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Sea Grant Depository

MAKAHIKI KAI



FESTIVAL OF THE SEA

# Student Workbook

APRIL 15-18, 1975

HONOLULU INTERNATIONAL CENTER  
SEA GRANT • UNIVERSITY OF HAWAII

Dear Boys and Girls:

This booklet is designed to guide you as you proceed through the exhibits and activities which have been set up especially for you.

There are three parts to Makahiki Kai\* '75:

- The Ocean--the place
- Three historical views of Hawaii and her people:
  - † An ancient fishing village
  - † Hawaii during the whaling era
  - † Hawaii today
- Marine Education Center:
  - † Recreation and vocations
  - † Sea art
  - † Water safety
  - † Man in the sea
  - † Physical oceanography
  - † Marine biology

The giant mobile at the exit takes you once again back to the ocean--the place. Enjoy its beauty.

For the next 100 minutes unlock your imagination and climb into the yellow submarine and let it take you to the undersea world. When you leave the yellow submarine, you will find that you have traveled backward into time to ancient Hawaii. We won't tell you any more. Discover for yourself the magic of the yellow submarine.

Sea Grant College Program

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#### SEA GRANT COLLEGE PROGRAM

The Hawaii Sea Grant College Program and its advisory and educational services serve as the transmitter of information on developments in marine sciences to all segments of the state of Hawaii, including the general public. The responsibility which Sea Grant has is great and vital and to the degree possible with constraints of personnel and budgetary limitations, we have and are continuing to promote awareness of the ocean and its resources and their relation to the people of the state of Hawaii through newsletters, reports, and the mass media.

However, such efforts are dwarfed by the Makahiki Kai, the festival of the ocean, which has been coordinated by Sea Grant College Programs in cooperation with state, federal, and county agencies and departments, the various marine-related departments of the University of Hawaii, and many business firms in the private sector.

The University of Hawaii Sea Grant College Program is concerned with needs that are immediate and vital to the well-being of the state's marine environment. The program deals with these needs through the areas of research, education, and advisory or extension services.

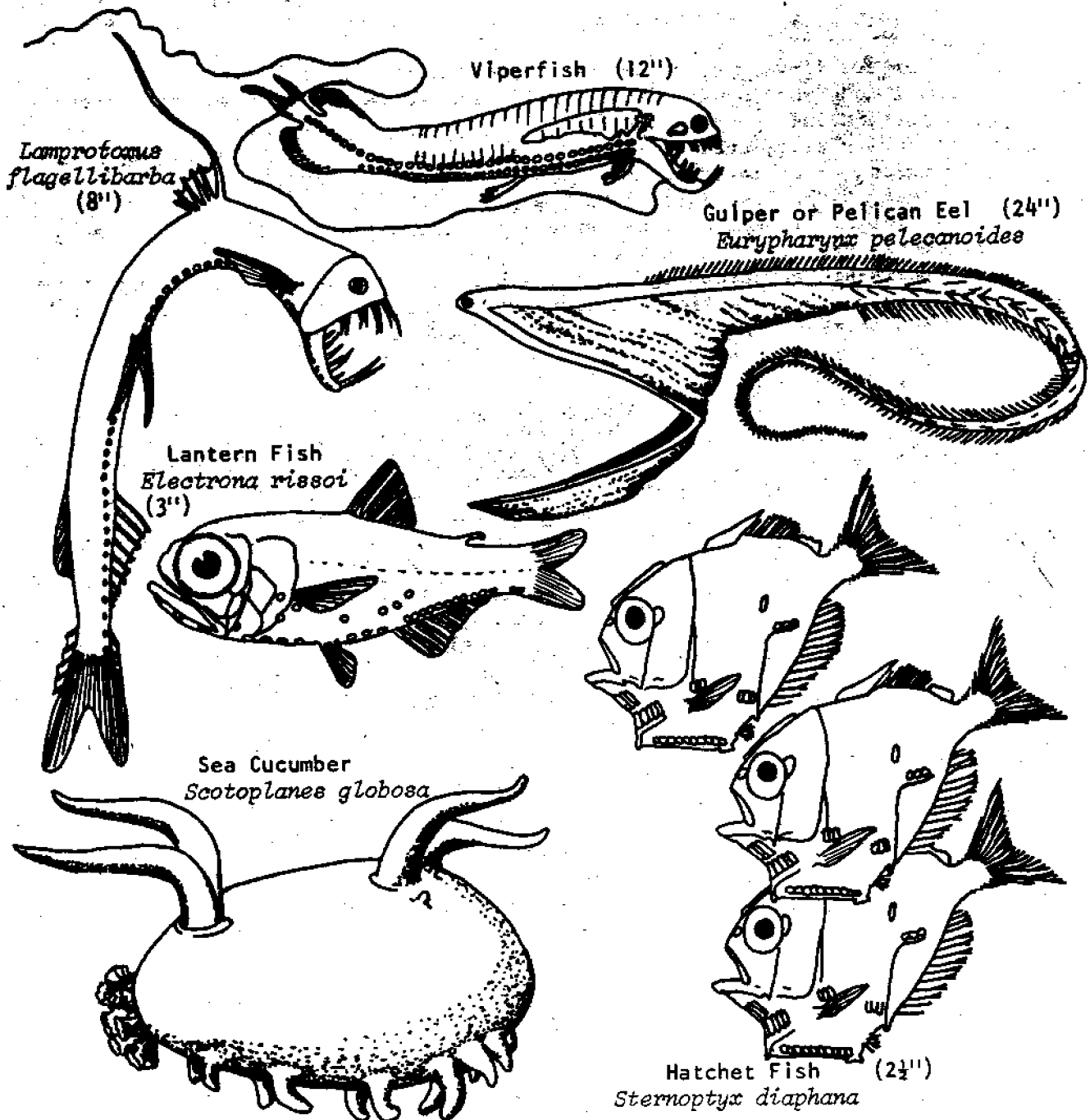
Research sponsored by Sea Grant is involved with the development, exploration, and management of the marine environment. Sea Grant encourages support of marine education for all segments of Hawaii's population. The Marine Advisory Program communicates marine-related information to the general public, the scientific community, and specific individuals concerned with the marine environment.

\*Festival of the Sea

the ocean - - the place



# abyssal animals

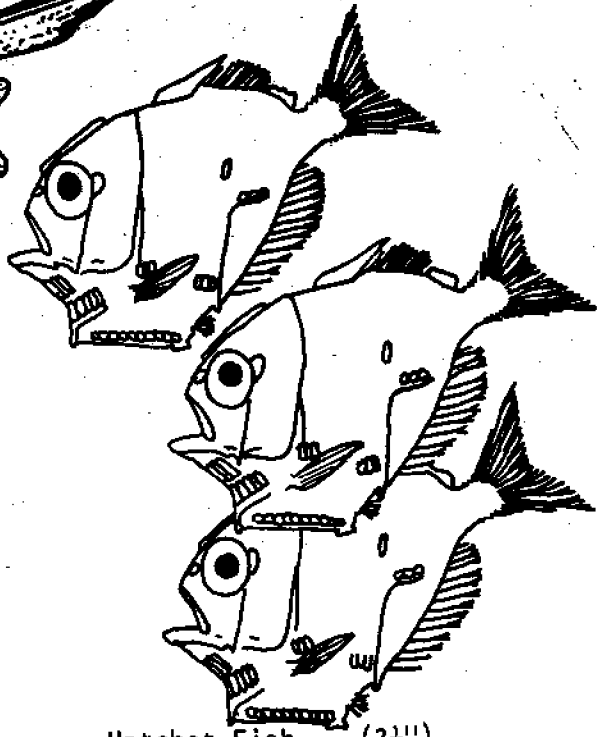


*Lamprolepis flagellibarba*  
(8")

Viperfish (12")

Gulper or Pelican Eel (24")  
*Eurypharynx pelecnoidees*

Lantern Fish  
*Electrona rissoi*  
(3")



Hatchet Fish (2 1/2")  
*Sternoptyx diaphana*

Sea Cucumber  
*Scotoplanes globosa*

## HAWAIIAN TIDAL POOLS

Have you walked along a rocky coast and noticed a tidal pool?

What do you see when you casually glance over those areas of water trapped by rocks and land? You may see limu-covered rocks, a fish darting quickly for cover, a crab sunning but warily watching you.

If you peer more closely, you will view an exciting realm of marine life that you would have missed with a casual glance:

Blennies, the agile rockskippers, jumping from pool to pool to escape their enemies;

Young damselfishes chasing other tiny fishes away from their territories;

Hermit crabs examining a new shell as a possible home;

Long spined sea urchins (wana) waving their spines in response to a fish passing by (they are protected by their long poisonous spines so please do not touch);

Opihi crawling about on wet rocks feeding on algae;

Small cone shells which employ poisonous darts to paralyze their prey before eating them;

Various shrimps such as the colorful red and white bandana prawn, crawling about in crevices

If you look at the tidepools themselves you will find that they are of two types, those created by periodic wave splashes (splash pools) and those formed by retreating tides (intertidal pools).

Splash pools are situated high on rocky benches and the animals living within them must tolerate wide variations in temperature and salinity. The blenny, opihi, and nerite (pipipi) are a few animals commonly found in splash pools.

Intertidal pools disappear at high tide and are reformed at low tide. Animals living within this type of pool are able to withstand strong wave surge.

Our tidal pool exhibit is an attempt to show a cross-section of the animals representative of a typical Hawaiian intertidal pool found above the low tide mark. It portrays a hallow lava or limestone rock basin which contains sand, limu, and the most common animals in this type of pool.

Intertidal pools are an important link in the life cycles of many marine animals. They are inaccessible to large predatory animals and serve as nurseries for fishes that later grow to larger sizes in the sea. They teem with miniature marine life, and provide permanent homes for many smaller animals which seek protection from larger animals in deeper water.

The lives of all of us in Hawaii are intrinsically touched by the ocean and for those who like to explore, look for a fascinating tidal pool and you will come to cherish these easily accessible windows to the sea.

## TOUCHING POOL

Our touching pool is intended to allow you to handle marine animals and thereby add the dimension of touch to the other sensory experiences provided by Makahiki Kai. This pool contains some of our most hardy marine animals; sea stars, short spined sea urchins, millet, small hermit crabs, and cowries.

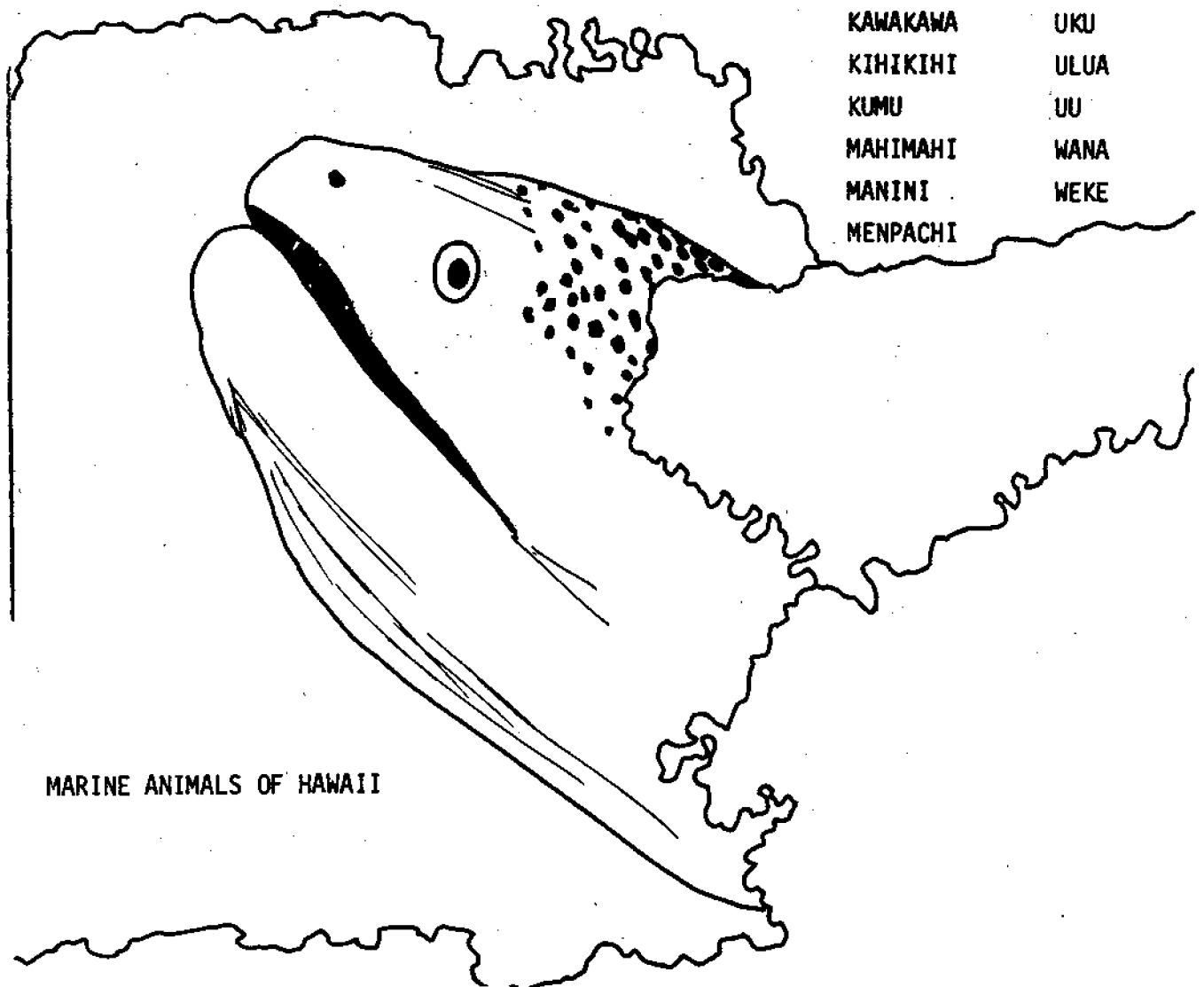
## DANGEROUS MARINE ANIMAL AQUARIUM

This 60-gallon aquarium depicts various marine animals to increase your awareness that some life in the sea can be harmful to touch or to eat. Animals included are: the lionfish which has poisonous spines, moray eels which have sharp teeth, and wana which has toxic long spines, pebble crabs which can pinch, parthenopid crabs which are poisonous if eaten, and the sea anemones which have stinging cells in their tentacles.

# WORD SEARCH I

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

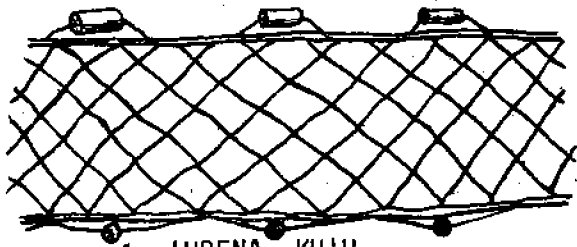
AHI	MOANA
AHOLEHOLE	MOI
AKU	NABETA
AKULE	OIO
AMAAMA	OMAKA
AWAANA	ONO
AWEOWEO	OPAKAPAKA
EHU	OPELU
HALALU	OPIHI
HINALEA	PALANI
HUMUHUMU	PAPIO
KAHALA	PIPIPI
KALA	PUHI
KALIKALI	UHU
KAWAKAWA	UKU
KIHIKIHI	ULUA
KUMU	UU
MAHIMAHI	WANA
MANINI	WEKE
MENPACHI	



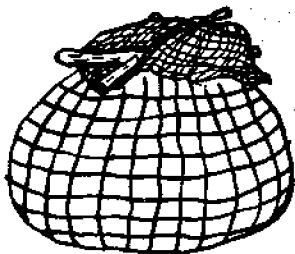
MARINE ANIMALS OF HAWAII

# fishing in old hawaii

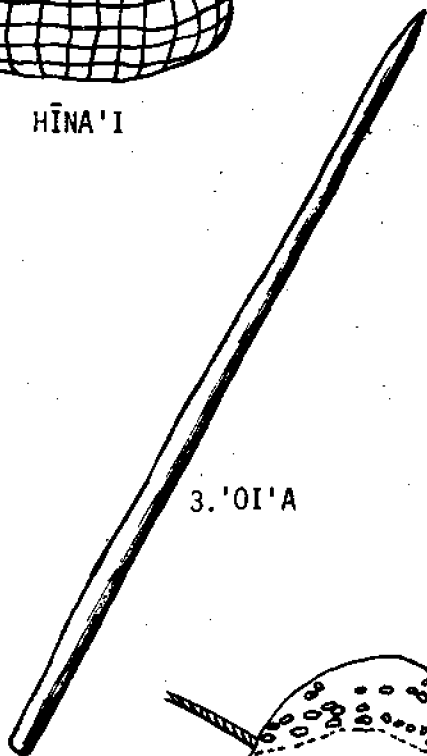
DRAW A LINE CONNECTING THE ANIMAL WITH THE PROPER FISHING TOOL.



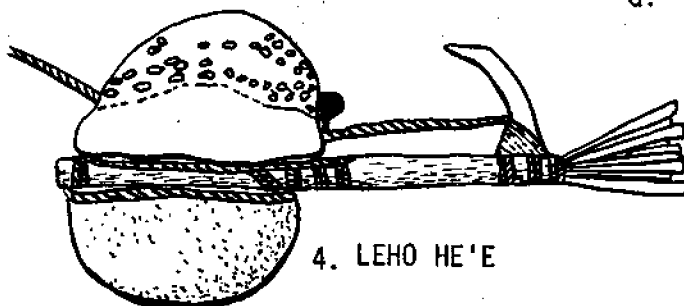
1. 'UPENA KU'U



2. HĪNA'I



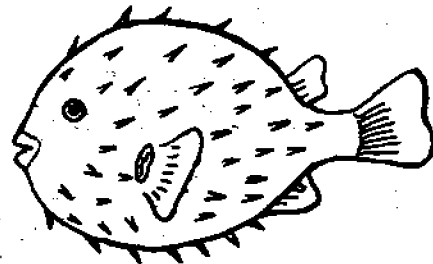
3. 'OI'A



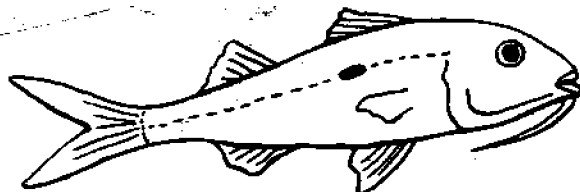
4. LEHO HE'E



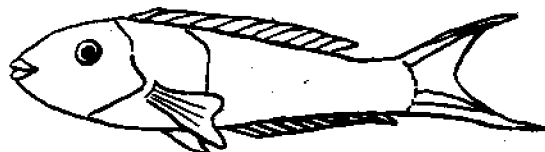
a. HE'E



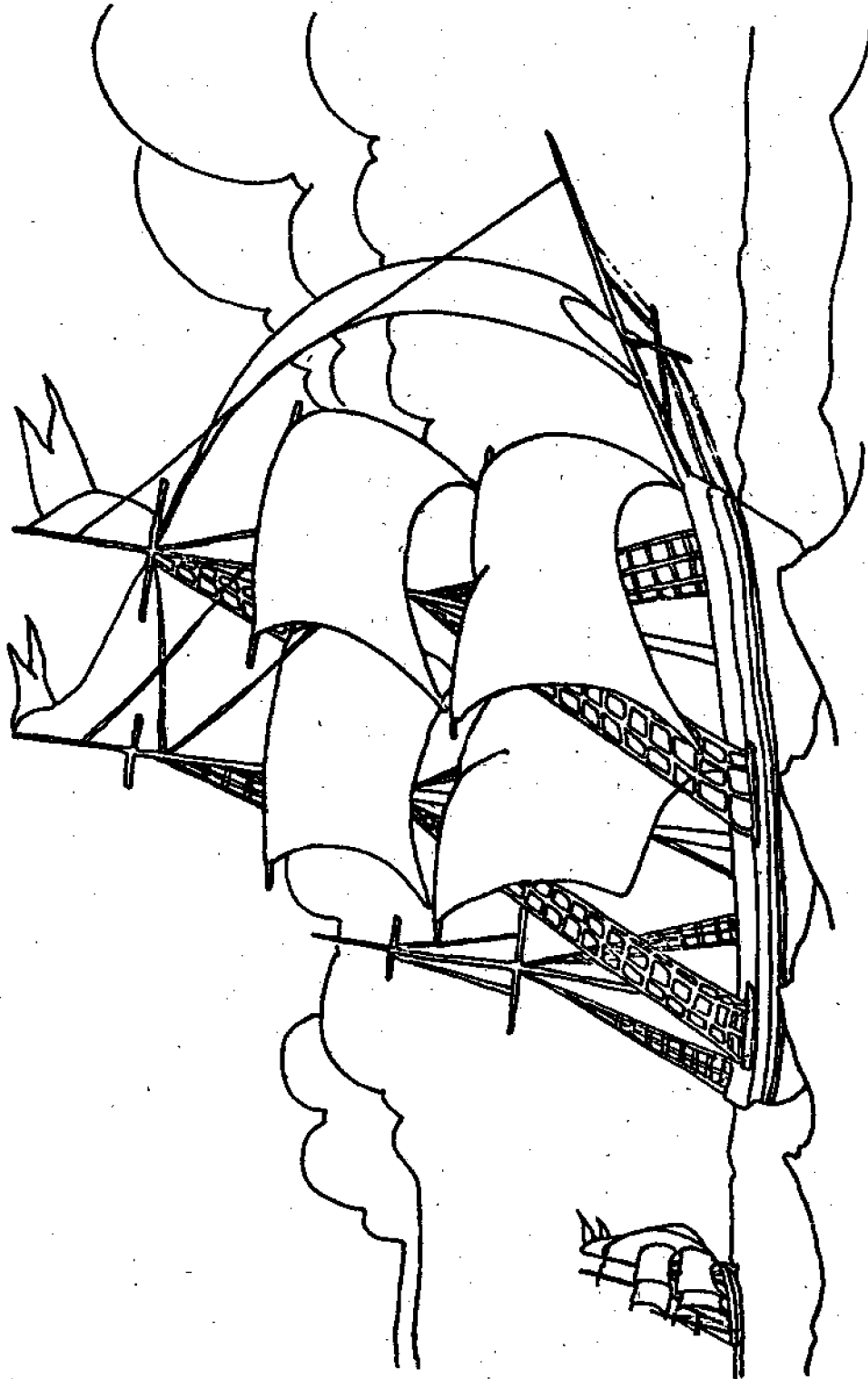
b. 'OPŪ HUE



c. WEKE 'Ā'Ā



d. HINALEA



*Color me!*



# KNOTS :

1) Overhand:



2) Figure-8:



an "end-of-the-line" knot

3) Square knot:



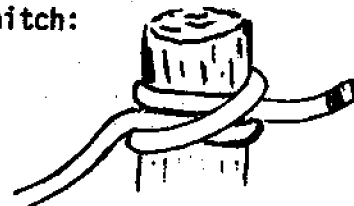
Note: this is not a square knot!



4) Bowline:



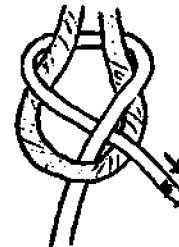
5) Clove hitch:



6) 2 half-hitches:

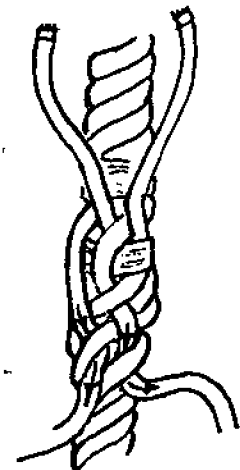
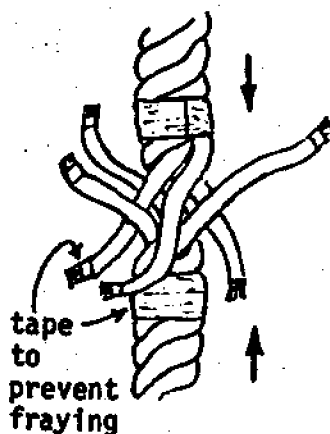


7) Sheet bend:



start with a loop

# SPLICING :

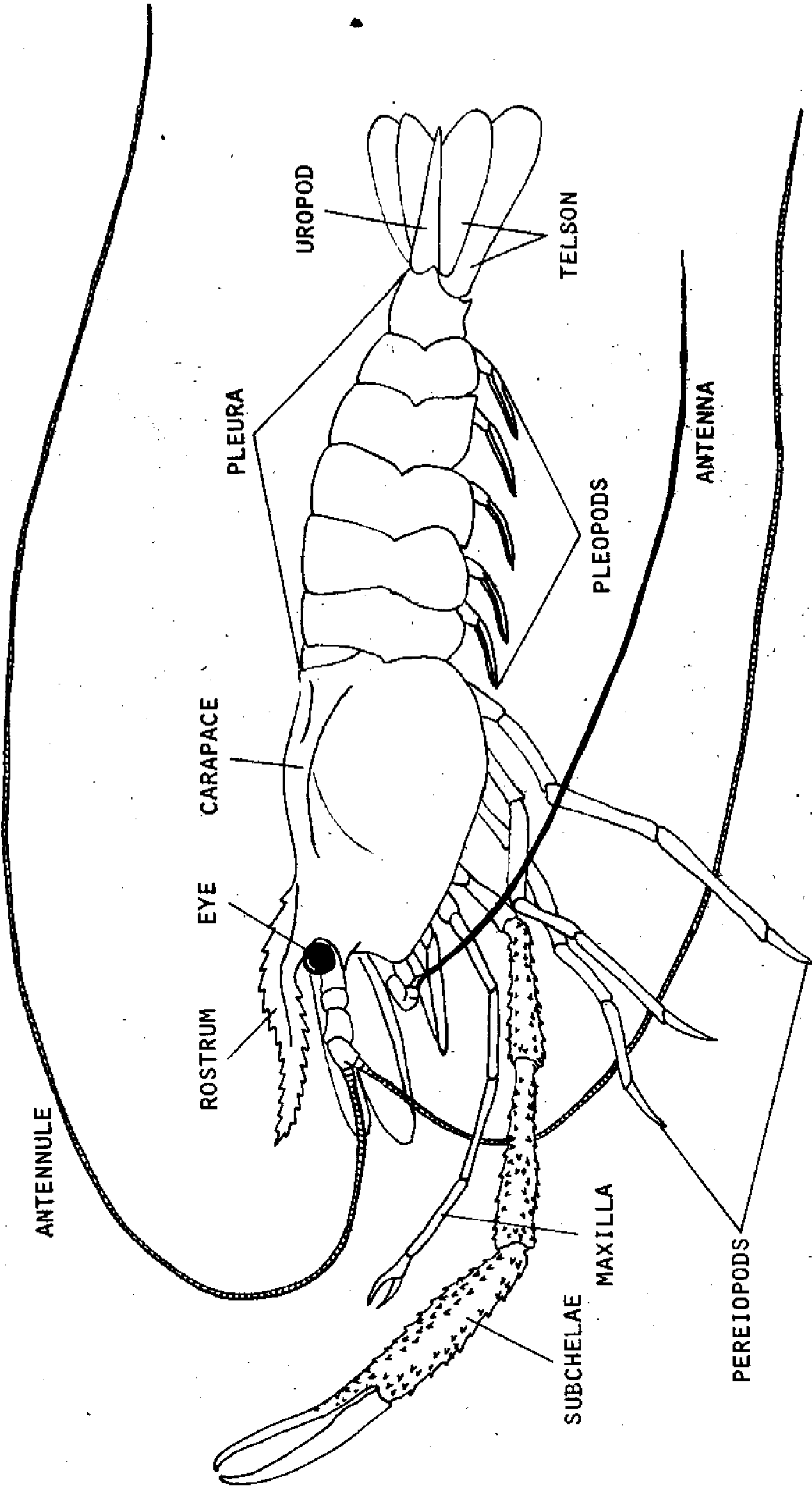


Note: A square knot will reduce the strength of the line joined by 50%, a bowline by 30-40% and a splice by only 10%.

1) "Marry" the two ends to be spliced

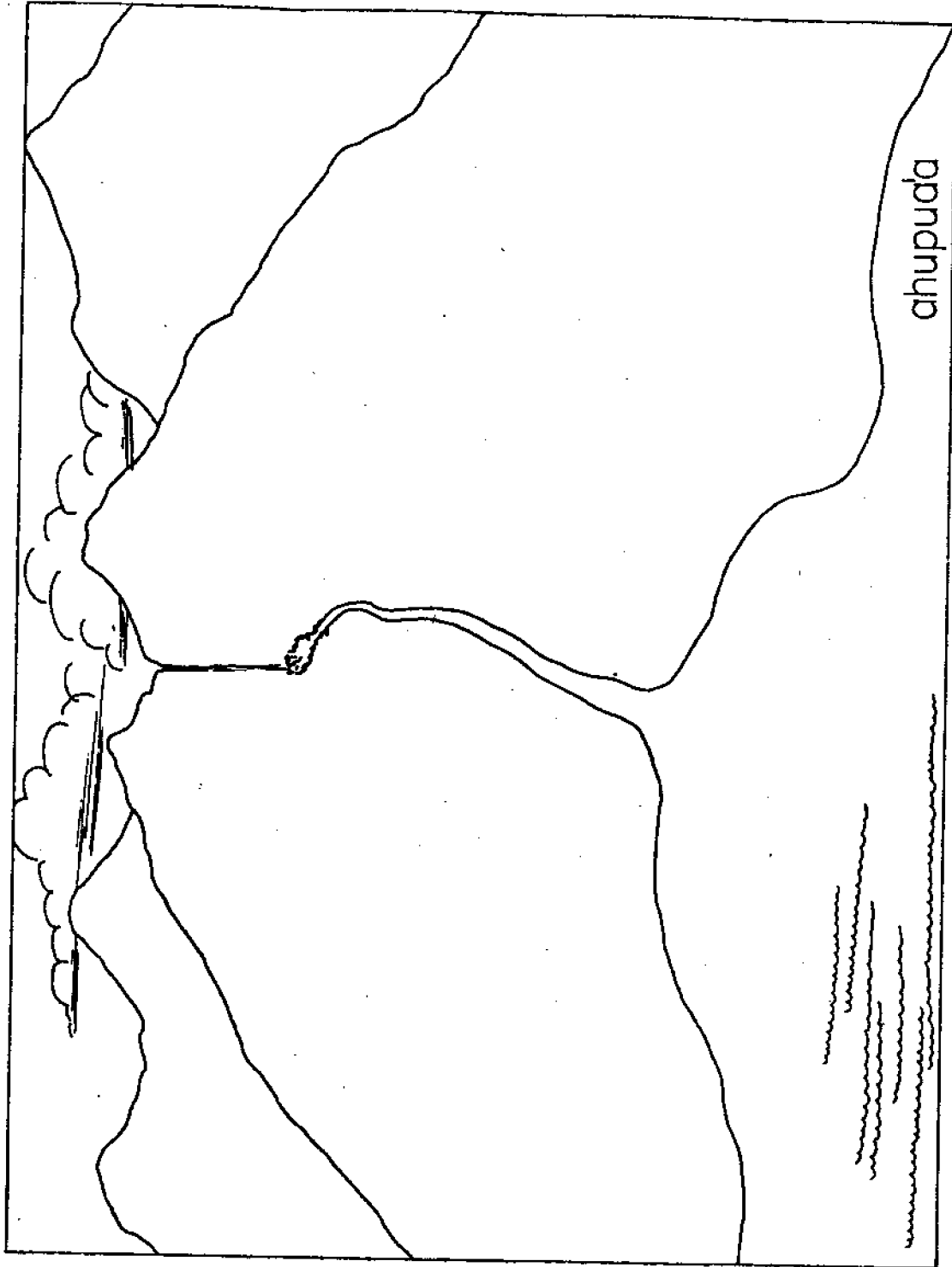
2) Weave the ends in and out of the partially unlayed line

COLOR ME!



GIANT MALAYSIAN PRAWN

(*Macrobrachium rosenbergii*)



This is a picture of an ahupua'a\* on Oahu before people came to live in it. What did people add to the ahupua'a? Imagine that you are on a boat at sea. Fill in this ahupua'a so that it looks like a typical valley in which people live today.

\*land section, usually extending from the upland to the sea

WORD SEARCH II

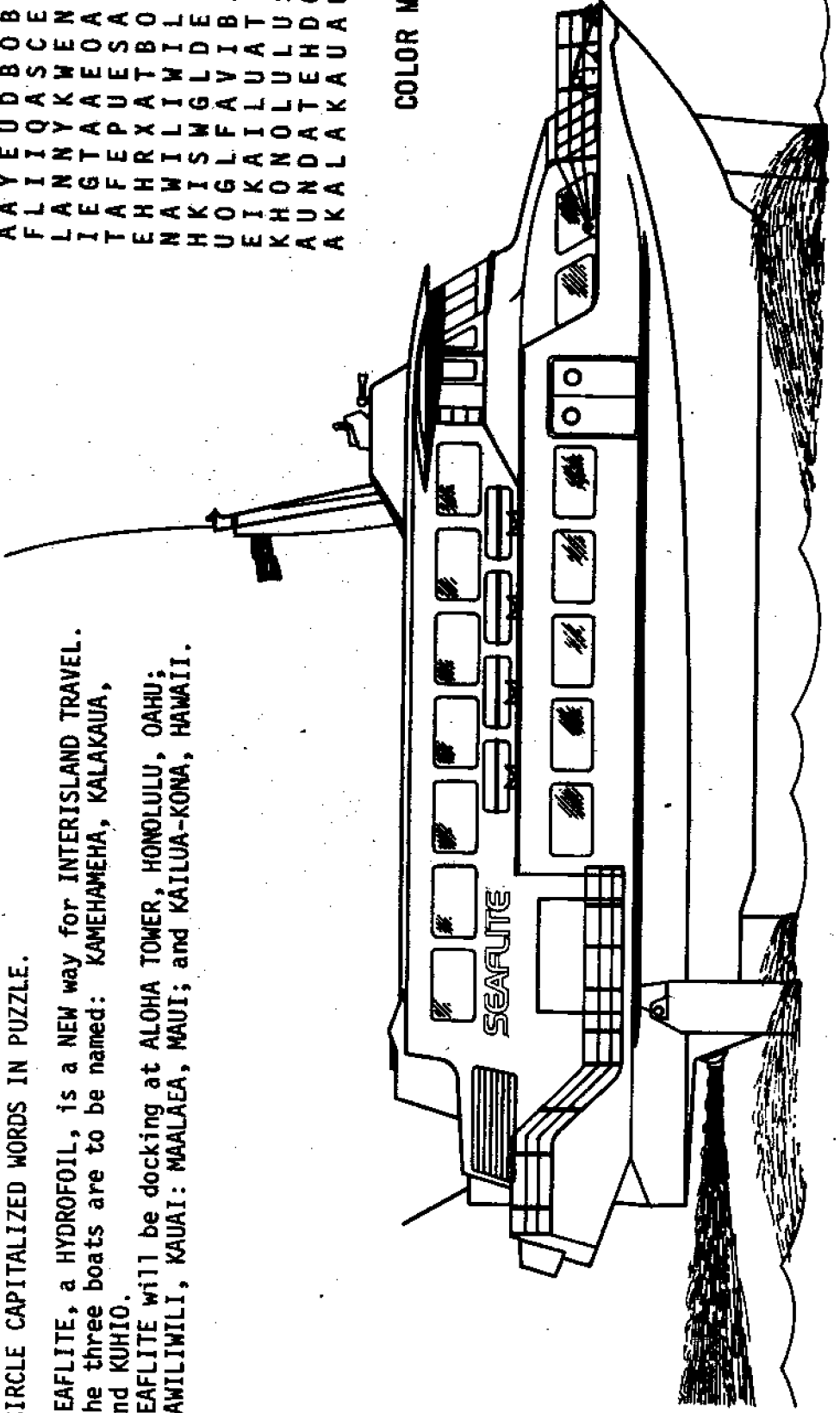
CIRCLE CAPITALIZED WORDS IN PUZZLE.

SEAFLITE, a HYDROFOIL, is a NEW way for INTERISLAND TRAVEL. The three boats are to be named: KAMEHAMEHA, KALAKAUA, and KUHIO.

SEAFUTE will be docking at ALOHA TOWER, HONOLULU, OAHU; MAWILIMILI, KAUAI; MAALAEA, MAUI; and KAILUA-KONA, HAWAII.

SMFLAKAFAKAKA  
 EAALYUOAMH  
 AAYIYUOAMH  
 FLAINTAUE  
 LIEFHXAL  
 TEFHRIW  
 EHWISL  
 NAKIGL  
 HKIOLF  
 UOKA  
 EIKON  
 AKND  
 ALAK  
 AUA  
 UI  
 A

COLOR ME !



**SEAFUTE**

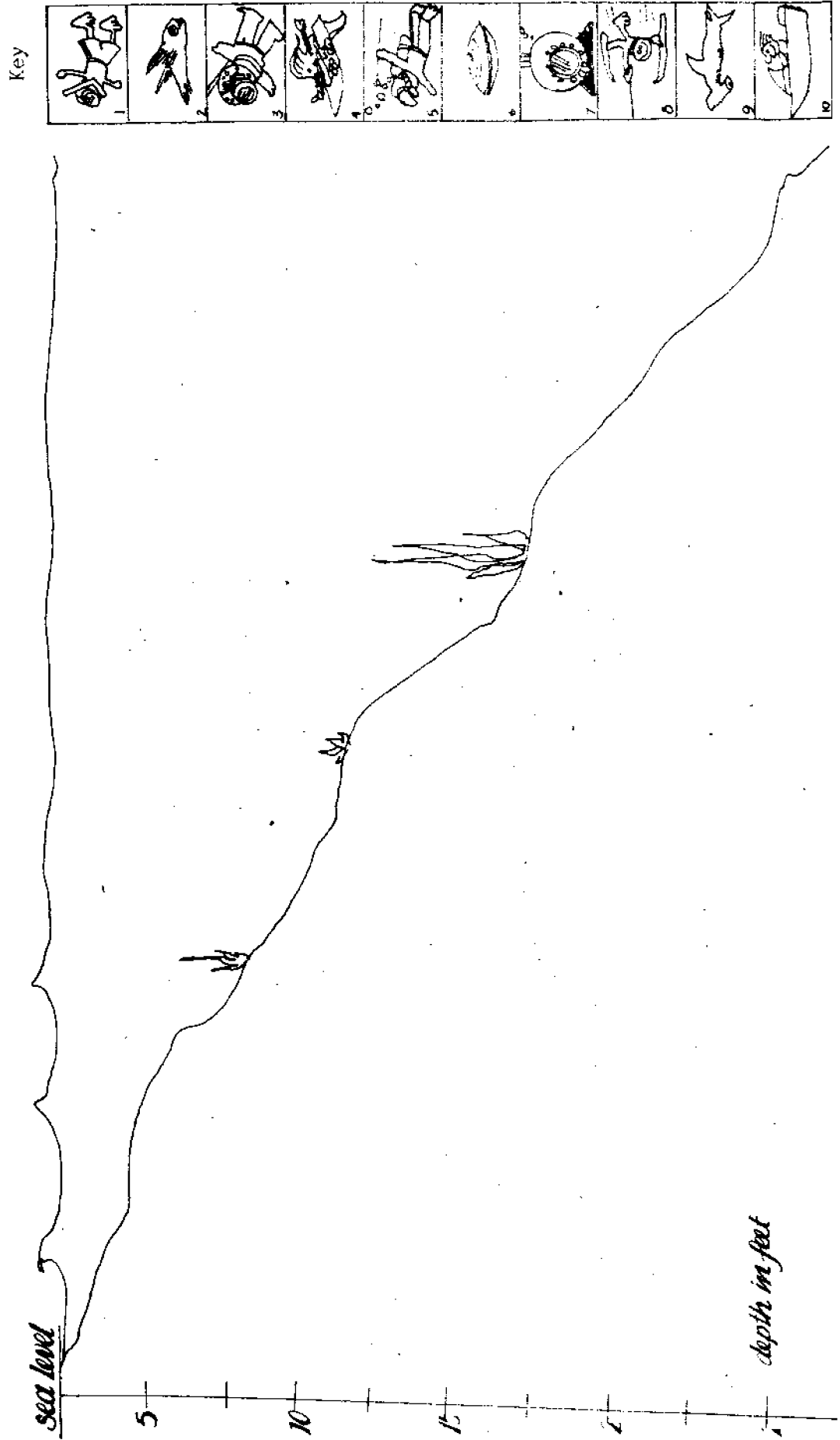
**PACIFIC SEA TRANSPORTATION, LTD.**  
 A KENTRON HAWAII COMPANY

marine  
education  
center



# Recreation

Draw in recreational activities that can be carried on at different depths of the ocean. See cartoon key at right.



# WORD SEARCH III

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

ART	REEF
CANOE	SAIL
CHANTS	SALT
CORAL	SEAWEED
DEPTH	SHARK
DIVER	STAR
FISH	SWIM
GAS	SQUID
JOB	TIDE
LEATHERBACK (TURTLE)	WATER
MARINE	WAVES
OCEAN	WHALE
POND	

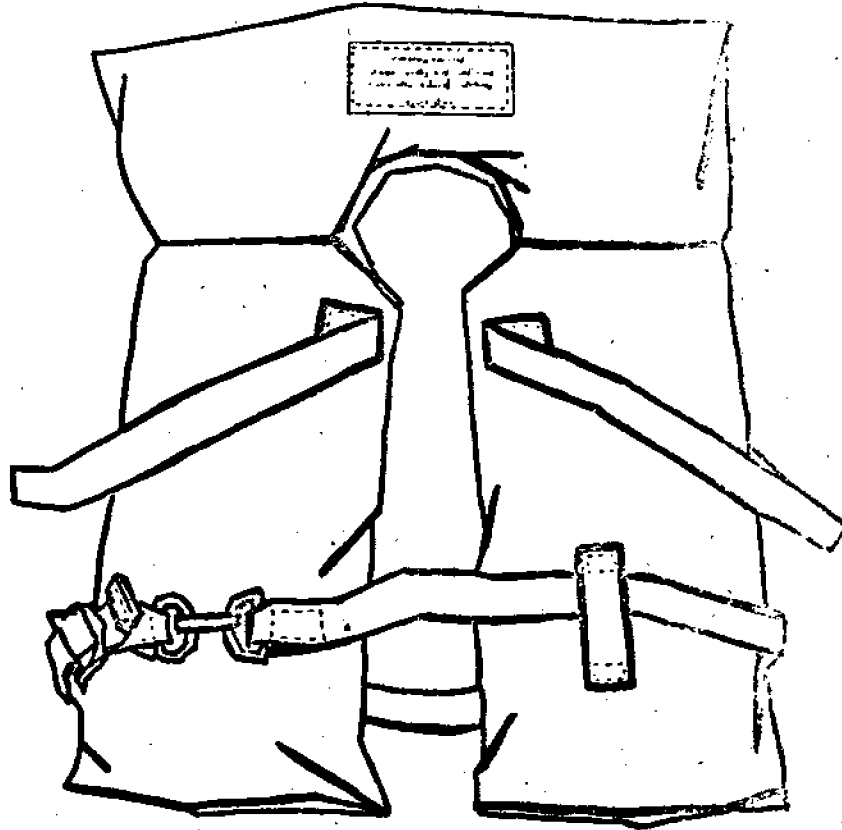
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## VOCATIONS

List 5 ocean-related vocations you have seen at Makahiki Kai:

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

## WATER SAFETY



**THIS WON'T  
SAVE YOUR LIFE  
Unless you're wearing it**

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## MAN IN THE SEA

The sciences usually begin with basic animals and plants. At the end is man! This is the goal for our research. We look at how man or how you can perform in the ocean.

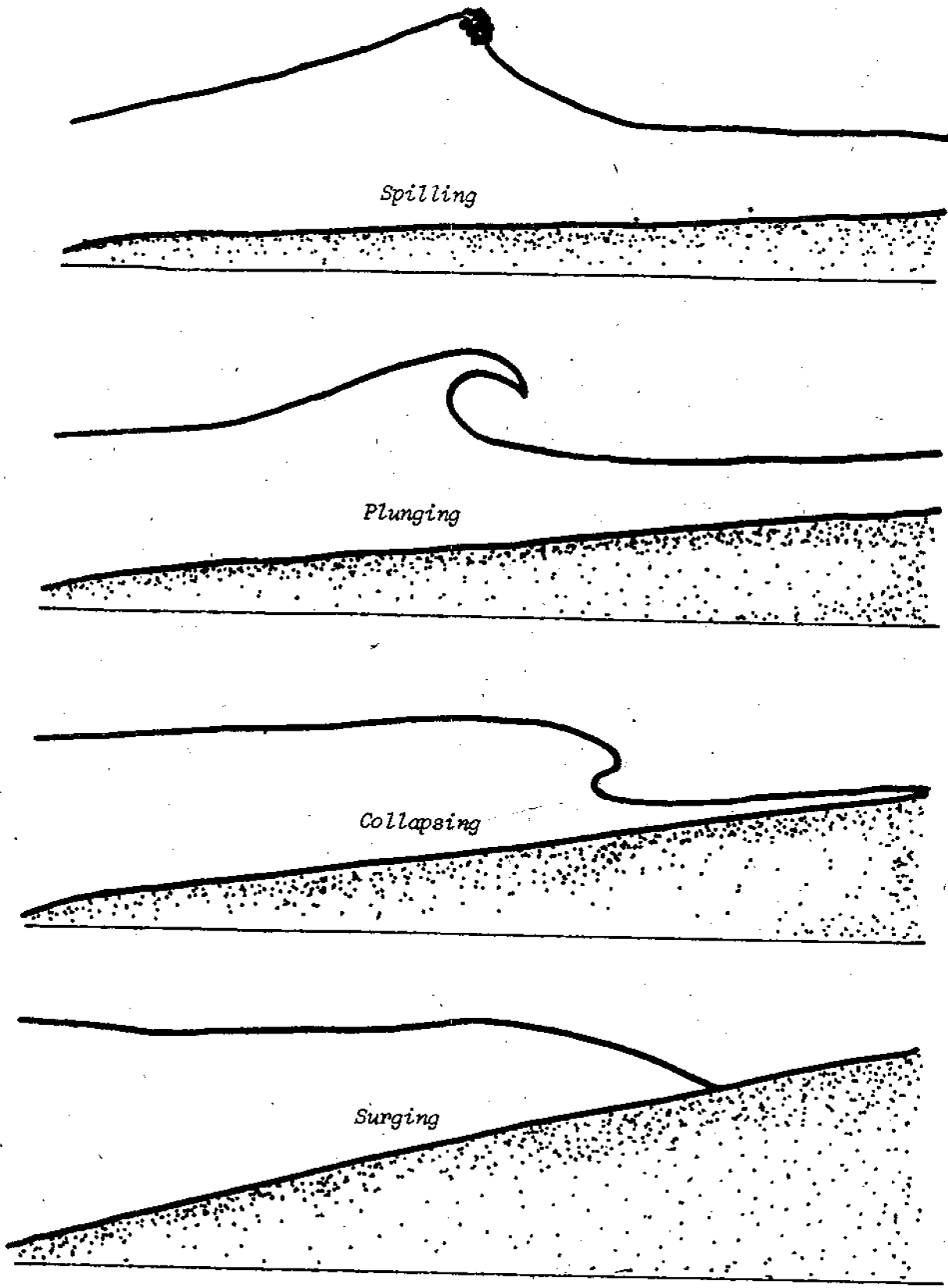
To do this--we have special "tools." One is the bicycle ergometer, which can show how much work you are actually doing and how much energy you have.

Another "tool" is the chamber. In this chamber, and bigger ones like these, we can make a person feel what the pressures of diving do to us.

"Heliox" is the term used by divers when they speak of a helium and oxygen gas mixture. This gas is used in place of air when diving deep or for a long time. One problem with "Heliox" is that it makes you feel cold.

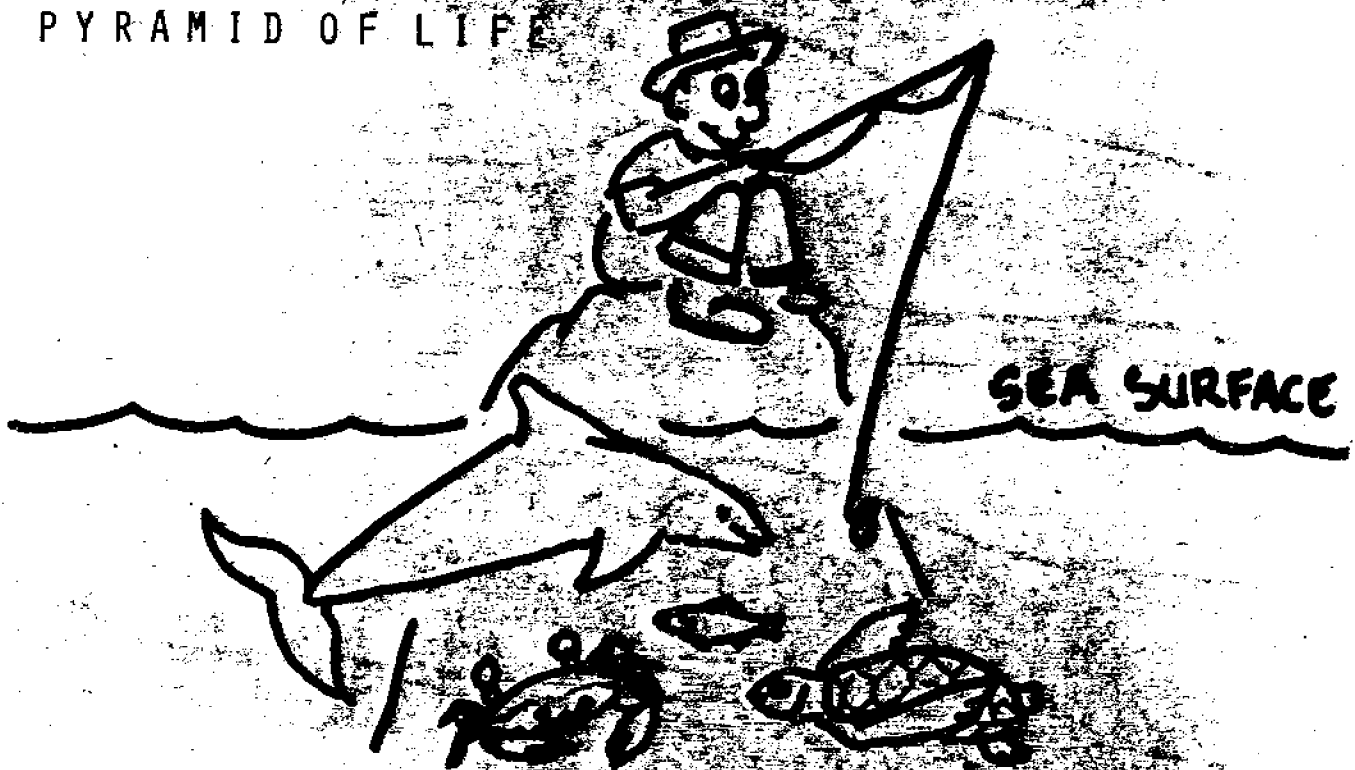
All of these "tools" and gases are used today to learn more of working and enjoying life under the oceans. Maybe one of you may become our future Aqua-people!





**BREAKER CLASSIFICATION**

PYRAMID OF LIFE

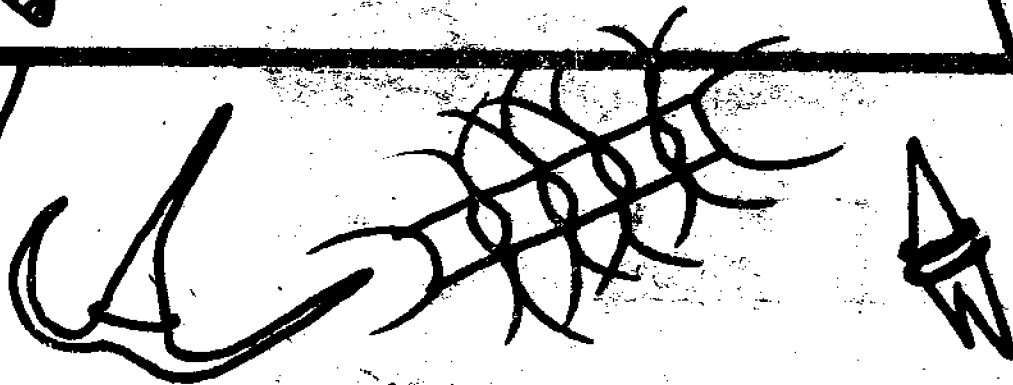


SEA SURFACE

**BENTHIC and NEKTONIC ANIMALS**

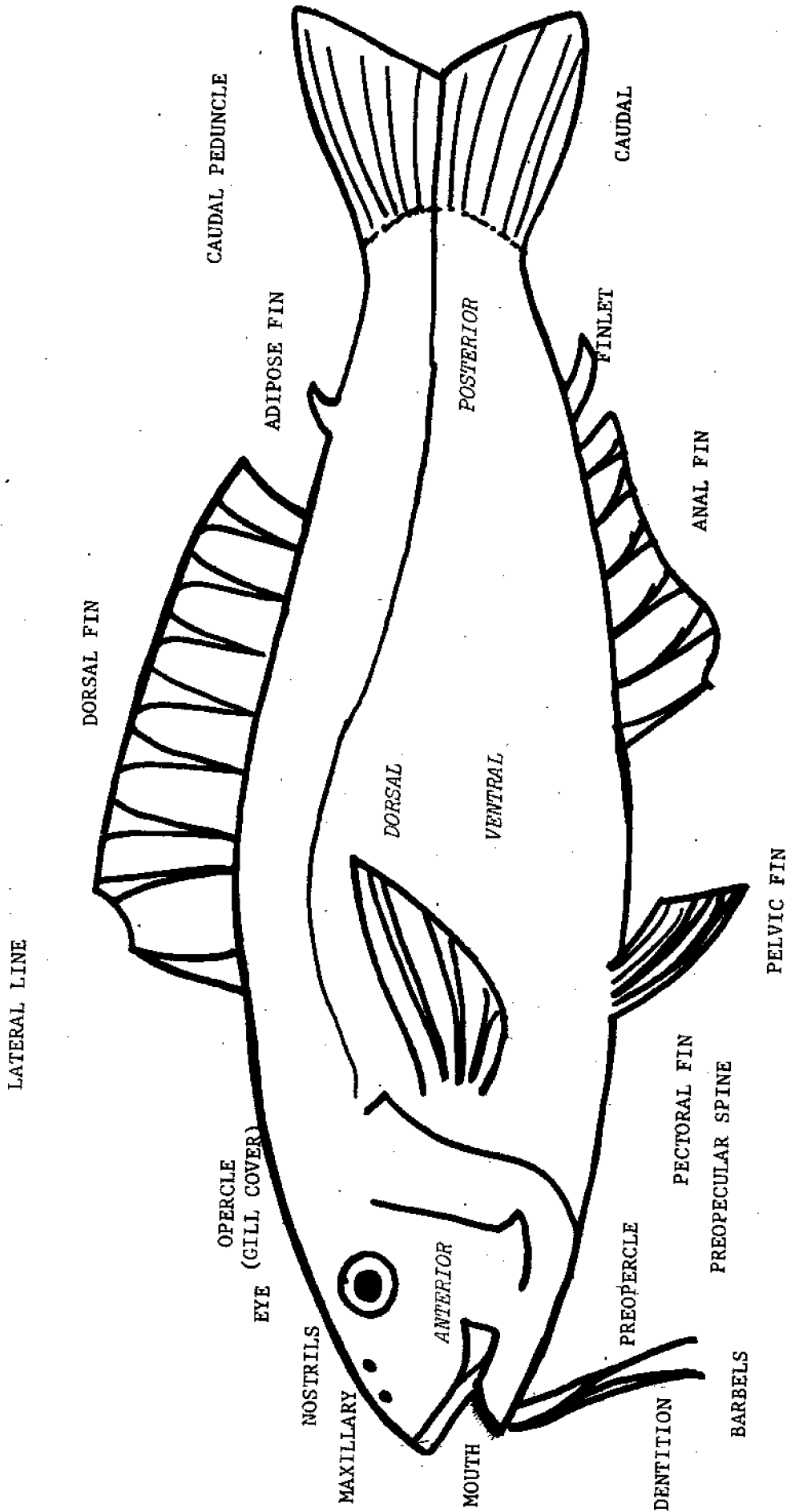


**ZOOPLANKTON**

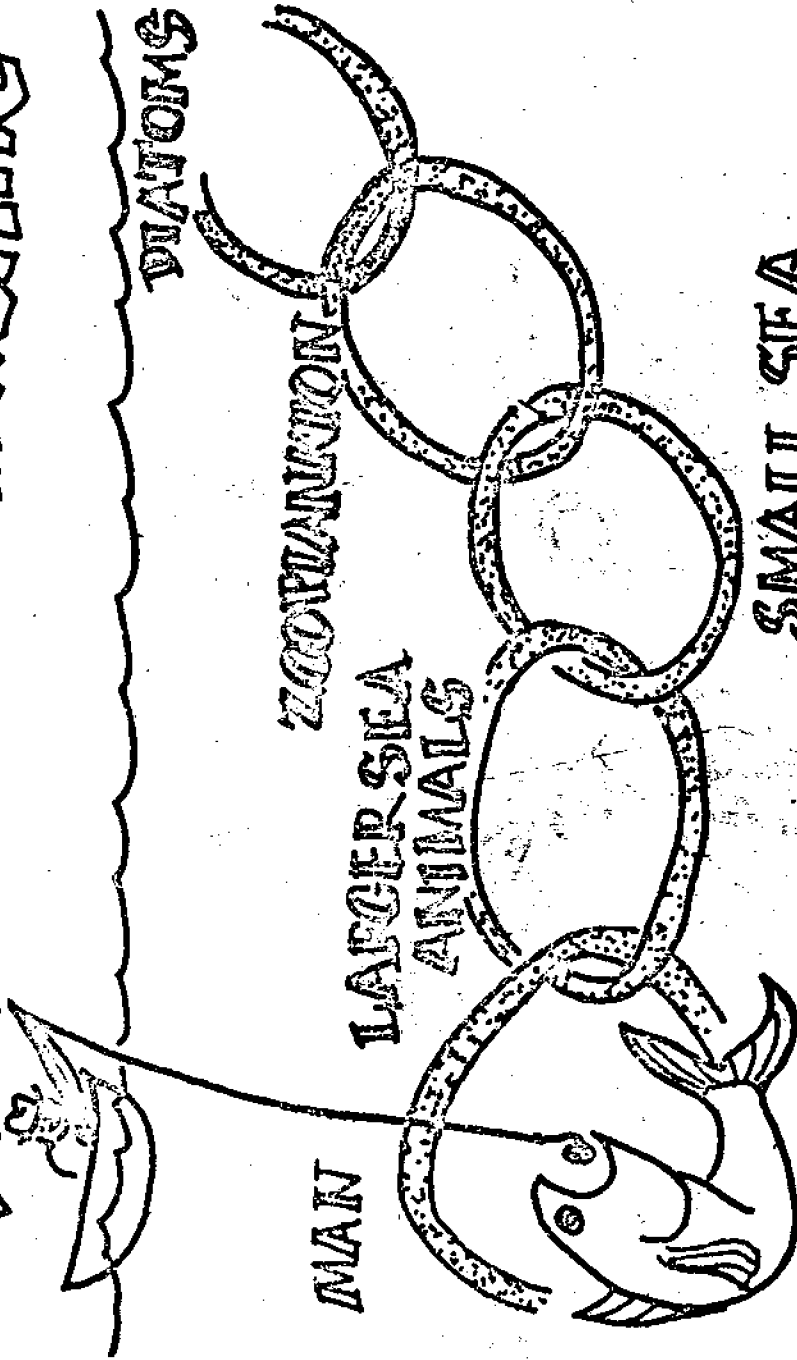


**PHYTOPLANKTON**

# PARTS OF A FISH



# FOOD CHAIN - AQUATIC

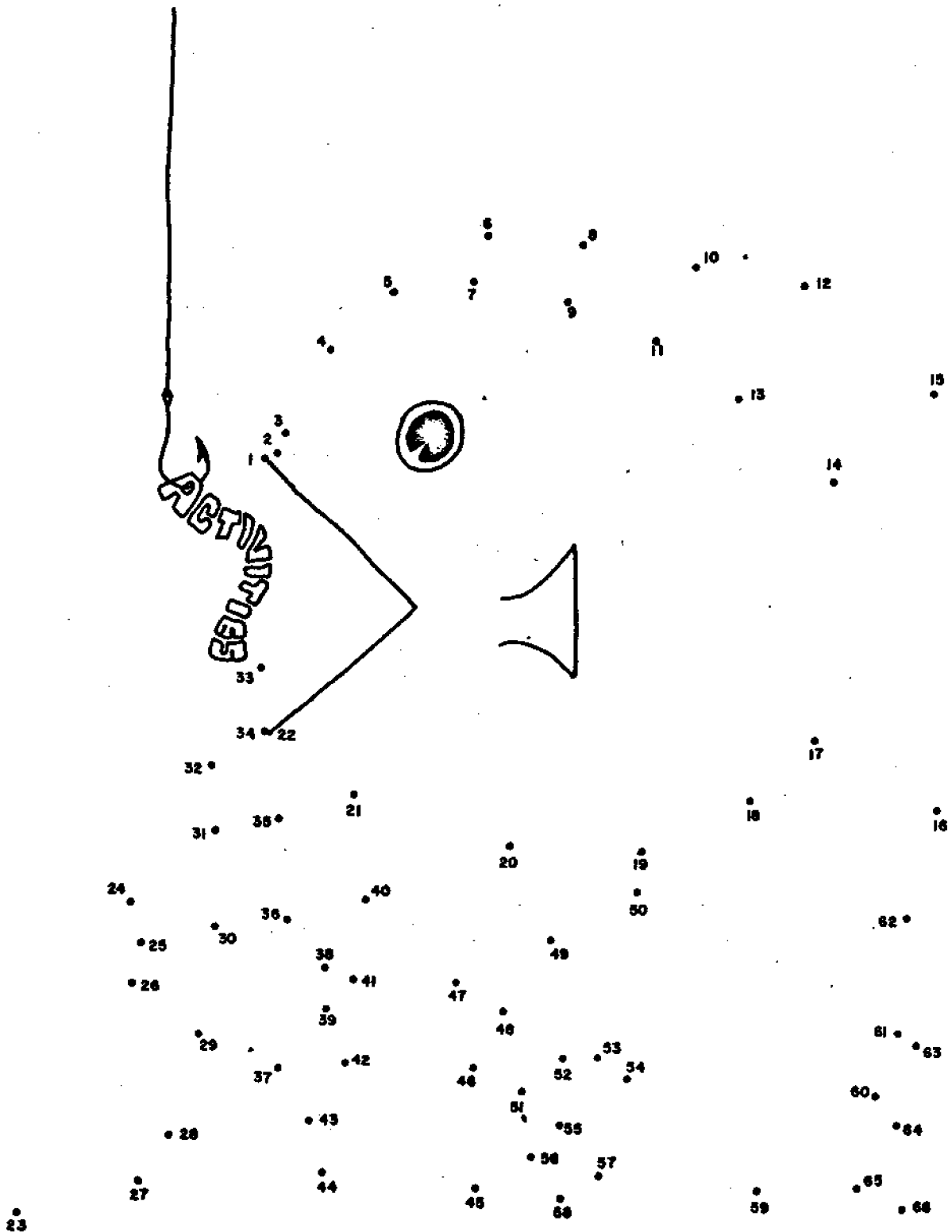


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Place these in their proper food-chain links.

Connect the Dots



# WORD SEARCH IV

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

ABYSSAL FISHES

AHUPUAA

ARTS AND CRAFTS

AQUACULTURE

BAY

BEACH

CANOE

COAST

ENVIRONMENT

HABITAT

HARD HAT DIVER

HEIAU

HELIOX

KNOT TYING

MANTA (RAY)

MARINE

NAVIGATION

OCEAN

ORGANISM

POLLUTION

RECREATION

SAFETY

SALT

SAILS

SCUBA

SEA CHANTIES

SEASHORE

SYMBIOTIC (RELATIONSHIPS)

TECHNOLOGY

TIDAL POOL

VOCATION

WAVES

## FIND THE MEANING

1. abyssal zone
  2. heiau
  3. groyne
  4. ahupua'a
  5. reef
  6. tidal pool
  7. aquaculture
  8. heliox
  9. symbiotic relationship
  10. oceanography
  11. chantey
  12. rip current
  13. tsunami
  14. food chain
- a. areas of water trapped by rocks and land
  - b. raising or fattening of fish in enclosed ponds
  - c. a chain or range of rocks or ridge of sand lying at or near the surface of the water
  - d. living together of two dissimilar organisms in any of various mutually beneficial relationships
  - e. gas mixture of oxygen and helium; "Donald Duck" effect
  - f. biographic realm consisting of the deep sea, lacking higher plant life because of the absence of light and occupied chiefly by carnivorous animals that are often blind or have special luminous organs and are structurally adapted to withstand the great pressures of this level
  - g. rigid structure built out at an angle from shore to protect shore from erosion by currents, tides, and waves or to trap sand
  - h. strong surface current flowing outward from shore (also called rip tide)
  - i. ancient place of worship
  - j. land section, usually extending from the mountains to the sea
  - k. geography that deals with the ocean and its phenomena
  - l. an unusually high sea wave that sometimes follows an earthquake
  - m. song sung by sailors in rhythm with their work
  - n. a sequence of organisms in a community each of which uses the next usually lower member of the sequence as a food source, plants being the ultimate basis of the sequence

## DID YOU KNOW . . . ?

Is life found at all depths in the ocean?

Some scientists believed, as recently as 1860, that marine life could not exist below 1,800 feet. That view was altered when a telegraph cable laid in the ocean bottom at 6,000 feet deep was retrieved and found covered with many forms of marine life.

How many fish species are there?

The most oft-quoted estimate is 20,000. There may be as many as 20,000 more.

What is the world's largest fish? The smallest?

The largest is the whale shark, which grows to more than 50 feet in length and may weigh several tons; second largest is the basking shark, which may measure 35 to 40 feet long. The smallest fish is the tiny goby, an inhabitant of fresh-to-brackish-water lakes in Luzon, Philippines. It seldom is longer than a half-inch in adulthood, yet is so abundant it supports a fishery.

How is the age of fish determined?

Mainly by two methods: Growth "rings" on scales, and/or ringlike structures found in otoliths (small bones of the inner ear), are examined and counted. The rings correspond to seasonal changes in the environment and can be compared to the annual rings of tree trunks. A series of fine rings are laid down in scales for each year of life--in summer, the rings grow faster and have relatively wide separations; in winter, slower growth is indicated by narrow separations between rings. Each pair of rings indicates one year. Because scale rings are sometimes influenced by other factors, scientists often use otoliths, whose ringlike structures also indicate years of life.

How long do fish live?

A few weeks or months (some of the small reef fishes) to 50 years or more (sturgeons). Longevity information is still sparse, but scientists have learned that species live 10 to 20 years in temperate waters.

Do fish breathe air?

Yes, but not directly into the lungs as mammals do (except for some tropical fish). As water passes over a system of extremely fine gill membranes, fish absorb the water's oxygen content. Gills contain a network of fine blood vessels (capillaries) that take up the oxygen and diffuse it through the membranes.

Can fish swim backwards?

A number can, but usually don't. Those that can are mostly members of one of the eel families.

Do fish chew their food?

Not in the human manner. Carnivorous fish use their sharp teeth to seize and hold prey while swallowing it whole or in large pieces. Bottom dwellers such as rays are equipped with large flat teeth that crush the shellfish they consume. Herbivorous fish (grazers) often lack jaw teeth, but have tooth-like grinding mills in their throats, called pharyngeal teeth. Fish would suffocate if they tried to chew, for chewing would interfere with the passage of water over the gills, necessary for obtaining oxygen.

How many kinds of tuna are there, and which kind makes up the biggest catch?

There are seven commercial and sport-caught tunas, as well as several related species, all of which are members of what is called the scombrid family. Commercially caught tunas consist of albacore, bigeye, blackfin, bluefin, bonito, skipjack, and yellowfin. Yellowfin, taken in the eastern Pacific and tropical Atlantic, makes up the biggest U.S. commercial catch. Albacore, caught in the eastern Pacific, is the true "white-meat" tuna; skipjack, caught throughout the world in tropical and subtropical waters, makes up the second largest U.S. commercial catch; bigeye is caught mostly in tropical waters; blackfin is caught commercially only in the Caribbean and off South America; the very large bluefin (rod-and-reel record, 1,040 pounds) is a highly prized sport catch in the Atlantic and Pacific; and



the widely distributed bonito is used largely as pet food.

Do tunas have scales?

Yes, all species do, but scales are so small over most of the body as to be nearly invisible. Prominent scaling appears only around the head, on the cheeks, and in a triangular area on each side of the body near the head.

How do porcupine fish inflate themselves?

All puffer-like fish inflate by pumping water into special sacs when in their natural environment. Out of water, a puffer fills the sacs with air instead, and takes on a balloon-like appearance.

What fishes are named after other animals?

Many are named after animals--alligator, bird, boar, buffalo, cat, cow, dog, elephant, frog, goat, goose, hawk, horse, leopard, lizard, parrot, porcupine, rabbit, sheep, squirrel, tiger, toad, unicorn, viper, wolf, and zebra.

What attracts sharks? Which are most dangerous?

Considerable research has been devoted to finding out what stimuli attract sharks and incite them to attack. Results are mostly inconclusive, but some general principals have been advanced: certain types of irregular sounds--like those made by a swimmer in trouble or a damaged fish--seem to attract sharks from great distances. Sound, rather than sight or smell, seems to be a shark's primary cue for moving into an area. Some scientific experiments indicate that sharks can distinguish light colors from dark, and that they may even be able to distinguish colors. Yellow, white, and silver seem to attract sharks. Many divers maintain that clothing, fins, and tanks should be painted in dull colors to avoid shark attacks.

Though blood itself may not attract sharks, its presence in combination with other unusual factors will excite the animals and make them more prone to attack.

The most dangerous species in order of documented attack records are: the great white shark, bull shark, tiger shark, grey nurse shark, lemon shark, blue shark, whaler shark, sand tiger,

blue shark, whaler shark, sand tiger, several species of hammerheads, and the mako. Some species such as the nurse shark are extremely sluggish and have poorly developed teeth, but even these have been known to attack man when excited or disturbed.

What sea creatures other than sharks may be dangerous to swimmers?

The barracuda (though divers claim its ferocious reputation is undeserved), moray eels, octopuses, and sharp-spined sea urchins can be dangerous to swimmers. The Portuguese man-of-war has tentacles up to 50 feet long with specialized cells that produce painful stings and welts on contact by swimmers. Sting rays, toadfish, catfish, and jellyfish can inflict damage on swimmers and waders. Certain coral-reef organisms are to be avoided by divers.

Can crabs swim?

Most crabs "wade" or run across the ocean bottom. Some, such as the commercially caught blue crab of the Atlantic coast (a member of the one family of "swimming crabs") can swim. Their rearmost pair of legs is modified for swimming and legs are paddle-shaped.

How do crabs grow?

By shedding their outgrown shell. The rigid shell imprisons the crab and limits growth. Once the shell is shed, the crab can absorb water and expand into its new-grown shell.

How do prawns, crayfish, and shrimp differ?

As so often happens, common names are used loosely and inconsistently in the shrimp family. The "prawn" of Great Britain and other countries is essentially the same animal as the shrimp of the U.S. In this country, the term "shrimp" applies to all crustaceans of the *Natantia* group, regardless of size. "Crayfish" or "crawfish" are names given to both a common freshwater crustacean and to the saltwater spiny lobster.

## SOME INTERESTING SEA STORIES

### FICTION

- Juv. Blenmiller, Carl *The Hydronauts*  
When the surface of the earth is destroyed by nuclear war the race of men go underground depending on the ocean for food. (Gr. 6 & up)
- Juv. Brink, Carol *Baby Island*  
Shipwrecked with four babies, Mary and her sister Jean drift to a South Pacific island where they find goats, a parrot, and a sailor who hates children. (Gr. 4-6)
- Juv. Buck, Pearl *The Big Wave*  
Jiya, a fisherman's son, learns to accept death and tragedy when his family is swept out to sea by a huge tidal wave. (Gr. 4-6)
- Juv. Chrisman, Arthur *Shen and the Sea (and other) Chinese stories for Children*  
A wise king outwits the Shen, water demons of the sea, who threaten to flood his small, lowland kingdom. (Gr. 4-6)
- Juv. Kipling, Rudyard *Captains Courageous*  
When the spoiled, pampered son of an American millionaire is washed overboard on a cruise he is rescued by a fishing schooner and forced to share the hardships of its crew. (Gr. 6 & up).
- Juv. Montgomery, Rutherford *Corey and the Sea Monster*  
While scuba diving to get underwater photos for his father's book on marine biology, Corey discovers a sea monster long thought to be extinct. (Gr. 6 & up)
- Juv. Sperry, Armstrong *Call it Courage*  
Branded as a coward, Mafatu, the son of a Polynesian chief, sets out alone in a canoe to conquer his greatest fear--the sea. (Gr. 5 & up)
- Juv. Stevenson, Robert Louis *Treasure Island*  
A foul murder, an ancient map and a sinister peg-legged seaman begins one of the most masterful high seas adventures of piracy and buried treasure. (Gr. 6 & up)
- Juv. Tabrah, Ruth *Red Shark*  
When Stanley Sasaki accidentally stumbles across a sacred stone alter in the form of a shark he becomes emeshed in a frightening supernatural legend of the red shark. A tale of modern Hawaii. (Gr. 5 & up)
- Juv. Taylor, Theodore *The Cay*  
When his ship is torpedoed by a German submarine a twelve year old boy, blinded by a blow on the head, is stranded on a small island with an old negro man he dislikes. (Gr. 5 & up)
- Juv. Verne, Jules *20,000 Leagues Under the Sea*  
In 1867 a prototype of the modern submarine roams the seas endangering and destroying all surface ships. (Gr. 6 & up)

## FOLKLORE

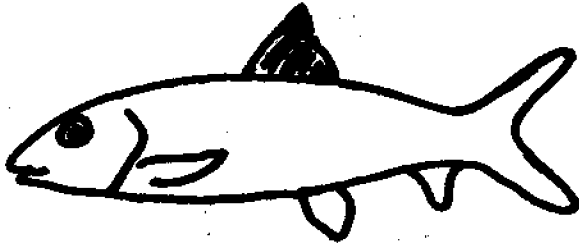
- J 398.2 Andersen, Hans Christian *The Little Mermaid*  
A little Mermaid suffers great hardships in order to become human.  
(Gr. 3 & up)
- J 398.2 Grimm *The Fisherman and His Wife*  
When a kind-hearted fisherman frees a magical fish his greedy wife makes him return again and again to ask for favors. (Gr. K & up)
- J 398.2 Hodges, Margaret *The Wave*  
When a tidal wave threatens a small Japanese village Tada and his grandfather take drastic measures to save the people. (Gr. K & up)
- J 398.2 Matsutani, Miyoko *The Fisherman Under the Sea*  
A Japanese folktale about Urashima, a fisherman who is allowed to live in the kingdom of the sea as a reward for his kindness. (Gr. 4 & up)
- J 398.2 Rockwell, Anne *Tuhurahura and the Whale*  
A Maori folktale. When Tuhurahura is stranded far out in the deep ocean by a wicked sorcerer he is befriended and rescued by Tutunai, the great whale. (Gr. 3 & up)

## BIOGRAPHIES

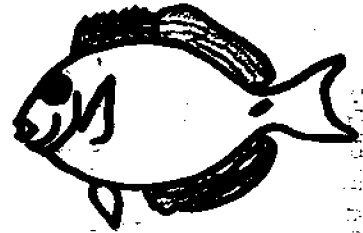
- J B Dugan, James *Undersea Explorer*  
Cousteau The exciting adventures of Captain Jacques Cousteau and his undersea expeditions. Captain Cousteau's lifelong interest in the mysterious sea began at age ten when he did some diving at a summer camp in Vermont, U.S.A. (Gr. 5 & up)
- J B Latham, Dorothy *Carry On, Mr. Bowditch*  
Bowditch Adventure on the high seas in the privateering days of early America. Indentured as a servant at age twelve to a ship chandlery in the 1790's Nat Bowditch educated himself in mathematics, science, and languages, then computed navigational tables still in use today by the U.S. Naval Academy. (Gr. 6 & up)
- J B Sperry, Armstrong *John Paul Jones, Fighting Sailor*  
Jones The zestful sea battles and exploits of John Paul Jones, the "Father of the American Navy" whose immortal reply to demands for surrender was "I have just begun to fight!" (Gr. 4-6).

POPULAR NAME	SIZE AT MARKET (lb)	APPROXIMATE COST NOVEMBER 1974 (\$/lb)	GENERAL CHARACTERISTICS	HOW TO PREPARE
Channel Catfish	1-2	1.30	Mild flavor; tender, moist flesh with some oiliness	Filletts or dressed; fry, bake, steam, broil, barbeque
Kalikalii (Kalekale)	3-5	1.70	Mild flavor; fairly dry, firm flesh	Filletts: fry, bake, poach
Mullet	1-2	2.60	Rich, distinctive flavor; compact, moist flesh; some small bones	Filletts or dressed: fry, steam, bake, broil
Oio ('Ō'io)	2	.95	Rich flavor; very tender, fine-grained flesh; many bones	Fishcake, fish dumplings, pupus, soup
Opakapaka ('Ōpakapaka)	3-5	1.59	Mild flavor; distinctive odor; tender, moist meat	Filletts or dressed: fry, poach, bake, barbeque, steam
Opelu ('Ōpelu)	1/2	1.60	Distinctive flavor and odor; some small bones	Dressed: broil, barbeque, fry
Palani	1-2	.65	Mild flavor; very moist tender flesh; tough skin	Filletts: barbeque, fry, broil
Pualu ('Pūalu)	1-2	.65	Mild but distinct flavor; compact flesh; very tough skin	Filletts: barbeque, fry, broil; skin can be removed after cooking
Taape	1	1.25	Delicate flavor; tender moist flesh; rather bony	Dressed: fry, steam, broil
Uku	2-4	1.35	Mild flavor; distinctive odor; firm, fairly moist flesh; tough skin	Filletts: fry, poach, steam, bake
Weke	3/4	1.89	Moist, tender flesh; mild flavor	Dressed: poach, steam, fry

COMMON HAWAIIAN FOOD FISH



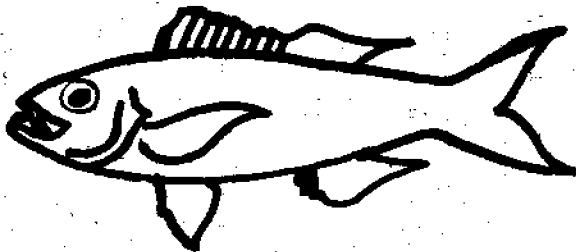
'Ō'io



Pūalu



'Ōpelu



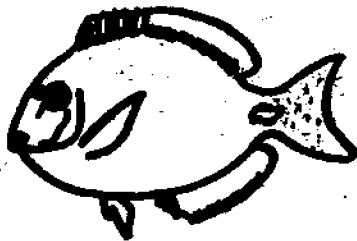
Kalikali



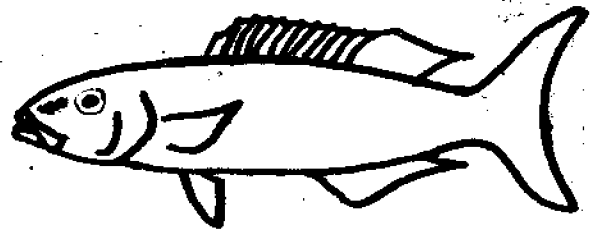
Weke



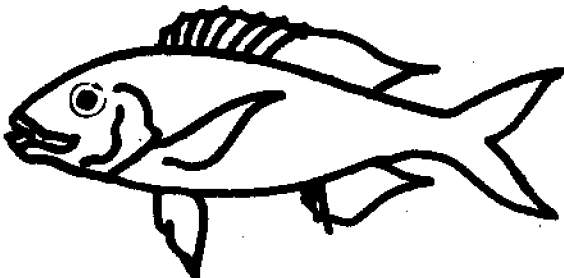
Mullet



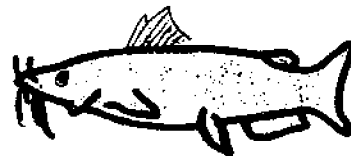
Palani



Uku



'Ōpākapaka



Channel Catfish

## RECIPES

### Chinese Style Opakapaka (serves 6)

2 lb. opakapaka fillet  
Vegetable oil for frying fish

Sauce:  
1 T green onion, chopped fine  
1 T minced ginger root  
2 T soy sauce  
1/4 C vegetable oil

Combine chopped green onion, minced ginger, and soy sauce in a bowl. Set aside. Fry fish on moderate heat in 1/8 inch of vegetable oil. When fish is brown on one side, turn carefully and brown other side. Fry for a total of 8 to 10 minutes or until fish flakes easily with a fork. Place fish on a serving platter. Heat 1/4 C of vegetable oil until hot but not smoking. Pour oil over green onion, ginger, and soy sauce mixture. Pour sauce over fish.

To reduce the calories in this dish you may prefer to use steamed or baked opakapaka with this sauce.

### Weke in Red Pepper Sauce (serves 4)

2 lb. weke, eviscerated and scaled  
Vegetable oil for frying fish  
2 T green onion, chopped fine  
1 t white sesame seeds

Sauce:  
1/8 t ground red pepper  
1 t sugar  
1 small clove garlic, minced  
2 t ginger, minced  
2 t sesame oil or vegetable oil  
1/8 C soy sauce  
1/8 C water

To make sauce combine ingredients in second column. Set aside. Fry weke in 1/8 inch vegetable oil on moderate heat for 8 to 10 minutes or until fish flakes easily with a fork. Turn fish once while frying. Pour sauce over fish and simmer 2 minutes. Place on serving platter and serve hot, garnish with finely chopped green onion and sesame seeds.

The amount of red pepper in this dish can be adjusted to suit your taste. Use 1/8 teaspoon red pepper for a mild flavor, 1/4 teaspoon for a moderate flavor and for a hotter sauce add the red pepper to taste. If you want a Korean style sauce use sesame oil instead of vegetable oil.

### Baked Mullet with Dill Sauce (serves 4)

2 lb. mullet, eviscerated and scaled  
1 t salt  
2 T melted margarine or vegetable oil

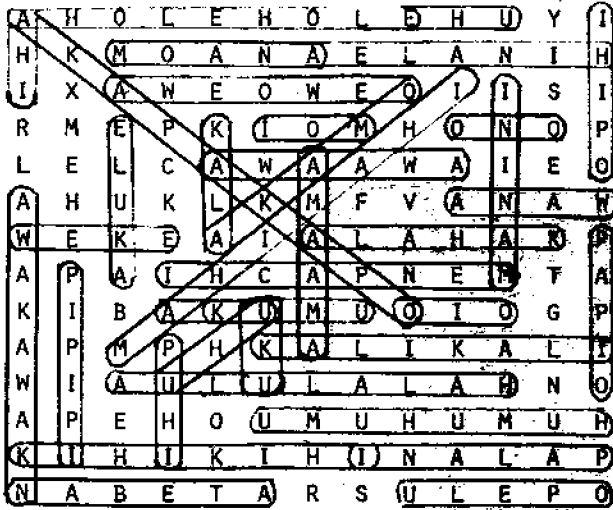
Sauce:  
1/2 C plain yogurt  
1/2 C mayonnaise  
1 t dill weed  
2 T minced onion

To prepare the sauce, combine the ingredients in second column, mix well, cover, and refrigerate until mullet is ready to serve. Clean, wash, and dry fish. Rub inside and outside with salt. Place fish in a greased baking pan. Pour melted margarine over top of fish. Bake in an oven preheated to 350°F for 20 to 25 minutes or until fish flakes easily with a fork. Place fish on a platter, garnish with parsley or lemon wedges if desired. Serve Dill Sauce separately.

# ANSWER PAGE

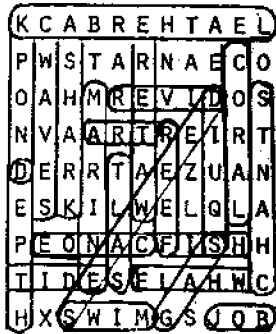
## Fishing in Old Hawaii

### Word Search I



1. c
2. d
3. b
4. a

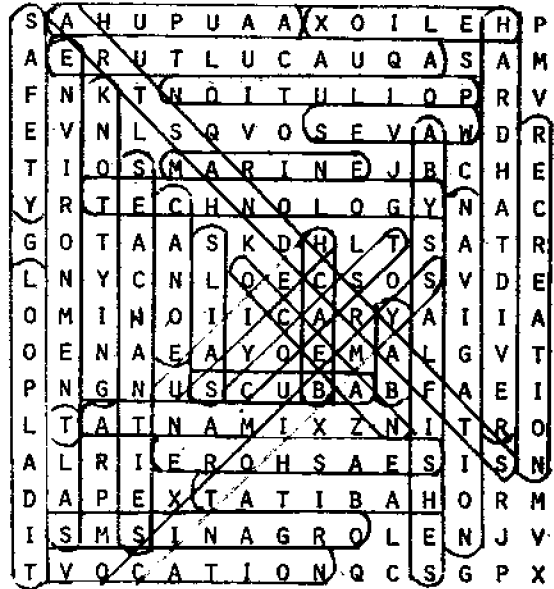
### Word Search II



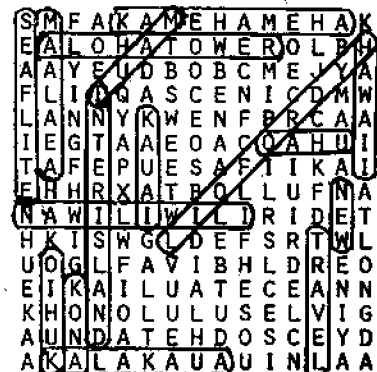
Find the Meaning

- |      |       |
|------|-------|
| 1. f | 8. e  |
| 2. i | 9. d  |
| 3. g | 10. k |
| 4. j | 11. m |
| 5. c | 12. h |
| 6. a | 13. l |
| 7. b | 14. n |

### Word Search III



### Word Search IV



# mahalo

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