

Unit Seven

Nests

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Alaska is one of the most important nesting areas in North America --and the world--for waterfowl, shorebirds and seabirds. Every spring, waterfowl and shorebirds by the millions head north to nest in Alaska's wetlands. Millions of seabirds congregate on rocky outcrops to raise their young.

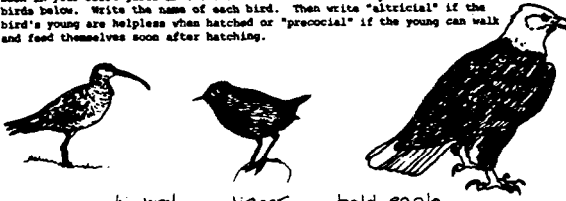
Worksheet 7A

Altricial or Precocial?

Ask the students about their own experiences with bird nests. Then have them complete the activity sheet, which will give them a chance to think about those experiences.

7A

Look in your field guide in the back of this book for help in labeling the birds below. Write the name of each bird. Then write "altricial" if the bird's young are helpless when hatched or "precocial" if the young can walk and feed themselves soon after hatching.



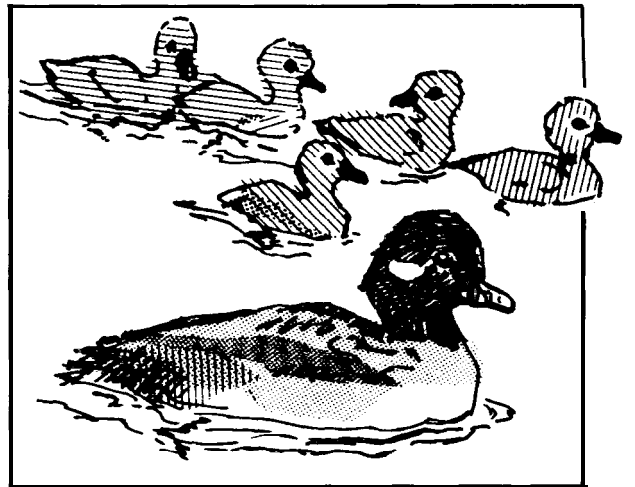
Name of Bird: whimbrel dipper bald eagle
 Altricial or Precocial: precocial altricial altricial

Springtime is an important time for birds. It is their one chance to have babies so that their population can remain healthy. You can help by keeping away from areas where birds are nesting. Sometimes, if a mother bird is scared off the nest, predators like ravens, foxes, or bears will gobble up the eggs. Many birds will abandon their nests if there are too many people around. Especially in rainy or cold weather, it is important that the birds stay on the nest all the time. If you find a baby bird, leave it alone. Usually, the parent will be back soon to feed it. Write an imaginary or true story about one time when you found a baby bird and what happened to it.

Now write the words "altricial" and "precocial" on the board. Have the students read aloud the stories they have just written about baby birds or talk about their experiences with bird nests; write the names of species mentioned on the board, under the two headings.

Ask the students:

- What happens when birds are disturbed in the nest? (Eggs might get cold and die or predators might eat the eggs.)
- How many times do birds nest every year? (Most birds nest just once.)
- Why is it important to protect nesting birds? (Keeps the population high so there will always be birds to enjoy.)



Worksheet 7B

Coastal Wetland Nest Sites

Worksheet 7C

River, Lake, and Marsh Nest Sites



These two activity sheets should start students thinking about where birds nest. Answers will vary on this exercise.

7B

Coastal Wetland Nest Sites

Some places where birds might build a nest are numbered in this picture. On the lines below, write the name of a bird that might nest in each place. Can you add more numbers to the picture in places a bird might nest?

- answers will vary
1. ducks, terns
 2. crane, snipe
 3. murre
 4. mew gull, jaeger, sandpiper
 5. crested auklet, murre, phalarope, swan

Clue: Use your field guide!



7C

River, Lake, and Marsh Nest Sites

Some places where birds might nest are numbered below. Write the name of a bird that might nest in each place. Add more numbers to the picture in places birds might nest. answers will vary

1. bald eagle, great horned owl
2. woodpeckers
3. great grey owl
4. wrens, flycatchers
5. northern harrier



Worksheet 7D

Canada Geese:
Precocial Birds

Worksheet 7E

The Bald Eagle: An
Altricial Bird

These two stories provide reading practice for your students, introducing them to terms such as "endangered," "extinct," and "pesticide."

Additional Activities:

1. Art, Science : Have students make a nest (try using only two fingers like a beak) with locally available materials. See if it will hold a chicken egg.
2. Art, Science : Have students cut paper in the shape of eggs and try to camouflage them. Split the group and assign them different habitats (outside or inside the classroom). Have each group color its eggs to camouflage them appropriately, and then place them in their habitat. The eggs must be in plain view, not hidden beneath objects. Have the students then try to find and "eat" the eggs in others' habitats. The team with the most surviving eggs wins. Discuss what makes for good camouflage characteristics. Were the

same eggs well camouflaged in more than one habitat? Would having different-shaped eggs have helped to camouflage them?

3. Science, Language Arts: Have students give oral or written reports on endangered or extinct species, or on the usage, purposes, and hazards of pesticides.
4. Language Art, Science: Have your students write and illustrate bird stories, poems, or a children's bird book.
5. Science : Hatch chicken eggs. You'll need an incubator, incubator thermometer, fertile chicken eggs, water, and someone to turn the eggs 2-4 times a day. The eggs should hatch in about 20 days.
6. Science, Mathematics, Language Arts : Read the following news article to students. Develop math problems based on the number of mosquitoes devoured by dragonflies.

Dragonflies Taking Toll on Mosquitos - Independent Press Service

There is this question: How many mosquitos can a hungry dragonfly eat if a hungry dragonfly eats mosquitos all day long? That is not a riddle but a matter of public interest here. One Maine entomologist estimates each dragonfly probably eats 100 mosquitos a day. Thus, the 14,000 dragonflies the town of Wells imported could be devouring 1.4 million mosquitos a day, 42 million mosquitos a month.

A lot of people in this part of south coastal Maine think the dragonflies work and pay \$10 for 50 of them, Wells motel owner Robert Zalko says that fogging mosquitos with pesticide is useless and buys 2,000 dragonflies a year. "One year we didn't buy them, and we needed to, and we went right back to it. . . Nothing is 100 percent effective, but they do a very good job. "

Dragonflies are big insects with two wings on each side of their fuselage, like World War I fighter planes, and used to be called darning needles by children who thought dragonflies could sew up a person's mouth. They also are called snake feeders and horse stingers, though they do not feed on snakes, sting horses or anything else. They also are called something more appropriate, mosquito hawks.

Dragonflies catch mosquitos by holding out their six legs in front of them to form a basket. There is no question they eat mosquitos, but some insect authorities doubt that dragonflies are making a dent in the mosquito population here. Christopher Leahy of the Massachusetts Audubon Society, who recently published a booklet on insects, is "extremely dubious" that they can control mosquitos. However, Leahy says, pesticides work only in the short run and lead to stronger mosquitos and stronger

pesticides. For that reason he "would be very glad to be proven wrong. "

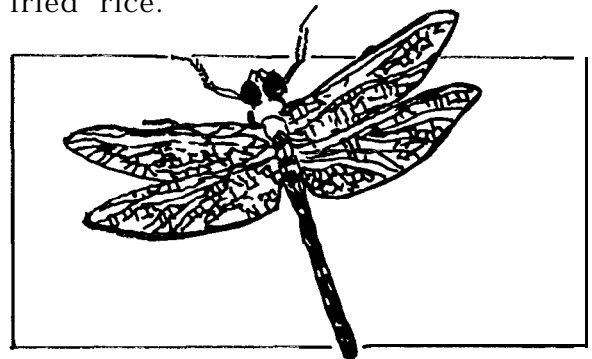
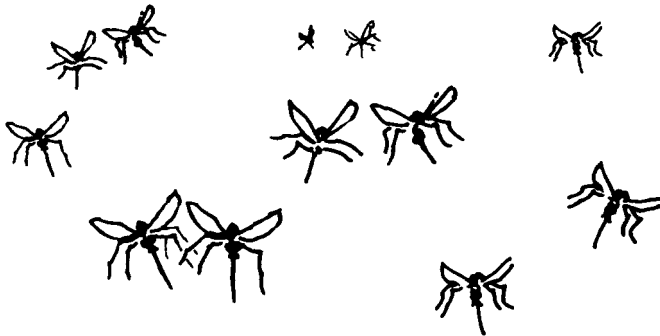
Nowadays, dragonflies are only about three inches wide, wingtip to wingtip. In the past, dragonflies had a wingspan of two feet across, but that was 260 million years ago.

This year's batch of 14,000 dragonflies came to Wells from the Connecticut Valley Biological Supply Co., in Southamptton, Mass. Sales Manager Mike Gaylo says it doesn't advertise them for mosquito control and knows of no other town buying its dragonflies. Most of the dragonflies are sold for research and education. The dragonflies are collected from ponds, scooped into nets off the surface of the water when they are in their flightless, nymph stage.

Wells' Chamber of Commerce began buying dragonflies eight years ago after a citizen read about dragonflies and mosquitos, and the chamber followed through.

The chamber runs the program, advertising the flies for sale in April and selling them from a roadside stand.

The dragonfly nymphs look like crickets, are packed in moss in small cartons (the kind you might get for take-out food from a Chinese restaurant). Purchasers are instructed to place the nymphs on the edge of stagnant ponds but not where there are fish, for nymphs are food for fish, good as fried rice.



Unit Eight

Wetland Plants and Animals

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Wetland plants and animals thrive in wet conditions. They have made various adaptations to their aquatic environments. Water plants, for instance, often have large air spaces in their stems and leaves to help keep them afloat. Cattails have seeds that float until they reach a proper place to germinate. Certain kinds of muskeg plants eat insects to make up for the nutrient-poor soils in which they grow. Many insects spend their immature phase in the water, then fly around wetlands

during their adult life. Water striders scoot along on the surface of the water, taking advantage of the surface tension. Water boatmen and predacious diving beetles capture an air bubble to take with them when they dive below the water's surface. Amphibians, birds, and mammals have webbed feet to help them swim, and long legs to help them wade. More information on these and other adaptations can be found in Dr. William A. Niering's The Life of the Marsh (see bibliography).

Worksheet 8A Wetland Crossword

Ask the students about their own experiences with wetland plants and animals; encourage them to find out more. You might ask them to make up their own wetland puzzles, or to add onto this one.

8A
Wetland Crossword

Alaska's wetlands provide habitat for plants that prefer wet soil. Wetland animals depend on these plants for food and cover. Complete this crossword. Hint: check the pictures.

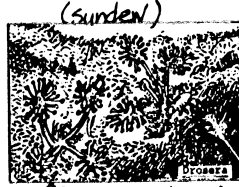
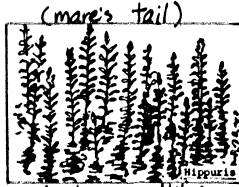
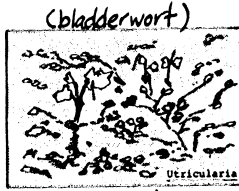
Worksheet 8B Wetland Plants Game

This activity introduces students to 24 of the most common wetland plants. Sedges, grasses, and willows of one variety or another will be found in every wetland habitat. In contrast, black spruce grows only in muskeg areas; cattail only in marshes. Students may also want to interview knowledgeable long-time residents or biologists about different uses for plants. Three good references are the Alaska Cooperative Extension Service's Wild Edible and Poisonous Plants of Alaska; Furlong and Pill's Edible? Incredible! Pondlife; and Hulten's Flora of Alaska and Neighboring Territories (see bibliography). Remind students that before they eat any plant they must be sure they know what it is. Water hemlock is a common and extremely poisonous wetland plant. There are several species of it.

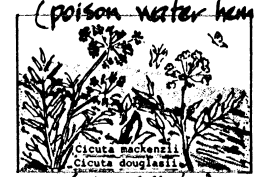
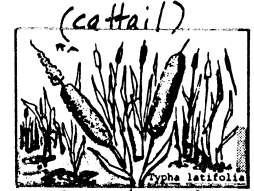
Students may be interested to learn that the parts of sedges, grasses, and reeds that are edible by humans are the roots, the tender young leaves and stems, and the dried seeds. The roots can be eaten raw, roasted or boiled. The young leaves and stems can be eaten raw in salads or cooked. The dried seeds can be cooked as cereal or made into flour.

Directions: Color, cut out and make up a game using these flash cards.

Wetland Plants Game



Wetland Plants Game



Wetland Plants Game

Many plants have adapted to wetland life.

HORSETAIL

Many millions of years ago, in the time of the dinosaurs, horsetails were the size of trees. Instead of regular seeds, horsetails have spores that come out of a fruiting body. Tap them, and the spores will come out like a soft green powder in your hand. Geese and swans enjoy eating horsetails in late summer and fall.



PONDWEED

Many types of pondweeds grow in lakes and ponds throughout Alaska. Pondweed provides cover for fish, snails and other animals. Ducks and swans depend heavily on these plants for food.



YELLOW PONDILLY

Yellow pondillies grow from thick branching rootstocks. Many small aquatic animals lay their eggs on its leaves and stems. Moose eat the whole plant.

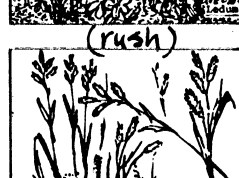
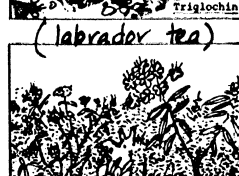


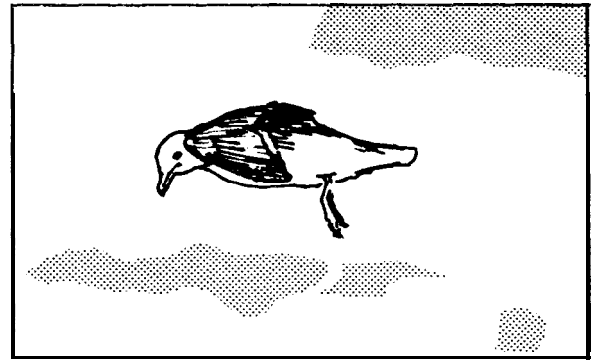
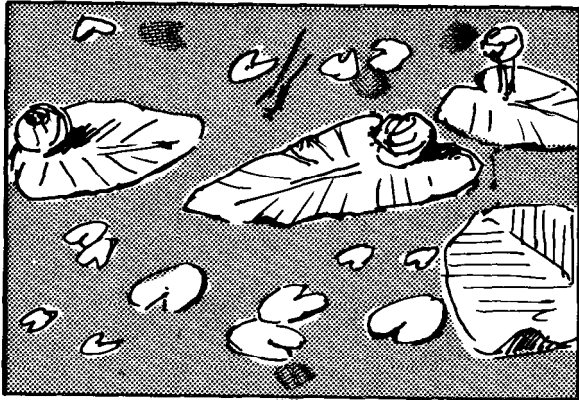
SPHAGNUM MOSS

Sphagnum, or peat mosses grow in thick greenish mats. Their leaves contain many empty cells which fill up with water like a sponge. During dry weather, the water is released slowly so the moss is always moist.



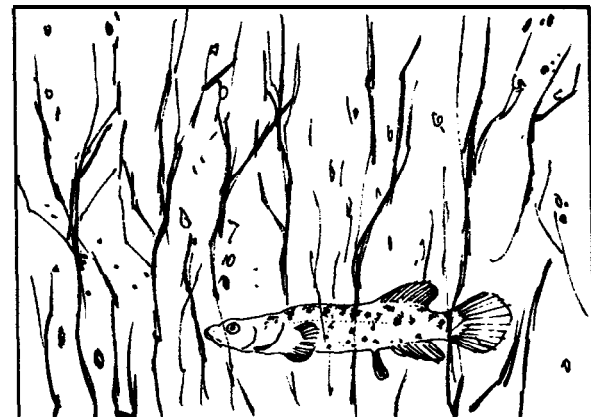
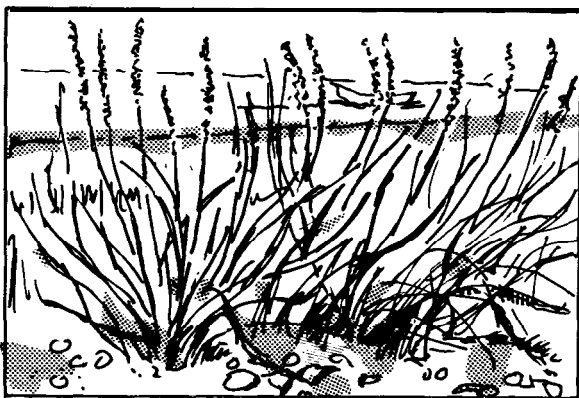
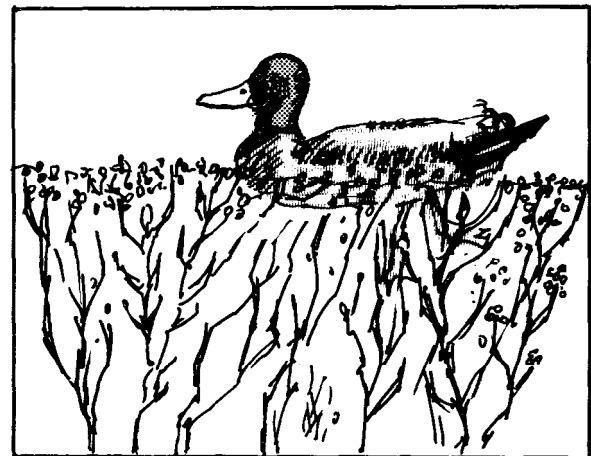
Wetland Plants Game





Additional Activities:

1. **Science, Art :** Have students **find and cut out pictures of birds and appropriate foods for these birds.** Display pictures on a bulletin board.
2. **Art, Language Arts, Science:** **Make a wetlands animal book.** Have students pair up to write reports and draw pictures of different animals that live in wetlands. Then photograph the students' faces, and arrange the pictures alongside the appropriate reports. Place in a three-ring binder and share with the community. (Suggested by Dawn Madera, Aniak School, Aniak.)



Unit Nine

Wetlands Field Trip

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The field trip (or trips) should be the highlight of your birds and wetlands study. Chances are, your students will have plenty of interesting experiences: watching a honking goose fly overhead, a moose wading as it feeds on water-lilies, a ptarmigan eating cranberries or a water strider skimming across a pond. They'll feel sedge plants warming in the sun or hear frogs and toads croaking in the marsh grass.

The field trip should be to the best birding spot in your community. If you need help in finding a good place, check with your students, their parents, local bird-watchers, the Alaska Department of Fish and Game or the U. S. Fish and Wildlife Service.

If your school doesn't have money for field trips, take the students on bird walks on or near the school grounds. Encourage them to visit more distant birding locations after school or on week-ends. The field trip activity sheets in the student book are designed to be used individually or with the class. (Be innovative-- Lisa Jean Parkman of Anchorage once took her students on a bicycle bird trip!)

Be sure the group is quiet when you arrive at the site. Tell the students they need to sneak up on the birds. Often your best look at them is your first, before they've seen you.

Follow these excellent suggestions :

HOW TO LEAD A SUCCESSFUL BIRD WATCH (Adapted from Bird Kit, Portland State University, Portland, Oreg.)

1. Be enthusiastic. Don't worry if you don't know much about the birds.
2. Try to keep each group as small as possible. Four to six students with each adult leader or student helper is an optimum size.
3. Make sure everyone stays close together. This prevents rapid movements when a bird is spotted and also helps keep a group in touch with its leader.
4. Move slowly. This will prevent you from scaring the birds and enable you to see more. How much can you see when you're moving down the freeway at 55 mph?
5. Watch the trees, bushes or grasses for movement. Birds usually move around a lot and You can take advantage of this by letting your eyes go out of focus and scanning large areas with one glance. You are more likely to pick out movement in the trees using your peripheral vision than by trying to focus on specific branches.
6. Use your ears. Birds will often announce their presence by calling or singing. A noisy group will not be able to hear sounds as well as a quiet one. Noise doesn't always scare birds away.
7. When you spot something, stop.
8. Avoid making sudden movements if the bird is close by. Pointing it out with your arm might scare it away.
9. A trick for attracting birds that works quite well sometimes: Make a loud "pshh, pshh, pshh" sound through your teeth or kiss the back of your hand. Some birds will come within a few feet if you stay absolutely still.
10. Vary the speed of your walk. Helps keep student interest.
11. Before you go out bird-watching, assign various students to be "experts" in each of the bird groups. A few students may be "swimming bird experts," for example; others may be "perching bird experts" or "shorebird experts," etc. During the field trip, divide the experts so that each group has one of each.
12. Dogs like to go on walks, but they are no help at all on a bird walk. Leave them home.
13. Which direction should you walk in? If possible, walk away from the sun so that you have good light but are not dazzled by the glare.
14. Encourage students to use the field identification guides. Resist being an authority by saying "that's a so and so" : let them identify.
15. While watching the birds, try to observe what they're doing, where they're going, etc.

16. Time of day makes a difference in what birds you will see. Early morning is best, before sunset is next best, and the middle of the day is usually the worst time. But weather, the tide, or migration may affect the birds too. On tidal beaches, it's generally best to do your birding at high tide because the birds are more concentrated then. During migration, you are likely to see birds at any time of day, although they tend to be most active in the morning.

Materials:

- binoculars and spotting scopes on tripods
- plastic sandwich bags and one large garbage bag for each group of students
- pencil and clipboard (and plastic bag cover) for each group of students
- popcorn, bread crumbs, or fish (such as herring)
- rulers or measuring tapes for each student
- hand lenses
- thermometers
- kitchen strainers, nets
- large plastic container for field aquarium
- MAP TIME, worksheet 9A, FIELD NOTES, worksheet 9B, WETLANDS CHECKLIST, worksheet 9C, and student field guide
- large piece of cardboard, felt-tip marker, and small roll of transparent tape for each group
- first-aid kit
- matches /tinder for group leaders

Procedure:

1. Discuss the wetland area you'll be visiting before you go. Show the students a map. Review the information in this book on the habitat types found in the area. Check the library for additional information.

Have students review birds using their own field guide, which is organized by bird groups. Discuss these groups and, if you have other field guides, talk about the way they are organized. Mention field marks by which birds are identified- -size, bill, feet, etc.

2. Have a "dry run" of the field trip in class beforehand. Show the students pictures or slides of birds. Have them use their field guides to identify the pictures. Practice using binoculars and spotting scopes. Bring in plant samples and have students tell you about them. Talk about fish, mammals, amphibians, and invertebrates that you might see. Ask them to draw a mural with felt-tip markers on a large sheet of paper, predicting what may be seen on the field trip.
3. Stress conservation--the protection and wise use of our natural resources. Ask students how they can help take care of animals and plants they encounter in their field and classroom studies. Develop with student participation such rules as: step softly and quietly while observing animals; stay away















from nesting birds; replace rocks or logs after looking underneath (to keep the roofs on animal homes); handle animals gently; don't take live animals or plants away from their homes; throw trash in a garbage bag.

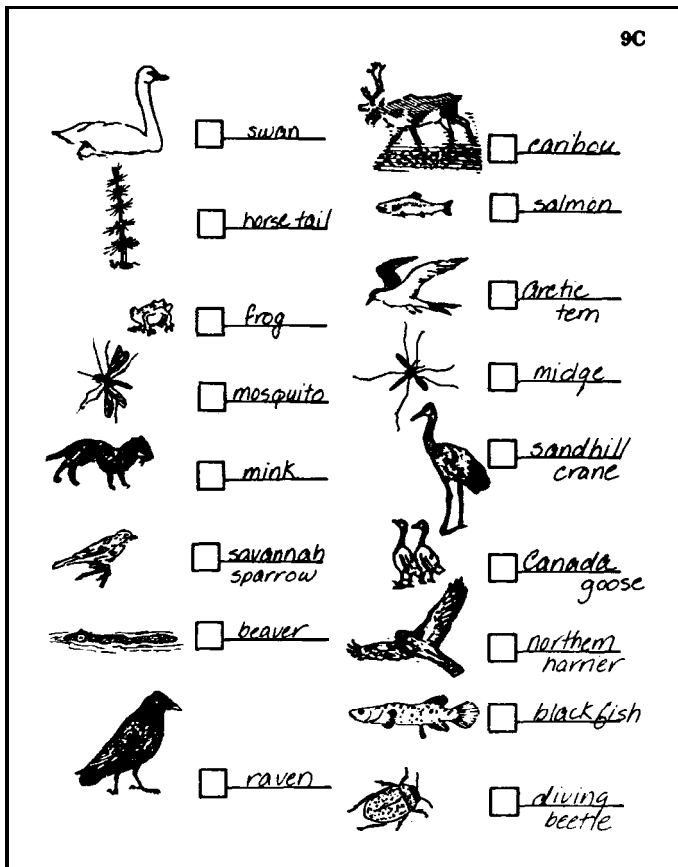
4. It is a good idea to discourage personal collections of any natural items, living or nonliving, so that other people can enjoy the area in the future. Limit collections to educational purposes such as art projects or aquarium study. Animals that are already dead can be preserved for classroom specimens, but return any living animals to their natural habitats as soon as possible.
5. Remember safety. Keep students in groups by using the buddy system or by using adult or older child supervision. Take a first-aid kit. Discuss hypothermia. Take matches and tinder for starting a warm-up fire if necessary. Make sure students dress warmly and take extra clothing and rain gear (plastic bags will do in a pinch). Mention the danger of falling into muskeg ponds - which may be deeper than they look. And wear life jackets on boat trips.
6. When you arrive at the bird-watching area, review the rules your class developed to protect the wetlands. Remind students to stay with their group. List any hazards to be avoided and agree on a time to reassemble.
7. Ideally, group leaders will

have visited the site previously and can head immediately for the field. Students should observe, name, and check birds on the WETLANDS CHECKLIST, worksheet 9C. Or create a checklist similar to this but specific to your area by cutting out and pasting local bird and plant pictures. Then have students work on FIELD NOTES worksheet 9B. At least one person in each group should take field notes on birds, fish, mammals, amphibians and invertebrates. Each group should make a plant collection. Use the kitchen strainers and nets to find insects in the water, on the land and in the air. Which birds eat these insects? Put the aquatic insects in a plastic field aquarium so that students can watch them. What role do insects play in the wetland?

9C
Wetlands Checklist

Write the names of these plants and animals on the lines. Check off the boxes as you see these species on your field trip.

| | | | |
|---|--|---|--|
|  | <input type="checkbox"/> ptarmigan |  | <input type="checkbox"/> moose |
|  | <input type="checkbox"/> red fox |  | <input type="checkbox"/> harlequin duck |
|  | <input type="checkbox"/> bald eagle |  | <input type="checkbox"/> spotted sandpiper |
|  | <input type="checkbox"/> caddis fly larvae |  | <input type="checkbox"/> cranberry |
|  | <input type="checkbox"/> flounder |  | <input type="checkbox"/> muskrat |
|  | <input type="checkbox"/> toad |  | <input type="checkbox"/> pintail |
|  | <input type="checkbox"/> brown bear |  | <input type="checkbox"/> dipper |



8. After the mid-point of your trip, ask the students:

- . What birds have you seen?
- . What have you seen that birds could eat?
- . What other interesting things have you seen?

Some birds might be lured in with popcorn, bread crumbs, or fish; then their behavior can be observed closely. Remind students to be quiet and still to encourage the birds. Ask them to close their eyes for a few minutes and listen to the sounds of the birds around them.

9. Have each group prepare a display by taping and labeling the items they collected on a large piece of cardboard. These displays can then be

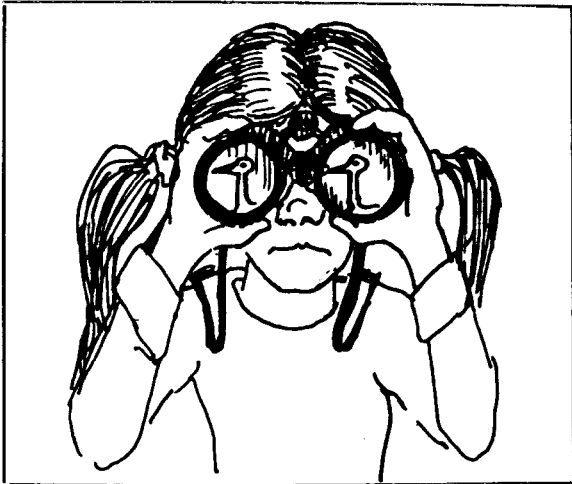
taken back to the classroom for judging and for follow-up learning activities. Students can check the accuracy of the plant labeling from the illustrations on their worksheets or in other plant books.

10. Play "gulls and crows" as a field trip finale once you are away from the bird-watching area. Divide class into two equal teams. Lay out a brightly colored home base line of heavy yarn. When true statements are read, the gulls chase the crows as the crows run toward home base. If the statement is false, the crows try to catch the gulls. Anyone caught joins the other team. Listed here are some possible statements.

- . Eagles are small perching birds. (F)
- . Black oystercatchers have long legs. (T)
- . Arctic terns have forked tails. (T)
- . The robin can swim. (F)
- . The red-throated loon has a yellow throat. (F)
- . The Steller's jay is the same as a blue jay. (F)
- . The rock ptarmigan is white all year. (F)
- . The great blue heron is blue-gray. (T)
- . Juncos eat fish. (F)
- . The short-eared owl is very wise. (F)
- . Canada geese fly in a v-shape. (T)
- . Bald eagles are not bald. (T)

(Contributed by Sherry Foster, Baranof Elementary School, Sitka)

11. Don't forget before you head for home to have each student evaluate the trip or tell what he or she liked best.
12. In a class later, summarize your data with WETLANDS FIELD TRIP SUMMARY, worksheet 9D. Look over your mural, and add new animals and plants.

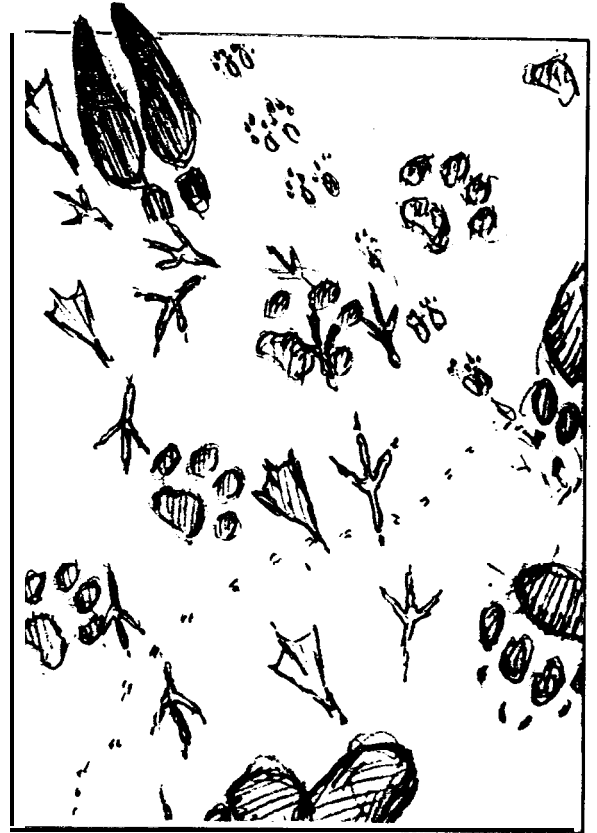
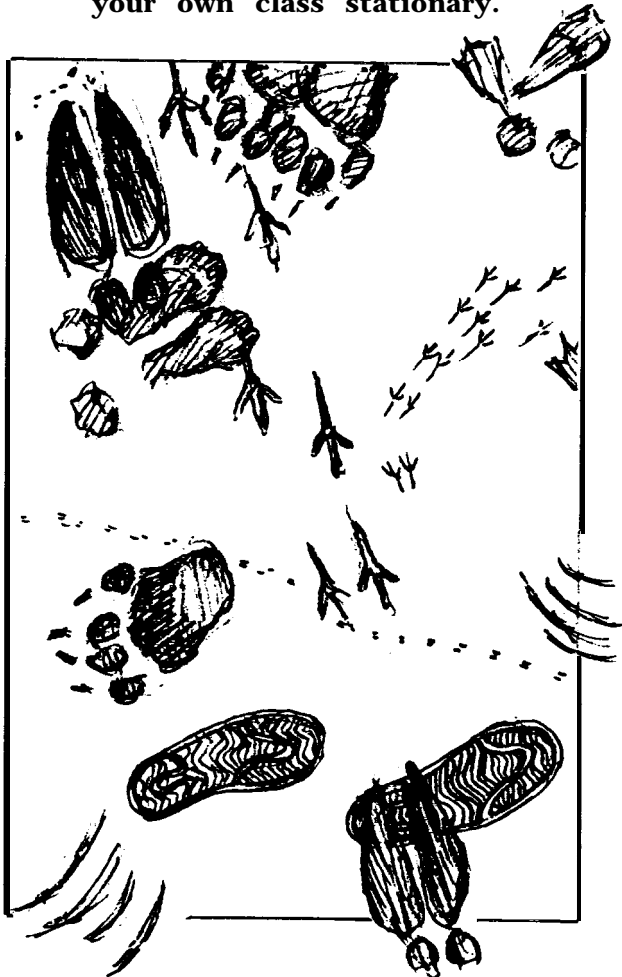


Additional Activities:

1. Language Arts, Science: Have students write stories or reports that might be given orally to your own class or some other class as a method of sharing Sea Week knowledge. Some suggested starters are :
 - . My bird adventure started with. . .
 - . I would like to be a bird, so that. . .
 - . I looked through my binoculars and suddenly . . .
 - . I wasn't afraid of walking though the marsh at night - - but then the sound began. . .
 - . Splash! Squish! Suddenly I fell into a bog. . .
2. Science, Art: Identify and illustrate the common wetland plants and animals of your area. (Plants might be pressed and labeled, pictures cut from books or magazines, pictures duplicated from books; or student can do their own drawings.)
3. Social Studies, Science: Think of the site of your Sea Week field trip as a possible development spot. Have the children help you create a list of alternative uses for the site (include present use). Divide the class into groups. Have each group choose one use. Have each group make two lists on newsprint or butcher paper based on their use selection: Benefits - - all the positive reasons for having the site used for a particular purpose. Costs - - all the possible negative effects of using the site for that purpose. Let each group report to the class. Discuss the alternatives as a class and add new ideas to the sheets. Then predict as a class what will happen. Will your class have any effect on the outcome? How can you make your opinions known? (Possibilities include talking to other people; talking to the decision makers; writing letters to the editor; preparing a report for the city or village council; or making up T-shirts or bumper stickers.)
4. Home Economics, Science: Have a wild foods dinner using edible wetlands plants. Get the help of parents and wild food experts. Have students help with the cook-

ing and prepare place cards with information about the plants. The Cooperative Extension Service's Wild Edible and Poisonous Plants of Alaska and Furlong and Pill's Edible? Incredible! Pondlife are good references (see bibliography).

5. Art, Science: Challenge students to be track experts. Observe bird and wetland tracks in the wilds. Olaus Murie's A Field Guide to Animal Tracks has some good background information. Then make potato track prints by carving potatoes. Roll thick poster paint or block printing ink onto the potato. Press the tracks on paper to create mysterious track stories and your own class stationary.



6. Science, Mathematics, Home Economics: Have a contest to see how many birds your students can see individually and as a class in one day. The students can make bird-shaped cookies as prizes.
7. Art, Science: Make a model of your wetland. Draw it on a big piece of cardboard. Use dried vegetation with cardboard or wooden fish and wildlife. You might even try making the model realistic by building it on sponges in a pan.
9. Art: Make grass or bark baskets or driftwood carvings from materials from your wetland. Ask local basket makers and carvers for assistance.

Unit Ten

Birds Benefit People

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Birds have practical uses for people, such as providing meat and eggs for food, and feathers for warmth in clothing and quilts. Bird hunting is an ancient human activity, and the more modern sport of stalking birds with binoculars and cameras is an absorbing hobby. But beyond any utilitarian purposes, birds have always been a source of inspiration to people--a sign of spring and a symbol of hope.

Worksheet 10 A Birds and People

Ask the students why they enjoy birds. Then talk about the benefits of birds. Birds are critical for subsistence living in many areas of Alaska. Ask the students about local duck and goose recipes. Mention the rising popularity of bird watching in this country. Many serious birders come to Alaska to add unusual birds to their life lists. (See James Vardamen's Call Collect, Ask for Birdman and Audubon, the magazine of the National Audubon Society--both listed in the bibliography.) Birders are a prominent force in national conservation politics.

Wild birds are split into two groups:
Game birds (birds that are hunted, like geese, ducks and grouse) and
Nongame birds (birds that aren't hunted, like robins, sparrows and eagles. Sometimes eagles or other birds are shot out, but this is illegal. It is illegal to hunt nongame birds.).

Name some ways that people benefit from game birds and nongame birds:

| GAME BIRDS | NONGAME BIRDS |
|------------------------|------------------------|
| Food | sport of bird watching |
| sport of hunting | enjoyment of song |
| sport of bird watching | birds eat |
| fertilizer | fertilizer |

Although some of the things people do harm birds or their habitats, we also help birds in many ways. Sometimes we help birds without especially meaning to. Many birds do very well in farmlands or gardens because plants and insects are abundant in these places. Have you ever looked closely at a nest and found string or other manmade materials? _____ Have you ever seen seagulls following a fishing boat? _____ Or a jay eating leftovers from a picnic table? _____ Or swallows nesting in the eaves of houses? _____

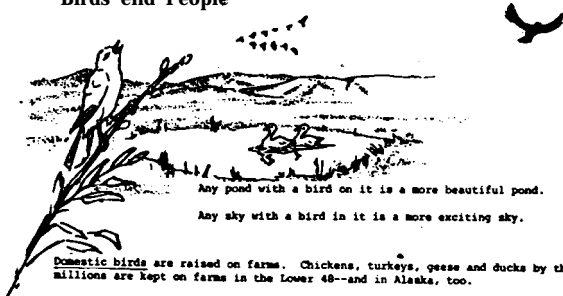
Other times we help birds on purpose. Are there any fields in your area that are sprinkled with grain in spring for the returning geese? _____ Are there any bird feeders or birdhouses in your neighborhood? _____

Can you think of any other ways that wild birds benefit from people?

rock doves perch on man made things - telephone wires etc.
people build ponds that birds use,



Birds and People



Any pond with a bird on it is a more beautiful pond.
Any sky with a bird in it is a more exciting sky.

Domestic birds are raised on farms. Chickens, turkeys, geese and ducks by the millions are kept on farms in the Lower 48--and in Alaska, too.

List ways we benefit from domestic birds.

eggs, meat, down, pets,
fertilizer



The farmer provides habitat and protection for his domestic birds:

- Food (usually grains)
- Water (tanks or ponds)
- Shelter (often barns)
- Protection from predators (usually fences)
- Places to nest (nest boxes, nest materials)
- Protection for young (heated brooders)
- Protection from disease (antiseptics, antibiotics)



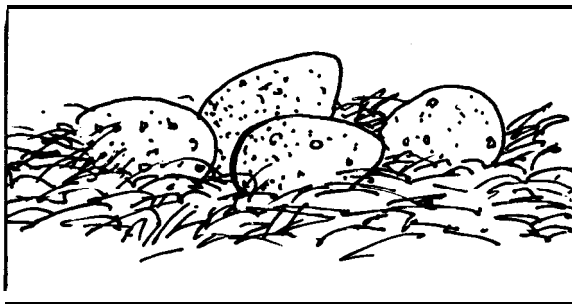
This all takes money, but if the farmer does his work well and is careful not to take too much, the birds will provide meat, eggs, and feathers year after year.

Sport hunters are also active in the conservation movement. Through duck stamps and groups like Ducks Unlimited, these hunters contribute to improving wetland habitat for waterfowl. Here in Alaska the problem is still one of preserving the existing habitat, while in many parts of the lower 48 states vast areas of wetland habitat have already been destroyed.

Until recently, the Alaska Department of Fish and Game (ADF&G) has focused primarily on game birds; because of the interest of sport hunters, the Habitat Division handles wetlands. But recently, ADF&G added a subsistence section, as well as a nongame program. Now all the birds are being monitored and studied. Through the Wildlife Viewing Project, stu-

dents and other citizens are encouraged to keep track of birds and other animals. Write to the Nongame Program, ADF&G, 1300 College Road, Fairbanks, Alaska 99701 for more information.

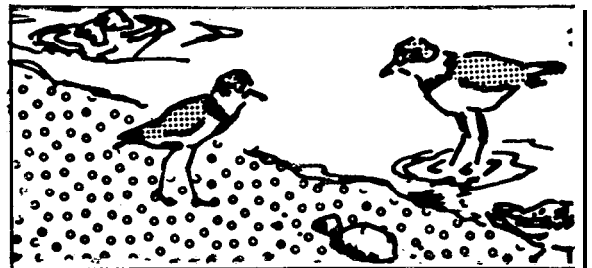
Several chicken farms are now functioning in Alaska. Compare the old way of raising chickens (letting them run everywhere) to the modern method where they never see the light of day. Have the students check on the cost of chicks and feed. What are problems they might have in raising them (foxes, bears, eagles, dogs, disease, shelter, water, food, etc.)?



On the question of egging, explain to your students that only Natives are allowed to take eggs of wild birds--and they can take only the eggs of scoters and alcids (murre, auklets, puffins, etc.). Egging is not allowed for any other species because it's too easy to reduce a bird population by taking its young. Eggs are a traditional coastal Eskimo food; if eggs are taken at just the right time, birds will lay another clutch (each batch of eggs is a clutch).

Worksheet 10 B Habitat and Protection For Wild Birds Worksheet 10 C Spring Birds

Discuss bird conservation practices past and present in your community. What are the local historic uses of birds? Ask the students about hunting methods and experiences. Where do your birds migrate to? What are the hunting regulations and practices there? Invite a bird hunter, bird watcher, and a biologist from the Alaska Department of Fish and Game or the U.S. Fish and Wildlife Service to talk about hunting and habitat protection. How do their opinions differ? What can students do to protect habitat and encourage birds to come to the area? (Some good suggestions are found in Alaska's Birds: Their Identification, Biology and Conservation: A guide for Youth Groups, produced by ADF&G's Nongame Wildlife Program and the Cooperative Extension Service--see the bibliography.)



Habitat and Protection For Wild Birds

Government wildlife agents cannot take care of each wild bird the way farmers can take care of domestic birds. Occasionally they sprinkle grain on a field in spring for the returning geese or build ponds, but mostly the wild birds have to fend for themselves. What the government agents can do is work to see to it that the birds have enough good habitat to find their own food, water and shelter. Agents also keep track of bird populations; when there are too few birds, hunting is restricted. But the wildlife agents need our help! Think about what birds need, and list some things you can do to help the wild birds in your area.

put out bird seed, bird feeders,
protect habitat, clean up garbage
provide water in pond or bird feeder

In Alaska, we have two government wildlife agencies: the Alaska Department of Fish and Game (ADFG) and the U.S. Fish & Wildlife Service (USFWS).

The USFWS is a federal agency that takes care of migratory birds—with our help. ADFG is a state agency that handles birds which live in Alaska all year.

**Interesting fact: There are more than three people in North America for every duck in the fall.

| | |
|-------------------------------|---------------------------------|
| PEOPLE USA: about 220,000,000 | DUCKS In fall: about 85,000,000 |
| Mexico: about 60,000,000 | In spring: about 45,000,000 |
| Canada: about 25,000,000 | |
| Alaska: about 400,000 | |

How many people are there in North America? Add these population numbers together to find out:



USA 220,000,000
Mexico 60,000,000
Canada 25,000,000
TOTAL 305,000,000

Figure out how many people there are for every duck in the spring.

Total People ÷ Spring Ducks = Number of people for every duck in spring

305 ÷ 45 = 1.88 ≈ 2

Probably no single bird species is as abundant as people are in North America, and most are much less abundant.

Worksheet 10 D
Seabird Conservation

Seabirds are a fascinating group of birds. They have their own particular conservation problems and they demonstrate some of the problems that must be faced in the wake of development. Two excellent references are David Saunter's Seabirds with color illustrations and Duff Wehle's Seabirds of Alaska Teaching Guide (see bibliography). If at all possible, try to get a film that shows a seabird colony. The large number of birds that congregate is impressive. The following activity is excerpted from the Seabirds of Alaska Teaching Guide.

Problems of Spring Birds

Why are there fewer ducks in the spring than in the fall? List things you think might kill birds.

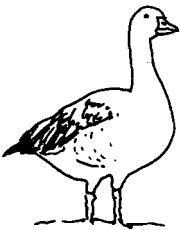
winter cold, food shortages,
hunters, predatory animals and
birds



White-Fronted Goose, Cackling Canada Goose, Black Brant, and Emperor Goose populations are alarmingly low on the Yukon-Kuskokwim Delta. Many people all along the flyway have agreed to reduce or stop hunting, especially in the spring. Spring hunting and eggng hurt bird populations. Both the goose and the gander are needed to raise the young birds and protect them from predators.

SPRING

FALL



1 GOOSE CAUGHT
NO YOUNG RAISED
How many are left to come back in the future? 0
1 GOOSE CAUGHT
3 YOUNG RAISED
How many are left to come back in the future? 3

The human population of America continues to increase rapidly. Not so the populations of some birds. If we want there to be as many birds in the future as there were in the past, people will have to give them more help: by not destroying too much of their habitat, by not overhunting them, and by taking steps to help recover populations that have been hurt by human interference.

Go back to your List of Birds You Know, 1A. Fill in column 7-OK to Hunt and column 8-People Uses.

Seabird Conservation



The world's great oceans and seas are home to most seabirds. They head to land only to nest and raise their young. Some of them gather to nest in large colonies on rocky cliffs and islands.

The term "seabird" includes a wide variety from two bird groups: swimming birds and gull-like birds. You can see gulls and other seabirds anywhere in Alaska. Look at these drawings of seabirds. What does a seabird look like to you? How are seabirds similar?



Answers will vary
all have webbed feet - aly



Alaska is one of the most important places in the world for seabirds because of its abundant, safe nest sites and its plentiful food. But seabirds are affected by oil pollution, plastic pollution—and loss of habitat. When feathers get oil on them they lose their insulating value; the birds get chilled and soon die. Plastics thrown or washed overboard are eaten by birds who mistake the plastic for food. Dead seabirds have been found with stomachs so full of plastic scraps and styrofoam balls that there was no room for food! Seabirds also become tangled in plastic fish nets.

Are there threats to seabirds in your area? List them.

answers will vary: Prince William Sound
has threat of oil tanker spill
development in Cook Inlet can reduce
habitat



What alternatives are there? answers vary
safety & prevention of oil spills
thoughtful & well planned developments

Which alternative do you favor? answers vary

How will you make your opinion known? answers vary
attend public meetings, research alternatives



HOW MUCH DO SEA BIRDS EAT?
by Duff Wehle

To illustrate the importance of sea birds in Alaska's marine environment, work through the following problems with your students.

Let's say that the total population of Alaska's breeding sea birds during the summer is 50 million birds. (Remember, about twice this many birds also come to Alaska's offshore waters during the summer to feed, but not to breed.)

Although individuals of some species (murre) weigh much more than other species (auklets), let's say the average weight of all 50 million birds is 1.2 pounds or 0.54 kilograms, and that every day each bird eats approximately 15% of its own weight in food, whether it be crustaceans, squid, octopus, fish, or whatever. During the roughly five-month (130-day) summer period these birds feed in Alaskan waters, how much food in pounds or kilograms do they consume?

Solution:

$$1.2 \times 0.15 \times 130 \times 50,000,000 =$$

_____ pounds

$$0.54 \times 0.15 \times 130 \times 50,000,000 =$$

_____ kilograms

Once you have solved this problem with your students, have each student choose a sea bird species from Table 1. Then, with the information provided in the table and an understanding of the mechanics involved in solving the previous problem, have each student determine the amount of food eaten by his or her species during the five-month summer period.

What sea bird species would be most affected as a result of an oil spill killing fish? Killing crustaceans? Would some species be less affected than others? Is there a general relationship between the size of the birds and type of food they eat? In terms of weight do the sea bird species collectively eat more crustaceans or fish? Why?



Table 1.

Approximate
Average Body Weight
of Individual Birds

| Selected Alaskan Sea Bird Species | Pounds | Kilo- Grams | Alaska Population* | Major Foods Eaten |
|--------------------------------------|--------|----------------|--------------------|----------------------------|
| Northern Fulmar | 1.3 | 0.6 | 2,000,000 | squid, crustaceans fish |
| Fork-tailed Storm-Petrel | 0.13 | 0.06 | 5,000,000 | crustaceans |
| Leach's Storm-Petrel | 0.13 | 0.06 | 4,000,000 | crustaceans |
| Double-crested Cormorant | | 2.4 | 7,000 | fish |
| Red-faced Cormorant | 4.0 | 1.8 | 90,000 | fish |
| Pelagic Cormorant | 3.3 | 1.5 | 130,000 | fish |
| Black-legged Kittiwake | 0.9 | 0.4 | 2,500,000 | fish, crustaceans |
| Red-legged Kittiwake | 0.9 | 0.4 | 250,000 | fish, crustaceans |
| Arctic Tern | 0.2 | 0.1 | 25,000 | fish, crustaceans |
| Aleutian Tern | 0.2 | 0.1 | 10,000 | fish, crustaceans |
| Common Murre | 2.2 | 1.0 | 5,000,000 | fish |
| Thick-billed Murre | 2.2 | 1.0 | 5,000,000 | fish, crustaceans |
| Black Guillemot | 1.1 | 0.5 | 400 | fish |
| Pigeon Guillemot | 1.1 | 0.5 | 200,000 | fish |
| Ancient Murrelet | 0.4 | 0.2 | 400,000 | crustaceans, fish |
| Cassin's Auklet | 0.2 | 0.1 | 600,000 | crustaceans |
| Parakeet Auklet | 0.4 | 0.2 | 800,000 | crustaceans |
| Crested Auklet | 0.4 | 0.2 | 2,000,000 | crustaceans |
| Least Auklet | 0.2 | 0.1 | 6,000,000 | crustaceans |
| Whiskered Auklet | 0.2 | 0.1 | 20,000 | crustaceans |
| Rhinoceros Auklet | 1.1 | 0.5 | 200,000 | fish, crustaceans |
| Homed Puffin | 1.1 | 0.5 | 1,500,000 | fish, squid |
| Tufted Puffin | 1.5 | 0.7 | 4,000,000 | fish, squid |

*From Catalog of Alaskan Seabird Colonies, by SOWLS, Batch, and Lensink, Fish and Wildlife Service, U.S. Department of the Interior, 1978

Additional Activities:

1. **Social Studies, Art:** Birds have been used to represent human qualities and character. The dove stands for peace, the owl for wisdom, the eagle for courage, and the chicken for cowardice. Ask your students if they can think of any more symbols or expressions that use birds. Ask students to find the federal government's eagle crest. What is the eagle doing? Have students then

design their own crest using their favorite bird. Explain orally what the bird and picture symbolize.

2. **Language Arts:** Have the students research Native bird legends. Have them make costumes and put on a play for parents and other classes.

Unit Eleven

Wetlands Benefit People

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Wetlands are extremely valuable as habitats for fish and wildlife-- and they are also of immense value to people. Sue Quinlan stated it very well in her Alaska Wildlife Week materials Water, Wetlands, and Wildlife (pp. 4-6; see bibliography):

Just as mammals, migratory birds, and fish are drawn to Alaskan wetlands, so too are humans. Most of the Native people of Alaska have depended on wetlands ever since their ancestors crossed the Bering Land Bridge into North America. Most villages and hunting camps are and were located near Alaskan wetlands. Natives of western Alaska harvested the waterfowl that crowded the coastal wetlands each spring and

fall, gathered eider eggs from the barrier islands, and hunted belukha whales and spotted seals in the lagoons. Those people who moved inland tended to settle along rivers where fish could be caught from the rivers, berries gathered from the muskegs, and ducks hunted in the lakes and ponds. The muskrat, beaver, and otter that live in Alaska's interior wetlands led trappers to explore the remote areas of the Great Land. Even the gold miners who rushed to Alaska used the living resources of Alaska's wetlands to survive. Thus the trading posts and settlements of white men were also located near wetlands. How many of the villages and towns near your school are located on or near a wetland?

Today, as in the past, we Alaskans are drawn to our wetlands. We visit them to pick berries, hunt moose and bears, to trap muskrat and beaver, to fish, and for the chance to see a moose, or hear the honking of wild geese. Whether we realize it or not, most of us depend on wetlands for food and recreation. We depend on wetlands for other values too. Many freshwater wetlands store water from rain and snow. Wetland plants use much of the water that might otherwise rush down to flood our cities. Some wetlands also hold water back so it can seep down into the aquifer (underground water supplies) and keep our wells full of water. By releasing water slowly, wetlands keep our streams continuously flowing and prevent or lessen floods from heavy rains and snow. Wetland plants also stabilize the soil, prevent erosion of valuable land, and keep our rivers and lakes relatively free of silt and the waters clear and clean.

Despite all the values of wetlands, many people have, until recently, considered wetlands to be wastelands. Over 40 percent of the wetlands in the continental United States have been destroyed by draining, filling, dredging, and pollution.

The realization that wetlands are valuable has come late. Water pollution, changes in water temperatures from power plant discharge, changes in stream bottoms from erosion, and changes in the amount of water in wetlands caused by water diversion were all caused by people who did not understand the value of wetlands or the interconnections of marshes, rivers, lakes, and coastal estuaries. Although some areas are being returned to wetland status, many wetlands throughout the

world have been permanently destroyed. Even today over 300,000 acres of wetlands are lost every year in the continental United States alone.

When wetlands are changed too much or lost, so too are the wildlife that depend on wetlands. Much of Florida was once wetlands, but humans built cities, drained swamps, channelized wide rivers and built dams to control water. Now, Florida has more endangered species of wildlife than any other state in the United States except Hawaii. Most of these endangered species are wildlife that depend on wetland habitat. River otters, once found in all the major waterways of the United States and Canada, are now endangered or gone from 15 states and one Canadian province.

We are lucky in Alaska for we still have extensive areas of rich wetlands and enjoy plentiful wildlife. But change is coming quickly to our State. Even now 70 percent of our population lives along the coast, and most of our towns and cities are built right on top of wetlands. In many instances we are repeating the path of dredging, draining, and filling of wetlands that ultimately led to many problems and loss of wildlife in the continental United States.

Alaskan wildlife has already been affected by some loss of wetlands. Increased erosion from gold mining in the upper tributaries of the Yukon River is considered by biologists to be the reason that salmon runs in interior Alaska are now far lower than reported by early explorers. Throughout the State, small salt marshes and estuaries have been and are being dredged or filled to create more room for houses, airports, boat harbors, and staging areas for oil production. Water is being divert-

ed from streams for irrigation of agricultural land and drained from aquifers for human use. When too much is diverted or held back, wetlands dry up and the wildlife that depends on the wetlands disappear.

We Alaskans still have our wetlands. But we must recognize their values and interconnections and carefully protect them from draining, filling, and pollution. If we do not, we will soon find that our salmon are no longer abundant, the places to hunt moose and pick berries are far away, and the wild geese no longer return to mark the arrival of spring.


Worksheet 11A Wetland Values

After students have completed this activity, encourage them to apply the information to their own wetlands. How are they valuable?


11A

Wetlands Values


Directions: Number the pictures that go with each paragraph.




10




4



2




7




1

1. Alaskan wetlands are very important for migratory birds. Millions of waterfowl and waders nest in Alaska's muskeg, wet tundra, marshes, and coastal wetlands.
2. Fish, too, depend on wetlands. Alaska's salmon industry is based on wetland spawning and rearing areas. Grayling, pike and whitefish spend their entire lives in freshwater wetlands.
3. Bear, caribou, moose, mink, muskrat, otter and beaver live in Alaska's wetlands. These animals depend on the plants that grow rapidly in the long summer days. Some animals eat these wetland plants. Other animals eat the wetland animals that eat the plants.
4. Some tidal wetlands can grow more plant material than the best farm fields. And no one has to plant or fertilize a wetland. Farmer's crops can be measured in bushels per acre. But the crops from wetlands can be measured only by estimates of the numbers of fish, birds, mammals, clams and crabs in the area.
5. Alaska's Native peoples have known about wetland values for a long time. They have been depending on birds, fish, mammals and plants for food and clothing.


11A




11




5




9



6



3

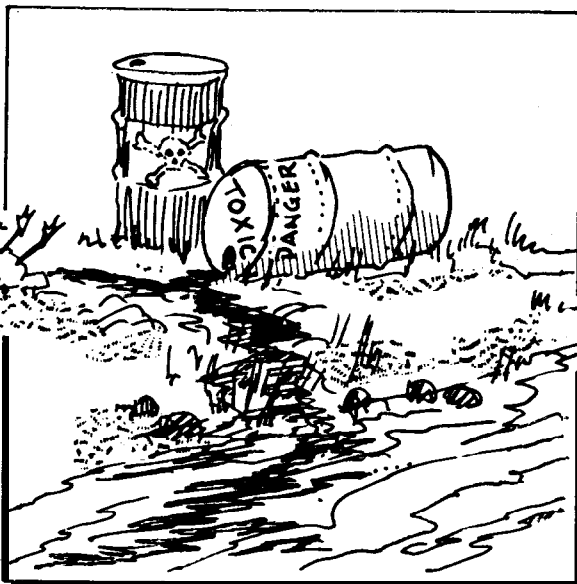


8

6. Today, Alaskans use wetlands for hunting, fishing, trapping, berry picking, and edible greens! We also use them for recreation - birdwatching, hiking, jogging, cross-country skiing, sketching and photography.
7. Wetlands help protect our villages and towns from flooding. They soak up extra rain and snow like a sponge. Then they release it slowly in drier times.
8. This stored water in wetlands helps keep our rivers, lakes and underground reservoirs full. That way, we have plenty of water for people as well as wildlife.
9. Wetlands filter water to help reduce pollution. Wetland plants take the nutrients from waste water (within limits) and use them for growth. Wetland plants also hold the soil. They help prevent soil erosion and help keep streams and rivers from filling up with mud and other sediments.
10. Wetlands serve as natural storm barriers. They protect animals, plants and people from waves and flooding.
11. When wetlands are changed too much or lost, wildlife populations decrease and the work done by wetlands--like storing and filtering water--is also lost. Over 40 percent of the wetlands in the lower 48 have been destroyed by draining, filling, dredging and pollution. We are lucky in Alaska, we still have lots of rich wetlands and plentiful wildlife. But change is coming quickly to our state.

Worksheet 11 B Wetland Habitat Protection Worksheet 11 C Wetlands Development

Ask students to think about wetlands protection and development in their own community. What did their community look like 5 years ago, 10 years ago, 50 years ago, 100 years ago? (They may need to check with long-time residents for these answers.) What structures have been built on wetlands? How has animal and plant life changed as a result of this building? What positive and not-so-positive things have happened as a result of this development? What does your class predict will happen in the future? What effect will your class have on birds and wetlands now and in the future?



Wetland Habitat Protection

1. List things that people do on wetlands which do not destroy the habitat.

- answers will vary -
- boating
- skiing
- canoeing
- hunting
- berry picking
- fishing
- flying



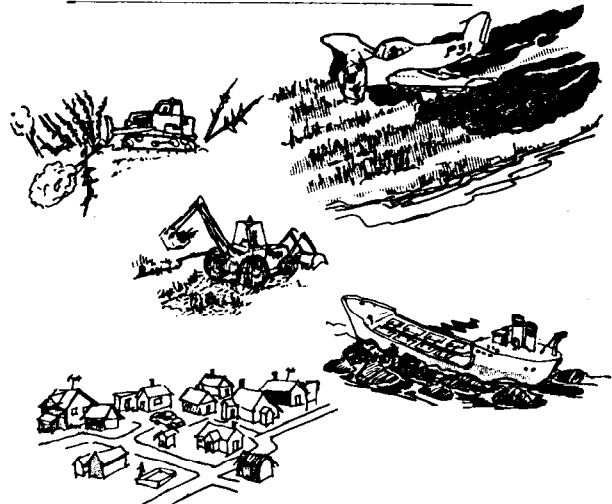
2. List some things that people have done in your area that do destroy wetland habitat for birds or other creatures.

- clear cutting
- dam building
- land development
- pollution; air, water + land
- disturbing stream beds
- building some roads



Some of these things may be necessary if we are going to have a place for people. Some could be done elsewhere. Which of the habitat-destructive items you listed probably could have been done someplace else?

- a. answers will vary
- b. land development
- c.
- d.
- e.
- f.



Unit Twelve

Birds and Wetlands Review

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Here are some puzzles and questions for student review. Have students answer these, and then make up their own to exchange with other students.

Worksheet 12A Bubble Bird

Worksheet 12C Wetlands Magic

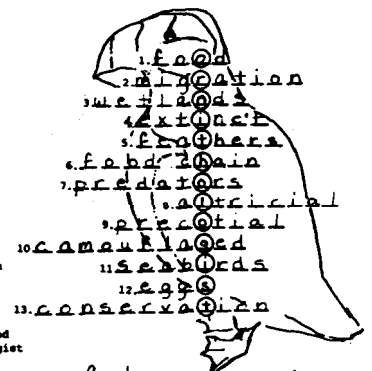
Worksheet 12B Bird Watcher's Special

12A

Bubble Bird

Need some help?
Try these words:


| | |
|--------------|---------------|
| predators | food chain |
| conservation | seabirds |
| eggs | altricial |
| food | wetlands |
| extinct | feathers |
| precocial | camouflaged |
| migration | ornithologist |









- Birds need habitat that has food, cover and water.
- Most Alaskan birds move south for the winter. This is called migration.
- Alaskan wetlands are important resting, feeding and nesting grounds for many North American birds.
- A bird is "endangered" if there is a chance it might become extinct.
- Birds are the only animals in the world that have feathers.
- Energy passes from plants to animals through what is called the food chain.
- Hawks, owls, and other birds that kill birds and animals for food are called birds of prey, or predators.
- A bird that is helpless when hatched is an altricial bird.
- A bird that can walk or swim and find its own food a few hours after birth is a precocial bird.
- Birds that blend in with their habitat are camouflaged.
- seabirds often nest in large colonies on islands and along rocky areas of the coast.
- Birds give us pleasure as we listen to them sing or watch them fly about. People use some birds for more practical purposes as well—we eat their eggs and meat and wear jackets stuffed with their feathers.
- The protection and wise use of our resources is called conservation.
- Whoooo... are you? I'm an ornithologist. I study birds!

Bird Watcher's Special







Directions: Answer the questions.

- Did this flight feather come from the bird's right or left wing?
right 
- How do birds fly? birds pull forward like rowing, they push air down and back, their wings create an airfoil producing lift.
- Name a local bird that migrates. white crowned sparrow
Where does it go? MEXICO
- What are four hazards a bird might meet during migration?
snow airplanes
fog bridges







5. Name these birds!

| | | |
|---|---|---|
|  |  |  |
| a. <u>swimming</u> bird group <u>mallard</u> name | b. <u>swimming</u> bird group <u>Tufted puffin</u> name | c. <u>gull-like</u> bird group name |
|  |  |  |
| a. <u>grouse</u> bird group <u>spruce grouse</u> name | b. <u>perching</u> bird group <u>junco</u> name | c. <u>birds of prey</u> bird group <u>boreal owl</u> name |

6. Match these bird bills with appropriate foods. Write the name of the food next to the picture of the bill.

| | | | |
|---|---------------------|---|--------------------------|
|  | a. <u>shrews</u> |  | b. <u>fish</u> |
|  | c. <u>mud clams</u> |  | d. <u>grass</u> |
|  | e. <u>seeds</u> |  | f. <u>scavenged food</u> |

7. Write what each of these types of feet are used for:

| | | | |
|---|--------------------------------|---|------------------------------|
|  | a. <u>perching on branches</u> |  | b. <u>gripping tree bark</u> |
|  | c. <u>swimming</u> |  | d. <u>clutching rocks</u> |
|  | e. <u>scratching for food</u> |  | e. <u>walking on snow</u> |

8. Draw a sketch or cartoon that shows how wetlands are important to birds.

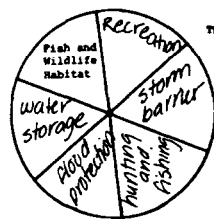
Wetlands Magic

| | | |
|----|----|----|
| A. | B. | C. |
| 8 | 1 | 6 |
| D. | E. | F. |
| 3 | 5 | 7 |
| G. | H. | I. |
| 4 | 9 | 2 |

Directions: Select from the numbered descriptions the best answer for each of the wetland terms. Put the number in the proper space in the magic wetland box. The total of the numbers will be the same across each row and down each column.

| Wetland term | Descriptions |
|------------------------------|---|
| A. Muskeg | 1. Flat, treeless water-soaked land found in northern and western Alaska. |
| B. Wet tundra | 2. Grasses and sedges that are sometimes covered by salt water. |
| C. River, lakes, and marshes | 3. A general term to describe where land and salt water meet. |
| D. Coastal wetland | 4. Wetland formed at a river's mouth. |
| E. Estuary | 5. A place where freshwater rivers and streams meet salt water. |
| F. Tideland | 6. Freshwater wetlands that are needed for spawning and rearing salmon (and many other purposes). |
| G. River delta | 7. Beaches and mudflats periodically covered by the tide. |
| H. Barrier Island | 8. A bog known by its plentiful sphagnum moss. |
| I. Salt marsh | 9. A narrow sand or gravel island that divides the open ocean and a lagoon. |

THE MAGIC NUMBER IS 15.



Wetlands are important for: (fill in the circle).