Unit Five
Life on the Seas and Rivers

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Objectives:

To help students:

• Explore the influence of the sea on art, music and literature (Activity 1).
• Express their feelings about the sea through poems, stories, watercolor paints, music and wood or soap carvings (Activity 1).
• Label the parts of a boat (Activity 2).
• Use nautical phrases (Activity 2).
• Read a nautical chart (Activity 3).
• Compute a variety of knotty problems (Activity 3).
• Tie eight different knots (Activity 4).
• Read a tide table (Activity 5).
• Graph local tides for a week or more (Activity 5).
• Plan necessary boat safety practices and equipment for their own boat (Activity 6).
• Wear life jackets and survival suits (Activity 6).
• Play a Safety Afloat Game (Activity 6).
• Survey local sportfish and their habits (Activity 7).
• Read sportfishing regulations (Activity 7).
• Practice sportfishing skills (Activity 7).
Fishing is an old, old way of life. At its most basic, it is a way of getting food - a means of survival. Before people had supermarkets, even before fields were cultivated and seeds planted, people hunted and fished to obtain their food.

From earliest times, those people who set out in boats to fish have been aware of the risks involved. Fishing peoples past and present have pitted themselves and their frail vessels against the unpredictable, often violent, forces of wind and waves. Anyone who has ever fished or known people who fish can give accounts of vessels and people lost without a trace in stormy weather, of ships driven onto rocky shores, of crew members lost overboard. The sea and rivers can be hard masters that do not compromise or forgive mistakes.

Knowing the risks they take, many men and women still choose to make fishing their way of life. The reasons for such a choice are many but high on the list would be a desire for independence, a desire to live close to the elements of nature, and a need to face challenge.

Risks and rewards of fishing have changed little over thousands of years. Modern technology has, of course, made some aspects of life at sea easier, but it has not yet tamed the elemental forces nor substantially reduced the risks. Modern fishermen and women draw upon knowledge and skills from generations before them. To these are added the latest electronic or mechanical products of our time. Survival and success at sea depend on knowledge drawn from many sources over many years.

Fishing consists of more than understanding and being able to operate a boat and its gear. For students to understand fishing as a way of life, they will need to explore some of the many areas of knowledge and skill fishing requires.
Activity 1
Art, Music, Literature and the Sea

Background:

The seas and rivers have powerful influences on most Alaskans, who receive most of their food and supplies from over the sea, if not from the sea itself. Many jobs are sea-related: The grocer stocks seafood products and sea-transported products; and dockhands, captains, boat builders and manufacturers of a multitude of boat and fishing equipment for the commercial, sport, and subsistence fisheries are all involved directly with the sea. In addition to supplying bodily needs, the sea has had a tremendous effect on the art, music, and literature, of our history and culture. This activity just barely opens the door (or the porthole) to a vast array of exciting reading, writing, painting and carving.

Materials:

- sea and river poems and stories, paintings and carvings
- paper
- pencil
- watercolors
- brushes
- bar of soap or block of wood for each student
- knife for each student
- local artist

Procedure:

1. To capture the spirit of "putting out to sea," share these poems and others with your class; or sing a few sea chanties, read some of the stories listed in the bibliography, and bring carvings and paintings (such as those of Winslow Homer). Try to capture the mood of the sea. Imagine the ocean both in calm and stormy days, rain and sun. Mention the long hours at sea and that some sailors and fishermen filled by carving exquisite scrimshaw into ivory, keeping journals, or making sketches of sea life.

Sea-Fever

I must go down to the seas again,
to the lonely sea and the sky,
And all I ask is a tall ship and a star to steer her by,
And the wheel's kick and the wind's song and the white sail's shaking,
And a grey mist on the sea's face
and a grey dawn breaking.

I must go down to the seas again,
for the call of the running tide
Is a wild call and a clear call that may not be denied;
And all I ask is a windy day with the white clouds flying,
And the flung spray and the blown spume, and the sea-gulls crying.

I must go down to the seas again
to the vagrant gypsy life,
To the gull's way and the whale's
way where the wind's like a
whetted knife;
And all I ask is a merry yarn from
a laughing fellow-rover,
And quiet sleep and a sweet dream
when the long trick's over.

by John Masefield

The Sea to a Sailor

Blue green water
stretching forever
ebbing gently
whispering
slipping by
broken only by the distant
white
of seagulls.

Then suddenly
the fish jumps
the solemnity is shattered
the ripples laugh
silver bubbles burst
then slowly
silently
the calm returns
to reign
once more.

by John Haines, Alaskan poet
from Winter News, p. 61

Poem of the Wintery Fisherman

At the foot of October
where the current narrows,
the salmon wait,
Burning in the shallows -
blood-red, green and orange,
in the ice-blue glacier water.

Listen! you can hear
the long, slow pull of slush
against the banks,
depth rumble of stones.

I stand alone in the smoking
frost, a long hook poised,
and fling the bright fish up
the pebbled, icy bar
to quiver and lie still,
a sinking fire.

Sometimes the cold eggs spill
in the snow, glowing
like the eyes of foxes who wait
at sundown, when I shoulder
my catch and mount
the frozen twilight homeward.

Along the darkening river,
ravens grip their iron twigs,
shadows of
the hungry, shuddering night.

by John Haines, Alaskan poet
from Winter News, p. 61

2. Then have students try to
express their own feelings
with watercolors; soap or
wood carvings; poems;
stories; music. Invite local
artists, musicians, poets, and
authors to share their
experiences with your class
and assist the students in
their projects.

Fish
Gold red
It eats animals
Lives in the sea
Diving and swimming
Salmon, halibut, fish.

by Cherish Carroll, (Gerry Young,
teacher) University Park Elementary,
Fairbanks)
Activity 2
Boat and Nautical Language

Background:

Boat terminology and language have developed over the centuries. In times of emergency, many seconds of valuable time can be saved by using correct and precise terms.

Vocabulary:
- keel
- hull
- house
- mast
- boom
- bow
- stern
- port
- flying bridge
- crow's nest
- starboard
- rudder
- propeller
- aft
- aboard
- aloft
- below
- deck
- hatch
- scuppers
- galley
- head
- batten
- shipshape
- bilge
- stow
- list
- bunk
- helm
- line
- cast off
- belay
- P.F.D.

Materials:
- model boat
- paper
- pencils
- worksheets:
  ...Captains Know Their Boats (5A)
  ...Ship Ahoy (5B)

Procedure:

1. Ask students to think of nautical terms and share them with the class. Pass out the worksheet Captains Know Their Boats and have students label the parts. (Answers: a: bow; b: starboard; c: port; d: stern; e: bridge; f: house; g: hull; h: crow's nest; i: boom; j: scuppers; k: keel; l: rudder; m: propeller.) Use a model boat in the discussion afterwards to assist students in visualizing all the features.

2. Share this boat poem with students as a sample of what happens when a part is forgotten!

Homemade Boat

This boat that we just built is just fine -
And Don't try to tell us it's not.
The sides and the back are divine
It's the bottom I guess we forgot....

by Shel Silverstein

3. Then try out nautical phrases with the students. Pass out the worksheet Ship Ahoy.

4. Begin a class collection of nautical terms and phrases. Have students write short humorous paragraphs or poems using as many nautical terms as possible.

Activity 3
Navigation

Background:

Navigation is a complex science, but its basic concept can be conveyed through the relatively easy skill of reading a chart. Landlubbers have maps which delineate roads, cities, and political boundaries. Charts emphasize natural and man-made features of interest to a navigator. To travel anywhere safely, a skipper must have knowledge of water depths, shoals, channels, and where ports and harbors are located. This information can be gained only from other local residents, or through long experience in an area, or by reading a chart. For details in navigation or chart reading, use Chapman's Piloting, Seamanship and Small Boat Handling.

Vocabulary:

- chart
- scale
- compass rose
- declination
- latitude
- longitude
- navigational aids
Materials:

- local charts
- compasses
- pieces of string
- pencils
- copies of local charts
- electronic navigational equipment
- worksheets:
  - Port of Anchorage Chart (5C)
  - Nautical Knots (5D)

Procedure:

1. Obtain a nautical chart of your area from a government agency, store, local resident, or order one from National Ocean Survey Chart Sales and Geodetic Control, Federal Building and U.S. Court House, 701 C Street, Box 38, Anchorage, Alaska 99513. Make copies of portions of the chart and develop questions for the students to answer. Use the worksheet Port of Anchorage Chart as an introduction. You'll need to tape the two sheets of the chart together. (Answers: 1: starboard, port; 2: hard, rock; 3: 66 feet; 4: port; 5: 140 feet, equal intervals 6 seconds light; 6: port; 7: draw a line so that the boat has more than 6 fathoms of water.) For more information, check Tidelines, "The Port That Grew in the Wrong Place," Vol. III, No. 3, November 1980.

2. Go over the following terms and information about navigational aids:

- Scale indicates distances. A chart is a representation in miniature of a certain area. Actual distances must be "scaled down." Have students calculate distances between different points on their charts by using a piece of string to measure the distance, and then comparing it to the equivalency scale. Note that from the scale on the Port of Anchorage chart that distances are given in nautical miles as well as statute (or land) miles. 1 nautical mile = 1.15 statute miles, so nautical miles are just a little longer. The worksheet Knoty Problems contains a few computations for your students using nautical miles and boat speeds. (Answers: 1: 5 hours; 2: 70 nautical miles; 3: 6 knots; 4: $15.)

- A Compass Rose is the star shape printed on maps to indicate the 64 compass points (Some compass roses contain only 32 points, some 16, and some eight: North, Northeast, East, Southeast, South, Southwest, West, and Northwest). A student using a map and compass should spread the map on a flat surface, then rotate it so that its compass rose point indicating magnetic north is pointing the same direction as the compass needle.

- Latitude and longitude are indicators of exact location on the earth's surface. The whole world is divided like graph paper with longitude lines running north and south, and latitude lines running east and west. Have students find the latitude and longitude lines on their charts. Ask the students:

- Where are the 0° latitude
and longitude located? (They should be able to tell by looking at their charts that the 0° longitude is east and the 0° latitude is south. Latitude starts at the equator and longitude starts on a line that runs through Greenwich, England.)

- Depths on the Pacific Coast are listed in fathoms (1 fathom = 6 feet) at the "mean lower low water." The definition of mean lower low water is the average of all the lowest water levels for tidal days over a period of time. Have students find the deepest spots on their charts. Then have them change those readings to feet. For example, if the depth is 6 fathoms, it would translate to 36 feet.

- Natural and man-made features are marked throughout the chart. Have students look for uncovered rocks; bottom types (knowing whether a bottom is sandy, rocky or muddy is important to know for anchoring), wrecks, snags or stumps. Note the land contours which show heights of mountains and other landmarks that a person might be able to see briefly through the fog! Have students make a class list of all the different markings.

- Navigational aids are a variety of markers that help people traveling in seas and large rivers. Buoys are used to indicate channels. There is a little phrase students should know: "Red right returning." When anyone's coming into the harbor, all the red buoys should be on their right.

3. Research old and new ways of navigation. Invite village elders, a long-time fisherman or woman, someone from the Coast Guard, a Sea Grant Marine Advisory agent or a marine supply owner to go over old-time and the latest electronic navigational equipment. Your class may want to visit a boat or marine supply store, or look at marine catalogs.
Activity 4
Knots

Background:

Knowing knots is critical to anyone who spends any time around water. Fishermen and other boat handlers should know knots so well that they can tie them in the dark and blindfolded! Knots often must be able to hold under adverse weather conditions, yet untie easily. And that's sometimes tough when they are wet and frozen. Every smart fisherman or woman always carries a knife to cut the lines quickly in an emergency.

Materials:

- 2 pieces of string or line per student
- several cleats mounted on wooden boards
- small log or chair leg
- ring or coat hanger
- scissors
- colored pencils
- worksheet:

...Eight Knots (5E)

Procedure:

1. Collect two pieces of string or line for each student, several small logs or chair legs, rings or coat hangers pulled out of shape, and colored pencils. Attach several cleats to boards (devise imitation cleats out of pieces of wood if you don't have the real thing).

2. Explain to students that they'll need to know these knots for their next ocean or river voyage! Then pass out copies of the worksheet Eight Knots and two pieces of string per student. Remind students that on a boat, ropes are called "lines." The students may want to shade each line a different color on the drawings of the square knot and sheet bend so that they can tell where each line goes. Have students cut out the pictures of the different knots to make little cards, then practice tying.

3. After the students practice, call out the different knots and see how fast their hands can move. Check for knot accuracy throughout the session. Discuss situations in which each knot would be needed, such as "The line was rapidly slipping through my partner's hands as he tried to hold our skiff, which was being pulled away by a fierce rip tide (strong current). I quickly grabbed the end of the line and wrapped it in a figure eight around a cleat."
Activity 5
Tides

Background:

Tides are important to fishermen. Some places may be better to fish at a particular stage of the tide and may even be impossible to fish if the tide is ebbing or flooding too strongly. When fishing, a boat operator must always be aware of whether the tide is flooding or ebbing and must operate the boat and the fishing gear accordingly. Everybody fishing carries one or more tide books and often a book showing tidal currents as well.

Tides are caused by the gravitational pull of the moon and the sun on the earth’s surface. The moon, because it's closer to the earth, exerts the strongest pull. As a result, the side of the earth (a) closest to the moon will have higher tides than the side closer to the sun (b). Water is pulled from the intermediate areas (c and d) to form the high tides, so these areas will have low tides. The earth is continually spinning so that areas c, d, e and f alternate between low and high tides.

The average highs and lows vary in different areas because of land formations and ocean currents. Cook Inlet has the greatest tidal range in Alaska and the second highest worldwide. Sometimes the Cook Inlet tide varies 40 feet from low to high tide. Yet the tides are almost nonexistent along the shores of the Bering Sea and other northern coast areas of Alaska.

Materials:

- tide tables, one per student if possible
- worksheet: ...

Procedure:

1. Obtain tide tables for each student or at least enough so that every two or three students will have one to share. Banks, marine supply, and sporting goods stores often distribute tide tables free or at a nominal cost.

2. As a class, review the causes of tides and then spend time looking through the tide books and discussing the kinds of information they contain. If possible, look at tidal information for a location near your community. Ask the students:

   - When is there a low tide today?
   - When is there a high tide?
   - When is the highest tide of the month?

If the tide book contains information on the combined effect of wind and temperature, discuss the importance
wind chill tables. If you live near a marked channel, and channel marker information is included in your tide books, review the colors and markings of navigational aids.

3. Distribute the worksheet Tides and allow time for students to complete the answers to the questions. (Answers: 1: 12.7; 2: .09; 3: 8:59 a.m. and 9:06 p.m.; 4: 6:53 a.m. and 7:39 p.m.; 5: Nov. 5; 6: Nov. 5; 7: 9.4 feet.)

Activity 6
Boating Safety

Background:

The risks of fishing, being aboard a vessel at sea, or running a skiff up a river can be reduced by boating safety practices. Many students already are involved in commercial, subsistence and sport-fishing or in recreational boating, so knowing about safety precautions can be of real practical importance.

Vocabulary:

- radar
- fathometer
- VHF
- bilge pump
- ballast

Materials:

- paper
- pencils
- life jackets (P.F.D.s) and survival suits
- safety afloat net, safety afloat equipment, safety afloat playing cards
- fishermen's newspapers and magazines and marine supply catalogs
- Coast Guard representative or

4. Using the tide tables obtained for the class, have students graph the tides for your area for one or more months. Label the vertical scale in feet and the horizontal scale in days of the month. Have each student plot one week or one month of tidal activity. Then the charts of all students can be combined, if the same scale is used, to show tidal changes over a longer period.
1. Ask students what safety equipment they take with them on boat trips. Ask them about other safety equipment with which they're familiar. Then distribute the worksheet Putting Out To Sea and any fishing newspapers, magazines, marine supply catalogs that you have available. Look in the bibliography for suggestions. The worksheet asks students to draw a picture of a large or small boat they'd like to own and add and label all the necessary safety equipment. If there are enough catalogs, they can figure safety equipment costs.

2. Go over each item on the worksheet and discuss safety needs in terms of local conditions. You might want to add extra rain gear and warm clothes to the list of safety needs. Have the students try on life jackets and survival suits. Invite someone from the Coast Guard or a Sea Grant Marine Advisory Agent to demonstrate equipment and mention stories of people who had to use some of these safety items.

3. As a review, make up sets of the Safety Afloat card game worksheet for students to play. It is similar to "pick-up sticks"—only students pick up safety equipment, naming each item before picking it up with their boat hooks.

Additional Activities:

1. Physical Education: Have life jacket relays in the gym or swimming pool. Stress the need to take special care of jackets because they may be needed to save lives. Never sit on a jacket; sew up rips immediately; and replace jackets when they show signs of wear. Have students practice putting them on in and out of the water. Remind students that life jackets are made to be worn. They won't do any good sitting in a locker.

2. Art: Have students make a safety collage with pictures of safety equipment from magazines and newspapers.

3. Language Arts: Encourage students to interview people who have had close calls, asking what happened and what they would have done differently. Then have students write stories and read them to the rest of the class.

4. Language Arts, Science, Art: Arrange for students to tour a boat and make a drawing of where all its safety equipment is located.
Activity 7
Sportfishing Trip

Background:

A fishing trip may be just the thing needed to spark your students’ interest in fisheries. It can be a good review of what a fish is, how it lives, what it looks like and how it behaves, plus a chance to practice the nautical skills covered in this unit.

More than 200,000 anglers fish Alaska annually, harvesting about 2½ million fish. Sportfishing is important to Alaska’s economy, and is one of the state’s main tourist attractions. About 25 percent of the total number of anglers are non-residents. The Kenai River is one of the most heavily fished rivers in the United States. And fish caught sportfishing form an important food base for many Alaskan households.

Materials:

- pencils
- chalkboard
- chalk
- art supplies
- poles, lines, hooks and dip nets (if applicable) for students to use or share in pairs
- bait or lures
- knife
- pliers
- stringer or sack to hold the fish
- warm clothing and rain gear
- sportfishing regulations
- sport fisherman or woman
- Fish and Wildlife protection officer
- small group leaders

Procedure:

1. Make a chart to survey local fish and fish habitats. Give students individual copies of the chart and have them talk to biologists, their parents and other local resource people about fish. Then compile a big class chart on the board of everyone’s answers. (This chart was suggested by Mary Couche, Kivalina)

<table>
<thead>
<tr>
<th>Name of Fish</th>
<th>How it's Identified</th>
<th>How it's Caught</th>
<th>Where it's Caught</th>
<th>Time of Year Caught</th>
</tr>
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<td>5.</td>
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</tr>
</tbody>
</table>

2. Invite sport fishermen or women to explain and demonstrate their techniques. Also check Volume 2 of the Sea Week Curriculum Series for information on sportfishing lures and how they are developed to look like aquatic insects.

3. Involve students in planning the trip. Have them help get the equipment together (or make it), develop safety rules, read the tide tables and nautical charts, plan a
nutritious snack or lunch, invite parents, resource people, or older students to come along as small group leaders, send home permission slips. You might want to consider taking part of the class at a time, or fishing on a well-lighted dock at night (as lights often attract fish so that they can more easily be seen and caught).

4. Discuss conservation of fish and the need for fishing regulations. Read some of the local sport fishing regulations. Write to the Sport Fish Division, Alaska Department of Fish and Game, Box 3-2000, Juneau, Alaska 99802 for a copy of the regulations, or pick them up at wherever fishing licenses are sold in your community. Invite a local fish and wildlife protection officer to talk with the class.

Why is fish habitat important? What has happened to sport fishing opportunities in the Lower 48? What has happened to fish habitats there? (Mention filling and dredging, channelization, housing, roads, logging, dams.) Ask students what they can do to be sure there will be plenty of fishing for their children and grandchildren. This might be a good time to remind students that fish are a renewable resource. (Used wisely, fish will be here for generations to come.)

5. Study the fish you catch. If the fish are common in your area, be sure all students can name them and understand how to identify them. If you catch fish that they can’t identify, take them back to school and key them out, thumb through reference books until you identify them, or ask a local person familiar with fish. If you catch several different fish, compare their external features. What about color patterns? Are there any apparent differences in scales? What about placement of the fish’s eye on the body? How do body shapes differ?

Stress to students the importance of not wasting a natural resource. If youngsters want to see a fish and study it, but have no further use for it, be sure it is carefully unhooked and returned alive to the stream. Keep only the fish you can use in further studies or for food. And remember, any live fish are handled, your hands should be wet to help prevent stripping the protective outer mucus layer of the fish.

If you plan to keep any of the fish, clean them right after they are caught. Have students identify internal structures as a review of what they have already learned. Be sure to open the stomach to see what the fish has been eating.

6. As a follow-up, have the students write stories, poems or music, and use a variety of art supplies to draw, paint or carve reminders of their fishing trip. Compare these projects to the ones developed at the unit’s beginning. Was the actual fishing a real inspiration?
Additional Activities:

1. **Art, Language Arts:** Have students make up and draw cartoon stories about "the fish that got away." (Suggested by Tuck Mallory, Turnagain Elementary, Anchorage)

2. **Language Arts:** Have students prepare oral or written reports on big fish they have caught or want to catch. Write to the Alaska Department of Fish and Game, Division of Sport Fish, P.O. Box 3-200, Juneau, Alaska 99802 for information about trophy fish award rules. The department awards 8"x10" parchment certificates to all contestants that win one of these awards. Certificates are given for fish of trophy weight, for the largest weight for the year; and for any new state records. The fish must be weighed, photographed, and an affidavit signed in the presence of a trophy fish official.
Unit Six
Fish as Food

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Objectives:

To help the student:

- Compute how quickly bacteria multiply (Activity 1).
- Properly handle and clean a freshly caught fish (Activity 1).
- Read about processing fish (Activity 2).
- Diagram the workings of a cannery (Activity 2).
- Design a label for canned salmon (Activity 2).
- Survey a local grocery store for seafood products (Activity 3).
- Plot the origins of the local store’s seafood on a world map (Activity 3).
- Figure the distance traveled by each of the locally stocked products
  (Activity 3).
- Make a fish-shaped recipe book (Activity 4).
- Describe the nutritional values of fish (Activity 4).
- Prepare and taste fish (Activity 4).
- Design a fish business (Activity 5).
- Advertise and sell a fish product (Activity 5).
- Develop a profit and loss statement and investment analysis for stock-
  holders (Activity 5).
Unit Six: Fish as food: Salmon are cleaned as soon as possible after being caught. The fish are gutted, top right; and the kidney and gills removed before the salmon is stored on ice for shipment to a processor.
Alaskan waters produce a great abundance and variety of sea foods. Historically, people who lived along the coasts and rivers were sustained by fish, shellfish, sea vegetables and other aquatic foods. Today, many Alaskans still depend on fish, for their tables, their livelihoods or both. Commercial seafood processing is an important enterprise in Alaska, and its products are shipped around the world.

The processing industry changes continually, with new technology and new consumer demands. Consumer preference has shifted, for instance, from canned salmon to fresh or frozen salmon; but the shift came so suddenly it caught both fishermen and processors unprepared. In less than 10 years Alaska's fresh and frozen salmon production soared from around 30 million pounds to 195 million pounds in 1980. That increase amounted to more than one-third of the state's total salmon catch.

Activity 1
Fish Quality

Background:

To compete in the world market, Alaskan processors and fishermen are beginning to concentrate more on fish quality than quantity. With refrigerated cargo planes, ships, barges, trucks and trains, people can have their Alaskan fish any way they want it, no matter where they live.

Materials:

- several whole fish
- sharp knives with 5- to 6-inch blades
- cutting boards
- teaspoons
- copies of Cleaning a Fish
- worksheet:
  ...Taking Care of Your Catch (6A)

Procedure:

1. Use the worksheet Taking Care of Your Catch (adapted from "How to Take Care of Your Catch," Tidelines, Vol. IV, No. 1, Sept. 1981) to start your discussion. (Answers to questions 1 and 2
are 1,073,741,824 and 2,147,483,648,000,000,000.
Remaining answers will vary among individuals.)

2. Invite parents or others to bring in several whole fish or go on a fishing expedition to catch your own. (See Unit 5, Activity 7.)

3. Have students clean the fish. Round up teaspoons and some sharp knives with 5- to 6-inch blades. Plastic or some other hard material is better than wood because knife handles is easier to clean. You'll also need cutting boards. Again, a plexiglass or steel surface is better than wood for the same reason. If you do use wood, rub the board with salt to help sanitize and cut the slime and to make the job less slippery. Pass out copies of Cleaning a Fish. Remind students to be careful of the knives and to always cut away from themselves.

4. Review external and internal fish features (Unit 1, Activities 4 and 5) and get ready to taste the fish (Unit 6, Activity 5). This cleaning technique is the one recommended by Dr. Don Kramer, seafood technologist and quality control specialist with the Alaska Marine Advisory Program. It was first printed in Tidelines, "How to Take Care of Your Catch," Vol. IV., No. 1, Sept. 1981.

CLEANING A FISH

1. Insert the point of your knife into the vent opening, just deep enough to cut through the skin. Then run the cut smoothly the length of the belly to a point just below where the pectoral fins join the body. Keep the cut shallow to keep from damaging the internal flesh or the egg cases.

2. Carefully cut the connecting tissues at both ends of the digestive tract (throat and anal vent) and the viscera will fall right out. Wash the eggs and put them in a clean plastic bag. If you don't eat them (many people do), save them for bait—either fresh or dusted well with Borax.

3. Next the gills. Go in under the gill cover. Cut through the connecting tissue at the top and run the knife around
the jaws to the bottom. Then twist the gills out.

4. Now all that is left is the kidney. This looks like a line of clotted blood running along the spine from the head to the vent. Some fishermen simply slit the kidney down the middle and then scrape out the dark material. But a better way is to make two long slits through the membrane down either side of the kidney. The double cut makes the kidney easier to remove and also does away with the "ribbons" of membrane (which many processors object to) that are left behind by the center cut.

5. Scrape out the kidney with a spoon. Get every trace of it. The hardest to reach is the kidney tissue in the small bones near the vent, called the "knuckles." Use the knife tip carefully, trying not to puncture the flesh. Now wash the fish inside and out with clean cold water and it's ready to be iced or refrigerated.
Activity 2
Fish Processing

Background:

Processing Alaskan salmon, halibut, king crab and other seafoods is a major industry in Alaska. Processing probably began with early settlers who shipped a few salted salmon back to their native lands.

In 1878, the North Pacific Trading and Packing Company built the first Alaskan cannery at Klawock on Prince of Wales Island. Later the same year, a cannery opened in Sitka. Within 10 years there were many canneries along the coast from Southeast Alaska to the Bering Sea.

The cannery business was a tough, a boom or bust operation. If fishing in nearby waters was good, the cannery might thrive; but no fish meant failure for the operation. In addition, there was cutthroat competition between canneries and their wealthy backers. Sometimes price wars erupted, with the one packing company undercutting others in an attempt to bankrupt the competition.

Today, cannery operations still involve risk. Fishing from year to year can be good or bad. Markets fluctuate, and prices and profits go with them. Abandoned canneries dot the Alaskan coast, many of them old and long-deserted; and each year more canneries consolidate or close.

Materials:

- colored pencils or felt-tip markers
- paper
- a variety of salmon cans
- What Happens in an Alaskan Salmon Cannery illustration
- the manager of a fish processing plant or a cannery worker
- worksheet:
  ...Salting, Canning, Freezing, and Smoking (6B)

Procedure:

1. Ask students how they preserve fish. Then pass out the worksheet Salting, Canning, Freezing, and Smoking. (Answers: 1: freezing, smoking, or drying; 2: salting; 3: king (also red and silver) salmon; 4: canned or frozen; 5: glaze it with a thin covering of ice; 6: false.)

2. Have the students diagram what happens in an Alaskan salmon cannery. Use the "What Happens in an Alaskan Salmon Cannery" illustration for reference. Go through the steps one by one on the board and let students make their own drawings with colored pencils or thin felt-tip markers as the class talks about them. Have the students predict what happens from one step to another.

3. Invite a local cannery man-
ager or worker to talk about the fish processing business and critique your class's drawings. Better yet, take a trip through a cannery and have the students check the accuracy of their own drawings. In the interior, you should be able to find a parent or brother or sister of one of your students who has worked in a cannery.

4. Have the students look over different canned salmon labels and then design their own.

5. Discuss home canning and the need to use clean and sterile utensils and containers to prevent botulism. This type of bacteria can appear in many foods besides fish. Botulism cannot be smelled or tasted, so students should watch for damaged cans or canned lids that are puffed outward.

6. List the benefits of canning, freezing, smoking, drying, salting, pickling, and eating fish fresh.

Activity 3
Grocery Store Survey

Background:

Grocery stores are the consumer's main contact with the fishing industry. Fresh, frozen, canned, pickled, smoked and dried fish as well as other seafood products from all over the world line the shelves, refrigerator, and freezer compartments.

Materials:

- sample of seafood products
- grocery store
- pencils
- world map
- colored yarn
- tacks
- small slips of paper
- worksheet:

...Grocery Store Survey Form (6C)

Procedure:

1. Ask students what seafood products they eat. Ask about others that they know about. Then plan a field trip to a grocery store or assign students to fill out the survey form as an assignment.
Pass out copies of the Grocery Survey Form. Have students complete the first few items with samples that you've bought. Encourage students to look in the ethnic sections of the store and to read labels closely. (Ice cream for instance, has seaweed extract—alginate—in it to make it extra smooth.) Then see how well your super sleuths do at finding the amazing number of products from the sea.

2. Make a class list of all the products and mark each on the world map with a tack and a small slip of paper listing the product by name. Tun pieces of yarn from the tacks to your town or village.

3. Figure the distance traveled by each product and the cost per pound of each product. (Save these figures for Activity 4 in this unit.)

4. Follow-up this activity by discussing the role of Alaska in feeding the world (Unit 6, Activity 3) and by trying the next activity—fish nutrition and a fish feast. Students may want to purchase some of the products they discovered at the store for their feast. Mention that what everyone likes to eat is a result of where they grow up and of what their parents and friends eat. Encourage your class to try foods new to them—some of which they'll find wonderfully delicious.

**Activity 4**

**Nutrition and a Fish Feast**

**Background:**

Fish is rich in vitamins and minerals and is a delicious source of protein. Fish and shellfish can provide in generous amounts most of the nutrients the body requires. High quality amino acids in fish are readily digested; and fish products are rich in B complex vitamins such as thiamine, riboflavin, niacin, vitamin B₆, vitamin B₁₂, and pantothenic acid. Fish is also a good source of calcium, iron, potassium, phosphorous, copper, iodine, manganese, and cobalt. Fish is especially good for heart patients because it is low in sodium and the great majority of species are low in fat. Fish is low in calories, too!

Seafood meals are time and money savers. Preparation is simple with little waste. No special equipment is required. Seafood can be mixed with soups, chowders, and casseroles and goes well with almost any spice. It can be baked, broiled, grilled, poached, steamed, or fried. Many ethnic groups have settled in Alaska and their recipes have been passed from generation
to generation providing a great
variety of culinary delights.

Materials:

- seafood
- spices
- cooking utensils
- heat source
- plates and silverware
- paper
- pencils
- crayons, colored pencils or
  narrow felt-tip markers
- construction paper
- scissors
- stapler

Procedure:

1. Discuss with students how
fish are prepared in their
homes. Ask them to bring
several of their favorite
seafood recipes from home for
a class cookbook. Mimeo-
graph copies and have the
students place them in fish-
shaped booklets with construc-
tion paper covers for family
presents and student mementos.
Alternatively, copy your
recipes on fish shapes and
place them in a bulletin board
of pots--ready to be cooked!
(Suggested by Sandy Poor
and Ann Schultz, Mt. Eccles
Elementary, Cordova)

2. Discuss seafood nutrition and
cooking. Important to remem-
ber about seafood is that it
should not be overcooked.
Crabs and shrimps should be
steamed about 10 minutes.
Clams need only a few min-
utes of steaming or frying.
Fish requires less cooking
time than "red" meats.
Filletts and steaks should be
tested often with a fork while
cooking to avoid overcooking.
When fish flakes, it's done.

3. Have the students assist you
in planning a seafood snack
or feast. Invite parents to
bring favorite seafood dishes.
Have students prepare some
of the simpler recipes, mea-
suring ingredients and com-
puting quantities. You might
want to purchase a variety of
seafoods from the store or the
whole feast could originate
there. Or you might want to
try making some special local
recipes such as cooking in a
fire pit, smoking or pickling
fish. For additional sugges-
tions, write to the Alaska
Seafood Marketing Institute,
526 Main Street, Juneau,
Alaska 99801.
Activity 5
The Fish Business

Background:
The fishing industry is vital to Alaskan economy. Twenty-five percent of Alaska’s jobs are connected directly with fishing and many more depend upon it indirectly. There are many costs involved in getting fish from water to mouth. Perhaps the best way for students to understand the fish business is to try it themselves.

Vocabulary:
- product
- consumer
- perishable
- capital loan
- market value
- profit
- loss
- labor
- wholesale
- retail
- advertising
- sales
- competition
- investment
- stocks
- stockholders

Materials:
- prices of fish at various stages of processing
- seafood product to sell
- poster paper
- felt-tip markers

Procedure:
1. Approach students with the idea that now that they know something about fisheries, maybe they would like to get into the fish business. The business can be real or imaginary. Ask them what local seafood products would make a good investment. Go over the price figures from Activity 3 in this unit and see what looks like the best bet to make a profit and what they think people would like to buy, such as specially prepared fish (smoked or pickled); fresh fish delivered to their door; canned salmon with a delicious recipe attached; sometimes hard to obtain seafood (clams, crabs); or a local tradition (hot fish and chips).

2. Have students check out the market (by asking their parents or friends if they would like to buy a particular item and at what price). Who will be the competition? Students may even do some preliminary figuring such as checking:
   - costs of boat and gear
   - cost of fuel
   - boat maintenance and repairs
   - time spent fishing
   - amount of fuel used
   - captain wages
   - crew wages
   - price paid to the fisherman by the processor
   - electricity and water
   - costs of can or other packaging
• wages paid to cannery workers
• salary paid to cannery supervisors
• price of fish sold to wholesaler
• transportation costs (shipping)
• retail price on the shelf

To have much meaning, the figures will need to be standardized with such a standard of comparison, to cost-per-pound. Students then can relate such items as cost of fuel per pound to the price paid per pound to the fishermen, the retail price per pound, and so on.

3. One of the biggest considerations with seafood is perishability. Have the students decide how to get their product from the water to the consumer as quickly as possible, using a good method of preservation.

4. Have the students decide on one product to sell and a name for their business. If students need money (capital) to start their business, check with a local banker. Students may prepare a mock presentation and go in and ask for a loan. Or they might want to sell stock.

5. Develop an advertising campaign. Have the students make posters about their product and plan business details such as advance orders, who's going to get the product, who will transport, who will sell it, who will take the money and keep track of profits and losses.

6. Then the students should be ready for business. They might even want to have a grand opening!

7. After the product is "sold," have the students figure profits and losses, analyze their strengths and weaknesses as a business, and write a stockholders' report. Discuss such correlation between the student business and the fishing industry as transportation, preservation, weather problems and fish product availability.
Unit Seven
Fisheries and the Future

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Objectives:

To help the student:

- Explore the needs of other countries for fish resources (Activity 1).
- Define and use terms common to hatchery operations (Activity 2).
- Sequence the yearly events in a salmon hatchery (Activity 2).
- Identify ocean whitefish by use of a taxonomic key (Activity 3).
- Read about the difficulties of entering the whitefish industry (Activity 3).
- List solutions to problems involved in development of the Alaska ocean whitefish industry (Activity 3).
- Role-play development and habitat issues in the Mighty Salmon Cannery Game (Activity 4).
- Draw cartoons to influence local issues (Activity 5).
Unit Seven: Fisheries and the future: top left, tagging salmon fry; top right, salmon returning to hatchery. At bottom, some of the white fish involved in Alaskas' fishery plants.
When few people were living in Alaska, everyone could take fish needed for food and have little worry about depleting the resource. Now, however, there are more people to feed, more people fishing, more sophisticated fishing gear, and fisheries habitat losses. Each season, management biologists with state or federal agencies must reevaluate the status of marine resources and determine how much fishing pressure they can bear. These decisions affect all who depend on the resources for food or livelihood.

As pressure increases on fishery resources, four means of keeping them healthy are used.

First, managers try to regulate existing fisheries to achieve the maximum sustainable yield. That is, they allow the most possible fish of any one species or run to be taken without decreasing the numbers of fish that will be available in the years to come.

Second, the fishing industry has turned its attention to unfished resources. Here, Alaska's developing ocean industry is an example. Relatively few marine species have been the object of intensive fisheries, and many others may yet become commercially important as public demands make them profitable.

Third, state and private organizations are turning toward aquaculture, the controlled rearing of various aquatic species, usually with the intention of making them available as food.

And fourth, development projects are carefully reviewed for their impact on fish habitat. Subdivisions, shopping centers, logging, oil and gas explorations and drilling, mining, dams, roads, airports and agriculture all can affect rivers, streams, and the fragile coastal environment which is so important for fisheries.
Activity 1
Fish for the World

Background:

The ocean has been proposed as a food source for hungry peoples around the world. Sometimes forgotten is the fact that the ocean is most productive along its coasts, over the outer continental shelf, and in bays and estuaries. Nutrients are flushed down rivers to shallow coastal waters or are trapped in bays and estuaries by the mixing of salt and fresh waters. These nutrients insure luxuriant phytoplankton (plant) growth which in turn produces food for fish. In the depths of the ocean, where light penetrates only so far and not all below 1,700 feet, phytoplankton (plant) growth which fuels the ocean's food web is very low, and hence there are not many fish. The most prolific fishing grounds are already being fished. The ocean can be an important solution to world food problems but we need to:

- Increase the efficiency of fish transportation and fish processing so that fish are kept fresh and all parts are utilized.
- Increase our knowledge of fish biology and ecology and develop workable international agreements so that fish are not overharvested.
- Investigate new fisheries, new fishing gear, and fish farming.
- Decrease ocean pollution from both land and sea sources.
- Protect fragile coastal and riverine habitats where the majority of fish spawn and raise their young.
- Change our eating habits so we eat less and eat lower on the food chain—more seaweed and less tuna; more grains and less beef.

Vocabulary:
- import
- export
- per capita

Materials:
- fish-shaped crackers or cookies
- paper bag
- slips of paper with names of countries written on them
- Ocean Fish Consumption Chart
- Major Ocean Fishing Grounds map
- world map

Make a photocopy of the Ocean Fish Consumption Chart contained in this unit. Cut out the names of the countries and place them in a container.

Procedure:

1. Place slips of paper with names of countries for each class member in a paper bag.
(Cut up a copy of the Ocean Consumption Chart for as many countries as you have students. Pick a variety from the different continents.) Tell students to pretend that instead of being born in the United States, they have been born in a foreign country. As students draw slips of paper from the container, tell them that for today they are residents of that country. Ask them to imagine what it would be like to live there. Have students find their countries on the world map.

2. Hand out the fish-shaped crackers or cookies to students based on the percentage of their countries' fish consumption. Some countries will have many and others will have none. Explain "per capita" consumption. Ask the students:

- Should you share? (Most countries do not!)

- Can you see why countries have wars sometimes?

- What could be done to make everyone feel better? (When students talk about giving everyone the same number of crackers, write the words "import" and "export" on the board. Explain the difference. If the class is going to "even up" the crackers, how many of them think they will be exporting? How many will be importing? As a class exercise, total on the blackboard the number of crackers in the class and divide by the number of class members. Have the exporters reduce their supplies to the average, then have the importers increase their supplies to the average.

3. For additional discussion, show students the map of the major ocean fishing grounds, plus the list of the 10 largest marine fishing nations.

Additional Activities:

1. Math, Social Studies: Have students figure the effects of population on fish consumption. How many pounds of fish does each country consume?

2. Social Studies. Have each student write a paragraph about his or her country's fishing industry, including an answer to the question of whether most of the fish eaten in that country are imported or exported.

3. Art, Science, Speech: Have students draw a picture of the fish most eaten in their countries, and give a one-minute oral report on the fish, covering such points as its size and color, whether it lives on the bottom or travels in schools, what it eats, whether it is found in shallow or deep water, how it is caught and how it is most often eaten.
The world's major fisheries. Demersal fish are bottom fish, Coastal pelagic fish are open-sea fish caught offshore, and Cephalopods are members of the squid and octopus family.


**THE TEN LARGEST MARINE FISHING NATIONS**

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**SOURCE:** Fisheries Yearbook, U.N. Food and Agriculture Organization, 1977.
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<td></td>
<td>5</td>
</tr>
<tr>
<td>Australia</td>
<td>12.4</td>
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<tr>
<td>New Zealand</td>
<td>2.7</td>
<td>37.3</td>
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Activity 2
Aquaculture

Background:

"...Down through the centuries, people have tried their luck at cultivating- or farming-aquatic plants and animals. As early as 475 B.C., a gentleman named Fan Li raised carp in a small freshwater pond in China. Trout farming began in Europe in the 15th Century; and today, aquaculture is practiced all over the world.

"Shrimp are penned and raised in the backwaters and estuaries of such far distant places as the South China Sea and the Mediterranean Sea. Salmon, trout and even catfish are cultivated in the U.S., Canada, Russia, Spain, and many other countries.

"In the island nation of Japan, everything from eels to seaweed to salmon to shellfish is farmed. Oysters, scallops, clams, and mussels are cultivated on neat hanging underwater racks and lines, well out of reach of sea bottom predators. And the network of salmon hatcheries which Japan has developed over the past 100 years recently yielded a harvest of chums that was greater than the natural chum runs of Alaska.

"In aquaculture, the "farmer" controls the elements that are vital to the growth of marine life: light, shelter, weather, oxygen, water flow, and food. The "crop" is protected from disease and from other animals that might prey upon it. Under ideal circumstances, the survival rate increases, the growth cycle is speeded up, and healthy fish are produced.

"It takes solid scientific knowledge, however, to determine just these ideal circumstances might be. Care must be taken not to tip the delicate balance of food and life support systems in the sea by building up one species at the expense of others. Inferior stock should not be turned loose to interbreed with, and weaken or disease natural runs of fish."

—from "Aqua (water) + Culture (cultivate)," Tidelines, Vol. 1, No. 1, September 1978

In Alaska, salmon hatcheries are the most prevalent form of aquaculture. Some are government operated and involved in researching aquaculture techniques. Others are run by aquaculture associations, private individuals, schools, or Native associations.

Establishing and operating a hatchery is a demanding task. Water circulation, temperature, food and disease control are all factors that can decide the success or failure of fish rearing.

Hatchery schedules and activities vary with the species being reared. The general sequence of activities
in a salmon hatchery goes something like this:

Mature fish are taken in the fall when they are ready to spawn. Eggs are stripped from females and milt, or sperm, from mature males are added. Immediately after this procedure, fertilized eggs are placed in incubators and bathed with a continuous flow of fresh water. Eggs are tended until they hatch into alevins with a large yolk sac that will supply them with all the food they need for two to four months. In many hatcheries, fry (young fish that have now absorbed the yolk) emerge and voluntarily leave the incubation boxes on their way to holding pens where they will be fed until the time is right to release them. Upon release, the fish make their way downstream and out to the open ocean to feed and mature.

Fish tagging is one way fish managers gauge the success of their operation. Any types of visible markings can also be seen by predators, so the numbers of returning fish are naturally reduced when outside markers are used. Fin clipping has also been used but fish need all their fins except the adipose fin for swimming or resting.

So, lately, hatchery managers and fish biologists involved in other studies have begun placing magnetized stainless steel wire bearing a code number into the nose cartilage of the fish. To indicate the presence of this tag, the adipose fin is clipped.

Advise your students to save the head of any salmon they catch that has the adipose fin missing and turn the head of the fish over to the Alaska Department of Fish and Game. Tagged salmon are a real prize for hatchery managers and biologists, especially if the fish is ocean caught, because comparatively little is known about the ocean migration of salmon.

Vocabulary:

- egg
- sperm
- fertilization
- spawn (review)
- alevin (review)
- hatchery
- aquaculture
- mature
- incubator
- egg box
- fry (review)

Materials:

- hatchery manager or fish biologist
- worksheets:
  ...You've Just Got a Job in the Hatchery (7A)
  ...Hatchery Basics (7B)

Procedure:

1. Use the worksheets You've Just Got a Job in the...
Hatchery and Hatchery Basics. Explain tagging and go over the dictionary definition of each word. Students may need fishery books or an encyclopedia for some terms. Go over what happens in a hatchery. Then ask the students:

- What are some ways we can help fish production without hatcheries? (Protect fish habitat and natural fish production.)

- Why is aquaculture important to us? (As a source of food, a way to replenish fish stocks, a source of employment.)

- What are some of the reasons we have to be careful with aquaculture? (To not tip the balance of food webs of the sea by building up one species at the expense of others. Also, if hatchery fish are inferior for any reason, they should not be turned lose to interbreed and weaken or disease natural fish runs.)

- What promise does aquaculture offer? (Increased fish runs by increased survival of young, and return of salmon to formerly empty streams or streams where salmon numbers are few.)

2. Invite a hatchery manager or fisheries biologist to visit your class and discuss hatchery management and their fish tagging procedures. If a hatchery is located in your community, try to visit the facility. As an alternative, have students research hatcheries and fish tagging in your local library or write letters to the Alaska Department of Fish and Game or private aquaculture associations asking for additional information.
Activity 3
New Fisherlies

Background:

As more fishing pressure is exerted in existing fisheries and as regulation of these fisheries stiffens, many fishermen are beginning to explore alternatives. Some are gearing up to harvest "whitefish"—the great bulk of finfishes of the sea—and the main food fish of the world. Sometimes they are called "bottomfish" or "groundfish"—which they really aren't, since only a few spend their lives on the bottom.

There are billions and billions of commercially important whitefish in the Bering Sea and Gulf of Alaska. So far, these stocks have been harvested almost entirely by foreign fishermen. But now that the United States has extended its fisheries management zone to 200 miles off our shores, Alaskans and other U.S. fishermen are getting more interested in what could be a multi-million dollar year-round industry.

The 200-mile zone was established in 1976 with the passage of the Fisheries Management and Conservation Act. Until that time, except for a few international treaties, high seas fishing was a wide open affair. Fishermen could go after anything they wanted and take as much as they pleased. And the whitefish stocks off Alaska were being harvested so heavily by foreign fleets that some species had dropped to dangerously low levels. The goals of the act were (1) to bring foreign fishing under control and set up management plans so the stocks could build back, and (2) give Americans a reasonable chance to develop fisheries off their own coasts.

The law did not say that foreign fishermen would have to stay out of the 200-mile zone. But it did say that foreign harvests would be limited to those fish that Americans are unable to catch. In other words, if we don't take them, they will.

The tricky task of setting up management plans, including quotas for foreign and domestic (U.S.) fishermen, belongs to regional councils—whose actions must be approved by the U.S. Secretary of Commerce. In Alaska, this council is the North Pacific Fisheries Management Council.

The Fisheries and Management and Conservation Act is designed to fill a gap until the nations of the world can agree on a Law of the Sea treaty to cover the ocean's resources. (Information for this activity was taken from "What's That Funny-Looking Fish?", Tidelines, Vol. III, No. 5, Feb. 1981.)

Materials:

- library books, encyclopaedias
- map of Alaska
• person involved in a new fishery
• worksheets:
  ...What are Those Funny-Looking Fish? (7C)
  ...Gearing Up for Whitefish (7D)

Procedure:


2. Follow-up with class mini-research on the kinds of whitefish found in local waters. How many can students name without doing research? How many additional names of fish can they list by consulting books, encyclopaedias, local fishermen, their parents or friends? Students might want to learn something about some of these fish (where they are found, what they look like, what they eat, how they might be used).

3. Then have students read the worksheet Gearing Up for Whitefish. You will need a map of Alaska for the last question. (Answers: 1: pollock, cod, ocean perch, etc.; 2: salmon, shark; 3: human food, fertilizers, pet food; 4: fishermen would rather fish salmon, crab, shrimp, halibut, processing plants and fishing boats would have to change gear, bigger boats required for many tons of fish, some Alaskan ports would have to be enlarged for these deep water ships, a fish must be processed immediately, high labor costs, gutting machines don't fit fish, little is known about whitefish biology, developing a market; 5: individual answers to above solutions; 6: The Pribilofs are in the Bering Sea north of the Aleutian Islands and west of Bristol Bay. In the discussion of predicted changes, one of the main ones would be the increased numbers of people coming to the islands, plus increased noise activity, jobs, stores, along with social problems such as alcoholism and crime. The Aleut young people would probably tend to stay on the islands because they could get jobs. There would be some loss in wildlife habitat and disruption of some birds and animals used for subsistence lifestyle. One of the few alternative vocations would be to build up the tourism industry to get people to come to watch birds and marine mammals and buy Native crafts. These similar options for development are being faced by many other rural Alaskan communities.

4. If a new fishery has recently started in your community, find someone who is involved in it and arrange for them to address the class. Before the speaker comes, prepare students by having them think about the kinds of things they would like to learn from the speaker. For example:

• What kind of gear is used?
• Is it hard to change over
from some other kind of fishery?

- What time of year must the fishing be done?
- Is it expensive to prepare for fishing?
- What will be the market for the fish?
- Do the fish require any special handling?
- What are sources of information about the new fisheries?
- Is a state or federal agency helping fishermen get started in it?

If possible, arrange for students to visit a vessel engaged in the fishery in question. Be sure the vessel captain or a crew member is present to answer questions and explain the gear to students.

Activity 4
The Mighty Salmon Cannery Game

Background:

Throughout Alaska, every community is facing development issues. Sometimes there are possibilities for compromise. Other times inhabitants have to decide on development or the status quo. In any case, residents have to decide on their own priorities and live with the consequences.

Many times, decisions are made in Juneau or Washington, D.C.—or Tokoyo or Cairo. But Alaska is famous for the "coffee cup decision"—whether made over coffee at a hotel in Anchorage or someone's kitchen table in a village.

Hopefully, as Alaskans become more cognizant of all the results of decisions, and more astute politically, Alaskan resources and Alaskans will benefit. Our young people need to learn at an early age what's going on in their community and the world in general, and that they can have an effect on their own lifestyles and surroundings. One fun way to get started is to role play
different points of view in a simulation game.

Materials:

- butcher paper
- felt-tip markers
- sets of role cards
- copies of Mighty Salmon Cannery Map

Procedure:

1. Ask students to name planned local development projects. Pass out copies of the Mighty Salmon Cannery Map and go over the proposal. Ask them how they would imagine people in Bekoute Village feel. Tell them that there will be a public hearing on this issue soon.

2. Divide the class in seven groups and hand out the role cards. Each group represents the point of view typified by the role on the card. Have each group tell the rest of the class its name and title. Then tell them to read over the card and elect one of their group to the village council and elect one person spokesperson. The village council should meet up front while the rest of the group helps the spokesperson put together a two minute speech for the public hearing which will be occurring in 15 minutes (or so). Go over techniques for making a presentation (outline the points you want to make, develop charts and graphs, speak clearly and convincingly, etc.)

3. Have the village council elect a mayor (who will chair the hearing), recording secretary, and timekeeper; and arrange the room for the hearing. Brief the village council on its role. The council members need to listen to all sides and ask questions that might give them better information to make the decision. After the public hearing, they will go outside the room briefly to make their decision. Then they'll come back and announce their decision and reasons.

4. During the hearing, allow each speaker two minutes, followed by questions from the council and audience.

5. After the hearing is over and the council has made its decision, debrief the group by talking about the way decisions are made. Ask the students:

- What would have happened if everyone had tried to influence everyone else?
- Does everyone have equal influence?
- Who else might have affected the decision? (The governor, legislature, Congress.)
- What are important things to know before a decision is made? (Affects on natural resources, the economy, people's feelings, traditional ways, new opportunities.)

Mention several local examples of past development decisions, the roles of community residents, and decision results. Compare these with current local issues.
The Mighty Salmon Cannery Game Role Cards

FRED FRIDAY - manager of the Native Company Store and Corporation Board member.

Fred is excited about the idea of the Mighty Salmon Cannery Corporation locating a cannery at Eekoute. There should be jobs for corporation members in the cannery plus the local fishermen and women could sell their catch locally instead of having to take it down the coast. He likes the idea of the dam, because the excess electricity could be used for other corporation development projects. Plus electricity would be a lot cheaper for everyone in Eekoute, and they wouldn't have to worry about breakdowns all the time on the village's diesel generators. He doesn't care where the cannery is located, just so it comes!

CATHY COHO - fisheries biologist with the Alaska Department of Fish and Game

Cathy would like to see the cannery located over by the airstrip instead of by the Big Riley River. A lot of good wetland habitat would be lost at the river site. The Eekoute Village area is famous for its duck and goose production as well as salmon runs. Oil and gas from the road might seep into the river and, also, there could be erosion that would cover up the salmon eggs. Though the dam would be located above the place where salmon are spawning, nutrients that the fish need would be trapped up above the dam and the water below the dam would be much warmer than it should be for good salmon runs.

THORNE THURBER - cannery owner

Thorne has just come to Alaska from Seattle. He's anxious that everything will go well. His company has put a lot of money into planning the cannery already and this is definitely the cheapest and best design. The cannery will boost the local economy and he's promised to hire local people as much as possible. The barge can bring all the materials right to the cannery site. Once the fish are processed, the majority will be flown out fresh to the Lower 48. The rest will be canned and barged to Seattle at the end of the summer.
NELLIE NIKOLAI - postmistress

Nellie is quite concerned about the situation. She thinks should be studied a lot more. She likes the idea of the wind generator. As a government employee, she's sure that the village can get money from the government to build it and maybe that would be a source of cheap electricity. The wind's always blowing! She doesn't really like the idea of the dam but the road sounds great. She'd just like to be able to drive, drive, drive!

RIP RYEBACK - old timer hunter and trapper

Rip likes it just like it is. He doesn't want to see any development around Eekoute. Any development will hurt the hunting, fishing, and trapping. And development would bring more people which he dreads. He's comfortable in his cabin in Eekoute, just like he's comfortable in his long underwear which he wears all winter.

PAUL PANNIYAK - local conservationist

Paul grew up in Eekoute and just graduated from the University of Alaska. He's not sure what he's going to do back in the village, but he'd sure like to see a wind generator go in. He sees this as the perfect opportunity to get a wind generator. The dam sounds like a poor idea to him and he agrees with the new fish biologist, Cathy Coho, that the site by the airport would be much better. With the wind generator, they wouldn't need a road—which would save a lot of fish and wildlife habitat.

WILLIE WEBER - long-time fisherman, head of the fisherman's co-op

Willie is really happy to hear about the cannery as that will save local fisherman a long trip down the coast to deliver fish. He is concerned about anything that would damage fish habitat and is especially concerned about the dam. He would also hate to see the loss of wetland habitat, so favors the airstrip site for the cannery. The little Riley River is big enough to handle the fish wastes and all the fishermen could run the materials from the barge up to the airstrip site on a high tide. Also, the cases of canned salmon could be boated down to the barge after the cannery is built.
The Mighty Salmon Cannery Map

The Mighty Salmon Cannery Company is proposing to build a cannery outside of the village of Eekoute on the Big Riley River. Water for processing will come from the river and electricity will be produced by a dam at the headwaters of the Big Riley River. Fish wastes will be dumped into the Big Riley River.

Eekoute is a village of 300 people. A large salmon gillnet fishery has been building up over the past few years. Most of the people in the village depend heavily on subsistence foods which they harvest from the surrounding country.
Activity 5
Cartooning Local Issues

Background:

Oftentimes a cartoon or a sense of humor can be very effective politically. Plus, humor makes life more bearable and enjoyable for all of us.

Materials:

- paper
- pencil
- sample cartoons

Procedure:

1. Brainstorm with your class a list of local fisheries issues. These might include disregard of a fisheries regulation, potential losses in fisheries habitat by proposed developments, lack of knowledge of how to hold a fish, the importance of fish spawning habitat, or the need to be careful with incidental fish and crabs caught in gill nets, seines, or trawls. The class might be interested in helping the community obtain an aquarium, hatchery, or education program.

2. Select and research one issue. Students may interview or invite speakers.

3. Decide on a point of view or proposed solution. Then draw cartoons to illustrate your point.

4. Show your results to the decision makers or people involved in the issue. Offer your help in resolution of the issue. Students can make a difference!

Additional Activities:

1. Art, Social Studies: Have students make T-shirts with a fish cartoon or saying on the front. They can silkscreen the shirts themselves or order them from a specialty company. The students might want to make enough to sell and to spread their points of view to the community!

2. Art, Social Studies: Have students design postage stamp posters as another way of conveying their ideas to the community.