry when his pincher is broken off? Does a broken pincher feel like a broken bone? A cut?

Make some rules about preventing injuries to animals... if they feel it's necessary.

MORE: Without naming names...discuss what they have seen people do to injure animals.

MORE: (for the teacher) Headlines! Teacher breaks arm off students body...accidentally...while playing.

(This is really dumb, and a crab probably wouldn't care).

ACTIVITY #6. SO NEAR AND YET SO FAR

The assignment: Imagine you are 100 steps from your home, and you can only travel 20 steps in one day.

Describe how you would feel...what you would miss... what you might encounter...during those five days of travel.

For the Teacher: The kids might say:

They would feel angry, helpless, sad, hungry, scared, etc.

They would miss their family, food, T.V., shelter, etc.

They might encounter strangers, embarassing questions, scary creatures at night, cold, spiders, toads, ghosts?

SO WHAT? When you release an animal away from where you found it:

the animals takes long to get home.

predators, hunger, fear are along the way.

they might starve or be preyed upon.

Some animals need rocks...and are helpless on sand...and may wash ashore on the next high tide.

MORE: How would you get home if I dropped you off in the jungles of Africa?

MORE: At the seashore, find out if there is a difference...close to shore vs. 100 feet from shore:

kinds of animals and seaweed.

numbers of animals (population study)

wave zone vs. calm zone.

MORE: At the seashore: Find out:

How far a Hermit crab can move in 24 hours.

How far a Sea Cucumber can move in five days.

How long it would take a Cowrie shell to move 100 inches.

What happens to a Spanish Dancer when you release it in water with a sandy bottom close to shore.

MORE: Do some math problems..."If a Brittle Star can travel ten inches in 12 seconds, how far can it travel in one minute?"

ACTIVITY #7. ROCKS

The assignment: Imagine a giant took the roof off your home and put it down in the next town.

What would it be like with no roof?

What would you do?

Discuss...make a list of responses.

For the Teacher: Students might say: cold, rain, wind, sun, dust, insects, burglars, angry, sad, scared, catch cold ...Move out...buy a new roof, cry?

SO WHAT? Animals make their homes under rocks.

They lay eggs there.

They hide under rocks.

They rest there.

They work hard to burrow and make their beds.

Eggs and babies get eaten when exposed.

SO WHAT? When searching under rocks/roofs...replace rock roofs EXACTLY as they were found. Do not carry rocks around.

MORE: When do people really lose their roofs? How do they feel?

Hurricanes, tornados, eviction, fires, etc.

DUMB MORE: or, more dumb? Here's a dumb thought:

Giant lifts roof to observe you. EEK! Call the cops!

Giant drops roof on you (squish).

Giant moves to next roof to observe next home.

Giant turns in completed worksheet to his teacher.

Gets an A.

ACTIVITY #8. SEACRETS

The assignment: Do something nice for an animal at the seashore...and don't tell anyone you did it. Most of all, don't let that animal find out you did it.

Write down how you felt while keeping that secret.

For the Teacher: This activity was taken from ESSENCE'S "Do something nice for someone in your family and keep it a secret..."

Nice things happen when they (students) are able to secretly complete this assingment. They realize how many things others do for them and they take for granted. They realize how un-often they say thanks for these things (dinner, clean clothes, allowance, etc.)

And, they also discover how it feels not to be thanked, or even noticed...especially as they wait for their secret to be discovered.

I wondered what would happen if this assignment were done at the seashore. (I've never done it yet).

MORE: When visiting friends/relatives parents often bring a gift. Ask your parents why they do this.

MORE: Bring a gift for the animals at the seashore.

MORE: Let students find out what animals really like for gifts. (make phone calls, write letters, use the library, or experiment at the beach)

MORE: Plan a party for the animals you are going to visit. Decide on

what you are celebrating and really throw a big party!

SO WHAT? I don't know. Getting there is half the fun.

ACTIVITY #9. CAN I HAVE MANGOES?

The assignment: How would you feel if:

Someone asked you for some mangoes from your tree ...And, you said "okay". And, he took your whole tree?

Discuss!

For the Teacher: When picking seaweed...pick a few "branches".

"DON'T PULL OUT THE WHOLE THING!"

Seaweeds are food and shelter for animals.

MORE: At the beach: Pick some seaweed branches and place them in a baggie.

Shake it gently. Observe the animals that were hiding there. (Hand lenses would be helpful).

MORE: Create some "art" using seaweed.

MORE: Seaweeds also copy nicely on a copy machine. Dry it first!

MORE: THERE are many seaweed recipes. Teachers have been trying some weird inventions that turn out fine (limu soup, fried Sargassum, tempura seaweed...besides the regular ogo, poki, etc.)

ACTIVITY #10. BYE! THANK YOU! TAKE CARE!

The assignment: At the beach: When you release an animal say out loud "Bye! Thank you! Take care!" Then, silently tell the animal the same things.

Discuss: Are you just saying the words, or do you really mean them?

What are words anyway?

Did you feel the same saying it silently as you did saying it out loud?

MORE: Write a letter to an animal you met at the seashore.

ACTIVITY #11. UP-TIGHT!

The assignment: Make a list of things that make seashore animals "up-tight". Share, discuss.

To the Teacher: This assignment was taken from ESSENCE I. The assignment was:

"Make a list of things that make you feel up-tight in school".

This is a most worthwhile assignment when done in an accepting, non-judgmental way.

ACTIVITY #12. KAPU!

The assignment: Make a list of public and private places for people. Then, make a list of public and private places for seashore animals.

COMPARE YOUR TWO LISTS. How are your two lists the same?

SO WHAT? Animals have private places too. When and if you enter their private places, be extra careful.

ACTIVITY #13. EXPECTASEANS

The assignment: What do you expect animals at the seashore to do for you? Discuss this.

Next question: What do animals at the seashore expect you to do for them? Discuss this.

Next step...let the class decide.

To the teacher: The students may not understand the word expectations.

Here is a good assignment:

"What do people expect you to do but don't tell you?"

"What do you expect people to do but don't tell them?"

Or, if you'd like to improve communications in the classroom: ask the same questions about teachers and students.

ACTIVITY #14.

The assignment: What can you do with a FISH...besides eat it?

Make a list.

To the teacher: This is very similar to Activity #2 (Steal nothing, taka a lot).

There are many things fish and sea animals can give to us...There are many ways fish can give to us. There are many ways and things we can take.

MORE: Do something to a fish.

Do something for a fish.

Do something with a fish.

Let a fish do something to you.

Let a fish do something for you.

Let a fish do something with you.

ACTIVITY #15. THE TRUTH...THE WHOLE TRUTH...AND NOTHING BUT THE TRUTH

The assignment: What do people say they'll do at the seashore, but they don't? Make a list.

What do people say they won't do at the seashore, but they do? Make a list.

What shall we do about that?

MORE: What else do people say they'll do but don't?

MORE: What do animals at the seashore say they'll do but won't?

What do animals at the seashore say they won't do but they do?

ACTIVITY #16. 50%-50% or 100%-100%???

The assignment: If you are at the beach and these things happen...who is responsible?

1) Someone pushes you and you smash a crab.

2) Someone takes your pail with a Spanish Dancer in it. One hour later you find the pail and the Dancer is dead.

Discuss: Who is responsible?

To the teacher: In both cases both are responsible. And, they are each 100% responsible. (not 50-50...that seems to leave room for irresponsibility).

Both must be responsible because they decided to place themselves at the site. If they were not there it wouldn't have happened.

I guess, in a way, the crab and the Dancer were 100% responsible too. If they weren't there it wouldn't have happened.

SO WHAT? If everyone feels 100% responsible...there might not be a single fatality or injury.

AND... Don't forget...you are 100% responsible for everything.

You are 100% responsible also for the good, the wonderful, the valuable experiences the students are gaining on fieldtrips. (I am not being sarcastic).

ACTIVITY #17. ALOHA SPIRIT

The assignment: Make a list of animals that want you to visit the seashore.

Make a list of animals that don't want you to visit.

Have a discussion!

To the Teacher: I don't think any of the seashore animals want people visitors...especially 50 at a time. 50 multiplied by four limbs each equals 200 hands and feet. 100 feet multiplied by 300 steps equals 30,000 crunching steps.

50 people each picking up 10 animals =

500 ? .

And yet, when the visit is "in-tune" with nature, and a message of love...I feel the animals don't mind.

MORE: A good way to have a discussion is to use the "FISHBOWL".

1) Prepare the setting: A meeting table with seven seats around it.
2) Select three students who feel strongly "pro" (for). Select three students who feel strongly "con" (against). These six students will occupy six of the seats.
3) The rest of the class will be the audience and observe/listen. Only the six selected may talk (argue).
4) Anyone in the audience may "speak their piece" if they occupy the empty seat (seventh seat at the table).

5) The person speaking from the seventh seat must vacate the seat when he/she is through speaking...OR if another person in the audience taps them on the shoulder.

6) Both sides try to convince the other side and the audience to agree with them.

MORE ASSIGNMENTS FOR FIELDTRIPS

While I'm still thinking about the seashore, I'd like to add other activities I like. These assignments are still sort of ambiguous and the student will have to invent meaning...and make some decisions about them.

1) Make a list of things that appear impossible to count. Count any three of them. (In counting the students will begin to learn many things about what they are counting...especially since counting is sort of boring.

2) Make predictions about what you will find at the seashore...then go and check it out. Make predictions about:
   a) any animals you will find living on the seaweed Dictyota.
   b) three animals you will find under a rock 10 feet from shore.
   c) three animals you will find under a rock 50 feet from shore.
   d) what the first scream will be about.
   e) what will make you feel "best" at the seashore.
   f) what the oldest thing will be...also, the youngest.
   g) which animals will be exactly three inches long.

3) At the seashore...what will you find that is like:
   a) a hotel
   b) a tank (military)
   c) a policeman
   d) a shy person
   e) a treasure

4) How is a Hermit Crab like a car?
   How is a seaweed like your principal?
   How is sand like time?

These assignments focus on similarities instead of differences...the togetherness

How is an Octopus like you? of Nature...the whole vs.

How is the seashore like Math class? parts...

5) Find something you really hate at the seashore...and see what you can do to change it.

6) At the seashore: Love something you cannot see.

IF YOU LIKE THESE AND WANT MORE: SEE ESSENCE by Addison-Wesley.

PEOPLE RULES FOR THE SEASHORE---By Small Shrimp

1. Do not hurt any animal.
2. Do not run...place your feet. (When you run you can't see what you're stepping on.)
3. Do not toss/throw animals.
4. Do not keep animals in pails/baggies for more than two minutes... Change the water or let them go.
5. For plastic ponds: Change 1/2 of the water every three to five minutes.
6. For plastic ponds: Keep only one of each kind of animal to prevent over-crowding.
7. Release all animals as soon as your study is over. Release animals as close as possible to where you found them.
8. Do not remove animals that grow attached to rocks (oysters, Tunicates, etc.). They can't be put back.
9. Be careful and gentle when turning rocks over.
10. Do not use chopsticks on soft-bodied animals (Flatworms, Nudibranchs, etc.).
11. Replace rocks exactly where they were. Do not move rocks from one place to another.
12. Remove animals with sucking feet gently (Sea Stars, Cucumbers, etc.).
13. Do not remove whole seaweed. Take "branches".
14. Do not feed animals while they are in captivity...or feed them very little.
15. Do not leave your rubbish.

OME NICE THINGS YOU COULD DO:

. Bring a gift for the animals.

. Say "Thank you" and "bye" or "Good Luck" when releasing animals.

COMMON SEASHORE ANIMALS

SPONGES

COELENTERATES---coral, Portuguese Man O' War, Jellyfish, Sea Anemone, Pennaria

FLATWORMS

ANNELIDS (Segmented Worms)---Fireworm, Feather worm, Spaghetti worm, Peanut worm

MOLLUSKS---Cone shells, Cowries, Clam, Oyster, Chiton, Nudibranch, Sea Slugs, Sea Hare, Octopus, Squid

ECHINODERMS---Spiny-skinned---Brittle Star, Sea Stars, Urchin, Sea Cuc Sand Dollar

ARTHROPODS---Jointed Legged animals. Most seashore Arthropods are CRUSTACEANS. Shrimp, Lobster, Hermit Crab, Crabs, mole crab (San Turtle), Mud Shrimp, Mantis Shrimp, Snapping Shrimp, Banded Shrim Cleaner Shrimp, Barnacles.

TUNICATES---Sea Squirts

VERTEBRATES---Fish, Sea Snake

POISONOUS/DANGEROUS ANIMALS ---Portuguese Man O' War...Jellyfish...Pen ...Zooanthella (?) or soft coral...Fireworm...Cone Shell...Large, long-spined Sea Urchin (Black)...Crabs...Mantis Shrimp...Lionfish Eel (Moray)...Sea Snake

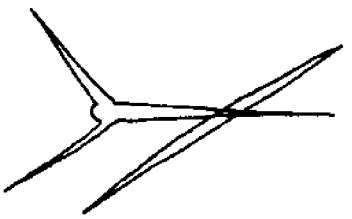
COMMON SEAWEED (ALGAE)

RED (RHODOPHYTA)	GREEN (CHLOROPHYTA)	BROWN (PHAEOPHYTA)	BLUE-GREEN
Gracilaria-Ogo	Ulva-Sea Lettuce	Sargassum	Lyngbya
Galaxaura	Codium-Waiwaiole	Dictyota	
Laurencia	Enteromorpha-Eleele	Dictyopteris	
Hypnea	Caulerpa	Padina	
Acanthophora	Cladophora	Turbinaria	
Asparagopsis-Kohu	Microdictyon	Colpomenia	
Grateloupia	Valonia	Hydroclathrus	
Ceramium	Bornatella		
Halymenia	Dictyosphaeria		
Trichoglea			
Plocamium			

PHYLUM PORIFERA
SPONGES

UPRIGHT SPONGE

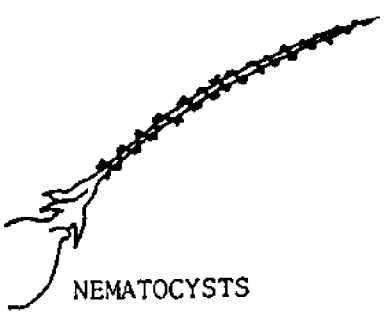
Sponges are the simplest of the animals made from more than one cell. They don't move and are always attached to something. They may be upright (like a simple bush) or encrusting (flattened). They are usually brightly colored. They have many small holes by which food and wastes exit.



SPONGE SPICULES

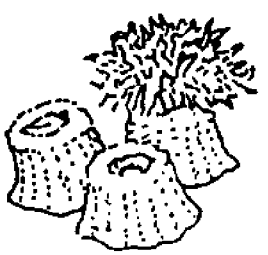
Sponges have skeletal elements called spicules. These tiny glass rods can be irritating to human skin. You can examine the spicules by putting a little Clorox on a small piece of sponge. This dissolves the tissue so you can look at the spicules under a microscope.

PHYLUM COELENTERATA (=CNIDARIA)
SEA ANEMONES, CORAL, JELLYFISH, HYDROIDS



NEMATOCYSTS

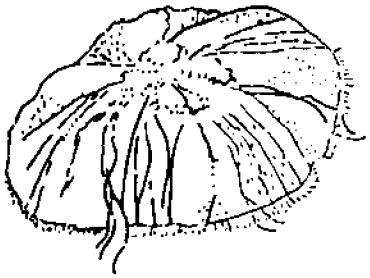
Coelenterates are soft bodied. The individual animals are radically symmetrical (round, like a pie) with a ring of tentacles around a central mouth. The tentacles have stinging cells (nematocysts for food gathering and protection.



SEA ANEMONES

Sea anemones illustrate the polyp form of this group. A polyp has an upright stalk with the mouth and tentacles directed upwards. Colonial sea anemones are groups of

anemone-like animals which share tissue. They form soft mats of living animals.

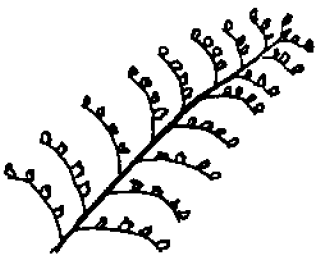


JELLYFISH

Jellyfish illustrate the medusa form. There is no stalk, only a bell-like structure with the mouth and the tentacles on the undersurface of the bell. Jellyfish swim about by muscular contractions of the bell. Some can give a painful sting.

CORAL

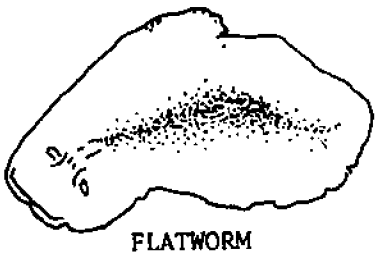
Corals are colonies of anemone-like animals which secrete a hard, usually calcium carbonate ($CaCO_2$), skeleton. Reef-building corals have tiny, one-celled algae living in their tissue. These algae aid in the formation of the hard skeleton.



HYDROIDS

Hydroids are colonies of polyps which form a plant-like structure. The stems and branches of the colony are hollow and food and water are passed through them. Hydroids can sting and should not be handled.

PHYLUM PLATYHELMINTHES
FLATWORMS



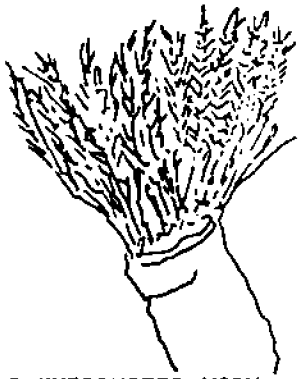
FLATWORM

Flatworms are bilaterally symmetrical (having a right and left side) and very flat. They glide along by secreting a sheet of mucous and beating small hairs on their undersurface on this mucous sheet. Some can swim also. They are very thin so that wastes can pass from the body through the skin.

PHYLUM ANNELIDA
SEGMENTED WORMS

BRISTLE WORM

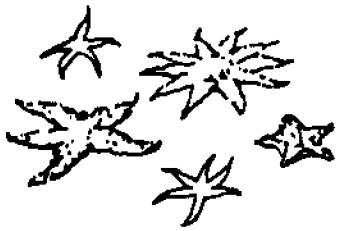
Annelid worms are bilaterally symmetrical and segmented. Some structures, like muscles and kidneys, are repeated in each segment. Marine annelids are called polychaetes (= many bristles) because they have spines or bristles along the sides. These may be used for protection or for holding on in a tube. Some annelids, like the fire worm are free-living and are found under rocks.



FEATHERDUSTER WORM

Tube worms, featherduster worms, and spaghetti worms are annelids which secrete a protective tube. They stay in this tube and extend tentacles or fans from the head end to catch food. When frightened, they can draw this food catching apparatus in rapidly.

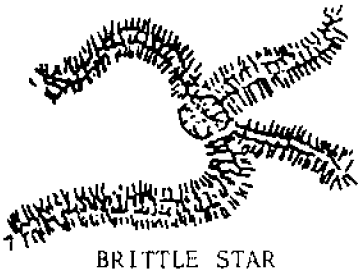
PHYLUM ECHINODERMATA
STARFISH, SEA URCHINS, SEA CUCUMBERS, BRITTLE STARS



STARFISH

Echinoderms are basically built on a five ray plan. This plan is evident in starfish and brittle stars and can be seen on sea urchin tests (= shells). Echinoderms are the only group that has tube feet for locomotion and/or attachment. This group exhibits a high degree of ability to regenerate lost body parts. Starfish usually have five rays, or at least five sides, but some, like the crown-of-thorns, have many. There is a row of

tube feet on the undersurface of every arm. The digestive and reproductive systems extend into the arms. Starfish eat by extruding a thin, pouch-like stomach over their prey.

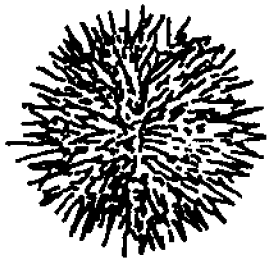


BRITTLE STAR

Brittle stars look like skinny, black starfish, but are really quite different. Their body and arms are distinctly separate, they can drop their arms at will, their digestive and reproductive systems do not extend into the arms, the arms are lined with spines, and the tube feet do not have suction cups on the ends as they do in starfish. Brittle stars are commonly found under rocks.

SEA CUCUMBER

Sea cucumbers have an elongate body with the mouth and anus at opposite ends. The mouth is ringed with food gathering tenacles. Sometimes a small black and white crab may be found in the mouth. Certain kinds of sea cucumbers spit out sticky white threads when disturbed. Tube feet are found all over the undersurface of most Hawaiian sea cucumbers, helping them to hang onto rocks. Sea cucumbers breathe by pumping water in and out of the anus. Their respiratory mechanism is inside the body near the anus.



SEA URCHIN

Sea urchins are usually spiny. Most are harmless unless you fall or step on them, but the ones with long, thin spines are venomous. All sea urchins are edible, the

gonads being the part that is eaten. Sea urchins eat with five hard teeth found in the center of the underside of the body. These are part of a larger internal structure called an Aristotle's lantern. Sea urchins have tube feet among their spines.

FEATHER STAR

Crinoids are the most ancient members of this group. They are also called feather stars. Unlike their relatives their mouth is on the top rather than underneath. Food particles are caught on the feathery arms and moved to the mouth.

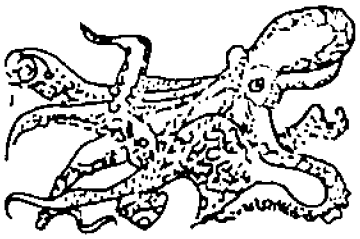
PHYLUM MOLLUSCA
SNAILS, SLUGS, CLAMS, OYSTERS, SQUID, OCTOPUS, ETC.

Mollusks have a soft body which is usually protected by a shell. The shell may be single or paired.

SNAIL

CLAM

Mollusks have a mantle which secretes the shell, and which, in the cowries, can cover the shell. The foot is a muscular structure which is used for crawling or digging (as in clams). Mollusks also have eyes and rhinophores (chemically sensitive tentacles on the head). Cones are snails which catch their prey with a venomous dart. Nudibranchs and sea hares are also termed sea slugs, because they are snails with only tiny shells or none at all. They are often beautiful.

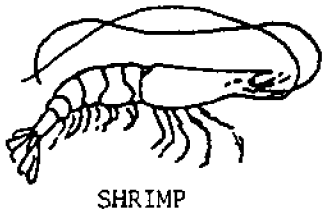


OCTOPUS

Octopus, cuttlefish, chambered nautilus and squid are all mollusks that feed with tentacles. The chambered nautilus is the most primitive and ancient member of this group and retains a large shell. The octopus is the most highly evolved member, having a highly developed nervous system and no shell. Both the octopus and cuttlefish are able to change color and texture rapidly.

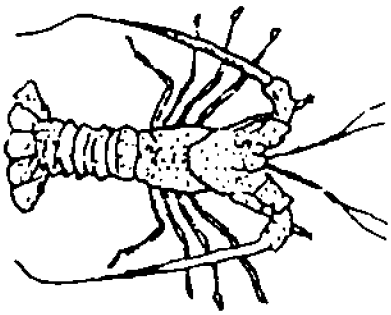
PHYLUM ARTHROPODA
BARNACLES, SHRIMP, LOBSTERS, CRABS

Arthropods have jointed legs and hard body coverings which they must molt periodically in order to grow. During molting the hard body covering is shed, exposing a new, soft one underneath. This hardens in a short time. Most marine arthropods are termed crustacea (not barnacles though).



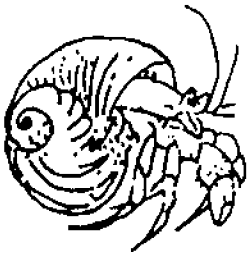
SHRIMP

Shrimps have a long abdomen and five pairs of legs. They have two pair of antennae and a rostrum, or point between they eyes. Usually one, two and sometimes three pairs of legs have pincers. The mouthparts are several pairs of modified legs. Large, edible shrimp are called prawns.



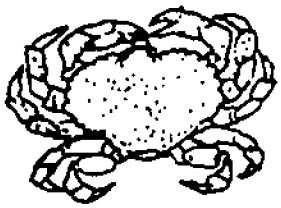
SPINY LOBSTER

Spiny lobsters have five pairs of legs and no pincers. One pair of antennae is enlarged greatly, and has a spiny base; this structure is used in interactions between other animals. True or Maine lobsters have have pincers on the first pair of legs, and are not closely related to spiny lobsters. Slipper lobsters are flattened lobsters with no pincers. These are closely related to spiny lobsters.



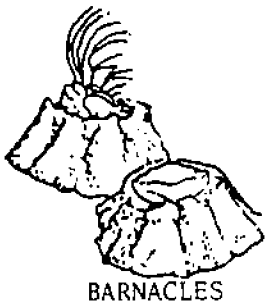
HERMIT CRAB

Hermit crabs have a reduced and softened abdomen which they usually cover with a mollusk shell. Some species of hermits have sea anemones that live on the shell. These probably help protect the hermit crab from predators with their stinging cells.



CRAB

Crabs have a totally reduced abdomen. All that is left of it is a flap under the body which covers the copulatory organs. Crabs exhibit many adaptations to different life styles. Swimming crabs have the last pair of legs paddle shaped. Rock crabs are flattened and have spines on the legs for hanging onto rocks in the surf zone. Box crabs and Kona crabs are adapted for burrowing in the sand. Some crabs have long eyestalks for peering out of the mud or sand in which they live. Many crabs are semi-terrestrial meaning they are adapted to live out of water for extended periods.



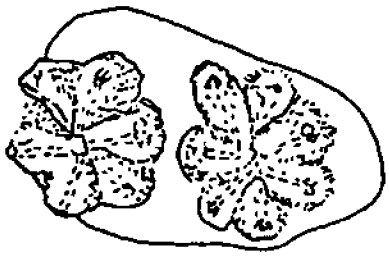
BARNACLES

Barnacles don't look like other members of this group when they are in the larval stages, they look like small shrimp. They settle out on a hard surface and form their stony house around themselves. The two doors at the top open during high tide to allow the feathery feet to catch small animals in the plankton.

PHYLUM CHORDATA, SUBPHYLUM UROCHORDATA
TUNICATES OR SEA SQUIRTS

SEA SQUIRT

Sea squirts and colonial tunicates are in the phylum chordata (along with you and I) because they have Chordate characteristics during the larval stages. Some of these characteristics are gill slits and a heart. In the adult stage, however, they look like very primitive animals. A sea squirt is a single individual with two openings into the body, one for the entrance of water and food and one for the exit of water and wastes. Sea squirts are sessile organisms, which means they are permanently attached. If you squeeze them, water will squirt out.



COLONIAL TUNICATES

Colonial tunicates are colonies of tiny sea squirt-type animals. Often they form themselves into petal-like arrangements. This is done so they can share a common water and waste exit. Some of these colonies are as big and fat as a softball, others are very thin. They are often colorful.