Unit Five
Seaweed

Index

Activity 1: Tasting Seaweed .... 84
Worksheets:
   Holdfast ............5A
   Bull Kelp ............5B
   Matching ............5C
   Bull Kelp Maze .......5D
   Sea Lettuce ..........5E
   Color-Code ..........5F
   "S" Seaweed ..........5G

Activity 2: Kelp Carving .... 87

Activity 3: Pressing Seaweed .......... 88

Activity 4: Seaweed Weaving .... 89

Activity 5: Beach Seaweeds .... 90

Seaweed Bibliography .... 91

Objectives:

To enable students to:

- Cook and taste seaweed (Activity 1).
- Carve a bull kelp bladder like a pumpkin (Activity 2).
- Make note paper, cards, bookmarks, wall hangings, or placemats from pressed seaweed (Activity 3).
- Weave seaweed into an object d'art (Activity 4).
- Practice a seaweed dance (Activity 4).
- Write a story about seaweed (Activity 4).
- Observe seaweeds on the beach (Activity 5).
- Make a beach in a box (Activity 5).
- Recognize that seaweeds are important because they provide food for many animals and provide places for some fish and invertebrates to hide (Activity 5).
Seaweeds are algae: plants which have no roots and do not produce flowers, but do contain chlorophyll – the green pigment that plants must have to manufacture their own food. Algae are distinguished from most green land plants by absence of special "woody" cells which add mechanical support and are part of a water-conducting system. Since algae live in the water, they don't need a water-conducting system. And since the water supports their forms, seaweed don't need the rigid woody tissue.

There are many forms of algae, both in fresh water and salt water. Some of it is microscopic – invisible to the naked eye. Seaweeds are algae that live in the marine environment and microscopic – visible to the naked eye. In size, seaweed range from tiny, barely visible plants to huge plants more than 100 feet long.

The major groups of seaweeds are divided on the basis of color. Green algae are so colored by the chlorophyll they contain. Red and brown algae have additional pigments which give them the predominant red or brown color. The presence of red or brown pigment enables the plant to produce food with different wavelengths of light than is used by green algae. In general, green algae are found in the most shallow waters, brown algae are somewhat deeper, and red algae can live deepest of all.

Although some seaweeds grow as free-floating plants, many kinds also may be found growing on hard surfaces. They do not have roots, but instead cling to rocks, pilings or shells with their special means of attachment called a holdfast. The holdfast may look like a small circular button or may consist of numerous finger-like projections that grow downward and cling to a hard surface.

Seaweeds are important because they provide food and shelter for many animals. Many kinds of seaweeds are edible by humans, including many that grow in Alaskan waters.
Activity 1
Tasting Seaweed

Background:

Of the several kinds of edible Alaskan seaweeds, three of the most easily collected are bull kelp (Nereocystis luetkeana) which is found southward from Unalaska Island in the Aleutians; and sea lettuce (Ulva or Monostroma) and rockweed (Fucus distichus), both of which may be found on most beaches in Alaska.

Bull kelp is a large brown seaweed that grows in relatively shallow water and is often washed up on beaches. Finger-like projections make up its holdfast. Above the holdfast grows a long stipe (or stem) that may be several feet long. Atop the stipe is a bulbous, gas-filled bladder with attached blades, or fronds. The bladder gives the plant flotation and enables it to keep the upper part of the plant near the water's surface.

Rockweed is the most common brown seaweed. Found attached to rocks throughout the middle intertidal zone, it has gas-filled bladders at the tip of each branch that help keep it floating near the surface when the tide is in, thus increasing the amount of light available for its energy needs. Rockweed secretes a mucus-like substance which helps keep it moist during low tide.

Sea lettuce is a bright green alga that grows in the low intertidal zone. It looks like limp lettuce leaves, is brilliant green and very thin.
Depending on when you plan to use the seaweeds in class, either collect algae from the beach before taking a class field trip to the shore, or, if you find a good supply of algae, bring some back from the class outing. To keep the algae in good condition until it is used, you may place it in the refrigerator in a plastic bag with moist paper towels for a few days. Algae may even be frozen and transported from coastal to interior communities in the state. Dried seaweed is sold in many grocery stores, particularly those with a good oriental selection.

Vocabulary:

- frond
- blade
- stipe
- holdfast
- seaweed
- kelp
- lettuce

Materials:

- seaweed (including edible varieties)
- cooking utensils, pans, heat source
- spices, sweetener, soy sauce, rice
- recipes
- worksheets:
  ...Holdfast (5A)
  ...Bull Kelp (5B)
  ...Matching (5C)
  ...Bull Kelp Maze (5D)
  ...Sea Lettuce (5E)
  ...Color Code (5F)
  ...NW Seaweed (5G)

Procedure:

1. Bring seaweed into the classroom for students to smell and touch. Point out the different parts (holdfast, stipe, blade). Have the students hold their seaweed in an imaginary ocean and wave back and forth with the waves crashing in. Talk about how seaweed provides food for many animals (such as snails), and how they are good hiding places for fish.

2. Now let the students taste the seaweed! Pick one or more of these for your own recipes to try out. People of Asian origin and Alaskan Natives also have recipes which they may be willing to share.

Seaweed Rice

Crumble one of your local edible seaweeds such as fresh sea lettuce or dried seaweed from the grocery store in a pot of steaming hot rice and cook for several minutes. Serve with soy sauce.

Seaweed Crackers

Add tiny seaweed pieces and a little soy sauce to one of your favorite cracker recipes. These also can be purchased commercially.

Seaweed Salad

Shred edible seaweed and place in salad.
Kelp Relish or Pickles

Use stipes no longer than 15 feet and sections that are no more than three inches in diameter. Snap off a piece to test for freshness; if it breaks crisply, it will make good pickles. Chop off the bulb and "tail."

Pare kelp with a vegetable peeler and slice into thick rings. Rinse in cool water. Soak rings in cool water for three days, changing water two to three times a day. On the fourth day, place rings in cold water to cover. Bring to a boil and simmer 12-14 minutes. Drain and measure.

For each quart of rings bring to a boil and simmer together for five minutes:

3/4 cup cider vinegar
2 cups brown sugar
1 teaspoon mixed pickling spice
a few cloves

Pour over rings and let stand overnight. Next day, drain off syrup, heat to boiling point and pour over rings. Let stand another night. Fill hot jars with kelp rings, cover with hot syrup and seal. Let stand a month before serving.

Krazy Kelp Kandies

2 cups bull kelp circles
vinegar
2 cups brown sugar
1/4 cup water
2 teaspoons ground cinnamon

Find a newly beached bull kelp whose stipe has the texture of a crisp, hard apple. Cut off about one foot of the stipe where the diameter is one or two inches. Store it in a moist plastic bag in a cool place.

Back in the classroom, cut the stipe into quarter-inch "Life Saver" circles - enough to make 2 cups. Place pieces in a pan and cover with vinegar (do not use wine vinegar). Mix 2 cups kelp, 2 cups brown sugar, 1/4 cup water. Bring mixture to a boil, stirring until sugar dissolves. Add 2 teaspoons ground cinnamon, turn heat down and let mixture cook very slowly, uncovered for one hour.

Using a slotted spoon for fork, lift the kelp from the syrup, draining over the pan a few seconds, and place in a shallow pan with 1/4 inch brown sugar on the bottom. Using a fork, coat kelp with brown sugar and spread to dry and cool on a plate. You and your friends will enjoy krazy kelp kandies. Any remaining syrup may be used on pancakes, waffles, french toast, or over ice cream.

(adapted from Exploring the Olympic Seashore, S. Forrest Blau, National Park Service, 1976)

3. Use the seaweed worksheets as a followup to your taste treats.
Activity 2
Kelp Carving

Materials:
- bull kelp bladders
- blunt knives, sticks, broken shells, other implements for cutting

Procedure:

For a face, carve the kelp bladder just as you would a pumpkin. Experiment to make different faces and designs. Demonstrate carving to the students. Then if you have enough bladders, let students--either singly or working in pairs or groups--carve faces using blunt utensils.

For a horn, cut off one-half of the bulb and part of the stipe leaving the remaining half of the bulb attached to a length of stipe several feet long. Take a deep breath and blow into the stipe, keeping your lips tight as if blowing a trumpet. You can produce a mellow sound or even a tune if you practice enough.
Activity 3
Pressing Seaweed

Materials:
- small, delicate seaweeds
- bucket of sea water
- drawing paper
- shallow pan larger than sheets of paper
- paper towels
- cheesecloth or pieces of old sheet, diapers, muslin or waxed paper
- newspapers

Procedure:
1. Collect algae from the beach and put it in a bucket or plastic bag of sea water (at least keep the seaweed cool and damp). Use as soon as possible after collecting.

2. Place a piece of drawing paper in the pan and cover with sea water or tap water. Float and arrange a piece of algae over the paper. Gently lift the paper from the water with the algae on top and do any final arranging. Cover with cheesecloth (Pieces of sheet, diapers, muslin or waxed paper often work better, since finely structured seaweed specimens tend to get caught in the large weave of cheesecloth.). Cover the cloth with newspapers, cardboard, more newspapers and finally with books. Let dry for several days. Change newspapers from time to time. Natural gelatins in the algae will cause them to stick to the paper, but if the algae is thick, you may need to glue it or spray with fixative after it has dried.

3. Alternatively, lightly dry the seaweed between paper towels and press between two sheets of clear contact paper or use your school's laminating machine.

4. When the seaweed is dry, make bookmarks, note paper, cards, placemats, or wall hangings. Or mount it on wood or other stiff material to make a plaque.
Activity 4
Seaweed Weaving

Materials:

- 2 large pieces of driftwood
- jute twine
- seaweed
- music
- paper and pencil

Procedure:

1. Wrap the two pieces of driftwood with jute and add an additional strand for hanging. Using seaweed you or the children have gathered, weave seaweed into the jute. Allow to air dry and hang.

2. Weave your own seaweed dance! Find a recording of sea music such as Debussy's "The Sea." Play the record (part of it) for the students, letting them listen to it and imagine algae weaving rhythmically back and forth by the motion of the sea. Read the stanza by Robert Lewis Stevenson about seaweed:

   Ever drifting
   drifting
   On the shifting current of the restless sea.

   Then, ask them to pretend they are algae and to move, either as if they were attached to the bottom of the sea or adrift at its surface. Make up your own seaweed dance.

3. As a class project or with individual students, have the student weave their own imaginary seaweed story, for instance one entitled:

   The Adventures of a Floating Seaweed

   that begins:

   One day while adrift on the sea, I....

   Have the children illustrate the story and use what they have done to create individual books or perhaps a class mural.
Activity 5
Beach Seaweeds

Materials:
- small boxes or trays
- sand, pebbles, and other items found on a beach

Procedure:
1. Visit the beach. After students have had some initial exploration time, focus on seaweed (See Task Card).
2. Have the children make a beach in a box, including seaweed, sand, shells, driftwood and pebbles.
3. Summarize by talking about the importance of seaweed as food for many animals (including people!) and as places for fish and other small animals to live and hide.

Seaweed
Leader: Ask the children if they can find some seaweed. When they have, ask them:

- What colors are the seaweeds you found?
- How do they feel?
- How do they smell?

Ask the children questions about likenesses and differences of specimens collected:

- Which seaweed did you find in tide pools? On rocks? On shells?
- Where did they not grow?
- Can you find any animals living on seaweed? (Look closely among the blades and at the base of the holdfast.)
- Are seaweeds like land plants? (Seaweeds have "holdfasts" which are like roots, "stipes" which are like stems, and "blades" or "fronds" which are like leaves.)
- Can you find the blade, stipe and holdfast?
- Do seaweeds float? (Most don't, but the bladders on kelp and rockweed help those seaweeds to float.)
Seaweed Bibliography

Teacher's Reference:


Basic information about seaweeds accompanied by line drawings of some species.


Excellent recipes and information on identifying the various species. Line drawings and some color.


Tips on identifying, collecting, and drying seaweed for use in the kitchen. Includes nutritional values of seaweeds. Recipes for seaweed pizza, granola bread, soup, spaghetti, pickles, pie crust and more.


Species descriptions with full page illustrations.
Unit Six
Birds of Wetlands, Rivers, and Seashores

Index
Activity 1: Common Alaskan Birds .................. 98
Worksheets:
  Raven and Crow ............. 6A
  Eagle ..................... 6B
  Gull Maze ................. 6C
  Duck ..................... 6D
Geese ..................... 6E
Matching Birds ............ 6F
Bird Feet and Heads ...... 6G
Activity 2: Observing Birds ................ 100
Birds Bibliography ........ 101

Objectives:

To enable students to:

• Become familiar with the appearance and habitat of six Alaskan birds (Activity 1).

• Role play the different birds (Activity 1).

• Visit a local museum or the home of a bird expert to see live or mounted birds (Activity 1).

• Discuss the effects that man's presence has had on these birds (Activity 1).

• Observe birds at a beach, river or wetlands (Activity 2).

• Study bird tracks (Activity 2).

• Feed the birds (Activity 2).
Many species of birds are found along Alaska's rivers, wetlands, and in coastal waters. Like all birds, they may be grouped by where they live, how they move, and how they feed. Scientists group birds according to their likenesses in appearance and activity: swimmers, tree perchers, predators, divers, insect eaters, seed eaters, probers, waders.

Eagles, gulls, ducks and geese are seen throughout Alaska. Crows are common in southeast and southcentral Alaska. These six groups all consist of relatively large birds that children easily learn to recognize:

**CROWS.** Only one crow species occurs in southeast and southcentral Alaska. Called the northwest crow, it is smaller than the common crow of the fields and farms elsewhere in America, growing to a length of 17 inches. It is solid black, has a quick wing beat for so large a bird, and makes a loud "khaa" sound. Crows are most often seen in groups of a few to several hundred, and they often "work" the beaches, scavenging mussels, clams, crabs, and whatever other food they find. They often eat bird eggs, particularly seabird eggs when nesting seabirds are frightened away by humans or predators. Crows and ravens are intelligent. They are great imitators and are famous for the games they play with each other, and the tricks they play on people, dogs and cats.

**RAVENS.** Like crows, the common raven is black. It is, however, much larger than the northwest crow, growing to as much as 27 inches in length. The raven has a wedge-shaped tail, a bill heavier than the crow's, and shaggy throat feathers. Ravens are found all over the state. They fly by alternately flapping their wings, then gliding. Ravens usually are solitary or in pairs, never occurring in the large groups that characterize crows except at dumps and roosts. Ravens eat just about anything, including carcasses, bait from traplines, berries, bird eggs, insects, fish, crabs, clams and voles. The basic call of the raven is a cr-ruk - but raven sounds vary greatly, often imitating other birds, or calling in resonant, bell-like tones, or even sounding like a muttering human! The raven is extremely important in Tlingit traditions, in which he is believed to be the creator of the world. Many legends exist about his deeds. Other Native groups also have raven legends.
EAGLES. Alaska is one of the few places in the world where bald and golden eagles are still common. In southeast and southcentral Alaska, they are frequently seen along beaches and streams perched in tall evergreens, cottonwood trees or rocks from which they watch for spawned out salmon and other food.

Bald eagles reach a length of as much as 43 inches and may have a wing spread of six to eight feet. Immature birds are mostly brown and have a dark bill. With maturity, these markings change gradually until the mature bird has a white head and tail and yellow bill and feet. Bald eagles have a call that could be described as a squeal or screech – not at all what might be expected from such a large, imposing bird. Their eyesight is extremely keen. They can see distinctly for far greater distances than we can. Bald eagles are capable of landing in the water to capture prey and then using their wings to scull to shore.

Golden eagles generally are found more in the Alaskan interior. The adult is a large, dark bronze bird with no white patches. The immature golden eagle has a white patch at the base of the tail and white wing patches. The golden neck feathers can be seen only at close range. The golden eagle’s call is similar to the bald eagle’s, but louder. They eat primarily voles and other small mammals. Golden eagles often are seen soaring in the air currents near the tops of mountains.

In flight, eagles stroke deeply, then soar on broad, flattened wings.

GULLS. A number of species of gulls may be found in Alaska. Of these, the glaucous-winged gull is the largest and most common, in southeast and southcentral Alaska. Immature birds are a dusky grey-brown and have dark bills. Mature glaucous-winged gulls are grey with white head, tail and breast, and have a yellow bill. Glaucous gulls look very similar and are the most common gull in Western Alaska. These gulls feed on small fish they catch by diving at them when they show at the water’s surface; but they also will harass diving ducks to cause them to drop food they have taken or they will scavenge along beaches for any edible materials. The somewhat smaller mew gulls are found in the Interior. They have a mewing call, and wingtips that are black with white spots at the outer edge. In contrast to the mew gull, most gulls are known for their loud, raucous screams.
DUCKS. There are two main types of ducks: dabbling ducks and diving or bay ducks. The dabbling ducks take off directly out of the water just like helicopter pilots. Diving ducks have to run along the water like fixed-wing planes as they take off. Diving ducks dive and swim under water to get their food (fish, clams and other small invertebrates). Dabbling ducks just tip up to graze on pondweeds or pond invertebrates. Mallards, pintails, teal, and widgeon are samples of these shallow water ducks. The divers—such as oldsquaws, scoters, eiders, and harlequin, generally are found in deeper waters.

The mallard, which is the duck portrayed on this unit's Duck worksheet, is the best known American duck. The male mallard has a green head with a white collar; a yellow bill, orange feet, purple-blue wing patch, a grayish body, chestnut breast, and a white tail with an upcurled black tip. The female is mottled brown with a whitish tail, violet-blue wing patch, dark orangish bill and orange feet. As is the case with many other birds, the female mallard is less colorful than the male—a characteristic that enables her to blend with her surroundings. Thus she is less obvious to predators, which is especially important during nesting season. The female mallard call is a loud quack, quack-quack; quack, quack-quack. Males are more quiet, with a low kwek-kwek.

GEESE. Geese do not normally land on open salt water, preferring freshwater wetlands, though some species use salt water during migration or winter feeding. In spring or fall they often may be seen flying overhead. Some areas in Southeast Alaska, such as Juneau, have resident populations of Canada geese so that these birds may be seen year round. Canada geese (which appear on this unit's Geese worksheet) are distinctively marked, being generally grey-brown, but with a black head and neck and white cheeks. The Canada Goose is found all over Alaska. It eats primarily grasses and seeds. Geese in the air follow a leader but because of air turbulence can not fly directly behind in single file but must string out V-shaped on either side of the leader like military planes. Groups of migratory swans may sometimes be seen overhead as well. Such birds can be distinguished from Canada geese by their white color, greater individual size and by their call, which generally is softer than the honking of the Canada geese.
Activity 1
Common Alaskan Birds

Vocabulary:

- body
- bill
- feet
- wing
- raven
- crow
- gull
- goose
- duck
- eagle

Materials:

- films, slides, pictures, drawings of the birds
- slips of paper (enough for each of the children) with the different types of birds (one each) printed or drawn on them.
- local museum or home of bird expert
- worksheets:
  - Raven and Crow (6A)
  - Eagle (6B)
  - Gull Maze (6C)
  - Duck (6D)
  - Geese (6E)
  - Match Birds (6F)
  - Bird Feet and Heads (6G)

Procedure:

1. Discuss what the children think ravens, crows, eagles, ducks, gulls, and geese might eat. Use the bird work-sheets. Build upon their own knowledge and experiences. Discuss how the bill and feet of each of these birds is fitted to its way of living and feeding. As much as possible, let the children work out the connections.

2. Now pass out the slips of paper. Have the children role play the different birds. Honk, squawk, and quack.

3. Visit the local museums or the home of a bird expert to see live or mounted birds. Have students watch how they move and eat. Listen to the sounds they make. If possible let them touch the bird feathers. Try to have enough feathers so that each child may take one home.

4. Discuss the way in which gulls, eagles, crows, and ravens help keep our earth clean. Be sure that children know that these birds are protected by law and cannot be killed. Tell the students local stories or legends. Discuss the effect that man's presence has had on these six common birds, whether it has been good or bad and in what ways. (Gull, crow and raven populations have increased tremendously because of all the garbage we produce. Eagles in the Lower 48 have been dying out because their eggs don't hatch because of chemicals (poisons) used on crops to kill insects. Poisoned insects and chemicals
in water contaminate fish, which in turn contaminate eagles. Numbers of ducks and geese have been reduced primarily because of the loss of their homes (draining of wetlands) in the Lower 48.

Additional Activities:

1. **Language Arts:** Have each child dictate a short "event" concerning birds for a language experience chart or for a bird book to take home.

2. **Art:** Create a flock of gulls or geese using the following directions from the December 1977 issue of Sunset magazine:

   **Gull:** Transfer two circles to paper plate. Draw in eye just above center point. Add beak and neck and cut along solid black lines. Discard light gray area.

   **Goose:** Transfer two circles to plate around centers shown. Draw in beak and eye; cut along solid black lines. Discard gray-toned areas. Color beak and pieces marked "foot" a bright orange, then glue foot pieces to inside of body. Cut along lines A, B and X. Assemble by inserting slot A into slot B.

3. Just for fun, read aloud to students one or more of the stories or poems about birds listed in the bibliography. And share the following poem:

   **Ducks' Ditty**

   All along the backwater,  
   Through the rushes tall,  
   Ducks are a-dabbling,  
   Up tails all!

   Ducks' tails, drakes' tails,  
   Yellow feet a-quiver,  
   Yellow bills all out of sight  
   Busy in the river!

   Slushy green undergrowth  
   Where the roach swim--  
   Here we keep our larder,  
   Cool and full and dim.

   Everyone for what he likes!  
   We like to be  
   Heads down, tails up,  
   Dabbling free!

   High in the blue above  
   Swifts whirl and call--  
   We are down a-dabbling  
   Up tails all!

   --Kenneth Grahame

4. **Art:** Make a bird collage by cutting pictures of birds from magazines and gluing them to cardboard or pinning them to a bulletin board, making each picture touch others. Add feathers, pieces of egg shell, and whatever else imagination suggests.
Activity 2
Observing Birds

Materials:

- spotting scope (optional)
- bread crumbs, seeds, food scraps, gnet
- bird feeder

Procedure:

1. Go to a wetland, river, or beach to watch for birds. Spotting scopes can be focused on particular birds so that everyone gets a look. Take along a local birdwatcher. High tide is often the best time to go birdwatching on the coast, as the birds are closer to the upper beach then. As the children watch, ask them what the birds are doing, how they fly and rest, and what they appear to be eating.

2. If you can convince children to sit very, very still, scatter old bread, meat or fish scraps at the edge of the water. Watch to see what birds come to the food. Be sure to watch and discuss the behavior of the birds toward each other in the presence of the food. Do birds of the same species interact with each other? How? How do birds of different species react to each other?

3. Help the children find bird tracks on the sand or mud. Observe the size of the tracks and whether or not they are webbed. See if the class can figure out what kind of bird might have made the tracks and what it might have been doing.

4. The easiest place to feed and watch birds is at school. Set a bird feeder outside your classroom window. Experiment with different foods to attract a variety of birds. Once you start feeding, continue all winter, because some birds that become dependent on your feeder might otherwise starve. Record your class's observations regularly, preferably every day. Perhaps the children can take turns watching and recording.
Birds of Wetlands, Rivers, and Seashores Bibliography

Children’s Literature:


The familiar tale about a duckling scorned by all until he discovers after a lonely winter that he has turned into a beautiful swan.


Whimsical verse and beautiful watercolor bird illustrations that captivate audiences young and old.


A Junior Science Book that tells the life story of Canada Geese including courtship, mating patterns and life cycle. A factual account of the experiences the author has had with the geese which lived at his pond for six weeks. The book devotes itself to the need for conservation and preservation of geese. Black and white photographs from various sources.


The adventures of Ping the duck are classic.


Discusses the annual migration of a flock of snow geese from the Sacramento Valley to and from Alaska, following the leader of the flock, Gander, and his family. Describes the passage of the seasons, various dangers encountered by the geese during their migration: hunters, oil slicks and blizzards. Pictures are charcoal black and white.


Let's Read and Find Out Science Book on how much birds eat, where they sleep, how they retain heat. Illustrations are in black, white, green and brown with details in ink.

Photographic series of a young goose from egg through early life.


A Let's Read and Find Out Science Book about duck preening and eating habits. Excellent hands-on experiments are provided in the text, and elementary analogies illustrate diving ability, migration and speed of flight. Illustrations are in color.


Highly recommend picture story book on the excitement of bird watching. Descriptive phrases: "Gulls that wheel and dip"..."Ducks are swift and sure. They beat their wings fast as they rise and turn." Beautiful watercolor illustrations.


About a sea bird blown inland by a storm.


Factual portrayal of the migration of the Trumpeter swan from North Carolina, California, Mississippi valley and Gulf coast to and from the Arctic Ocean. Details nest building, preening, egg laying, rearing of young. Beautiful pastel watercolors with ink.


Facts about the puffin are recounted in detail, and the various subspecies of the auk family are separated for purposes of identification and discussion. The accent is on man's relationship to the bird. Illustrations are charcoal and black watercolor.


Covers one year in the life of Honker, the leader of a flock of Canada geese, stressing the importance of refuges, banding and tracking. Illustrations are black and white and charcoal.


Picture-story book with a light and humorous account of a dog's encounters with birds such as the blue heron, pelican and albatross. Factual information is blended with fantasy in this extremely enjoyable book. Illustrations are in detailed ink.

Profusely illustrated information about a variety of birds. Describes the parts of a bird, flying, plumage, nesting, hatching, evolution, and migration. Alaskan birds mentioned include puffin (flying); eagle and albatross (ways of flying); blue heron and ducks (different feet); plovers and ducks (colors to blend); herring gull (eggs and hatching), and arctic terns and cranes (migration).


Excerpts from field notes and superb watercolor of Olaus Murie, a naturalist who traveled extensively throughout Alaska in the 1920s and 1930s.


Descriptions of birds, their habits, habitats and field marks. Illustrated by color and black and white plates. One of the Peterson Field Guide series.


Poignantly details the life cycle of the whistling swan from birth, through migration, and death. Begins with the swans spending the summer in Alaska, then migrating south to the Pacific coast, Mississippi River valley and Atlantic coast, and ultimately returning to Alaska the following summer. Obstacles include encounters with its natural enemies, man and inclement weather, as well as oil slicks and polluted water. Pen and ink illustrations.


Detailed information on diving birds and particular characteristics of the loons, grebes, cormorants and anhinga. Touches on bird evolution and the uses of cormorants for centuries by Chinese and Japanese fishermen. Pen and ink illustrations.

Descriptions of birds and their habits, songs and ranges - illustrated by color drawings. Easy to use in the field but not as much background information as the Peterson Field Guide.


Great attention is given each aspect of goose lives: selection of a mate; birth and caring for the young, and death. Man's intervention in nature is portrayed as one of helping maintain the balance. A table of "goose talk" is provided. Illustrated with black and white photographs.


Includes chapters on structure, mystery of a feather, bills, feet, nests. The material is somewhat "dry" but factual. Charcoal and pen drawings.

Charts and Records:


One after another songs of the various species.

Voices of the Loon. Written and produced by William F. Barklow. Published by the North American Loon Fund, Meredith, N.H. 03253 and the National Audubon Society, 950 Third Avenue, New York, N.Y. 10022

Various calls of the common loon together with commentary.


Bird songs of more than 500 species, including most Alaskan birds. Also available from Cornell Laboratory of Ornithology, 159 Sapsucker Woods Road, Ithaca, N.Y. 14850.


Set of six small color posters depicting Alaska's marine birds.


A large poster with color photos of many Alaskan birds and information on each species plus a map of migration routes. The guide contains activity ideas and easy-to-read bird information.

Delightful, informational book about the mysterious and unusual habits of the puffin. Similar to *Puffin: Bird of the Open Seas* (Martin), but brings the audience into the material.


A Science and I Can Read book about how a boy begins to observe and learn about birds.


A Tsimishian Indian legend of how the loon helps a blind man and receives his necklace. Watch for the film by the same name in your state and local film libraries.


A good old-fashioned story about Obadiah, a Quaker boy, and a sea gull.


Though wood ducks are not found in Alaska, helps students conceptualize the duck's environment and natural enemies. Beautifully illustrated with bright and cheerful water colors.


A photographic essay on the hatching and growth of a sea gull.

Teacher's Reference:


Helpful pamphlets at no cost.


The Alaska Fisherman's Journal says, "This book is worth the price for Tony Angell's drawings alone - and there is much more..."
the various species - grebes, gulls, terns, seals, sea lions, dolphins, whales - are detailed succinct and sometimes written with passion." All birds and mammals featured are found in Alaska. Stunningly illustrated. Includes maps, tables, bibliography.


Species descriptions and range information on Alaskan birds. Color photographs.


Detailed descriptions of waterfowl and their habits. Includes range information and full page maps of migration routes for each species. Color plates of adults and young.


The saga of Greenhead, a male mallard duck explores duck migration, natural enemies, and how man has upset the balance of nature. The text is complicated by an abundance of biological terms but everything mentioned is illustrated in detail in shades of black and white.


Personal observations on gulls over a six-week period. Provides detailed descriptions of the island where Louis Darling set up his tent, the rituals involved in courtship and the patterns long-established with nest-building, parent-chick relationships. Black and white and color photographs, and charcoal and pen drawings.


A lively account of the behavior and characteristics of gulls. Factual information about their scavenging nature. About 40 gulls are identified. Provides an excellent discussion of instincts. The lighter side is also presented so that the audience does not tire of data. Illustrated by black and white photographs.


The travels of David Hancock (a biologist) and his wife through British Columbia covering eagles, their nesting grounds, habits and other animals in their environment (puffin, sea lion and killer whale). Touches upon conservation and preservation in terms of damage incurred by biocides (pesticides/herbicides, etc.) and disturbance by humans. Black and white photography provided by David and Lyn Hancock. Some sketches.