This curriculum guide is the fourth (Series V) in a six-volume set that comprises the Sea Week Curriculum Series developed in Alaska. Twelve units contain 45 activities with worksheets that cover the following topics: (1) bird lists and field guides; (2) definitions of a bird; (3) parts of a bird; (4) bird watching; (5) bird migration; (6) wetland habitats; (7) nests and nesting; (8) wetland plants and animals; (9) wetlands field trip; (10) birds and people; (11) wetlands values, habitat protection, and development; and (12) a birds and wetlands review. Activities sharpen skills in language arts, science, social studies, math, music, art, and physical education. An introduction provides information designed to help teachers become familiar with the contents of the curriculum guide and to assist in planning. Each unit contains descriptive information on activity objectives, materials, and procedures. An annotated bibliography contains 152 resources. A packet of teacher reproducible worksheet masters accompanies the curriculum guide and contains a 64-word student glossary. A student field guide to common Alaska birds provides a small illustration and range map along with behavioral information for 100 birds. (LZ)
Birds and Wetlands of Alaska

March, 1988
University of Alaska
Acknowledgements

The seven volumes comprising the new Alaska Sea Week Curriculum Series are an expansion and revision of a curriculum project begun by Juneau parents 18 years ago. Publication of this volume is the result of work sponsored by the Alaska Sea Grant College Program, cooperatively supported by the National Oceanic and Atmospheric Administration's Office of Sea Grant and Extramural Programs under grant number NA86AA-D-SG041, projects E70-08 and A75-01, and by the University of Alaska with funds appropriated by the State of Alaska; Alaska Department of Environmental Conservation, Alaska Department of Fish and Game, Alaska Department of Education, National Marine Fisheries Service, University of Alaska Cooperative Extension Service, and the University of Alaska College of Human and Rural Development.

Special acknowledgements for assistance in preparing material for this guide go to Dr. Pete Mickelson, ornithologist; Pete Isleib, ornithologist; Sue Quinlan, Nongame Program, Alaska Department of Fish and Game; George Franklet, Department of Environmental Conservation; Bruce Batten, U.S. Army Corps of Engineers; Dennis Bromley, Anchorage School District Career Center; Pat Partnow, Anchorage School District Indian Education; Marcia Oswalt, East Elementary, Kodiak; Vern Kornstad, Redoubt Elementary, Soldotna; and Sandy Poor, Mt. Eccles Elementary, Cordova.
Introduction

Sea Week is a celebration. It is one of those rare school programs that can saturate a class with learning opportunities without intimidating a single child. The hundreds of teachers now participating in Sea Week throughout Alaska have found it to be a highlight of the year—a week of delight and awe, intrigue and excitement. It’s a week that translates classroom science, mathematics, language, history, social studies, art, and music into the flight of a bird, the crash of a wave, the scuttle of a crab, the drift of a kayak, the bark of a sea lion, the taste of smoked salmon, the scent of a pier. The only frustration we’ve found is among educators who discover that a week isn’t enough. Many teachers have expanded their programs to a month. Several have simply given up on trying to confine Sea Week to a time, and now make use of the curriculum throughout the year. However you design your own program, we’re confident that its primary ingredients—Alaska’s kids, rivers, and coastlines—come to you satisfaction guaranteed!

The seven volumes of the Sea Week Curriculum Guide escort youngsters along Alaska’s coastline, which lies along two oceans and three seas and, together with the shoreline along the numerous islands, inlets, bays, fjords, and delta regions, forms a total of 34,640 miles of saltwater shoreline—a distance almost equal to twice the circumference of the earth.

Sea Week also takes students to Alaska’s vast interior, which includes hundreds of thousands of miles of rivers and streams, and 390,941 square miles of wetlands. That’s two thirds of the state, all linked to the coastline by freshwater systems that serve as nurseries for Alaska’s salmon and waterfowl, as transportation arteries to and from the coast, and as the nutrient-rich replenishers of the ocean currents.

Sea Week introduces students to the state’s marine and wetlands-related resource: More than 90 percent of the fish caught in the United States come from Alaska’s waters. Alaska’s coastal zones contain an estimated 50 percent of the nation’s remaining petroleum reserves. There are over 5½ million acres of commercial-quality timber in the state’s coastal rain forests. Alaska’s marine mammals have provided sustenance for Alaska’s coastal populations throughout the centuries. Impressive concentrations of waterfowl breed in the tundra ponds and river deltas, along with an awesome population of, well, mosquitoes, that also thrive in wetlands and feed some of those birds.

And, finally, Sea Week talks about Alaska’s people, from Native populations living traditional lifestyles to modern urban dwellers. More than three-quarters of Alaska’s inhabitants live near the coastline and many of them have fish-related careers. The remaining quarter are consumers of sea products, beneficiaries of seacoast oil wealth and, most importantly, are linked to the sea by Alaska’s myriad rivers and wetlands.

It is because of such interconnections between wetlands and the sea that, with this edition, the Sea Week Curriculum Guide series has been expanded to include units on Alaska’s wetlands and the people with traditional and contemporary lifestyles who inhabit them.
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<td>What Makes a Habitat? 6A</td>
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<td>Coastal Wetlands 6B</td>
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<td>Estuary: A Very Special Place 6C</td>
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<td>Wet Tundra 6D</td>
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<td>Rivers, Lakes, and Marshes 6E</td>
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<td>Other Bird Habitats 6G</td>
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<td>Coastal Wetland Nest Sites 7B</td>
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<td>Canada Geese: Precocial Birds 7D</td>
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<td>The Bald Eagle: An Altricial Bird 7E</td>
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<td>9</td>
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<td>Field Notes 9B</td>
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<td>12</td>
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<td>Bubble Bird 12A</td>
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<td>Bird Watcher's Special 12B</td>
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<td>Wetlands Magic 12C</td>
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. Make lesson plans. Plan to include local history and culture. Note that there are activities to sharpen skills in language arts, science, social studies, math, music, art, and physical education so that all aspects of education during Sea Week can focus on Alaska's ocean, river and wetland environments. The entire school day can be spent studying birds and wetlands as students write themes on birds for language arts, figure migration problems during mathematics, use wetland terms during spelling, make a bird collage for art, and so on.
Field trips and other Sea Week activities make bright news features. Consider contacting your local newspaper, television, or radio station. Teachers usually find that reporters enjoy going bird-watching as much as the students!

Follow-up

1. Write thank you notes to speakers.

2. Ask students, teachers, parents, and community participants to evaluate Sea Week.

   The sea is important to me because...

   To me, the best part of Sea Week was...

   The part of Sea Week I didn't like was...

   My suggestions for making Sea Week better are...

   Overall, Sea Week was:

   ![sad face] poor
   ![neutral face] okay
   ![happy face] great

3. Write a brief report including samples of student work, evaluation forms, and news articles for your administrators. Send a copy to Sea Week Program, College of Human and Rural Development, 7th floor Grunening, University of Alaska, Fairbanks, Alaska 99775. We like to keep informed of what you are doing! We'll share your good ideas with other students, teachers, and administrators, and put you on our newsletter mailing list.

4. Photocopy your lesson plans and stick them in this guide, so you'll be ready for next year.

5. If you'd like to learn more, consider requesting a Sea Week inservice or 1-credit course for your school. Contact Alaska Sea Week/River Week, College of Human and Rural Development, 7th floor Grunening, University of Alaska, Fairbanks, Alaska 99775; or the School of Extended and Graduate Studies, Outreach Division, University of Alaska, Juneau, Alaska 99802; or Talent Bank, Department of Education, Pouch F, Juneau, Alaska 99811.
### SEA WEEK PLANNING SHEET

**Resource People:** Speakers, craftsmen, field trip leaders.

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**Field Trip Possibilities:**

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**Volunteers:** To help with field trips, seafood meals, classroom activities.
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TEACHER’S GUIDE TO
STUDENT WORKSHEETS
Watching birds can involve much more than simply learning their names, but that is the first, indispensable step. In back of this book is a simplified field guide covering 100 species of birds common somewhere in Alaska. If possible, each student should have a copy of his or her own. You might duplicate the pages and post them alongside each other as a class checklist. Other birds seen but not on this guide could be added to the posted list.

Some of these birds are found throughout Alaska, but others are only found in certain regions. The plumage of many species varies depending on age, sex, and time of year. In bird species whose plumage varies, our field guide illustration and description is of an adult male in spring plumage. The spring males are usually the most colorful and easiest birds to identify. (There are exceptions, such as phalaropes, in which the female is more brightly colored than the male.) For help in identifying females and juveniles, as well as the less common species that we don’t cover, we urge you to obtain at least one field guide for class use. The standard American field guides are described in the bibliography. A New, Expanded Guide to the Birds of Alaska, by Robert Armstrong, has photographs of each species and contains information about where birds can be found in Alaska in all seasons. Field guides stress identification, and if you wish to explore any topic of bird life in depth, you’ll need to go to other kinds of texts.
This is an exercise to show students that they already know quite a lot about birds—and to develop excitement for learning more. As the students work through the book, they will return to this page and fill out the remaining columns.

Get students to start thinking about birds by talking about those they are familiar with locally and from trips, books, movies, television, etc. Additional paper can be used if the students know more birds than will fit on the chart. If possible, incorporate names of birds in local languages. The names of birds in different Native languages are available in Gabrielson and Lincoln’s Birds of Alaska.

This activity should help to sharpen student skills in compiling data. This list will undoubtedly include the most common birds in your area, and the ones most likely to be seen on a field trip.
Worksheet 1C
Use Your Field Guide

Learning to use a field guide is an important aspect of this course. Discuss the organization of the student field guide. The field guide separates birds by groups and by species. There is a box for checking off the species as they are seen, and information on size, bills, feet, spring habitat, where the birds winter, and on their identifying features. A range map for each bird shows where in Alaska it is found.

In general, field guides start with the least evolutionarily advanced families of birds (swimming birds) and go to the more advanced (perching birds). The Sea Week field guide follows a simplified classification system under which birds are divided into six groups:

Swimming birds include waterfowl (ducks, geese, and swans), loons, grebes, and some seabirds (cormorants, puffins, murres, murrelets, auklets, and guillemots). Bird watching on a lake or bay, with binoculars or a spotting scope, can be rewarding even at midday when bird activity is low and birds can be difficult to find in other habitats.

Birds of prey include owls, hawks, and eagles, and falcons. Owls are nocturnal and may be hard to find. Look for the pellets of bones and feathers that they leave under trees.

Grouse and Ptarmigan are the smallest group; four species of grouse and three species of ptarmigan are found in Alaska. They have feathers over their nostrils and lower legs and, in ptarmigans, over the entire foot.

Waders include cranes, herons, and shorebirds (oystercatchers, plovers, and sandpipers). Many shorebirds stay in flocks during migration and in winter. The flocks often show remarkable coordination, flying wing-to-wing and displaying alternately their dark backs and their light bellies.

Gull-like birds include the gulls, terns, jaegers, and gull-like seabirds (fulmars, petrels, albatrosses, and shearwaters). These latter birds, the tubenoses, breed on far offshore islands and are rarely seen near the mainland—we have therefore omitted them from the student field guide.

Perching birds include the true perching (passerine) birds, whose feet, with three toes in front and a long one behind, are adapted for locking onto branches. Flycatchers, larks, swallows, jays, crows, ravens, chickadees, wrens, thrushes, warblers, finches, and sparrows comprise only a partial list of passerine families. For purposes of simplified classification we have also included woodpeckers, kingfishers, hummingbirds, and pigeons with the perching birds.
Use Your Field Guide

Part of the pleasure of "birding" is locating the homes of birds in your area. Field Guides to birds are usually written for the specific area where you live. They have drawings or photographs, hints to help you find all "similar" birds, and other information. They usually have checklists that you can use to keep track of all the birds you see. Your Student Field Guide lists 150 of Alaska's most common birds. Some are in your area.

1. What is the name of the first bird in your field guide?
   **Bufflehead**

   The last bird in your field guide? **Snowy Plover**

2. Identify these birds. If you do not already know their name, look them up in your field guide. Write their names under their picture. In the name for all the bird pictures you see问问 on these worksheets.

   - **American Robin**
   - **Canada Goose**

3. Check your field guide to see if you are correct.

   a. The species in your student guide are listed in the major groups. Write the names of each group. Your field guide can help.

      - **Swimmers**
      - **Brush-nest**
      - **Bee-eaters**
      - **Buntings**
      - **Buzzards**
      - **Cranes**
      - **Crows**

4. Show the students other field guides. Explain how these are similar to their Sea Week guide and encourage students to use them to identify less-common birds, females or juveniles, not in their own field guide. Have students immediately begin to check off birds in their field guide as they see and identify them. A bird that is seen but is not on the list can be added to the student guide in the correct bird group. Unusual sightings should be reported to Dr. Brina Kessel or Dan Gibson at the University of Alaska Museum, Fairbanks, AK 99775.

   (On question 5, worksheet IC, students may be interested in identifying each bird's name as well as its group: a. Snowy Owl; b. Mallard; c. Common Raven; d. Bald Eagle; e. Tufted Puffin; f. Chickadee; g. Yellowlegs; h. Bonaparte's Gull; i. Willow Ptarmigan; j. Sandhill Crane.)
GLOSSARY

Introduce the glossary in the back of the student workbook. The glossary can be used for spelling, games, or vocabulary words. Have the students add additional words as they find them during their studies. Make a classroom set of flash cards with these terms. The students can each make two or three cards; then laminate the set.

Additional Activities:

1. Language Arts: Have students practice making careful observations by describing a classmate in detail, so that the description is unique to that person. No other classmate will fit it entirely.

2. Language Arts, Science: Next, have a student describe a mystery bird to the class one feature at a time, using the field guide or a picture of the bird. After each clue is given, classmates try to guess the bird. The first student to correctly identify it takes the next turn describing a bird to the class.

3. Language Arts: Work with students and the librarian to develop a bibliography of books about birds that are available in your school library.

4. Social Studies, Science: Have students make a list of people in the community who know a lot about birds. Some of these people may be willing to share their knowledge with your students. (List may include parents, village elders, birdwatchers, hunters, government agency personnel, museum staff, taxidermists.)

5. Social Studies, Science: Adopt a bird. Have each student choose one kind of local bird to learn more about, and look for that bird whenever possible, recording information about it.

Suggestions for data to record:

- Name of bird
- Habitat where the bird is seen (marsh, tundra, forest, schoolyard)
- Location of the bird (ground, shrub, air, tree branch, tree trunk)
- Bird activity (flying, perching, walking, eating, hopping, singing, swimming)
- Observations about activity (manner of flying, how and what it eats)
- Relationship with other animals (whether it is alone or in a group, how it communicates with other birds or animals)

At the end of the week, ask students to share and compare their observations. Happy birding!
Unit Two
Definition of a Bird

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Worksheet 2C - How Birds Fly .................. 9
Worksheet 2D - Flight Strategies ............. 10
Worksheet 2A
What is a Bird?

Bring or have students bring some feathers for this exercise.

2A What is a Bird?

There are differences between different groups of animals. Some animals can fly! Yes No

1. Do you know Birds can Fly? Yes No

Feather Tone

2. Is it because birds can build nests? Yes No

Feathers

3. Can any other animals build a nest? Yes No

Feather Types

4. Is it because birds lay eggs? Yes No

Feather Functions

5. Can any other animals have feathers? Yes No

Feather Anatomy

6. Are the only animals that have feathers:

REMEMBER TO FILL THE CHART BELOW.

10. Have you ever wondered how many feathers a bird has?

- A hummingbird has about 1,000 feathers.
- A chicken has about 30,000 feathers as a housefly.

Fill in the chart below.

<table>
<thead>
<tr>
<th>Animal</th>
<th>Feathers</th>
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<tbody>
<tr>
<td>Hummingbird</td>
<td>1,000</td>
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<tr>
<td>Chicken</td>
<td>30,000</td>
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11. How many birds have a body temperature of 100°F to 105°F?

- What is your body temperature? 98.6°F
- Is this warm or cooler than a bird's? Cooler
- Do you think a bird is able to stay warm? By maintaining a high metabolism, eating much food, and remaining active most of the time it's flying.

15. How many kinds of feathers are there?

16. What kind of feather does a bird use for:

- Feathers:
  - Flight
  - Body
  - Tail

17. Which of these feathers would you put in a sleeping bag? Down

18. What kind of feather will hold a pen? Flight

19. How can you tell a wing feather?

20. How can you tell a tail feather?
Worksheet 2B
Make a Feather Pen

You will need feathers, knives or scissors, bottles of ink or ballpoint pen filler points, and glue. You may also need boards on which to cut.

Be sure to have a safety session if students will be using the knives. Ask students to suggest ways to be safe. They should cut away from themselves and never walk around with open knives. If for some reason a student needs to carry a straight-bladed knife without a sheath, the knife should be held at the side, pointing downwards. The ballpoint filler pen is easier to make than an ink pen, but does not demonstrate the way a quill pen works.

Worksheet 2C
How Birds Fly

You may want to bring in bird and animal bones for comparison. Open the bones to show what is inside.

1. Name a bird that soars.
   **Golden eagle, Alca, also named Aquila**

2. Name a bird that has its body flapped hard most of the time.
   **Tufted puffin, Fratercula**

3. Why do you think there is a difference in the way they fly?
   **Puffins have shorter wings and a relatively heavier body.**
Worksheet 2D
Flight Strategies

Students may want to invite a local pilot to talk to them about the problems of flying. For centuries, people dreamed of flying like the birds—but it is only recently that we learned how. You might read aloud the Greek story of Icarus, the boy who wanted to fly. He made wings of wax and jumped off a mountain, but the sun melted the wax and he fell to his death.

Additional Activities:

1. Language Arts: Have students close their eyes. Then touch them with a variety of feathers on the backs and palms of their hands, and on their cheeks. See if they can tell a down feather from a flight feather or one species of bird feather from another. Have them talk about the differences. For example, an owl feather has a soft velvet cover on it that helps silence the bird's flight.

2. Music, Language Arts: Have students sing bird songs, then write your own. Begin with a common tune everyone knows, and make up verses about local birds. For example, here's an adaptation of "Old McDonald Had a Farm":

   Old, old Chevak had some tundra
   e e e e
   And on that tundra lived a goose
   e e e e
   With a honk honk here and a honk honk there
   Here a honk, there a honk, everywhere a honk honk
   Old, old Chevak had some tundra
   e e e e
   And on that tundra lived a tundra swan.....

3. Social Studies, Language Arts: Have students find out about local aviation history. When did a plane first come to your community? How did people react to planes? How did planes change the way people lived?
Unit Three
Parts of a Bird

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Worksheet 3B - Types of Beaks ..................... 12
Worksheet 3C - Types of Feet ...................... 13
Worksheet 3A
Making a Living

Once students have completed this activity, have them play a modified form of "Simon Says" to reinforce the comparison of humans with birds made in the student workbook. They can take turns leading the activity in front of the class.

Peter says:
"Open your beak!"
"Wave your wing!"
"Pat your belly!"
"Touch your eye stripe!"

Worksheet 3B
Types of Beaks

Have students make up questions to quiz each other on types of beaks.

"What kind of bill does a robin have?"
"What bird has a sharp hooked bill?"
Worksheet 3C
Types of Feet

After students have completed the activity sheet, play foot charades. Have them move their feet or hands to imitate swimming, wading, grasping, perching, scratching—and see if the other students can guess what bird they’re mimicking.

Note that the student book directs students to fill in both beak and foot types on the chart of birds they began in Unit 1.

Additional Activities:

1. Language Arts, Art, Science: Have students work in groups to design imaginary birds. Use large sheets of paper and magic markers. Have students explain the parts of the bird and how it makes a living using its specialized parts. Their bird might eat garbage, run computer programs, nest in oil drums, or fly messages along the Iditarod trail!

2. Art: Copy this tangram and have students cut it out and arrange the pieces into a variety of bird shapes. Use paints or crayons to color the birds.
Anyone can enjoy watching birds, but to become good at identifying them in the field requires careful observation and patience. Many of the nation's best birders began at the age of your students. Setting up a feeder is an especially good activity for beginning birders, because birds at a feeder can be observed at close range. Gradually, students will learn to identify birds at a distance and in flight.
Worksheet 4A
Make a Bird Feeder

If possible, build a bird feeder directly outside your classroom window. The Alaska Department of Fish and Game report Winter Bird Feeding in Alaska mentioned in the student book is an excellent source of ideas. Students can take turns recording data. They may want to design experiments as well. Put an owl picture in the window and see what happens. Play recordings of bird songs. Try different kinds of food, such as sunflower seeds versus a bird-seed mix. This can be done in one feeder at different times, or the students can set up a second (control) feeder.

Worksheet 4B
Field Marks

One of the most difficult aspects of birding is to remember what you see when you observe a bird, so that you can identify it later. This activity will help sharpen students' observational skills as well as their use of descriptive language.
Worksheet 4C
Name and Color these Birds!

You can make flash cards from bird pictures cut out of the student guide or magazines. Students can practice identifying them with binoculars. Have one student hold up the cards, while another at the back of the room uses binoculars to identify them. Most binoculars have both a center focus and an individual eyepiece focus. The individual eyepiece focus helps when one eye is stronger than the other. It remains on the same setting for an individual; if both eyes are the same, set it on zero. When a bird is spotted, look at it and raise the binoculars to meet it, then focus with the center focus. If you don't see the bird, circle around the spot with the binoculars. If you still don't see it, start over and look for it again without the binoculars.
Worksheet 4D
Alaska Bird Regions

Alaska has a great variety of bird habitats. Dr. Brina Kessel and Dan Gibson described six regions in their 1978 publication Status and Distribution of Alaska Birds (see bibliography); these regions are also used in Armstrong's Guide to the Birds of Alaska, and we make use of them in the student field guide at the back of this book. For this activity, students will need red pencils or crayons to color their region red. You may want to have an Alaska map available so that students can locate the names of communities in the different regions. Have your students write letters to classes in other regions, including questions about local bird life and other topics of interest. The following table may be helpful in your geographical studies.
<table>
<thead>
<tr>
<th>Table of Characteristics of Alaska Bird Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weather</strong></td>
</tr>
<tr>
<td><strong>Winter</strong></td>
</tr>
<tr>
<td>Southeastern: cool-wet</td>
</tr>
<tr>
<td>South-coastal: cool-wet</td>
</tr>
<tr>
<td>South-western: cool-damp</td>
</tr>
<tr>
<td>Central: cold-dry</td>
</tr>
<tr>
<td>Western: cold-dry</td>
</tr>
<tr>
<td>Northern: cold-dry</td>
</tr>
<tr>
<td><strong>Summer</strong></td>
</tr>
<tr>
<td>Southeastern: cool-wet</td>
</tr>
<tr>
<td>South-coastal: cool-wet</td>
</tr>
<tr>
<td>South-western: cool-damp</td>
</tr>
<tr>
<td>Central: hot-dry</td>
</tr>
<tr>
<td>Western: cool-damp</td>
</tr>
<tr>
<td>Northern: cool-damp</td>
</tr>
<tr>
<td><strong>Vegetation Types</strong></td>
</tr>
<tr>
<td><strong>Wetland</strong></td>
</tr>
<tr>
<td>Southeastern: yes</td>
</tr>
<tr>
<td>South-coastal: yes</td>
</tr>
<tr>
<td>South-western: yes</td>
</tr>
<tr>
<td>Central: yes</td>
</tr>
<tr>
<td>Western: yes</td>
</tr>
<tr>
<td>Northern: yes</td>
</tr>
<tr>
<td><strong>Forest</strong></td>
</tr>
<tr>
<td>Southeastern: yes</td>
</tr>
<tr>
<td>South-coastal: yes</td>
</tr>
<tr>
<td>South-western: no</td>
</tr>
<tr>
<td>Central: yes</td>
</tr>
<tr>
<td>Western: no</td>
</tr>
<tr>
<td>Northern: no</td>
</tr>
<tr>
<td><strong>Mountain Tundra</strong></td>
</tr>
<tr>
<td>Southeastern: yes</td>
</tr>
<tr>
<td>South-coastal: yes</td>
</tr>
<tr>
<td>South-western: yes</td>
</tr>
<tr>
<td>Central: yes</td>
</tr>
<tr>
<td>Western: yes</td>
</tr>
<tr>
<td>Northern: yes</td>
</tr>
<tr>
<td><strong>Wet Tundra (wetland)</strong></td>
</tr>
<tr>
<td>Southeastern: no</td>
</tr>
<tr>
<td>South-coastal: no</td>
</tr>
<tr>
<td>South-western: yes</td>
</tr>
<tr>
<td>Central: no</td>
</tr>
<tr>
<td>Western: yes</td>
</tr>
<tr>
<td>Northern: yes</td>
</tr>
<tr>
<td><strong>Length of Season</strong></td>
</tr>
<tr>
<td><strong>Open Water</strong></td>
</tr>
<tr>
<td>Fresh Water</td>
</tr>
<tr>
<td>Southeastern: 8-12 months</td>
</tr>
<tr>
<td>South-coastal: 8-12 months</td>
</tr>
<tr>
<td>South-western: 8-12 months</td>
</tr>
<tr>
<td>Central: 6 months</td>
</tr>
<tr>
<td>Western: 5-6 months</td>
</tr>
<tr>
<td>Northern: 2-5 months</td>
</tr>
<tr>
<td>Salt Water</td>
</tr>
<tr>
<td>Southeastern: all year</td>
</tr>
<tr>
<td>South-coastal: all year</td>
</tr>
<tr>
<td>South-western: all year</td>
</tr>
<tr>
<td>Central: none</td>
</tr>
<tr>
<td>Western: 8 months</td>
</tr>
<tr>
<td>Northern: 6 months</td>
</tr>
<tr>
<td><strong>Bird Abundance</strong></td>
</tr>
<tr>
<td><strong>Summer</strong></td>
</tr>
<tr>
<td>Southeastern: abundant</td>
</tr>
<tr>
<td>South-coastal: abundant</td>
</tr>
<tr>
<td>South-western: abundant</td>
</tr>
<tr>
<td>Central: abundant</td>
</tr>
<tr>
<td>Western: scarce</td>
</tr>
<tr>
<td>Northern: scarce</td>
</tr>
<tr>
<td><strong>Winter</strong></td>
</tr>
<tr>
<td>Southeastern: abundant</td>
</tr>
<tr>
<td>South-coastal: abundant</td>
</tr>
<tr>
<td>South-western: scarce</td>
</tr>
<tr>
<td>Central: scarce</td>
</tr>
<tr>
<td>Western: scarce</td>
</tr>
<tr>
<td>Northern: scarce</td>
</tr>
<tr>
<td><strong>Numbers of regularly seen bird species (kinds)</strong></td>
</tr>
<tr>
<td><strong>Summer Water Birds</strong></td>
</tr>
<tr>
<td>Southeastern: 85</td>
</tr>
<tr>
<td>South-coastal: 106</td>
</tr>
<tr>
<td>South-western: 105</td>
</tr>
<tr>
<td>Central: 64</td>
</tr>
<tr>
<td>Western: 104</td>
</tr>
<tr>
<td>Northern: 72</td>
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<tr>
<td><strong>Summer Land Birds</strong></td>
</tr>
<tr>
<td>Southeastern: 91</td>
</tr>
<tr>
<td>South-coastal: 80</td>
</tr>
<tr>
<td>South-western: 62</td>
</tr>
<tr>
<td>Central: 87</td>
</tr>
<tr>
<td>Western: 65</td>
</tr>
<tr>
<td>Northern: 35</td>
</tr>
<tr>
<td><strong>All Birds Summer</strong></td>
</tr>
<tr>
<td>Southeastern: 176</td>
</tr>
<tr>
<td>South-coastal: 186</td>
</tr>
<tr>
<td>South-western: 167</td>
</tr>
<tr>
<td>Central: 151</td>
</tr>
<tr>
<td>Western: 169</td>
</tr>
<tr>
<td>Northern: 107</td>
</tr>
<tr>
<td><strong>All Birds Winter</strong></td>
</tr>
<tr>
<td>Southeastern: 124</td>
</tr>
<tr>
<td>South-coastal: 119</td>
</tr>
<tr>
<td>South-western: 105</td>
</tr>
<tr>
<td>Central: 39</td>
</tr>
<tr>
<td>Western: 28</td>
</tr>
<tr>
<td>Northern: 5</td>
</tr>
</tbody>
</table>

For all of Alaska, the total number of species, not including accidentals, is 355.
You may want to put the preceding chart on an overhead projector for your students, and ask them questions about it such as:

- How would you describe the weather in our region?
- What else can you find out about our region from the chart?
- What region has a hot summer? (Central)
- What region has the most species of birds in summer? (Southcoastal)
- What region has the fewest species of water birds? (Central)
- What region has the fewest birds in winter? (Northern)
- What region has the most species of water birds in summer? (Southcoastal)
- Is fresh water or salt water free of ice for the longer period? (salt water)

**Additional Activities:**

1. **Art:** Make a bird mobile. Cut out pictures of birds or bring in feathers and attach them with heavy thread to driftwood or pieces of coat hanger.

2. **Science:** Encourage students to be bird detectives. Many important discoveries about bird behavior have been made by people watching birds out their windows! (See "The New Art of Bird Reading" by Jean George, published in both *International Wildlife* Mar./Apr. 1973 and *Reader's Digest* Mar. 1973. Here are a few ideas to get your students started:

- Which birds dominate at the feeder?
- What happens when an eagle or raven flies overhead?
- Where does each bird eat at the feeder?
- How does each bird come in for a landing?
- What happens on a sunny day compared to a rainy or snowy day?
- What happens when it's windy?
One book that may be particularly helpful during these migration studies is Bellrose's Ducks, Geese and Swans of North America (see bibliography). It has full-page maps of waterfowl migration routes.

For more information on what overwintering birds eat, see the Alaska Department of Fish and Game Wildlife Weather Reports No. 1 (Winter Bird Feeding in Alaska) and No. 2 (Landscaping for Wildlife in Alaska) by Sue Quinlan. A more comprehensive treatment is given in The Audubon Society Encyclopedia of North American Birds.

Additional Activities:

1. Geography, Science, Art: Make a large classroom bird migration map. Have students trace the migration routes of several birds on the map with different-colored markers. See how many Alaskan birds you can track. But remind students that we don't know birds' exact migration routes. We can gain information by banding birds, but sometimes all we find out are the end points and general direction.

2. Language Arts: Migration is a special time. Birds flying south in the fall are a sign that winter is coming; birds returning after the long winter seem to bring the spring with them. Have students look for poems about migration—and write their own. The English poet Ted Hughes has written an especially fine poem on the subject: (see next page)

3. Art, Geography: Have students draw pictures of what birds see as they migrate over your community. Add pictures of what birds see en route, and attach with yarn to a bulletin board map of the bird's migration route.

4. Mathematics: Use the migration map and scale to create math problems. Have students determine 1) the length of the oldsquaw's flight path; 2) how long it would take the oldsquaw, flying 40 miles per hour, to reach its wintering grounds; 3) how many days the flight would take if the bird flew nonstop; 4) how many days it would take if the bird flew eight hours a day and rested and ate the remainder of the time.

5. Physical Education, Mathematics, Geography: Figure the migration distances flown by several different birds. Then have the class pick one bird. Adding up daily distances for the whole class, have the students try to run as far as the bird migrates. Mark your progress on the map. For example, if each of your 25 students runs a mile, then your bird has flown 25 miles for that day. You may need help from other classes, joggers, or cross-country team members to reach your bird's destination. Another alternative would be for your class to run every day for a week. Then have the students figure what fraction of the bird's migration route they have completed.
GOOSE

The White Bear, with smoking
mouth, embraces
All the North.
The Wild Goose listens.

South, south-- the Goose stretches
his neck
Over the glacier.

And high, high
Turns the globe in his hands

Hunts with his pack from star to star
Sees the sun far down behind the world.

Sinks through fingers of light, with apricot breast,
To startle sleeping farms, at apple dawn,
With iceberg breath.

Then to and fro all Christmas, evening and morning,
Urging his linked team,
Clears the fowler's gun and the surf angler.

Homesick
Smells the first flower of the Northern Lights--

Clears the Lamb's cry, wrestles heaven,
Sets the globe turning.

Clears the dawns--a compass tolling
North, North. North, North.

Wingbeat wading the flame of evening.

Till he dips his eyes
In the whale's music

Among the boom
Of calving glaciers

And wooing of wolves
And rumpus of walrus.

"Goose" from Under the North Star by Ted Hughes. Copyright (c) 1981 by Ted Hughes. Reprinted by permission of Viking Penguin Inc.
Unit Five
Bird Migration

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Worksheet 5C - Alaska Bird Migration Map ....... 24

Alaska Bird Migrations

The migration of birds has been an endless topic of fascination. How do birds manage to travel so far time after time? Birds travel without road signs, restaurants, or travel guides.

5A

Alaska Bird Migrations

Give reasons why birds migrate from one part of the country to another:

To find food
To find places to rest
To avoid cold weather
To avoid open water that freezes or dries up!

In Alaska there is lots of food for birds in summer. In winter places is been for birds.

Lost some kinds of food birds can find in Alaska in the summer that are not available in winter when the water is frozen and snow covers the ground.

1. insects
2. worms
3. fish
4. berries

Where do birds go in winter? The following map shows half the world. The dotted numbers on the map mark the departure beginning and end points of some Alaska birds. The 7's mark the flight of the birds. Routes have been noted in all regions of Alaska in the summer. Connect the 7's with a red line to show the fliers’ range. Where do robins winter? Where do birds winter?

1. California or Florida
2. Argentina Chile
3. Siberia or California or NY

Some examples given winter in Prince William Sound and Southeast Alaska.
Worksheet 5A  
Alaska Bird Migrations  
Worksheet 5B  
Bird Wintering Areas  
Worksheet 5C  
Alaska Bird Migration Map

The Alaska Bird Migration Map, worksheet 5C, is needed for both exercises in this unit. Students will also need colored pencils and narrow felt-tip markers or crayons.

### Bird Wintering Areas

<table>
<thead>
<tr>
<th>Bird</th>
<th>Wintering Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tree swallow</td>
<td>California to Panama</td>
</tr>
<tr>
<td>Mew gull</td>
<td>Coastal Alaska to Subarctic</td>
</tr>
<tr>
<td>Arctic skua</td>
<td>Coastal Alaska to Southern Quebec</td>
</tr>
<tr>
<td>Goldeneye</td>
<td>Coastal Alaska to Washington Central America</td>
</tr>
<tr>
<td>Pile owl</td>
<td>Japan</td>
</tr>
</tbody>
</table>

Answer the following questions using your field guide:

1. Name five birds that can be found in all regions of Alaska in the winter:  
   - Common redpoll  
   - Red crossbill  
   - Common redpoll  
   - Red crossbill  
   - Common redpoll

2. Name four birds that winter in Japan:  
   - Common redpoll  
   - Red crossbill  
   - Snow bunting  
   - Snow bunting

3. Name one bird that winters in New Zealand:  
   - Goldeneye

4. Name one bird that winters in Africa:  
   - White-tailed kite

5. Which bird migrates furthest north?  
   - Barn swallow

6. Find or draw a picture of a bird or birds that stay in your area all winter. Put the picture here. Label your bird.  
   - Answers will vary

7. Name some other birds that stay in your area all winter. Have you seen them eating?  
   - Answers will vary

### Alaska Bird Migration Map

![Alaska Bird Migration Map](image)

24

33
Alaska is more than 85 percent wetlands. Look at the number of ponds, rivers, sloughs, streams, lakes, and freshwater marshes on a detailed map of the state—not to mention the 34,640 miles of coastline with its estuaries, salt marshes, tidelands, river deltas, and barrier island lagoon systems.

Wetlands are highly productive biologically, producing more biomass per acre than our best farmland. Alaska's wetlands provide food, water, and cover for fish and wildlife, and food and recreation for people. Alaskans visit wetlands to pick berries or to fish, to hunt moose, bears, ducks, and
geese, to trap muskrat and beavers, and simply to watch and enjoy the wildlife. Wetlands function in other ways useful to humans: they help control floods, buffer storms, improve water quality, and provide drinking water.

In Unit 11, we'll discuss the ways in which wetlands benefit us. For now, let's take a closer look at what a wetland is.

Alaska's wetlands are wet most of the summer and support plants and animals that prefer wet soil. In this book we talk about four categories of wetlands: coastal wetlands; wet tundra; rivers, lakes, and marshes; and muskeg. (These divisions basically follow the classification system used in the Alaska Department of Fish and Game's Wildlife Week materials by Sue Quinlan—see bibliography. We have used the Water, Wetlands, and Wildlife volume of the Wildlife Week program extensively in preparing this unit.)

These four types of wetlands are tied together by the water cycle. Water falls on land as rain and snow, then heads slowly toward the sea. Some water collects in low-lying areas, where it creates lakes, ponds, puddles, and soggy land. The rest flows in rivers to the sea; surface sea water evaporates and collects in clouds; clouds blow inland; and the water falls again as rain or snow.
The concept of habitat is very important. Plants and animals need their habitat (or home) to provide the right amount of food, water, and safe cover. The single greatest threat to wildlife is loss of habitat. As towns, roads, and industrial developments spread, the ranges of animals like caribou, bears, and waterfowl are reduced dramatically. Some species are able to co-exist with people; others cannot adapt to human encroachment. Mallards will return to a lake that is being built up. Trumpeter swans, by contrast, although they may tolerate some human activity, will not nest on a lake that is being crisscrossed by motorboats.

Birds nest in many different kinds of habitat, but the summer nesting birds in Alaska concentrate in the wetlands; the river flats and tundra. Millions of migratory birds nest and raise their young in Alaska, primarily in these biologically rich wetland areas. If too much of this key habitat is destroyed, they will have no place to go.

For designing a wetland logo, students will need colored pencils, crayons, or narrow felt-tip pens, scissors, cardboard, glue and safety pins. Students may want to sketch their logos in their books, then draw them again on a separate piece of paper. After coloring, they can cut the logos out, paste onto cardboard, attach safety pins, perhaps glue on ribbons, and wear as badges.
Migratory birds are found in all of Alaska's coastal wetlands, but certain areas are particularly important to large numbers of birds. For example, the delta at the mouth of the Stikine River in southeast Alaska is a migration stopover for thousands of snow geese, trumpeter swans, ducks, and shorebirds (or waders). Other major coastal wetlands in the state include the Copper River Delta, the Yukon-Kuskokwim Delta, Izembek Lagoon, and the North Slope's barrier island lagoon system.

The Copper River Delta in southcentral Alaska is a stopover and feeding ground for thousands of sandhill cranes and nearly 20 million shorebirds, including the entire world population of western sandpipers and most of the red knots and dunlin in North America. These birds rest and feed in the delta before flying farther north and west to nest in other Alaskan wetlands. They use their long bills to probe deep in the estuary mud for tiny clams, worms, and other invertebrates. The Copper River Delta includes not only extensive mud tidelands used by shorebirds, but also salt marshes and a series of sloughs among the freshwater ponds and marshes heavily used by ducks, geese, and trumpeter swans. Offshore sandbar islands provide nesting habitat for glaucous-winged gulls, and a protected lagoon system used by salmon, seals, and sea otters.

In western Alaska, the Yukon-Kuskokwim Delta area, where wet tundra on the inland delta intergrades with rich coastal estuaries, is one of world's most important bird nesting areas. This delta alone is the nesting ground for nearly two million waterfowl and an estimated 100 million shorebirds, including most of the western sandpipers, dunlin, and black turnstones in North America. It is important habitat for sandhill cranes, tundra swans, and three of Alaska's most beautiful ducks: the common, spectacled, and Steller's eiders. Nearly the entire world population of emperor geese and cackling Canada geese, and most of the Pacific flyway white-fronted geese and brant, nest in this area. Unfortunately, these goose populations have declined dramatically in the past few years. Biologists and interested people living all along the flyway have been joining forces to help protect them.

BARRIER ISLAND LAGOON SYSTEMS

Along the North Slope and in a few places in western and southwestern Alaska, long, narrow gravel barrier islands separate the sea from the mainland. The islands protect the lagoons from icy winds, rough seas, and the harsh scouring of pack ice. The lagoons are rich, like other coastal wetlands, because of the continuous deposit of silt and detritus (dead organic matter) by rivers and streams. The lagoon water warms up more quickly than open sea water, and the barrier islands provide nesting sites free from predators such as arctic foxes, which can't cross the lagoon waters. Molting waterfowl utilize the protected waters; Simpson Lagoon in northern Alaska is
crowded each summer with over 100,000 molting oldsquaw ducks.

The protected lagoons are important stopover places for migratory birds such as common eiders, arctic terns, and brant. Most of the western North American population of brant stop to rest in Izembek Lagoon on the Alaska Peninsula, and to feed on the eelgrass in the shallow water, before making their two-and-a-half-day nonstop flight to Baja California. Most of the world population of Steller's eiders and emperor geese also gather in Izembek Lagoon during fall, and remain in Alaska throughout the winter.

Invertebrates that live in lagoon mud are also food for fish and gray whales. Many fish overwinter in lagoon channels where a bit of open water remains during winter. Beluga whales, and ringed and spotted seals, spend much of every summer preying on fish that live in the lagoons.

The barrier islands off the Copper River Delta are sandbar islands. This barrier island lagoon system is very rich and productive, supporting large populations of fish, shellfish, marine mammals, and birds. The islands are important nesting areas for thousands of glaucous-winged gulls. Most dusky Canada geese (a subspecies of Canada) nest on the Copper River Delta. But some of these duskies are starting to nest on the islands as the predator population, consisting primarily of brown bears, increases on the mainland.

(The above material is drawn largely from Sue Quinlan's description in Water, Wetlands, and Wildlife, p. 9; Unit 2 of Wildlife Week.)

Worksheet 6C
Estuary: A Very Special Place

Estuaries, a type of coastal wetland, form where rivers meet the sea. The term includes the mouth of the river or stream, along with the bay and adjacent marshes, tideland, and river delta. Salt water and fresh water mix in warm shallow water and support an extremely high level of productivity. Scientists call this a "nutrient trap." The lighter, fresh river water flows over the heavier ocean water. The salt water moving in from below creates a circular motion that traps the nutrients. Twice a day, the rising tide from the ocean sends these nutrients surging over the marsh. And the ebb tide returns nutrients to the bay.

Nutrient-rich water draining into coastal wetlands enriches sea water and provides a rich nursery ground for marine fish and invertebrates. Clams, crabs, abalone are among the great variety of marine animals that use estuaries during part of their lives. Most of the animal species that we harvest from the sea in Alaska depend on estuaries.
Worksheet 6D

Wet Tundra

Wet tundra is found over most of northern and western Alaska. Some of the areas covered by wet tundra receive only 8 to 10 inches of rain and snow per year—desert conditions. But in spite of the low precipitation, these areas are classified as wetlands because of the permafrost—permanently frozen ground—beneath the surface. Water can't soak into permafrost, so when the few inches of winter snow melts, the water remains at the surface and covers the tundra with a sheet of water.
In winter, there is not much wildlife on the tundra. Caribou paw out craters in the snow to reach lichens, sedges, and shrubby plants that are buried beneath wind-drifted snow. Lemmings and voles tunnel beneath the snow and also eat the previous summer's plant growth--grasses, sedges, willows, and mosses. Ptarmigan, tundra hares, and beaver also overwinter, as well as predators including wolves, foxes, weasels, ravens, and gyrfalcons.

In summer, however, the wet tundra areas teem with life. Cottongrass and other sedges, willow plants, and other tundra plants grow quickly during the 24-hour daylight of the arctic summer. Insects, including blackflies, mosquitoes, and springtails, flourish, using the ample ponds and puddles for their larval stages.

These insects are the prime source of protein for the millions of migratory birds that raise their young on the tundra. Alaska's wet tundra areas are important nesting grounds for brant, Canada and greater white-fronted geese, three types of eiders, oldsquaw, and other ducks. During years of drought, even more ducks, millions of them that usually nest in Canada, come north to Alaska's wetlands. Without our wetlands, these birds could not survive dry summers.

Wet tundra is critical habitat for many waders, such as western and semipalmated sandpipers, phalaropes, dunlins, and whimbrels. These birds lay eggs and raise their young in just two short months.

Other nesting birds on wet tundra include swans, loons, parasitic jaegers, snowy owls, and short-eared owls.

Wet tundra is also crucial for thousands of geese after the nesting season. Brant, Canada geese, and greater white-fronted geese migrate to large wet tundra lakes to molt their wing feathers. During the few weeks they are unable to fly, the geese feed on the rich sedge meadows and escape predators by swimming offshore in the lakes.

(The above description was adapted from Sue Quinlan's Water, Wetlands, and Wildlife, p. 6.)
Worksheet 6E
Rivers, Lakes, and Marshes

Water from Alaska's vast expanses of muskeg and wet tundra seeps and flows into low-lying areas to form rivers and lakes. Freshwater marshes form along the riverbanks and lake shores. Detritus from these marshes provides nutrients for the plants and animals that live in the rivers and lakes.

This detritus is eaten by aquatic invertebrates such as snails, clams, and the larvae of mayflies, stoneflies, blackflies, and caddisflies. They are also eaten by some fish, such as rainbow trout and Dolly Varden. Young silver salmon feed on detritus, algae, and plankton. Other kinds of fish, such as red, pink, and king salmon fry, feed on detritus-eating animals. Since most salmon fry spend one to three years in fresh water before migrating out to sea, their survival depends on detritus in our streams.

Other wildlife that depend on this aquatic food chain include river otters, mink, brown bears, water shrews, spotted sandpipers, yellowlegs, bald eagles, ospreys, and kingfishers. Although these animals live mainly on land, they need the food resources of rivers and lakes in order to survive.

Algae are the most common lake and river plants. Pondweeds are found in the slower sections of rivers, throughout ponds, and along the shallower portions of lakes. Marshes are characterized by soft-stemmed plants: grasses, sedges, and rushes. Cattails are common in Interior Alaska. Beavers create a lot of marsh habitat as they dam up streams and sloughs.

Rivers, lakes, and the surrounding marshes have been used as important sources of food throughout human history. Villages are traditionally located along river banks or lake shores. Today, as they always have been, rivers and lakes are vital avenues of transportation, for boats and floatplanes in the summer, and for dog teams, snowmobiles, and ski-planes in the winter. Commercial, sport, and subsistence fishing depends on the salmon runs up Alaska's network of mighty rivers and lakes. These wetland areas support a tourist industry as well; people travel from all over the world to photograph, fish, hunt, and observe wildlife.

(This description is based on Sue Quinlan's Water, Wetlands, and Wildlife, p. 9.)
Muskeg is another word for bog. It is a type of freshwater wetland that occurs below tree line on low-lying lands in Alaska. Lakes and ponds are scattered throughout the muskeg.

Common muskeg plants include sphagnum moss, blueberries, cranberries, willows, Labrador tea, sundews, dwarf birch, and small trees like black spruce in Interior Alaska, mountain hemlock in south-coastal Alaska, and lodgepole pine in southeast Alaska—all plants that thrive in areas where the ground is covered or filled with water. The muskeg ground is composed of a thick layer of peat (decayed plants, primarily sphagnum moss), which in some places may be 40 or more feet thick. Peat soaks up water, so walking on muskeg in summer has a spongy quality.

Millions of ducks, especially northern pintails, American wigeon, lesser scaup, surf scoters, and white-winged scoters nest in and near the muskeg of the Yukon Flats, Minto Flats, and Tetlin. These areas are among the most important duck-breeding areas in North America. During years when the prairie potholes are dry, even more ducks than usual arrive from Canada and the northcentral United States.

Many Canada and greater white-fronted geese, as well as loons, grebes, and mergansers make their nests on muskeg lakes. Sandhill cranes dance their courtship displays and raise their young on muskeg wetlands, too.

Muskeg wetlands provide habitat for black bears, moose, muskrat, mink, beaver, red fox, marten, wolves, coyotes, and deer. People go to these areas to pick berries, fish, hunt, trap, and to observe and photograph wildlife.

(Again this description is based on Sue Quinlan's Water, Wetlands, and Wildlife, p. 6.)
Worksheet 6G
Other Bird Habitats

Birds are found everywhere. Discuss with students the fact that different birds prefer different habitats—just like people. Some people like Interior Alaska best, other people like coastal Alaska, and others like the lower 48 states, Hawaii, or foreign countries. Similarly, some birds live deep in the forest, others are found only high in the mountain tundra, and others live on cliffs. Although we have emphasized wetlands habitat in this book, both because wetlands make up the bulk of Alaska and because wildlife tends to be heavily concentrated in wetlands, students who want to look for woodpeckers will have to look in the woods, and those who want to see wheatears will have to go up into the dry mountain tundra where wheatears build their nests.

Wildlife tends to be most abundant on the border between two types of habitat—where the forest touches the edge of a marsh, for example. At the junction you will find birds and animals from both types of habitat. This is known as the "edge effect," and is a good concept to introduce to students.
Worksheet 6H
Habitat Choice

This activity provides students a chance to do some writing on their own, and to review what is covered in this unit.

Additional Activities:

1. **Art, Science, Language Arts:** Divide class into small groups to investigate wetland habitat types. Make murals of local wetland types, labeling cover (shelter or nesting site), food and water. Use string to connect the food with the organisms that eat it. Draw the sun, which provides energy to plants.

2. **Language Arts, Science:** Draw a chart on the board comparing two different wetlands—wet tundra vs. muskeg; estuary vs. freshwater marsh; and so on.

3. **Physical Education, Science:** Eagles eat fish, and fish eat insects. Let students choose to be insects, fish, or eagles. On a signal from the teacher, the eagles try to tag the fish, while the fish try to tag the insects. If an eagle catches a fish, the fish turns into another eagle, and if the fish catches an insect, the insect turns into a fish. After a few moments, stop the play. Any of the original eagles who have not caught a fish die and fall into the stream, where they are eaten by the insects; in the next round of play, they turn into insects. Start game up again.

What happened? If you started with lots of eagles, were they all able to get enough food? Have the students reassign themselves in a way that will result in having some of each creature at the end of the game. They should discover that there needs to be a lot of insects, some fish, and a very few eagles. Not only do the eagles need the fish, but the fish also need the eagles. If there weren't any eagles to control the fish population, the fish would wipe out their food source (the insects), and starve. Similarly, without fish to keep their numbers in check, the insects would overpopulate and wipe out all the plants that make up their food source. Discuss how this game reflects the situation in the real world. What are the game's shortcomings?
4. **Language Arts, Art, Science:**
   Have students each choose a bird they would like to have live in their area. Have them list the habitat needs of that bird (refer to student bird guide). From this list have them write an ad for the newspaper or make a poster advertising their neighborhood or village as a prime site for a home-hunting bird.

5. **Physical Education, Science:**
   You’ll need blindfolds, chalkboard, chalk, string, a sign that says "predator," and a sign that says "prey." Ask the class to name some regional predators and their prey. Write these pairs on the blackboard. Have two volunteers play the role of one of these pairs. Each person must wear the appropriate predator or prey sign. Clear a large space in the middle of the room. Blindfold the student who is acting as prey and place her some distance from the predator. Have the predator try to approach its prey stealthily. If the prey senses the approaching predator, she should point in his direction. If the predator is thus "spotted," the game ends and a new pair is chosen. A variation of this game would be to place the blindfold on the predator, spin her around, and tell her to locate the rabbit (hare) who must remain in place (although she may make squeaky, scratchy rabbit (hare) noises if she wishes.)

   A particularly rousing and uproarious version of the game follows: clear a large space in the middle of the room. Have the students form a large circle. In the middle of the circle place a blindfolded predator and a blindfolded prey. Gently spin each around. The predator will then begin to stalk the prey. The predator must occasionally make hungry noises (growls and lip smacking) and the prey must also make appropriate animal noises from time to time. These auditory cues will help them alternatively approach and avoid each other. After four or five pairs of students have played the predator-prey game, interest will be high for a class discussion concerning the qualities of successful predators (especially quick reflexes, good hearing and smell, overall physical strength). Also discuss ways in which prey protect themselves (speed, immobility, protective coloration, offensive odors). (Described by Barb Tervo, Selawik Elementary School, Selawik.)

6. **Language Arts:**
   Have students try to find as many names as possible for wetland habitats and define these names. Their list should include:

   Freshwater wetlands--marsh, swamp, bog, muskeg, pond, lake, river, stream, creek, brook, island, mudflat, point, peninsula.

   Saltwater wetland--tideland, reef, island, cove, inlet, bay, point, estuary, salt marsh, peninsula, lagoon, slough.
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.
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.

Look in your field guides in the back of this book for help in locating 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.

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:

1. What happens when birds are disturbed in the nest? (Eggs might get cold and die or predators might eat the eggs.)
2. How many times do birds nest every year? (Most birds nest just once.)
3. 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. Draw these boxes, write the name of a bird that might nest in each place. Can you add more numbers to the picture or place a bird in each place? Answers will vary.
1. ducks, terns
2. crane, snake
3. heron
4. mist, gull, jaeger, sand piper
5. osprey, night heron, prairie falcon, sparrow

Give: 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 or place a bird in each place. Answers will vary.
1. sand piper, great blue heron, cran
2. scoter
3. great gray owl
4. merganser, flycatchers
5. kestrel, raven

Give: Use your field guide.
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 Arts, 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.

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Dragonflies Taking Toll on Mosquitoes --Independent Press Service

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

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.
**Wetland Plants Game**

**Insects**

Many insects have adapted to wetland life.

**Wetland Plants Game**

Many insects are not native to wetlands. However, there are many species of insects that do live in wetlands. The wetlands provide a habitat for many different types of insects. Some of these insects include dragonflies, damselflies, and caddisflies. Dragonflies and damselflies are both types of insects that live in and around wetlands. Caddisflies are insects that live in streams and rivers. They are often called "water bugs" because they spend most of their lives in water.

**Shoreline Plants**

Shoreline plants are important for providing habitat for many different types of insects. Some of the most common shoreline plants include cattails, rushes, and reeds. These plants provide a habitat for many different types of insects, including dragonflies, damselflies, and caddisflies. They also provide a food source for many different types of insects, including dragonflies, damselflies, and caddisflies.

**Floating Plants**

Floating plants are important for providing habitat for many different types of insects. Some of the most common floating plants include water lilies, water lettuce, and water hyacinth. These plants provide a habitat for many different types of insects, including dragonflies, damselflies, and caddisflies. They also provide a food source for many different types of insects, including dragonflies, damselflies, and caddisflies.

**Wetland Animals**

Wetlands provide habitat for many different types of animals. Some of the most common wetland animals include ducks, geese, and cranes. These animals use the wetlands as a place to rest and feed. They also use the wetlands as a place to raise their young. Ducks, geese, and cranes are all important parts of the wetland ecosystem. They provide food for many different types of insects and other animals. They also help to keep the wetlands clean by eating dead leaves and other material.

**Wetland Ducks**

Wetland ducks are an important part of the wetland ecosystem. They use the wetlands as a place to rest and feed. They also use the wetlands as a place to raise their young. Ducks are important for keeping the wetlands clean by eating dead leaves and other material. They also provide food for many different types of insects and other animals.

**Wetland Geese**

Wetland geese are an important part of the wetland ecosystem. They use the wetlands as a place to rest and feed. They also use the wetlands as a place to raise their young. Geese are important for keeping the wetlands clean by eating dead leaves and other material. They also provide food for many different types of insects and other animals.

**Wetland Cranes**

Wetland cranes are an important part of the wetland ecosystem. They use the wetlands as a place to rest and feed. They also use the wetlands as a place to raise their young. Cranes are important for keeping the wetlands clean by eating dead leaves and other material. They also provide food for many different types of insects and other animals.
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.)
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 weekends. 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?

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**Wetlands Checklist**

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

- [ ] ptarmigan
- [ ] moose
- [ ] red fox
- [ ] harlequin duck
- [ ] bald eagle
- [ ] spotted sandpiper
- [ ] common loon
- [ ] moose
- [ ] meadowlark
- [ ] ptarmigan
- [ ] campion
- [ ] crow
- [ ] duck
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

Index:

Worksheet 10 A - Birds and People ......................... 56
Worksheet 10 B - Habitat and Protection For Wild Birds ... 57
Worksheet 10 C - Problems of Spring Birds .................... 57
Worksheet 10 D - Seabird Conservation ......................... 58

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 Vardaman'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.

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-
Students 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 (murrels, 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 agencies cannot take care of each wild bird. The way farmers can help save a wild bird is by planting food crops in the spring or fall. Occasionally, they might plant a few acres of small grain or other crops on their farms. This helps the birds find food, but many would still be left. This is why it is important to know the areas where birds are likely to be found. It is also important to know the type of food that is available to birds in your area.

- put out bird seed, nurseries
- plant flowers, shrubs, or trees
- water birds
- build nest boxes
- provide water or food for birds

To find out more about the birds in your area, you can check with local wildlife agencies or organizations. They can provide information on the species of birds that are found in your area, as well as how you can help protect them.

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 Sauer's Seabirds with color illustrations and Duff Wehle's Seabirds of Alaska Teaching Guide (see bibliography). 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.

Worksheet 10 D

Seabird Conservation

The world's great oceans and seas are home to many seabirds. They breed in large colonies on rocky cliffs and islands. The term "seabird" includes a wide variety of marine birds with the ability to fly. Seabirds use their nests and other breeding sites on land. Look at these pictures of seabirds. What do they look like? How are they important?

Answers vary

All have useful feet or claws.

Alaska is one of the most important places in the world for seabirds. They use it to feed their young. Many of them gather in large colonies on rocky cliffs and islands.

The term "seabird" includes a wide variety of marine birds with the ability to fly. Seabirds use their nests and other breeding sites on land. Look at these pictures of seabirds. What do they look like? How are they important?

Answers vary

All have useful feet or claws.

Alaska is one of the most important places in the world for seabirds because of its climate, food, and nesting sites. Many seabirds are affected by oil spills, pesticides, pollution, and loss of habitat. Some species are at risk of extinction because of habitat loss. Pigeons and other seabirds are at risk of extinction because of habitat loss. Pigeons and other seabirds are at risk of extinction because of habitat loss.

The human impact of oil spills in the Arctic is to affect the seabirds. They feed on fish and other marine animals. These animals are affected by oil spills, pollution, and loss of habitat. Pigeons and other seabirds are at risk of extinction because of habitat loss.

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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 (murres) 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:

$$1.2 \times 0.15 \times 130 \times 50,000,000 = \boxed{\text{pounds}}$$

$$0.54 \times 0.15 \times 130 \times 50,000,000 = \boxed{\text{kilograms}}$$

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.  

<table>
<thead>
<tr>
<th>Selected Alaskan Sea Bird Species</th>
<th>Approximate Average Body Weight</th>
<th>Alaska Population*</th>
<th>Major Foods Eaten</th>
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<tr>
<td></td>
<td>Pounds</td>
<td>Kilograms</td>
<td></td>
</tr>
<tr>
<td>Northern Fulmar</td>
<td>1.3</td>
<td>0.6</td>
<td>2,000,000</td>
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<tr>
<td>Fork-tailed Storm-Petrel</td>
<td>0.13</td>
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<td>5,000,000</td>
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<tr>
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<td>0.06</td>
<td>4,000,000</td>
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<tr>
<td>Double-crested Cormorant</td>
<td>2.4</td>
<td>1.5</td>
<td>7,000</td>
</tr>
<tr>
<td>Red-faced Cormorant</td>
<td>1.4</td>
<td>1.8</td>
<td>90,000</td>
</tr>
<tr>
<td>Pelagic Cormorant</td>
<td>3.3</td>
<td>1.5</td>
<td>130,000</td>
</tr>
<tr>
<td>Black-legged Kittiwake</td>
<td>0.9</td>
<td>0.4</td>
<td>2,500,000</td>
</tr>
<tr>
<td>Red-legged Kittiwake</td>
<td>0.9</td>
<td>0.4</td>
<td>250,000</td>
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<tr>
<td>Arctic Tern</td>
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<td>0.1</td>
<td>10,000</td>
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<td>Common Murre</td>
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<td>Thick-billed Murre</td>
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<td>Pigeon Guillemot</td>
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<td>200,000</td>
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<td>Ancient Murrelet</td>
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<td>0.2</td>
<td>400,000</td>
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<td>0.1</td>
<td>600,000</td>
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<td>Parakeet Auklet</td>
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<td>0.2</td>
<td>800,000</td>
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<td>Crested Auklet</td>
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<td>0.2</td>
<td>2,000,000</td>
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<td>6,000,000</td>
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<td>Whiskered Auklet</td>
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<td>20,000</td>
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<td>0.5</td>
<td>30,000</td>
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<td>Tufted Puffin</td>
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</table>


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 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.
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 beluga 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 tracing 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?
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?
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

---

Need some help?
Try these words:

- predators
- conservation
- marsh
- aquatic
- food
- wetlands
- extinction
- feathers
- camouflage
- ornithologist

1. Birds need habitats that have ____________: cover and water.
2. Most young birds have cover for the winter. This is called ____________.
3. **Migration** are important resting, feeding and nesting grounds for many North American birds.
4. A bird is "endangered" if its numbers become too small.
5. Birds are the only animals in the world that have _____________.
6. Energy goes from plants to animals through that is called the _____________.
7. **Mammals**, **fish**, and other birds that kill birds and animals for food are called _____________.
8. A bird that is helpless when hatched is an _____________.
9. A bird that can walk or run and find its own food a few hours after hatching is a _____________.
10. Birds that blend in with their habitats are _____________.
11. Southern birds often nest in large colonies on islands and along every state of the coast.
12. Birds give us pleasure as we listen to their music or watch them fly about. People also raise birds for many practical purposes as well -- our crops _____________.
13. The protection and wise use of our resources is called _____________.
14. **Wetlands** are areas where water is not deep for long periods of time and can be covered by water at high tide.

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**Worksheet 12A**
Bubble Bird

---

**Worksheet 12B**
Bird Watcher’s Special

---

**Worksheet 12C**
Wetlands Magic
Bird Watcher's Special

Directions: Answer the questions.

1. Did this flight feather come from the bird's right or left wing? Right

2. How do birds fly with flat forward like rowing, why push our down and back. Your wings create an upward and outward force. Make a list that indicates what does it get.

3. What are the hazards a bird might meet during migration?
   - snow
   - airplanes
   - fog

4. Name their friends:
   - swimming
   - fishing
   - quill
   - mallard
   - tufted puffin

5. Graze
   - peregrine
   - hogs
   - geese
   - mallard
   - quail

6. Draw a rich cartoon that shows how wetlands are important to birds.

Wetlands Magic

Directions: Select from the numbered descriptions the best answer for each of the wetland terms. Put the number in the square square in the white outlined box. The total of the numbers will be the same across each row of each column.

<table>
<thead>
<tr>
<th>A.</th>
<th>B.</th>
<th>C.</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
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<td>4.</td>
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<td>7.</td>
<td>8.</td>
<td>9.</td>
</tr>
<tr>
<td>10.</td>
<td>11.</td>
<td>12.</td>
</tr>
</tbody>
</table>

Wetland Terms

- A. Marsh
- B. Salt marsh
- C. River
- D. Coastal wetland
- E. Estuary
- F. River
- G. Tidal
- H. Tidal wetland
- I. Salt marsh
- J. Salt marsh

THE MAGIC NUMBER IS 11.
Bibliography

Compiled by Peggy Cowan, Belle Mickelson, Mary Lou King, Nancy Barr, and Dr. Earl Clark, associate professor, University of Alaska, Juneau, and his students Joyce M. Roloff, Linda Edmondson, Patricia Muchnick, Dan Penrose, Chris Winter, and Tom Castagnola.

Selections from the following annotated bibliographies are included in this volume. Consult these excellent sources for additional suggestions for Sea Week books.


A List of Books on the Marine Environment for Children and for Young People. Project Coast, 310 Willard Hall Education Building, University of Delaware, Newark, Del. 1971.


Children's Literature:


Description of an estuary, plant and animal inhabitants and their interactions.


An introduction to the birds of the world and their characteristics and behavior. Includes birds of the tropics, sea and shore, river, marsh, woods, fields and town—with gorgeous color illustrations.


Group names and the behavior and habitats of six different wild animals. Simple straightforward text; illustrations in greys and greens.


Whimsical verse and beautiful watercolor bird illustrations.


Small-format photographs, simple text.


Excellent booklet on ecological principles, illustrated cartoon-style.


Explains life cycle of frogs and toads and describes categories. Photos.


The drama of a year in the life of two Antarctic penguins; scientifically accurate text and illustrations.


Various worldwide bird species in their habitats. Attractive full-color illustrations.


Explains how bogs, marshes and swamps develop. Biology presented in simple, straightforward manner.


Over 60 accounts of familiar species.

Sea lore and close-up of beach plants, animals, and food chain; the story is about a day in the life of a gull.


Twenty-one days of egg incubation chronicled in photographs.


A Junior Science Book that tells about the courtship, mating patterns and life cycle of Canada geese through a factual account of the author's experiences with the geese that lived at his pond for six weeks. Stresses the need for conservation. Black and white photos.


The saga of Greenhead, a male mallard, explores duck migration, natural enemies, and how man has upset the balance of nature. The text contains 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. Detailed descriptions of the island where Louis Darling set up his tent, courtship rituals, nest building, and parent-chick relationships. Black and white and color photographs, and charcoal and pen drawings.


Abundant life forms and ecology of a salt marsh are clearly and interestingly described.

Downs, Barbara. *Alaskan Birds Coloring Book.* Arctic Audubon Society, P.O. Box 82098, College, AK 99708.

Full-page illustrations with brief text at the bottom of each page. Covers 31 Alaskan species; coloring guide in back.


Lively account of behavior and characteristics of gulls. Describes about 40 varieties. Excellent discussion of instincts. Black and white photos.
A young girl observes a junco that comes to her feeder.

Contains information about many ducks found in Alaska.

Classic story about a duck's adventures on the Yangtze River.

Simple explanation of bird flight.

Follows the leader of a flock of snow geese from the Sacramento Valley to and from Alaska. Describes the passing of the seasons and various dangers encountered by the geese during their migration: hunters, oil slicks and blizzards. Pictures are charcoal black and white.

Rhythm of the changing seasons and its effect on the marsh inhabitants.

A Let's Read and Find Out Science Book about bird behavior.

A Let's Read and Find Out Science Book that describes birds' sleeping habits and how eyes, feet and feathers protect them at night.

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

Informative book about a boy who comes into manhood when his father's gull research is called on to avert a catastrophe.

Young dancer from New York City and her cousin in Wyoming set off to find out where the cutthroat trout, which she caught, spawned. They take a bottom sample to discover what the fish are eating and watch the mayfly dance and breed.


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. Color illustrations.


A gentle reminder that birds can become extinct. Humorous illustrations.


Delightful book on storm petrels, auks, kittiwakes and puffins--mating and survival.


Story of a duck captured by a farm boy, told in a charming but not maudlin manner.


Author's travels through British Columbia. Covers eagles, their nesting grounds and habits, and other animals (puffin, sea lion and killer whale) in their environment. Discusses problems to habitat caused by pesticides, herbicides, and human disturbance.


Highly recommended 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.


Albatross is blown inland by a storm and has trouble finding way back.
<table>
<thead>
<tr>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Pages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elisabeth and the Marsh Mystery</td>
<td>Holman, Felice</td>
<td>Macmillan Publishing Co.</td>
<td>49</td>
<td>A well-told, informative story. Children try to identify strange calls from the marsh and learn about bird migration.</td>
</tr>
<tr>
<td>Biography of a Snowy Owl</td>
<td>Hopf, Alice Lightner</td>
<td>G.P. Putnam's Sons, New York</td>
<td>62</td>
<td>Traces the life cycle of the owl in its arctic tundra habitat.</td>
</tr>
<tr>
<td>Sandpipers</td>
<td>Hurd, Edith Thatcher</td>
<td>Thomas Crowell Co.</td>
<td>34</td>
<td>Chronicles the migration, mating and nesting in lyrical, sensitive language. Provides a wealth of information on the heron life cycle and habits. Woodcut illustrations.</td>
</tr>
<tr>
<td>The Last Trumpeters</td>
<td>Hutchins, Ross E.</td>
<td>Rand McNally and Co.</td>
<td>64</td>
<td>Portrays the migration of the trumpeter swan from North Carolina, California, the Mississippi Valley and Gulf Coast to and from the Arctic Ocean. Details of nest building, preening, egg laying, rearing of young. Beautiful pastel watercolors with ink.</td>
</tr>
<tr>
<td>Animal Travelers</td>
<td>Kaufman, John</td>
<td>Greenwillow Books, New York</td>
<td>55</td>
<td>Describes in simple language the migration of gray whales, as well as caribou, barn swallows and painted lady butterflies.</td>
</tr>
<tr>
<td>Honker: The Story of a Wild Goose</td>
<td>McClung, Robert M.</td>
<td>William Morrow and Co.</td>
<td>64</td>
<td>Covers one year in the life of Honker, the leader of a flock of Canada geese; stresses the importance of refuges, banding and tracking. Illustrations are black and white and charcoal.</td>
</tr>
<tr>
<td>Beaver Moon</td>
<td>Mites, Miska</td>
<td>Little, Brown and Company, Boston, Toronto</td>
<td>31</td>
<td>Survival is the theme of this story of an old beaver's flight from his former lodge. Pond community including bobcat, bear and muskrat also introduced.</td>
</tr>
</tbody>
</table>

Brief descriptive text followed by clear and outstanding close-up photos.


Engaging picture book humorously tells story of a dog's encounters with birds such as the blue heron, pelican and albatross. Factual information is blended with fantasy. Detailed ink illustrations.


Pamphlet with tips for bird watching; lots of color pictures.


Line drawings and brief descriptions of 262 common North American birds. Inside covers have small color illustrations of each bird.


Drama of a food web--the importance of pond flora is featured as a frog journeys through a pond and is eventually eaten by a pickerel, which is in turn consumed by a heron.


Delightful, informative book about the puffin's life.


Pamphlet with color photos and text.

City boy learns about the wilderness, cranes, and himself during a summer with his aunt in northern Michigan, spent trying to get pictures of nesting cranes.


Close attention is given each aspect of goose life: 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. Black and white photos.


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


Describes estuaries, fish, birds and animals that depend on them for life. Photos.


Poetic prose portrays some of America's wetlands. Carefully written and well designed.


Full-page illustrations of wide range of bird life face pages of biological data and information in outline form.


Message is to save our environment. Beautiful watercolors illustrate this fictional picture book.


Enchanting picture book account of Tsimshian Indian legend of how the loon received a collar and speckles on its back by helping a blind man.

Picture book following the journey of a raindrop to the sea.


Simple, poetic description of construction of beaver pond and interdependence of animals.


A good old-fashioned story about a Quaker boy and a seagull.


Colorfully and attractively illustrated introduction to bird life and habits. Good, simple biological overview.


Lots of good information and watercolor illustrations.


Story of a swan family. Large print, with beautiful watercolors.


Wood ducks are not found in Alaska, but this book will help students conceptualize the duck's environment and natural enemies. Bright, cheerful watercolors by author.


Story of summers in the 1930s on a Wisconsin lake shore. Shares nature lore, craft ideas and joys of childhood on a lake.


A photographic essay on the hatching and growth of a seagull.
Teacher's Reference:


Helpful pamphlets at no cost.

Alaska Wildlife Notebook Series. Alaska Department of Fish and Game, P.O. Box 3-2000, Juneau, AK 99802.

Excellent descriptions of Alaskan animals. Includes feeding habits, range, life histories. Illustrated with line drawings.


Stresses ecological relationships. Has many color photos and fine line drawings. One of the Our Living World of Nature series developed in cooperation with The World Book Encyclopedia.


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


Species descriptions and range information on Alaskan birds. Color photographs. Indispensable for bird watching in Alaska.


Overview of ponds. Describes the living community patterns. Clear, brief definitions and explanations.


Natural history of major groups of water and marsh birds.

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.


Republication of classic 1921 work of bird lore, presenting species by species observational data on breeding, range, life cycle and habits. Also see others in Life History series.


Excellent photos and text in picture book format, based on television series Wild, Wild World of Animals.


Excellent descriptions, pictures, and range maps of mammal species found north of Mexico. One of the Peterson Field Guide Series.


Pocket field guide containing line drawings and some color photographs of a wide range of herbaceous Alaskan plants. Text provides descriptions, habitat, range and information on preparation of edible species.


Photographs and text describe pondlife and how to prepare it as food. Helpful hints on where to find species.


Comprehensive treatment of physical characteristics and behavior of each species. Full-color illustrations, gazetteer and bibliography.


Nests of birds, mammals, insects, fish, reptiles and amphibians.

Handy identification guide, organized by color; photos of each flower.


Good treatment of varied topics. 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).


Handy field identification guide. Good color illustrations.


Natural history, descriptions, range maps, photos and drawings.


Describes various types of wetlands and their importance nationally. Many photographs and drawings.


The standard comprehensive flora, with technical descriptions of Alaska plants. Line drawings and range maps make it usable by non-scientists.


Scientific information and interesting tales and superstitions about flowerless plants in the plant kingdom.


All genera and species of the world’s waterfowl are pictured and described, including those that have become extinct.


Arranged chronologically by when they blossom; information on 100 common wildflowers, primarily of eastern U.S. Lovely color illustrations.


Excellent descriptions and line drawings of a wide variety of wetland plants and animals.


Description of wetland status nationally.


Pamphlet answers many questions about migration.


Detailed descriptions of Alaskan freshwater fish. Line drawings. Also available is a shorter version by the same author: *Illustrated Keys to the Freshwater Fishes of Alaska*, 78 p. Same publisher.


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


Describes tracks and other animal signs. Many of the fascinating stories happen in Alaska. Illustrated by line drawings. One of the Petersen Field Guide Series.

The monthly magazine of the National Audubon Society. Many articles on birds and wetlands, together with gorgeous photographs and news of conservation interest.


One of the best field guides, with range maps, species descriptions and color illustrations.


The bimonthly magazine of the National Wildlife Federation. Many articles on birds and wetlands, with photos and news of conservation interest. NWF also publishes International Wildlife, Ranger Rick and Your Big Backyard.


Line drawings of many different invertebrates; instructions for making sampling equipment.


Emphasizes ecological relationships. Color photos and line drawings. One of the Our Living World of Nature Series developed in cooperation with The World Book Encyclopedia.


Storehouse of information about invertebrates; photos and line drawings.


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


Illustrations and descriptions by habitat, i.e., woods, fields, wetlands, sandy soil. Full-color illustrations of each flower on the cover as a model for student coloring.

Describes estuary's physical characteristics, its flora and fauna.


Begins with swans spending the summer in Alaska, then migrating south to the Pacific coast, Mississippi River Valley and Atlantic Coast, and 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.


Encyclopedic reference, prepared in cooperation with Chicago Natural History Museum. Detailed illustrations.


Introduction to principles of aquatic ecology.


Detailed information on diving birds, and characteristics of the loons, grebes, cormorants and anhingas. 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 with color drawings. Easy to use in the field but background information is limited.


Little pamphlet that explains the importance of estuaries.


Excellent color pictures of ocean birds such as penguins, gulls, and pelicans; maps and descriptions.

Famous American bird artist captures the subtle beauty of the north with colorplate illustrations and narrative.


Tells the past and present of east coast marshes in a novel-like style. Good background on the importance of wetlands and their ecology.


Classic, fascinating study of all aspects of herring gull behavior.


Descriptions of seabirds commonly seen on various ocean voyages together with a few black and white line drawings. Combines world geography and birds for armchair travelers—or student report writing!


Photo-illustrated pamphlet that describes the permit process.


Story of the author's exciting attempt to see 700 birds in one year. Includes several chapters on Alaska birding.


Good explanation of marshes and the impact of human activity, with a detailed explanation of creatures and features of salt marshes of the southeastern United States.


Field guide to Alaska's most common flowers. Brief descriptions including habitat and range accompanied by color photograph of each species.
Game:


Board game for two to four players with 54 North American waterfowl on cards. Average playing time seven to ten minutes. Handicap system so that beginners can compete with experts. A birds and mammals card set is available that can be used with the same board.

Records:


Voices of the forest, marsh, and lake through a summer's day from dawn to dusk in Algonquin Provincial Park, Ontario, Canada.


Curricula:


A variety of activities and experiments. Illustrated with fine line drawings.


A variety of activities and experiments illustrated with fine line drawings.


Activities on classification, adaptation, behavior, identification, predator-prey relationships, and birds and humans for K-8 students.


Activities on swamps, bogs and marshes. Written for mid-upper elementary students and illustrated with fine line drawings. Includes packets of worksheets and task cards. Two succeeding volumes with the same title cover junior high and high school students.

Excellent activities, wildlife cards, worksheets, resources, teaching guide and filmstrip; for K-12 students.


Excellent discussion of bird characteristics, bird groups, watching birds, how to attract them, and migration. Many educational activities are suggested in connection with these topics.


Activities on migration, camouflage, adaptation, bird watching—with plans for a field trip and a game. Student worksheets and answers are included.


A collection of materials including a slide show and script on waterfowl common to interior Alaska. Includes information on Native uses of birds.

Your Bird List

There are more birds in the world than there are people. Birds live everywhere that people do and almost everywhere that people go—from the center of cities to the wilderness, high in the mountains and far out at sea (but not on the moon). There are almost always birds around; that is why everyone knows quite a lot about them. As you go through this book, you may be surprised to find out how much you and your classmates already know about birds. As you share your knowledge with each other, you will all learn something new.

Make a list of the birds you already know by filling in the following table. Do only the first three columns now.

Column 1 List wild birds you have seen in your area. Then add birds you have seen while visiting other places. Finish your list with wild birds you have seen in picture books or magazines, on TV, in zoos, or anywhere else.

Column 2 Does this bird live in your area? Write yes or no for each bird.

Column 3 Determine the size of each of your birds and write the letter in this column.

- **S** = Robin size or smaller
- **M** = Duck size (medium)
- **L** = Goose size (large)
- **VL** = Eagle size (very large)

Clue: If you are not sure of the size, look in your field guide. If the bird is not in the guide, consult your teacher or classmates.
# List of Birds You Know

<table>
<thead>
<tr>
<th>Name of Bird</th>
<th>Field guide name or local name if different</th>
<th>People Uses</th>
<th>OK to hunt?</th>
<th>Size</th>
<th>Bill</th>
<th>Feet</th>
<th>Where you have seen it</th>
<th>Yes/No</th>
<th>Yes/No</th>
<th>Your area?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Class Bird List

Your class may wish to make a class bird list by combining individual lists. One person writes on the chalkboard. Each student in turn names one of the birds on his or her list. All those who have this bird on their lists should raise their hands. The total number of hands is written next to the bird's name. Keep going around the room until all the bird names from everyone's list are on the board. When the list is complete, fill in the questions below.

1. How many birds are on your own list? ________________

2. How many birds are on the class list? ________________

3. Which birds were on the most lists?

   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________
   ____________________________  ____________________________

4. Which bird is your favorite? ____________________________

   Why? ____________________________________________
   ____________________________________________

5. Draw a picture of your favorite bird.
Use Your Field Guide

Part of the pleasure of "birding" is learning the names of birds in your area. Field guides to birds are books written to help you identify wild birds. They have drawings or photographs, hints to help you tell similar birds apart, and other information. They generally have checklists that you can use to keep track of all the birds you see. Use your Student Field Guide. It lists 100 of Alaska's most common birds. Some are in your area.

1. What is the name of the first bird in your field guide?

2. Identify these birds. If you do not already know their names, look them up in your field guide. Write their names under their pictures. Do the same for all the bird pictures you come across on these worksheets.

3. Check your field guide to see if you are correct.

4. The birds in your Alaskan field guide are split into six major groups. Write two examples of each group. Your field guide can help.

SWIMMING BIRDS - birds with duck-shaped bodies and webbed feet, usually seen swimming.

Examples: __________________________

BIRDS OF PREY - birds with grasping, sharp-taloned feet and sharp hooked beaks for catching and tearing animal foods.

Examples: __________________________
GROUSE AND PTARMIGAN - plump, chicken-like birds with short, stout bills and short legs; they don't swim, are usually seen on the ground or low in trees, and fly only a short distance when startled.

Examples:____________________  ____________________

WADERS - birds with long legs, often seen foraging in open habitats along shorelines or on the tundra. Some shorebirds can be recognized by their flocking behavior.

Examples:____________________  ____________________

GULL-LIKE BIRDS - birds usually seen near water, often in flight—but some nest on the tundra far from water. Most of these birds have pointed wings. Tail shape is important for identification.

Examples:____________________  ____________________

PERCHING BIRDS - a large group including sparrows, warblers, jays, woodpeckers, and other birds that commonly perch in trees or on shrubs or rocks.

Examples:____________________  ____________________

5. Find these birds in the field guide. Write the name of the group each bird is in on the line below the bird's picture.

a.____________________  h.__________________

c.____________________  d.__________________
A glossary will help you find answers you don't know, and tell you what some of the words used in this book mean. Turn to the glossary and find the definition for ACCIDENTALS.

a. How many kinds of birds are regularly found in Alaska? ____

b. How many accidentals? ____

c. How many birds in total? ____
What is a Bird?

Birds are different from other groups of animals. How?

1. Is it because birds can fly? Yes _____ No _____
   Can other animals fly? Yes _____ No _____
   What animals?

2. Is it because birds can build nests? Yes _____ No _____
   Can any other animals build a nest? Yes _____ No _____
   What animals?

3. Is it because birds lay eggs? Yes _____ No _____
   Can any other animals lay eggs? Yes _____ No _____
   What animals?

4. Is it because birds have feathers? Yes _____ No _____
   Do other animals have feathers? Yes _____ No _____
   What animals?

BIRDS ARE THE ONLY ANIMALS THAT HAVE FEATHERS!
5. How many kinds of feathers are there? __________________

6. What kind of feather does a bird use for
   a. underwear: __________________
   b. flying: __________________
   c. topcoat: __________________
   d. steering: __________________

7. Which of these feathers would you put in a sleeping bag? __________________

8. Which kind of feather would make a pen? __________________

9. How can you tell a wing feather? __________________

10. How can you tell a tail feather? __________________
Flight feathers and tail feathers have a shaft and a web. The web is held together by tiny barbs. Try pulling the web apart; then hook it back together by running it through your fingers (like opening and closing a zipper). Look at the barbs through a magnifying glass. Birds keep their feathers in good order (zipped up) by preening with their bill. Most birds have an oil gland just above the tail. By oiling their bills and then preening, they keep their feathers waterproof. When you are outside, look for a bird preening its feathers.

11. Have you ever wondered how many feathers a bird has?

A hummingbird has about 1,000 feathers.

A chicken has about eight times as many feathers as a hummingbird.

A swan has about 25 times as many feathers as a hummingbird.

Fill in the chart below.

<table>
<thead>
<tr>
<th>BIRD</th>
<th>ESTIMATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hummingbird</td>
<td>1,000</td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
</tr>
<tr>
<td>Swan</td>
<td></td>
</tr>
</tbody>
</table>

12. INTERESTING FACT: Most birds have a body temperature of 108° to 112°F.

a. What is your body temperature? __________

b. Is this warmer or cooler than a bird's? __________

c. How is a bird able to stay so warm? __________
Make a Feather Pen

In the past, people used feathers to make writing pens. These were called quill pens, and they were filled by dipping the sharpened tip into a bottle of ink. To make a quill pen, find a feather with a strong shaft (try looking at the beach or near a pond). You'll also need a sharp knife and a bottle of ink or thin paint. Cut the tip of the shaft at an angle. Then cut a slit in the tip so that the ink will spread when you write with it. Dip the pen into the ink and try writing.

It may be hard to make a quill pen that works well because the angle has to be just right to get the ink to flow evenly. But it is easy to make a fake quill pen using a ballpoint pen filler point. To do this, cut the tip of your feather straight across with a scissors or knife. Push the filler point into the feather with the point sticking out about half an inch. Dab a bit of glue on the filler where it touches the feather.
How Birds Fly

Like airplanes, birds are streamlined and are built of light materials so that they can lift easily in the air. Feathers point backward. Bills are lighter and more streamlined than the heavy jaws of mammals and reptiles. Most bird bones are hollow and filled with air from the bird's lungs. Even the wishbone is hollow. Next time you eat chicken or duck, look at the hollow bones.

Birds move through the air by pulling themselves forward like a person rowing a boat. They push air down and back with the broad side of the wing, then slightly turn and fold the wing to move it forward. Some birds with great, broad wings can soar and glide for long periods without flapping. Other birds have short wings and have to flap fast to stay up. Bird wings and airplane wings have a similar shape. This shape causes an airfoil that provides lift.

![Airplane Wing](Airfoil)

![Bird Wing](Airfoil)

**TRY THIS EXPERIMENT**

Hold a piece of paper like this and blow under it. The force of the wind will push it up.

Now blow across the top of the paper and watch it lift.

The slow moving air under the paper forces the paper up through the fast moving air on top of the paper, creating lift.
1. Name a bird that soars.

2. Name a bird that has to keep flapping hard most of the time.

3. Why do you think there is a difference in the way they fly?
Before a bird lands, it sets its tail and wings against the wind, using them like brakes to slow itself down. Water birds often use their feet like skis to slide along the water as they land. Watch a duck land on the water as it applies "brakes" and slides on its "landing gear."

Have you ever thought that birds and aircraft pilots might have some of the same kinds of problems?

1. List some things that are problems for pilots of small planes.

   ________________________________
   ________________________________
   ________________________________
   ________________________________

2. List some things that are problems for birds in flight.

   ________________________________
   ________________________________
   ________________________________
   ________________________________
3. Circle the things that are problems both for birds in flight and pilots of small planes.
Making a Living

People use their upper limbs--arms and hands--for many purposes, including the basic work of gathering food and building shelter. (What else do we use our hands for?)

People use their lower limbs--legs and feet--mostly to travel, to walk.

Birds' upper limbs are not arms and hands, but wings. Birds use their upper limbs not to hold and build things, but to travel--to fly or, in the case of penguins and some other birds, to swim.

Since birds can't use their upper limbs for grasping and building, they use their feet and bills instead. Birds use their feet to walk, to hold food, to cling onto bark, and to carry nest material. They use their bills for tearing food, for nest building, and for cleaning their feathers. Different types of birds have different needs and have developed specialized feet and bills to serve these needs.

Label the parts of this bird. Choose from these terms: back, belly, bill, breast, chin, crown of head, eye stripe, foot, leg, rump, side, tail, throat, wing bar.

a. b. c. d. e. f. g. h. i. j. k. l. m. n.
Types of Beaks

Different birds have different kinds of bills or beaks to help them obtain

Match the bills with their correct descriptions. The birds listed in parentheses are examples, not a complete list.

1. SHORT STRONG BILL for eating and cracking seeds (sparrows, grosbeaks, waxwings)
2. LONG SPEAR-LIKE BILL for catching fish and other small creatures (herons, cranes, loons, kingfishers)
3. SHARP HOOKED BILL for tearing animal food (eagles, hawks, owls)
4. SLIM BILL and wide mouth for catching insects (swallows, warblers)
5. LONG POINTED BILL for digging little animals out of the mud (sandpipers, snipe)
6. STRONG SLIM BILL for probing for worms or picking up seeds (robin, lark, blackbird)
7. HEAVY POINTED BILL for all-purpose eating: mussels, eggs, and other scavenged food (jays, crows, magpies, some seabirds)
8. WIDE FLAT BILL for eating pond weeds and sifting mud (ducks, swans)
9. WEDGE-SHAPED BILL for eating grass and roots (geese)
10. STOUT HOOKED BILL for catching and tearing fish and scavenged food (gulls and many other seabirds)

Now find Column 4 on worksheet 1A, and write in the bill type for each bird. Check with your field guide.
Even though birds travel mainly by flying, they can also walk. But birds use their feet for many other purposes besides walking.

Match the feet with the correct descriptions of what they are used for and how they look.

1. **SWIMMING**—webbed (ducks, geese)

2. **WADING** in water and soft mud—long straight toes and, usually, long legs (herons, sandpipers)

3. **GRASPING** prey—long talons and curved feet (eagles, owls)

4. **PERCHING** on branches—long curved toes for grasping (thrushes, crows, warblers, sparrows)

5. **SCRATCHING** for food—three strong toes in front and a spur-like toe behind (chickens, grouse, ptarmigan)

Some birds have feet highly specialized for their needs.

6. **GRIPPING TREE BARK**—two toes go forward and two back (woodpeckers)

7. **CLUTCHING ROCKS** while walking under water—long thin toes (dippers)

8. **WALKING ON SNOW**—toes covered with feathers (ptarmigan)

Now turn back to Worksheet 1A and fill in the foot type in Column 5 for each of the birds on your list.
Make a Bird Feeder

Watching birds can be lots of fun—and it is a hobby that may interest you all your life.

People who study birds are called ornithologists (or-ni-thol-o-gists). That's what you are as you fill out these worksheets and study the birds in your community.

One of the best ways to get a close look at small perching birds is to set up a bird feeder. Almost anything will work for a feeder, but a large feeder is likely to attract more birds. You can make or buy an elaborate feeder with a removable tray, glass sides, and a roof, or simply cut out holes in two sides of a milk carton.

Different birds eat different kinds of foods. Chickadees and grosbeaks don't care for mixed birdseed; they prefer 100 percent sunflower seeds. But redpolls will eat mixed seeds.

Woodpeckers, chickadees, ravens, and jays love raw animal fats. Save some fat from your deer, moose, or caribou, or get suet from the grocery store. Hang your fat up in a string bag out of reach of other animals.

If you begin feeding birds in the fall or winter, be sure you continue into the spring, as birds become dependent on their feeders.

Write to the Alaska Department of Fish and Game for their Alaska Wildlife Watcher Reports:

Vol. 1, No. 1 Winter Bird Feeding in Alaska
Vol. 1, No. 2 Landscaping for Wildlife in Alaska
Vol. 1, No. 3 Birdhouses for Alaska.

You may also want to put owl eyes on any large windows near your feeder. Birds often smash into windows and are injured or killed. Owl eyes in the window sometimes warn them. Color the large circles yellow, then cut out your owl eyes and put them near the center top of your window with scotch tape.
You need to have sharp eyes to be an ornithologist. You need to walk quietly and be alert to movement and sounds. It is useful to carry binoculars to magnify the birds so that you can see the details that help you identify them. Spotting scopes, which magnify the birds even more, are heavier to carry but are very useful for looking at birds on open water or in fields. Here are some FIELD MARKS to look for, and a bird picture to practice on. Look at the picture and answer these questions:

SHAPE—Is it chunky or thin? ____________________________

SIZE—How big is it? ____________________________

HABITAT—Where is it? ____________________________

COLOR—What color is it—and where are the different colors on its body? ____________________________

SONGS—What does its song or call call sound like? ____________________________

LEGs AND FEET—How long are they and what do they look like? ____________________________

BILL SHAPE—What does it look like—pointed or rounded, slender or thick, short or long? ____________________________

WING SHAPE—Are the wings long or short, narrow or broad? ____________________________

TAIL SHAPE—Is the tail short, long, broad, narrow, round, pointed, or forked? ____________________________

What group is this bird in? ____________________________

What is its name? ____________________________

Write at least one interesting fact about this bird. ____________________________

Look in your field guide for clues. For colors, look in one of the field guides in your classroom or library. You may want to color the birds in your own field guide, using one of these books as a model.

When you see real birds in the wild, look for field marks. Ask yourself the same questions you just asked yourself about the bird picture.
Name and Color These Birds!

Hint: Use your field guide. By deciding what group they're in first, you'll know better where to look in your guide.
Alaska Bird Regions

Alaska can be divided into six regions. Each has a different climate, different vegetation and different birds.

1. Label these regions using these terms: Central, Southcoastal, Northern, Southwestern, Southeastern, Western.

2. Draw a dot on the map where you live. Write the name of your community by the dot. Color your region red.

3. Your field guide at the back of the book has a map for each bird species, showing where it can be found in spring. The regions where birds are likely to be found are blackened on the map. However, just because a region is black on the map does not mean that a bird can be found anywhere in that region. It can only be found in the kind of habitat it prefers. For example, puffins are common in Southcoastal, Southwestern and Western Alaska, but that doesn't mean you're likely to see one waddling through downtown Anchorage! Puffins are found only in their preferred habitat of salt water and certain sea islands.

Some birds are much more common than others. The field guide maps are black for any bird that you are likely to see in a region, whether it is common or not very common.

Birdwatchers spend much of their time looking for rare birds. The maps are striped in regions where a bird is rare. The maps are white in regions where a bird is never seen. List six birds that you are likely to see in your region; three that are rare; and three birds that have never been seen in your region.

Likely to see:

______________________________  ________________________________  ________________________________

______________________________  ________________________________  ________________________________

Rarely seen:

______________________________  ________________________________

Never seen:

______________________________  ________________________________  ________________________________

4. Now list six birds that are common to all regions of Alaska:

______________________________  ________________________________  ________________________________

______________________________  ________________________________  ________________________________

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Alaska Bird Regions
Alaska Bird Migrations

Some reasons birds migrate (move from one part of the country to another) are:

- To find food
- To find places to nest
- To avoid cold weather
- To find open water (not frozen or dried up)

In Alaska there is plenty of food for birds in summer. In winter, when the water is frozen and snow covers the ground, there is less for birds to eat.

List some kinds of food birds can find in Alaska in the summer that are not available in winter.

1. 
2. 
3. 
4. 

Where do birds go in winter? The following map shows half the world. The circled numbers on the map mark the migration beginning and end points of some Alaskan birds. The 1's mark the flight of the robin. Robins have been seen in all regions of Alaska in the summer. Connect the 1's with a red line to show the robins' route. Where do robins winter?

5. ___________________________ or ___________________________

The 2's mark the beginning and end points for the barn swallow, which is found in southcentral and southeastern Alaska in the summer. Connect the 2's with a blue line. Where does the barn swallow winter?

6. ___________________________

The oldsquaw duck can be seen in all regions of Alaska in the spring. Connect the 3's with a black line. Where does the oldsquaw winter?

7. ___________________________ or ___________________________

(Some oldsquaws also winter in Prince William Sound and Southeast Alaska.)
Bird Wintering Areas

Each bird description in your field guide includes a category called "Wintering Area." Look in your field guide to find out where some of the birds you know migrate to for the winter. Write each bird's name and where it goes for the winter on the table below. Then draw lines on the map to show the migration routes. Number the lines on the map to match the numbers on the table.

<table>
<thead>
<tr>
<th>Name of Bird</th>
<th>Wintering Area (Where Bird Goes in Winter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
</tbody>
</table>

Answer the following questions using your field guide.

7. Name two birds that can be found in all regions of Alaska in the winter:
   ________________  ________________

8. Name four birds that winter in Japan:
   ________________  ________________
   ________________  ________________

9. Name one bird that winters in New Zealand:
   ________________

10. Name one bird that winters in Africa:
    ________________

11. Which bird migrates furthest south?
    ________________
12. Find or draw a picture of a bird or birds that stay in your area all winter. Put the picture here. Label your bird.

13. List some other birds that stay in your area all winter. What have you seen them eating?

<table>
<thead>
<tr>
<th>Name of Bird</th>
<th>Eat in Winter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
What Makes a Habitat?

The habitat of any animal or plant is the place where it lives. A bird's habitat must have food, cover and water:

**FOOD** - Foods from plants: seeds, leaves, buds, roots.
Foods from animals: insects, mice, fish, shellfish, worms, spiders, other birds' eggs.

**COVER** - Includes bushes, trees, grass, driftwood or rock piles for protection from the weather or from natural enemies. All birds require a safe nest site for raising their young. Birds' roosts—the places where they rest or sleep—also require adequate cover. Islands, reefs and bays provide shelter from the wind for birds that roost on the water.

**WATER** - Water must be available in sufficient quantities and in a relatively safe location. Some animals need water just for drinking and bathing. For others, water is a source of food and a place to swim and raise their young.

There are many kinds of habitats. There are forest habitats, mountain habitats and beach habitats. In this book we are focusing on wetland habitats because these are especially rich in bird, animal and plant life and because most of Alaska consists of wetlands. Huge numbers of migrating birds nest in Alaska's wetlands, and every region of Alaska has plenty of wetlands.

What is a wetland? A wetland is land that is wet most of the year and has plants and animals that prefer wet soil. Write the name of a wetland near where you live: ____________________________.

Make a logo of this wetland in the space below, showing food, water and shelter, and one or more of the birds that live there. Color your logo, fasten it to cardboard, and wear it as a badge during Sea Week.
Coastal wetlands are found where land and salt water meet. They are extremely rich in nutrients. Alaska's coastal wetlands are important places for birds to feed, rest and nest. These salt water or brackish wetlands include river deltas, salt marshes, tidelands, estuaries, and barrier-island lagoon systems.

Label these five types of wetlands in the drawing below. (Hint: Use your glossary to find out about these wetlands.)
Estuary: A Very Special Place

Directions: Fill in the blanks with these words: fish, nurseries, productive, coastal wetland, plankton, fertilize, sea, fresh water, salt marshes, tidelands. (Hint: check to see whether the sentence needs a noun, verb, or modifier.)

Estuaries are very special places. Estuaries are one kind of ___________. An estuary is where a river or stream meets the sea. Estuaries include bays, river, and inlets and the surrounding ___________ and ___________. Estuaries are extremely rich and ___________ places. Salt water and ___________ mix in warm, shallow areas. Nutrients from the river and the ___________ are blended together. This is just right for growing a thick ___________ soup. Plants and animals grow in enormous quantities. Many waterfowl, mammals, and ___________ use estuaries as _______ for their young. And the tide carries nutrients and detritus (dead plant and animal matter) out to sea to ___________ offshore waters. So deepwater fish benefit from estuaries, too.

1. What is the name of the estuary nearest to your community?

________________________________________

2. How many miles is it from your village or town to the estuary?

________________________________________

3. Why is the estuary important to you?

________________________________________

________________________________________

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Estuary: A Very Special Place
Wet Tundra

Wet tundra is found in northern and western Alaska and in some mountain valleys. Wet tundra is a flat wetland that is very important for birds. Millions of birds nest and raise their young on wet tundra. Caribou, arctic fox, wolves, arctic hares, and lemmings also live on the wet tundra.

Draw arrows showing what eats what in the drawing below. This is called a food chain. Animals that eat plants are called herbivores. Color the herbivores green. Animals that eat other animals are called carnivores. Color the carnivores blue. Animals that eat both plants and animals are called omnivores. Color the omnivores orange. (Hint: You may need to talk to a local expert or look in a book to find out what these animals eat.)
Alaska's rivers, lakes, and freshwater marshes hold lots of food for fish, wildlife—and people. Salmon use rivers, lakes and marshes to spawn or rear their young. Other fish, like grayling, pike and whitefish, live their entire lives in fresh water. Millions of waterfowl and shorebirds live in these wetlands. The fish and birds eat aquatic invertebrates (insects, snails, freshwater clams) as well as other fish. The invertebrates feed on plankton, algae, detritus (dead plant and animal remains), and other invertebrates. Animals that eat other animals are called predators. The animals that are eaten are called prey. In this drawing, color all the predators red.

Why are predators important?
One sign of a muskeg or bog is lots of sphagnum moss. As the sphagnum moss dies and decays, it turns into peat. This peat is sometimes 40 or more feet thick! Walking on a muskeg in summer is like walking on a great big sponge. You sink in and the ground goes "squish." Common muskeg plants are sphagnum moss, blueberries, cranberries, willow, sundew, sedge, labrador tea and small trees like black spruce. Small ponds, puddles, and lakes are common in muskeg. The water is often acidic. As in most habitats, birds and animals tend to blend in with their surroundings. We say they are camouflaged. Color this drawing so that the birds are camouflaged.
# Other Bird Habitats

In addition to wetlands, there are other kinds of bird habitats in Alaska. Match the pictures of these habitats with their descriptions—and with the birds that live in them (color matched sets, or cut out and paste, or connect with lines).

<table>
<thead>
<tr>
<th>Habitat</th>
<th>Description</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alder and willow</td>
<td>Found along rivers and creeks. Birch-alder-willow thickets are found in mountain areas.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Rain Forest</td>
<td></td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Cliffs and Rocky Areas</td>
<td>Some seabirds and diving ducks spend all their life at sea. They just come ashore to nest.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Man-made Areas</td>
<td>White spruce, birch, aspen and cottonwood trees—mixed with alder and willow bushes—are found in Interior Alaska. They provide nest sites and food for a great variety of birds.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Rocky islands and cliffs</td>
<td>Rocky islands and cliffs along the shoreline provide safe nesting sites for seabirds and shelter for sea mammals.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Ocean</td>
<td>Some seabirds and diving ducks spend all their life at sea. They just come ashore to nest.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Shrub Thicket</td>
<td>Sitka spruce are the great trees of this coastal forest. Sometimes they grow more than 200 feet high. Hemlocks, alders, cottonwoods and mosses also grow among the Sitka spruce.</td>
<td>![Bird Image]</td>
</tr>
<tr>
<td>Spruce-Hardwood Forest</td>
<td>People built roads, homes, schools and stores to make this habitat.</td>
<td>![Bird Image]</td>
</tr>
</tbody>
</table>
1. Choose a habitat.

2. Choose one bird that lives in the habitat you chose.

3. Write a paragraph that tells what your habitat provides for your bird.
   *Clue: Remember, a habitat provides more than food. Check the first page of this unit.

4. Turn back to page 3. Fill in Column 6 (Habitat). Where did you see the birds on your list?
Altricial or Precocial?

Alaska's wetlands are very important for nesting birds. Millions of waterfowl and shorebirds nest in Alaska's great expanses of muskeg, tundra, marsh, and coastal wetlands. Without this important habitat, these bird populations would soon be very small.

Where a bird builds its nest depends on how large the bird is and whether it can use its feet or bill to make holes or carry sticks, grass, and other materials. What sort of nest is needed also depends on what the young are like when they hatch.

**Altricial Birds**
(al-trish-al)

Turn to your glossary and copy the definition of altricial birds in the following space.

These birds must have a place where they will not fall out. Their parents need to feed and protect them for several weeks until they can fly. Most perching birds and tree nesters (hummingbirds, robins, eagles) have altricial young.

**Precocial Birds**
(Pre-ko-shal)

Other baby birds are precocial. Turn to the glossary and copy the definition of precocial.

Chickens, ducks and shorebirds have precocial young. Precocial birds usually must be kept warm (brooded) by their parents at night or when it rains. The parent, usually the mother, broods the young by covering them with her wings and body.
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: __________  __________  __________

Altricial or Precocial

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.
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?

1. 
2. 
3. 
4. 
5. 

Clue: Use your field guide!
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.

1. 
2. 
3. 
4. 
5. 

[Diagram showing various nesting sites in a natural setting]
Canada Geese: Precocial Birds

Directions: Read this story. On a separate sheet of paper, draw several small pictures or one large one illustrating the story. Definitions of the underlined words are in the glossary.

This Canada Goose pair makes their nest among the sedges and grasses on a little wet tundra island. The water around the island helps protect the nest from predators, like foxes, that don't like to swim. The goose (female) makes a little hollow scrape and sits in it, reaching out with her long neck to pull in pieces of grass and sedge, which she tucks about her to form the nest. The gander (male) pulls additional material within reach of his mate. Then the goose lays an egg and covers it with the nest material and leaves. The goose returns about every 30 hours to lay another egg, until there are five. Then she settles on the nest, pulling down from her breast to help keep the eggs warm. When the eggs reach body temperature the embryos begin to grow. The gander always stays nearby, ready to protect his mate.

In about 26 days the eggs begin to hatch. Because the first eggs are allowed to cool until the last one is laid, they all hatch at about the same time. It takes several hours for the gosling to crack its way out of the shell with its egg tooth. The parents guard carefully then, for the struggling babies make a chorus of peeping from within their shells.

The small wet goslings dry and fluff out quickly into a ball of down. They are precocial birds, which means that in less than a day they can walk, run and swim. The goslings can find and pick up food all by themselves. The brood of five goslings remains very close to their parents, who lead them to food and guard them from harm. Periodically the young need rest and crawl beneath the protective wings of the goose, who provides a ready source of heat and comfort. But they do not rest long. They must spend most of their time eating so they can grow up before winter.

In six weeks the goslings have all their feathers and begin to look much like their parents. In nine weeks they begin to fly. About three months after hatching they are ready to migrate to their wintering place thousands of miles away. The family will stay together through the winter and return in the spring, breaking up only when it is time for the parents to nest again.

Canada geese nest throughout Alaska. Sometimes they build their nests in deep woods, on drift logs at the top of the beach, in the branches of tall trees or on cliffs high above a lake or river. Some geese nest in a colony. Goose colonies occur only in places where there is abundant food and generally few predators. In colonies, geese can raise large numbers of young.

However, people can easily disturb colonies by shooting paired birds and by taking eggs and young. Geese in a colony have no defense against human disturbance except to go away and not use the area for nesting anymore. But perhaps someday we can help reestablish colonies that have been abandoned.
The Bald Eagle: An Altricial Bird

Directions: Read this story and illustrate it on a separate sheet of paper. Definitions of the underlined words are in the glossary.

This bald eagle pair begins building its nest in March. The eagles select a large, Sitka Spruce that stands near the edge of the sea. They gather sticks, seaweed, mosses and turf and carry the material to a fork in the tree. The finished nest may be four or five feet in diameter and several feet deep.

The mother lays two eggs and begins incubation right away. The eggs are not as large as you would expect for so large a bird. In about a month the young hatch and their down dries like that of the young geese—but what a contrast! The eaglet is unable to stand or move about. The only thing it can do is open its mouth when it hears a noise. The parents bring food, mostly fish, and put it directly into the babies' mouths. The young eagle is an altricial bird.

For four months, the nest remains home for the eaglets. The parents are very busy hauling food to their young and will attack anything that tries to get in the nest. By August you can often see the eaglets standing in the nest, exercising their developing wings. Sometimes one or even both eaglets will fall out of the nest and be eaten by predators.

When the eaglets finally solo and fly out of the nest they seldom go back. They begin to find their own food on the beach. Young eagles have brown feathers all over. It is four to five years before they gain their white head and tail and are ready to pair and nest.

Bald eagles nest in large numbers along the south coasts of Alaska from Southeast through the Aleutian Islands, and in smaller numbers farther north. They often continue to add to old nests year after year. Where trees are not available they nest on cliffs, rock pillars, small islands, and on the ground.

The bald eagle, our national bird, appears on the Great Seal of the United States (look for it on the dollar bill), as well as on other money and documents of our country. That is one reason why people became very upset when wild eagles disappeared from most states in the 1950s. This population decline was caused by habitat losses and by poisoning. It was found that pesticides containing a chemical called DDT—used to kill insects that bother people or eat farm crops—were harming the eagles. DDT sprayed in the air eventually would wash into streams, where fish would absorb it. The fish-eating eagles got large doses of DDT, which caused their eggs to have abnormally thin shells that broke before they could hatch. With no young to replace older birds as they died out, the population soon became endangered, but not extinct. DDT has been banned and now eagles are slowly increasing, but it will be a long time before there are as many as there once were. Currently, eagles are listed as endangered or threatened in all the lower 48 states. Alaska is the only state with a healthy bald eagle population. In the fall, the Chilkat River Valley north of Haines has as many as 3,600—the largest concentration of bald eagles in the world.
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.
ACROSS

1. The _____ has sharp teeth; it eats mostly smaller fish but also eats small ducks, mice, and insects.

7. The _____ can reach higher up on a willow tree to eat than the snowshoe hare can.

9. _____ have smooth skin and catch insects on their long tongues.

10. _____ live most of their lives in the ocean but depend on freshwater lakes and streams for spawning and rearing their young.

11. The _____ eats a great variety of foods, including berries, grass, sedges, horsetails, fish, and animal flesh.

13. Ringed, spotted and harbor _____ catch fish in river mouths and coastal lagoons.

14. Sea _____ dive for fish, sea urchins, mussels and other food, which they eat while floating on their backs.

DOWN

1. _____ have feathers on their feet to keep them warm in the snow.

2. _____ live partially or entirely buried in sand or mud and eat detritus (dead plants and animals).

3. The _____ is smaller than a beaver and lives in open areas where it builds houses made of mounds of vegetation.

4. Millions of waterfowl (ducks, _____ and swans) and shorebirds nest in Alaska's wetlands.

5. Although gray _____ are huge, they eat tiny marine animals, which they filter from the mud of estuaries and lagoons.

6. Shelled animals such as clams, _____ and shrimp depend on coastal wetlands for all or part of their lives.

8. Animals grow by eating plants or smaller animals, but plants grow by using water, air, and energy from the _____.

12. _____, foxes, coyotes and lynx prey on a variety of wetland animals.
Wetland Plants Game

Directions: Cut out these cards and glue the descriptions on the back of their matching pictures. Now you have a set of flash cards you can make up games with.
Wetland Plants Game

**LABRADOR TEA**
This plant has thick, leathery, rolled leaves with fuzzy undersides. It grows in muskeg and on the tundra. The leaves can be dried and used for tea.

**SEDGE**
Sedges are eaten by geese, caribou, deer and brown bears. People can also eat sedges and grasses. Sedges are probably the most common wetland plant. They have triangular stems. Grasses have round stems.

**COTTON GRASS**
Cotton grass has tufts on its seeds. It is commonly found in northern wetlands. Even though it is called a "grass" it has a triangular stem and is really a sedge. Some birds use cotton grass for nesting material.

**RUSH**
Rushes have round leaves with small clusters of flowers near the tops of the plant. They are found in wet areas throughout the state. Geese feed on rushes. People can eat them, too, just like sedges and grasses.

**BEACH RYEGRASS**
Beach ryegrass is found on sandy beaches along the Alaskan coast. Deer and bears eat young shoots in the spring. Gulls and geese use ryegrass for nesting material. Alaskan Natives dry and use this grass to make baskets.

**ARROW GRASS**
Arrow grass has long, narrow, round leaves. Rounded fruits are spaced along the top of its stem. It is a favorite food of cranes and geese. Arrow grass is found throughout the state.

**WILLLOW**
Willow ranges in size from 4 inches on the tundra to 16 feet along Interior streams and rivers. Male and female flowers are on different plants. Willow is a favorite food of moose and snowshoe hares. It can be eaten by people, too.

**ALDER**
Alder provides cover and nesting places for wetland animals. The seeds are borne in tiny cones. Alder twigs and buds are important winter food for white-tailed ptarmigan. The seeds are also eaten by many songbirds.

Now that you've had a chance to learn about these wetland plants, make flash cards for additional plants that are found in your wetlands.
BLACK SPRUCE
Black spruce trees grow in muskeg in Central and Southcentral Alaska. They look like trees made of toothpicks because the branches at the top are almost the same size as the bottom branches.

DWARF BIRCH
Dwarf birch is found throughout Alaska in wetland areas. It is good nesting cover for some shorebirds and songbirds. Dwarf birch is usually from 6 inches to 3 feet high. Its large relative, the paper birch, grows much taller!

CROWBERRY
People often eat crowberries mixed with other berries. Grouse, ptarmigan, bears and geese also depend on these berries for food. The small black berries are often found in blueberry areas. The plant grows on wet tundra and in muskeg.

BLUEBERRY
Blueberries grow in wetlands all over Alaska—except in the very far north. Blueberries are eaten by bears, grouse, ptarmigan, geese and people.

TAMARACK
Tamarack is a deciduous conifer. This means it loses its leaves in the winter. Its leaves (needles) are in groups of 12-20 on short side branches. Tamarack grows in muskeg and is also called larch or hackmatack.

CATTAIL
Cattail provides good cover for marsh birds and animals in Interior Alaska. The shoots, roots, green spikes and pollen are edible.

CRANBERRY
The bright red berries are tart, but delicious. Ptarmigan, grouse, bears and people all eat these berries. Cranberries grow on wet tundra and in muskegs.

POISON WATER HEMLOCK
This deadly poisonous plant looks very much like wild celery. Its chambered rootstock and strong odor help identify it.
HORSETAIL
Long ago, in the time of the dinosaurs, horsetails were the size of trees. Instead of regular seeds, horsetails have spores inside a fruiting body. Tap one, and the spores will fall into your hand like a soft green powder. Geese and swans enjoy eating horsetails in late summer and fall.

MARES'S TAIL
Mare's tail grows in shallow streams, ponds, and estuaries. The leaves are stiff when out of the water, and limp when under the water.

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

BLADDERWORT
Bladderwort grows in ponds and lakes throughout Alaska. It has a bright yellow flower. Its many bladders are used to trap insects. The insects supply vitamins, minerals and nutrients.

YELLOW POND LILY
Yellow pond lilies grow from thick branching rootstocks. Many small aquatic animals lay their eggs on the leaves and stems. Moose eat the whole plant.

EELGRASS
Eelgrass grows in lagoons and estuaries from Western to Southeast Alaska—and on down the coast. This bright sea "grass," actually a type of pondweed, is a very important food for black brant and emperor geese.

SPHAGNUM MOSS
Sphagnums, 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, and surrounding streams are less likely to dry up.

SUNDEW
This tiny plant grows on muskeg. It captures and eats insects. Try to find a sundew—and then watch what happens when you drop a mosquito in the center of one of its leaves.
Map Time

Decide on a nearby wetland to explore with your class or after school. What is the name of your wetland? Describe its location.

Draw a map of your wetland in the space below. After your field trip, write names or draw pictures of plants and animals in the places you saw them.
Field Notes

Date ___________________  Time ________
Weather ___________________  Temperature ________
Who went with you? ________________________________________

What happened on your trip? ______________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________

How many different kinds of birds did you see? ______
Draw a picture of one of them.

How many different kinds of mammals (or mammal signs) did you see? ______
Draw a picture of one of them.

How many different kinds of fish did you see? ______
Draw a picture of one of them.

How many different kinds of invertebrates did you see? ______
Draw a picture of one of them.
What kind of soil is in your wetland? 
Take a tiny bit and smear it here.

Describe the water in your wetlands.

Feel the water in different places.
Where is it coldest? 
Where is it warmest?

What color is it?

Find a plant growing in the water. Draw a picture of it here.

Find a plant growing next to water. Draw a picture of it here.

Find a plant growing far away from the water. Draw a picture of it here.

Find a tree growing near your wetland. Draw a picture of it here (Hint: in northern and western Alaska, "trees" may be very tiny.)

What differences did you notice in wetlands plants?

What similarities did you notice in wetlands plants?
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.
# Wetlands Field Trip Summary

1. Type of wetlands ______________________ Date ____________
   Time ________ Your Name ______________________________________

2. Weather ________________ Temperature __________________________

3. Soil ________________ Water ______________________________________

4. Fill in the following chart:

<table>
<thead>
<tr>
<th>Different kinds</th>
<th>Total numbers</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invertebrates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toads/Frogs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming Birds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birds of Prey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waders</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grouse/Ptarmigan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gull-like Birds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perching Birds</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. What human influences did you notice on the wetland? ________________
   ________________________________________________________________
   ________________________________________________________________

6. What impressed you most about the wetland you visited? ____________
   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
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.

The farmer provides habitat and protection for his domestic birds:
- Food (usually grain)
- 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.
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 at, 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**

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?
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.

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

The USF&WS is a federal agency that takes care of migratory birds—with our help. ADF&G 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.

<table>
<thead>
<tr>
<th>PEOPLE</th>
<th>USA: about 220,000,000</th>
<th>DUCKS In fall: about 85,000,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico:</td>
<td>about 60,000,000</td>
<td>In spring: about 45,000,000</td>
</tr>
<tr>
<td>Canada:</td>
<td>about 25,000,000</td>
<td></td>
</tr>
<tr>
<td>Alaska:</td>
<td>about 400,000</td>
<td></td>
</tr>
</tbody>
</table>

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

USA
Mexico
Canada
TOTAL

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

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

Why are there fewer ducks in the spring than in the fall? List things you think might kill 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 egging hurt bird populations. Both the goose and the gander are needed to raise the young birds and protect them from predators.

SPRING

1 GOOSE CAUGHT

NO YOUNG RAISED

How many are left to come back in the future? ________

FALL

1 GOOSE CAUGHT

3 YOUNG RAISED

How many are left to come back in the future? ________

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?

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.

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

What alternatives are there?

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Which alternative do you favor?

__________________________________________________________________________

__________________________________________________________________________

How will you make your opinion known?

__________________________________________________________________________

__________________________________________________________________________

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Wetland Values

Directions: Number the pictures to match the paragraphs.

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 wetland animals eat the 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 plants and 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.
6. Today, Alaskans use wetlands for hunting, fishing, trapping, berry picking, and collecting edible greens! We also use them for recreation--bird watching, hiking, jogging, cross-country skiing, sketching and photography.

7. Wetlands help protect our villages and towns from flooding. Extra rain and snow is soaked up like a sponge. Then, in drier times, the moisture is slowly released.

8. The water that is stored 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 some of the nutrients from waste water 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.

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 vast areas of wetlands and plentiful wildlife. But human activities can being rapid changes to the land.
11B

Wetland Habitat Protection

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

__________________________
__________________________
__________________________
__________________________

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

__________________________
__________________________
__________________________
__________________________
Some of these things may be necessary if we are going to have a place for people. Some could be done elsewhere, or done differently. Which of the items you listed as destructive could have been done in a more suitable location or in a less harmful way?
Wetlands Development

Alaska's fish and wildlife depend on high quality water and wetlands. The U.S. Army Corps of Engineers has a permit system to protect these wetlands and navigable waters. The permits (authorized by Section 404 of the Clean Water Act) are designed to allow necessary development to proceed while protecting Alaska's valuable water resources from poorly planned projects. This will help save our favorite fishing, hunting and wildlife viewing areas.

1. Name a wetland area in your community that may be developed in the future.

2. What is planned for this area?

3. Find out more about it. What animals and plants live there?

4. Write to the U.S. Army Corps of Engineers and the Department of Environmental Conservation about permits required for the development.

5. Write to the people planning the development, asking them exactly what their plans are.

6. Is this development necessary? If it is, has your community found the best location for it? Are the planners designing the project so as to do the least possible damage?

7. What do you think should happen to this wetland? Should the development take place there? If it should, can any changes be made in the plans to protect the wetland better? If it shouldn't, can you think of a better place for the project? Is the project necessary?

8. How can you make your opinions known?

9. Discuss the situation with your village/city officials. What were your results?
Bubbke Bird

Need some help? Try these words:

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

1. Birds need habitat that has ________________, cover and water.

2. Most Alaskan birds move south for the winter. This is called ________.

3. Alaskan __________ are important resting, feeding and nesting grounds for many North American birds.

4. A bird is "endangered" if there is a chance it might become __________.

5. Birds are the only animals in the world that have ________________.

6. Energy passes from plants to animals through what is called the __________ ____________.

7. Hawks, owls, and other birds that kill birds and animals for food are called birds of prey, or ________________.

8. A bird that is helpless when hatched is an ________________ bird.

9. A bird that can walk or swim and find its own food a few hours after birth is a ________________ bird.

10. Birds that blend in with their habitat are ________________.

11. ________________ often nest in large colonies on islands and along rocky areas of the coast.

12. 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 ________________ and meat and wear jackets stuffed with their feathers.

13. The protection and wise use of our resources is called ____________.

14. Whoooo... are you? I'm an _________________. I study birds!
Bird Watcher's Special

Directions: Answer the questions.

1. Did this flight feather come from the bird's right or left wing?
   
2. How do birds fly?
   
3. Name a local bird that migrates. Where does it go?
   
4. What are four hazards a bird might meet during migration?
   
5. Name these birds!
   
   a. ___________________________ bird group ________________ name
   b. ___________________________ bird group ________________ name
   c. ___________________________ bird group ________________ name
   
   a. ___________________________ bird group ________________ name
   b. ___________________________ bird group ________________ name
   c. ___________________________ bird group ________________ name
6. Match these bird bills with appropriate foods. Write the name of the food next to the picture of the bill.

a. 

b. 

c. 

d. 

e. 

f. 

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

a. 

b. 

c. 

d. 

e. 

f. 

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

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.

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

THE MAGIC NUMBER IS _____.

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

ACCIDENTAL A bird found in Alaska that does not normally migrate to Alaska. Some accidentals are Asian species that are blown to Alaska by storms. Others are birds normally found farther south that for some reason stray north. Armstrong in his New, Expanded Guide to Birds of Alaska lists 355 kinds of birds regularly found in Alaska and 50 accidentals.

ADAPTATION A trait that improves an animal's ability to live in a particular habitat.

AIRFOIL A wing designed to create lift while an aircraft is moving through the air.

ALTRICIAL BIRD A bird that is helpless when it hatches.

AQUATIC Living in water.

BARRIER ISLAND LAGOON SYSTEM A type of coastal wetland that forms where a narrow gravel or sand island separates the open ocean from a lagoon.

BRACKISH WATER A mixture of salt and fresh water.

BROOD The young birds from a single nest.

BROODING The action of a mother bird cuddling her young under her wings and body. This protects them from the weather and keeps them warm.

CARNIVORE A meat eater.

COASTAL WETLANDS Wetlands formed along the coast where land and salt water meet. Includes river deltas, salt marshes, tidelands, estuaries and barrier island lagoon systems.

COLONY A group of densely nesting birds.

CONIFEROUS TREES Trees that bear their seed in cones.

CONSERVATION The protection and careful use of our natural resources.

COVER Any place where a bird can find protection from weather or enemies. Good habitat must provide food as well as cover.
CRUSTACEANS: A large class of invertebrates with hard shells, including crabs, shrimps, lobsters, barnacles, and others.

DECIDUOUS PLANTS: Plants that lose their leaves or needles every year, usually in the fall.

DETritus: Dead plant or animal material, including scats, bone, hair and feathers.

DOWN: Feathers without shafts, found close to a bird's body.

EAGLET: A young eagle.

EDGE EFFECT: The increased variety of food and cover that is found in places where two or more types of habitat meet.

EGG TOOTH: The special hard spot on the upper part of a gosling's beak. It is used to crack a hole in the egg so the bird can get out.

EMBRYO: An animal in the early stages of development before birth or hatching.

ENDANGERED SPECIES: An animal or plant species that is in danger of becoming extinct.

ENVIRONMENT: All our surroundings including air, water, soil, vegetation, wildlife, people, and things made by people.

ESTUARY: A coastal wetland formed where rivers or streams meet the sea.

EXTINCT SPECIES: A plant or animal species of which there are no longer any living members.

FEATHER: Birds are covered by feathers. No other creatures have feathers. There are four kinds: down, body, wing and tail feathers.

FOOD CHAIN: The energy flow from plant to herbivore to carnivore—the line of what eats what in a particular environment.

FOOD WEB: Interconnected food chains form a food web.

FOREST: A dense and extensive growth of trees.

GAME ANIMAL: A wildlife species that is commonly hunted. Game animals are protected by regulations.

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<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>GANDER</td>
<td>A male goose. (The word &quot;goose&quot; can refer to a bird of either gender or it can be used especially to refer to a female.)</td>
</tr>
<tr>
<td>GOSLING</td>
<td>A young goose.</td>
</tr>
<tr>
<td>HABITAT</td>
<td>A place where plants and animals grow and live; their home.</td>
</tr>
<tr>
<td>HERBIVORE</td>
<td>A plant eater.</td>
</tr>
<tr>
<td>INCUBATE</td>
<td>To sit upon eggs in order to hatch them with the warmth of the body.</td>
</tr>
<tr>
<td>INVERTEBRATE</td>
<td>Any animal lacking a backbone. Insects, shellfish, worms and spiders are examples. Invertebrates are often an important source of food for birds and people.</td>
</tr>
<tr>
<td>MARSH</td>
<td>A freshwater or saltwater wetland formed along flowing and still waters, and the nearby soft, wet, treeless land.</td>
</tr>
<tr>
<td>MIGRATION</td>
<td>A mass movement from one place to another, usually faraway place, and back.</td>
</tr>
<tr>
<td>MUSKEG</td>
<td>A bog; known by an abundance of sphagnum moss.</td>
</tr>
<tr>
<td>NON-GAME ANIMAL</td>
<td>A wildlife species that is not commonly hunted or consumed.</td>
</tr>
<tr>
<td>OMNIVORE</td>
<td>An animal that eats both meat and plants.</td>
</tr>
<tr>
<td>ORNITHOLOGIST</td>
<td>A person who studies birds.</td>
</tr>
<tr>
<td>PEAT</td>
<td>A type of dark brown soil, formed by dead and decayed sphagnum moss.</td>
</tr>
<tr>
<td>PESTICIDE</td>
<td>Any chemical used for killing insects or weeds.</td>
</tr>
<tr>
<td>PLANKTON</td>
<td>Animal or plant life, usually microscopic, found floating or drifting in the ocean or in bodies of fresh water.</td>
</tr>
<tr>
<td>PRECOCIAL BIRD</td>
<td>A bird that can walk or swim, see and find its own food a few hours after hatching from its egg.</td>
</tr>
<tr>
<td>PREDATOR</td>
<td>An animal that kills and eats other animals.</td>
</tr>
<tr>
<td><strong>PREEN</strong></td>
<td>To clean and properly arrange feathers by combing them with the bill. Birds have an oil gland above the rump which supplies oil. They use their heads and bills to spread the oil, which keeps their feathers waterproof.</td>
</tr>
<tr>
<td><strong>PREY</strong></td>
<td>An animal hunted or killed for food by another animal.</td>
</tr>
<tr>
<td><strong>RIVER DELTA</strong></td>
<td>A wetland area built by the deposit of silt and organic material as a river enters a lake or the ocean.</td>
</tr>
<tr>
<td><strong>SHOREBIRDS</strong></td>
<td>Birds that feed or nest on the shores of oceans, rivers and lakes, or on the tundra.</td>
</tr>
<tr>
<td><strong>SHRUB</strong></td>
<td>A low, woody plant usually having several stems; a bush.</td>
</tr>
<tr>
<td><strong>SPECIES</strong></td>
<td>A distinct kind of animal or plant. Members of the same species can breed and reproduce their own kind.</td>
</tr>
<tr>
<td><strong>SWAMP</strong></td>
<td>Land with shrubs and trees that is regularly covered with water. This type of wetland is common in the southeastern United States, but not in Alaska.</td>
</tr>
<tr>
<td><strong>THREATENED SPECIES</strong></td>
<td>A plant or animal species whose numbers are so low that it may become endangered.</td>
</tr>
<tr>
<td><strong>TIDELAND</strong></td>
<td>A shoreline mud flat that is periodically covered by water—a type of coastal wetland.</td>
</tr>
<tr>
<td><strong>TREE</strong></td>
<td>A woody plant with a single stem that grows more than ten feet high.</td>
</tr>
<tr>
<td><strong>VERTEBRATE</strong></td>
<td>Any animal with a backbone. Birds, fish, reptiles, amphibians and mammals, including humans, are all invertebrates.</td>
</tr>
<tr>
<td><strong>WATER BIRDS</strong></td>
<td>Any of the birds that swim, dive, wade or feed in the water.</td>
</tr>
<tr>
<td><strong>WATERFOWL</strong></td>
<td>Ducks, geese and swans.</td>
</tr>
<tr>
<td><strong>WET TUNDRA</strong></td>
<td>Flat, treeless, water-soaked land; common in western and northern Alaska.</td>
</tr>
<tr>
<td><strong>WETLAND</strong></td>
<td>It's a place where you need boots to keep your feet dry! Wetlands are very rich in plants and invertebrates that provide food for birds and other creatures.</td>
</tr>
</tbody>
</table>

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KEY TO STUDENT FIELD GUIDE

Size: This refers to the average size of an adult bird, and is given in general terms: very small, small, medium, large and very large.

Feet: This gives a general idea of what the feet look like or are used for.

Bill: One or two of the most important characteristics of the bird's bill.

Summer Habitat: The type of place in which a bird lives during the summer months.

Nest: The bed or shelter prepared by a bird for laying and hatching its eggs and for rearing its young.

Food: What the bird eats during the breeding season.

Wintering Area: Where the bird goes in winter.

Notes: Any additional interesting information on the appearance or habits of birds.

For each bird in the guide there is a description, a drawing and a range map. The range maps show a general outline of Alaska divided into six regions: Southeastern, Southcoastal, Southwestern, Central, Western and Northern. If a bird is either common or uncommon within a region, in springtime, that region will be completely blackened. If a bird is rare within a region, that region will be striped. If it is never found in a region, that region will be left white.

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<th>Bird</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>1. Pacific Loon</td>
<td>1</td>
<td>51. Bonaparte's Gull</td>
<td>13</td>
</tr>
<tr>
<td>2. Common Loon</td>
<td>1</td>
<td>52. Black-legged Kittiwake</td>
<td>13</td>
</tr>
<tr>
<td>3. Horned Grebe</td>
<td>1</td>
<td>53. Arctic Tern</td>
<td>14</td>
</tr>
<tr>
<td>4. Pelagic Cormorant</td>
<td>1</td>
<td>54. Common Murre</td>
<td>14</td>
</tr>
<tr>
<td>5. Trumpeter Swan</td>
<td>2</td>
<td>55. Pigeon Guillemot</td>
<td>14</td>
</tr>
<tr>
<td>6. Canada Goose</td>
<td>2</td>
<td>56. Marbled Murrelet</td>
<td>14</td>
</tr>
<tr>
<td>7. Tundra Swan</td>
<td>2</td>
<td>57. Tw-tree Puffin</td>
<td>15</td>
</tr>
<tr>
<td>8. Greater White-fronted Goose</td>
<td>2</td>
<td>58. Rock Dove</td>
<td>15</td>
</tr>
<tr>
<td>9. Snow Goose</td>
<td>3</td>
<td>59. Boreal Owl</td>
<td>15</td>
</tr>
<tr>
<td>10. Emperor Goose</td>
<td>3</td>
<td>60. Great-horned Owl</td>
<td>15</td>
</tr>
<tr>
<td>11. Brant</td>
<td>3</td>
<td>61. Short-eared Owl</td>
<td>16</td>
</tr>
<tr>
<td>12. Mallard</td>
<td>3</td>
<td>62. Snowy Owl</td>
<td>16</td>
</tr>
<tr>
<td>13. Northern Pintail</td>
<td>4</td>
<td>63. Rufous Hummingbird</td>
<td>16</td>
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SWIMMING BIRDS: Birds with duck-shaped bodies and webbed feet, usually seen swimming. Some dive underwater for food and others dabble at the surface.

Pacific (Arctic) Loon

Size: Large

Feet: Webbed

Bill: Sharp, Dagger-like

Summer Habitat: Lakes in tundra and in evergreen forests

Nest: Small island or point of land jutting into lake

Food: Small fish, crustaceans and some aquatic insects

Wintering Area: Coastal Alaska to Mexico

Notes: Like all loons, dives deep into the water with its powerful legs. Back of head and neck gray, with white striping on sides of neck.

Red-throated Loon looks similar, but has a red throat patch and tilts bill up.

Common Loon

Size: Large

Feet: Webbed

Bill: Sharp, Heavy

Summer Habitat: Deep lakes or slow-moving rivers in tundra and in evergreen forests

Nest: On grassy edge of lakes, small islands or on top of old muskrat house

Food: Small fish and other water animals

Wintering Area: South-thern Alaskan coast

Notes: Famous for its laughing, lowo, yodel-like call. Head dark with a fancy white collar, bill black and straight. Back is covered with white checkers. If you see a bird that looks licky similar but has an ivory yellow bill, it's a Yellow-billed Loon.

Horned Grebe

Size: Medium, but smaller than many ducks

Feet: Lobed

Bill: Sharp

Summer Habitat: Freshwater ponds, sloughs and shallow lakes

Nest: Made of mud and plants—floating, attached to growing plants

Food: Fish and tadpoles

Wintering Area: Coastal Alaska to California

Notes: Light yellow ear tufts show brightly on black head; reddish neck, small head and short, dark bill. Like other grebes, it looks as if it has no tail.

Pelagic Cormorant

Size: Medium to large

Feet: Webbed

Bill: Hooked

Summer Habitat: Sea cliffs, rocky shores and inshore marine waters

Nest: Mass of sticks on cliff ledges or rocky islands

Food: Small fish

Wintering Area: Coastal Alaska to Mexico

Notes: Dives deep and swims underwater. Body greenish-black, with white patches on sides, and dull red patch on face.
**Trumpeter Swan**

- **Size:** Very large
- **Feet:** Webbed
- **Bill:** Wedge-shaped
- **Summer Habitat:** Freshwater or brackish lakes, marshes, and densely vegetated rivers
- **Nest:** A platform 3-1/2 feet in diameter, in water, made of surrounding vegetation
- **Wintering Area:** Southwestern Alaska to Northern California
- **Notes:** The largest swan, it is outnumbered only by the smaller Tundra Swan. Swans dig their food and ducks down low to feed on butter in vegetation.

**Tundra Swan**

- **Size:** Very large
- **Feet:** Webbed
- **Bill:** Wedge-shaped
- **Summer Habitat:** Tundra or sheltered coastal marshes
- **Nest:** Large round nest or on edge of tundra pool or lake, or on an island
- **Food:** Water plants, seeds
- **Wintering Area:** California, Maryland, North Carolina
- **Notes:** Usually has bright yellow teardrop on otherwise black bill. The most common swan, it is hard to tell apart from the Trumpeter Swan, which is larger and has an all-black bill.

**Canada Goose**

- **Size:** Large
- **Feet:** Webbed
- **Bill:** Wedge-shaped
- **Summer Habitat:** Marshes, islands and bars in rivers, and tidal lagoon
- **Nest:** Near ponds
- **Food:** Vegetation
- **Wintering Area:** Coastal Alaska to Mexico
- **Notes:** There are two subspecies of Canada Goose in Alaska. The larger of these subspecies has the familiar honk call, while smaller subspecies has a high-pitched cackling call. All geese's bills are strong and blunt for digging and flashing grass.

**Greater White-fronted Goose**

- **Size:** Large
- **Feet:** Webbed
- **Bill:** Wedge-shaped
- **Summer Habitat:** Tundra
- **Nest:** Made of dry plants placed in shallow depression in wet tundra
- **Food:** Vegetation
- **Wintering Area:** Canada, Texas, Mexico
- **Notes:** The most common Arctic goose in Northern Russia, Greenland, Canada, and Alaska. Pink bill and white face patch. Brown head and neck, black markings on gray belly, and yellow or orange legs. Often seen in fields and lakes during migration.
**Snow Goose**

*Size:* Large  
*Feet:* Webbed  
*Bill:* Wedge-shaped  
*Summer Habitat:* Grassy tundra, ponds  
*Nest:* In ground in tundra and tidelands  
*Food:* Seeds, grasses, berries  
*Wintering Area:* California  
*Notes:* A. white, except for black wing tip, pink bill, and pink feet.  

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**Emperor Goose**

*Size:* Large  
*Feet:* Webbed  
*Bill:* Wedge-shaped  
*Summer Habitat:* Coastal tundra, often near ponds and lakes  
*Nest:* In gravelly marsh habitat or on an island, hidden in tussock; always near water  
*Food:* Seaweed, grasses, mussels and shellfish  
*Wintering Area:* Southwest Alaska  
*Notes:* A. white, except for black wing tip, pink bill, and pink feet.  

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**Brant**

*Size:* Large, but small for a goose  
*Feet:* Webbed  
*Bill:* Wedge-shaped  
*Summer Habitat:* Lowland coastal tundra  
*Nest:* On ground in grassy area  
*Food:* Elkhair, seines, grasses  
*Wintering Area:* California, Baja California (Mexico); some in Izembek Lagoon, Alaska  
*Notes:* A stocky goose, similar to the Canada Goose, with black head, neck and breast, and whitish patch on either side of neck. Call is a croaking sound, different from other geese.  

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**Mallard**

*Size:* Medium to large  
*Feet:* Webbed  
*Bill:* Wide, flat  
*Summer Habitat:* Marshes, lakes, rivers and tidelands  
*Nest:* On ground, usually near water  
*Food:* Aquatic vegetation, insects  
*Wintering Area:* Coastal Alaska to Washington  
*Notes:* Metallic green head, yellow bill, white collar, and chestnut breast. Dabbles ducks leap into the air to take off, rather than running on the water. Their tails tip up as they submerge their heads and necks to food.  

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Northern Pintail

Size: Medium to large
Feet: Webbed
Bill: Wide, flat
Summer Habitat: Marshes, lakes, ponds and streams
Nest: On ground, sometimes far from ponds
Food: Plants, mollusks, insects and small fish
Wintering Area: Washington to Mexico
Notes: Chocolate iridescent head, long, slender neck, and long, pointed, black tail feathers.

Green-winged Teal

Size: Medium, but small for a duck
Feet: Webbed
Bill: Wide, flat
Summer Habitat: Ponds, lakes and marshes in forested areas
Nest: On ground in sedges or long grasses, near water
Food: Insects, mollusks, crustaceans
Wintering Area: Washington to Mexico
Notes: Smallest dabbling duck, fast flying and agile. Green ear patch on rusty-colored head, white stripe on gray side.

Northern Shoveler

Size: Medium
Feet: Webbed
Bill: Wide, flat
Summer Habitat: Lakes, flooded marshes and bays
Nest: On ground, near water
Food: Seeds, tiny fish, small birds, crustaceans and mollusks
Wintering Area: Washington to Mexico
Notes: Chocolate iridescent head, long, slender neck, and long, pointed, black tail feathers.

American Wigeon

Size: Medium
Feet: Webbed
Bill: Wide, flat
Summer Habitat: Marshes, shallow waters of ponds and lakes
Nest: On ground, sometimes away from water
Food: Aquatic vegetation, occasionally comes to shore to eat shoots of sedges and grasses
Wintering Area: Washington to Mexico
Notes: Shiny white crown, green band on side of head. Nickname is Baldpate.
Canvasback

**Size:** Medium

**Feet:** Webbed  
**Bill:** Wide, flat

**Summer Habitat:** Open lakes and marshes

**Nest:** In deep water lakes with vegetated shallows; marshes and sloughs

**Food:** Fish, aquatic vegetation, insects, molluscs, crustaceans

**Wintering Area:** California and Maryland

**Notes:** Red, slapping head, black chest, white back. The Canvasback and ducks in the following descriptions are diving ducks, which dive underwater for food. They are heavy birds that paddle along the water surface before taking off.

Greater Scaup

**Size:** Medium

**Feet:** Webbed  
**Bill:** Wide, flat

**Summer Habitat:** Wooded lakes, ponds and rivers

**Nest:** Nest water in dense vegetation.

**Food:** Aquatic vegetation, fish, crustaceans, molluscs

**Wintering Area:** California, Maryland

**Notes:** Bufflehead

**Size:** Medium

**Feet:** Webbed  
**Bill:** Wide, flat

**Summer Habitat:**  

**Nest:** Tree cavity

**Food:** Aquatic vegetation, fish, crustaceans, molluscs

**Wintering Area:** Coastal Alaska to Mexico

**Notes:** The Common Goldeneye has a roundish white spot below the eye and a glossy green head, while the Barrow's Goldeneye has a crescent-shaped spot and a glossy purplish head.

Bufflehead

**Size:** Medium, but small for a duck

**Feet:** Webbed  
**Bill:** Wide, flat

**Summer Habitat:** Wooded lakes, ponds and rivers

**Nest:** Tree cavity

**Food:** Aquatic vegetation, fish, crustaceans, molluscs

**Wintering Area:** Coastal Alaska to Mexico

**Notes:** A large white patch on black head. Unlike other diving ducks, it takes off without running along the surface.
Oldsquaw

**Size:** Medium  
**Feet:** Webbed  
**Bill:** Wide, flat  
**Summer Habitat:** Tundra lakes and marine waters  
**Nest:** Under bushes or in wedges near coastal ponds and lakes, and in well-concealed depressions in the tundra.  
**Food:** Aquatic vegetation, mollusks, insects  
**Wintering Area:** Sea of Okhotsk, Siberia, or Bering Sea  
**Notes:** The flat bill  

Harlequin Duck

**Size:** Medium, but small for a duck  
**Feet:** Webbed  
**Bill:** Wide, flat  
**Summer Habitat:** Swift streams and rivers; also, tidal saltwater shores  
**Nest:** In grass and near fast streams  
**Food:** Mollusks, crustaceans, fish, salmon eggs  
**Wintering Area:** Aleut Islands, California  
**Notes:** The male's beautiful red, blue, white and black plumage appears dark at a distance.  

Common Eider

**Size:** Medium to large  
**Feet:** Webbed  
**Bill:** Wide, flat  
**Summer Habitat:** Shallow bays and tundra near marine waters  
**Nest:** Near ponds and lakes  
**Food:** Mollusks and crustaceans  
**Wintering Area:** Coastal Alaska wherever water is open, except southeast  
**Notes:** White back and breast, with black sides and an orange bill shield. Largest duck in Alaska and North America. There are four kinds of eiders in Alaska.  

Surf Scoter

**Size:** Medium  
**Feet:** Webbed  
**Bill:** Wide, flat  
**Summer Habitat:** Lakes and rivers  
**Nest:** On tundra and in wooded areas, near lakes and ponds  
**Food:** Vegetation and mollusks  
**Wintering Area:** Coastal Alaska to Mexico  
**Notes:** Black overall, with long multicolored bill, and white patches on forehead and back of neck.
Red-breasted Merganser

Size: Medium to large
Feet: Webbed
Bill: Hooked, teethlike
Summer Habitat: Lakes, fish streams, marine waters
Nest: In woodlands near lakes and rivers, or in sheltered coastal areas.
Food: Fish, crustaceans and mollusks
Wintering Area: Coastal Alaska to Mexico
Notes: Fishish-brown chest patches; glossy green crested head; red eyes; long, narrow bill.

Rough-legged Hawk

Size: Large
Feet: Grasping
Bill: Hooked
Summer Habitat: Upland tundra with cliffs
Nest: On cliffs or in trees
Food: Rodents
Wintering Area: Western United States
Notes: Broad, white tail with a dark band at the end. Often hovers while hunting.

Red-tailed Hawk

Size: Large
Feet: Grasping
Bill: Hooked
Summer Habitat: In summer woodlands and coniferous forests
Nest: In trees or on cliffs
Food: squirrels, rabbits, voles, lemmings
Wintering Area: Western United States
Notes: Broad, white tail with a dark band at the end. Has a distinctive call—a harsh descending scream.

Bald Eagle

Size: Very large
Feet: Grasping
Bill: Hooked
Summer Habitat: Rivers and streams, coastal beaches, forests
Nest: In old trees; also in cliffs and on ground in areas without trees
Food: Mainly dead or dying fish, birds, seabirds and small mammals, carrion
Wintering Area: Coastal Alaska to California; a few winter in open water in Interior
Notes: The white head and tail feathers contrast with the brown body.
**Golden Eagle**

**Size:** Very large  
**Feet:** Grasping  
**Bill:** Husked  
**Summer Habitat:** Mountains, tundra  
**Nest:** Cliffs or treetops  
**Food:** Rodents, rabbits, marmots, squirrels and birds  
**Wintering Area:** Coastal Alaska  
**Notes:** Body a golden-brown color. Commonly seen soaring over mountain ridges.

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**Northern Harrier**

**Size:** Medium  
**Feet:** Scratching  
**Bill:** Hooked  
**Summer Habitat:** Open marshes, open mountain ridges, fields  
**Nest:** On ground in wet, marshy areas  
**Food:** Mice and small birds  
**Wintering Area:** Mexico, Central America  
**Notes:** White rump is prominent in flight. tail's flying only a few feet off the ground, with wings held at an upward angle.

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**Blue Grouse**

**Size:** Medium  
**Feet:** Scratching  
**Bill:** Short, strong  
**Summer Habitat:** Deciduous and coniferous forests, muskeg, alpine meadows  
**Nest:** On ground, often near a tree or log  
**Food:** Seeds and berries  
**Wintering Area:** Southeast Alaska  
**Notes:** The courting male bird produces deep booming sounds from his inflated neck sacs.

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**Peregrine Falcon**

**Size:** Medium  
**Summer Habitat:** Open country near cliffs; shores and marshes frequented by waterfowl and shorebirds  
**Nest:** On cliff ledges  
**Food:** Birds, especially seabirds and songbirds  
**Wintering Area:** British Columbia to South America  
**Notes:** One of the swiftest birds in the world. Nickname is "the Duck Hawk." Best identifying marks are facial pattern, dark cap and large size.

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**Grouse and Ptarmigan:** These are plump, chicken-like birds that generally feed on the ground.
Spruce Grouse

Size: Medium
Feet: Scratching
Bill: Short, strong
Summer Habitat: Forests
Nest: On ground, near a tree or under a log
Food: Seeds, berries, leaves and tree needles
Wintering Area: Central Alaska
Notes: This bird is very tame and can often be approached quite closely. Black throat and breast; black tail with orange tip; red comb over eye.

Willow Ptarmigan

Size: Small
Feet: Scratching
Bill: Short, strong
Summer Habitat: Willow thickets, muskeg and tundra
Nest: In ground under important vegetation
Food: Willow buds and leaves, berries, insects
Wintering Area: Throughout Alaska
Notes: Black-tipped tail, feathers on feet. This is Alaska's state bird. It usually looks much reddish than the rock ptarmigan, but the two are difficult to tell apart.

Great Blue Heron

Size: Very large—may stand four feet tall
Feet: Wading
Bill: Long spear
Summer Habitat: Salt and freshwater beaches, streams, shallow lakes, and marshes
Nest: Colonial nesters. Make platform of sticks in upper parts of tall trees, sometimes on rocky ground or in bushes
Food: Expert at catching fish, frogs and other water animals by spearing with bill
Wintering Area: Coastal Alaska
Notes: Long-necked, long-legged, blue-gray bird with a long yellow bill. Often seen wading in shallow water; sometimes in trees.

Sandhill Crane

Size: Very large
Feet: Wading
Bill: Long, pointed
Summer Habitat: Lowland tundra and marshes
Nest: On ground in grassy marshes
Food: Small rodents, frogs and insects
Wintering Area: California to Mexico
Notes: Gray, with red crown. Flies in large, noisy flocks. Holds neck straight out in flight, unlike the Great Blue Heron which folds its neck back in an "S" when flying.
Black Oystercatcher

Size: Medium
Feet: Wading
Bill: Long, flat
Summer Habitat: Rocky shores, islands
Nest: In beach gravel
Food: Mollusks, crabs and worms
Wintering Area: Coastal Alaska to Mexico
Notes: Black feathers, striking orange-red bill and feet.

Lesser Golden-Plover

Size: Small to medium
Feet: Wading
Bill: Pointed
Summer Habitat: Tundra, tidelands
Nest: Moss in tundra
Food: Insects or small marine animals, berries
Wintering Area: Hawaii, New Zealand, Asia
Notes: Black breast, throat and chin; marbled golden back.

Semipalmated Plover

Size: Small
Feet: Wading
Bill: Pointed
Summer Habitat: Lake, pond and river beaches; mudflats
Nest: In ground in sand, gravel or moss
Food: Worms, mollusks, and crustaceans
Wintering Area: California to South America
Notes: Has a wiry, black breast band; the legs and base of bill are orange.

Whimbrel

Size: Medium—but large for a sandpiper
Feet: Wading
Bill: Pointed
Summer Habitat: Tundra
Nest: In a depression or on a mound of vegetation in the tundra
Food: Insects, small marine animals
Wintering Area: California to South America
Notes: Impressive long, downcurved bill; striped crown.
Greater Yellowlegs

- **Size:** Medium
- **Feet:** Wading
- **Bill:** Pointed
- **Summer Habitat:** Muskeg and tundra
- **Nest:** On ground in moss
- **Food:** Insects, small marine animals
- **Wintering Area:** Washington to South America

**Notes:** A slim bird with yellow or orange legs. Larger than Lesser Yellowlegs and has a longer, heavier bill. Has a yodeling cry.

Red-necked Phalarope

- **Size:** Small
- **Feet:** Wading
- **Bill:** Pointed
- **Summer Habitat:** Tundra marshes and ponds
- **Nest:** Near water on ground in wet, grassy areas
- **Food:** Small marine animals, insects, crustaceans
- **Wintering Area:** At sea in South Pacific

**Notes:** Has a white throat with chestnut neck. Males incubate the eggs and care for young.

Spotted Sandpiper

- **Size:** Small
- **Feet:** Wading
- **Bill:** Pointed
- **Summer Habitat:** Shore of streams, rivers, lakes and marshes
- **Nest:** Near water in gravel or grass
- **Food:** Aquatic insects
- **Wintering Area:** Washington to South America

**Notes:** Striking plumage; barred upperparts and spotted underparts. Feeds ground. This bird bobs and teeters almost constantly.

Common Snipe

- **Size:** Small
- **Feet:** Wading
- **Bill:** Pointed
- **Summer Habitat:** Freshwater marshes, muskeg
- **Nest:** In grasses, sedges or alders
- **Food:** Insects, small marine animals
- **Wintering Area:** Southeast Alaska to South America

**Notes:** Vibrating tail feathers make a winnowing sound as bird dives downward in display flight.
Pectoral Sandpiper

Size: Small
Feet: Wading
Bill: Pointed
Summer Habitat: Grassy areas in wet tundra
Nest: On ground within tundra vegetation
Food: Insects, small marine animals, worms
Wintering Area: South America
Notes: Legs are yellowish-green. Breast streaks form bib above white belly.

Dunlin

Size: Small
Feet: Wading
Bill: Pointed
Summer Habitat: Coastal sedge-grass marshes, wet grassy tundra
Nest: On ground in grassy areas
Food: Mollusks, insects
Wintering Area: Asia, and California southward
Notes: Rusty back; white underparts with a large black patch on belly; drooped bill.

Long-tailed Jaeger

Size: Medium
Feet: Webbed
Bill: Hooked
Summer Habitat: Wet coastal tundra, and drier interior tundra
Nest: On ground
Food: Mostly lemmings, also other rodents, eggs, young shorebirds and songbirds
Wintering Area: At sea in South Pacific
Notes: Long central tail feathers, which often flutter in flight. Hovers over prey, then swoops down.

Glaucous-winged Gull

Size: Medium to large
Feet: Webbed
Bill: Stout, hooked
Summer Habitat: Tidal flats and beaches, islands and cliffs
Nest: In colonies on islands, cliff ledges and on rocky beaches
Food: Fish, bird eggs, molluscs
Wintering Area: Coastal Alaska to California and Japan
Notes: Large gull with dark eyes, pink legs, light gray back, and yellow bill with a red spot.
**Mew Gull**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Slender, hooked
- **Summer Habitat:** Tundra, streams, rivers, lakes and islands
- **Nest:** On tundra, on stumps, in trees, in depressions on sand
- **Food:** Fish, insects, molluscs, crustaceans
- **Wintering Area:** Coastal Alaska to California
- **Notes:** Half the size of Glaucous-winged Gull. At close range the thin, yellow bill and greenish-yellow feet and legs are visible

**Bonaparte’s Gull**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Stout, hooked
- **Summer Habitat:** Coniferous woods near ponds and lakes
- **Nest:** In trees
- **Food:** Fish, invertebrates
- **Wintering Area:** British Columbia to Mexico
- **Notes:** Black head, black bill, gray back and red legs. Flight is buoyant and ternlike.

**Sabine’s Gull**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Stout, hooked
- **Summer Habitat:** Wet tundra, tidal flats, lakes and ponds
- **Nest:** On tundra near lakes and ponds
- **Food:** Fish, insects, crustaceans
- **Wintering Area:** Coast to South America
- **Notes:** Bold dark gray and white pattern of triangles on spread wings. Dark head, gray back, forked tail; black bill with yellow tip.

**Black-legged Kittiwake**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Stout, hooked
- **Summer Habitat:** Sea cliffs, inshore marine waters
- **Nest:** In large colonies on sea cliffs
- **Food:** Fish, crustaceans
- **Wintering Area:** Coastal Alaska to Mexico, Japan
- **Notes:** Triangular black wing tips, black legs, and yellow bill. Follows ships, boats.
**Arctic Tern**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Sharp, strong
- **Summer Habitat:** Tidelands, lakes, rivers, beaches and marshes
- **Nest:** In rocks, sand, gravel or moss; in colonies or pairs
- **Food:** Small fish, insects
- **Wintering Area:** South America, Antarctica
- **Notes:** Most terns have a forked tail. They differ from gulls in their feeding technique: they hover, then plunge-dive after fish.

**Common Murre**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Heavy, pointed
- **Summer Habitat:** Coastal sea cliffs, islands
- **Nest:** In colonies on cliff ledges and cliff tops
- **Food:** Small fish, marine invertebrates
- **Wintering Area:** Coastal Alaska to Washington, Japan
- **Notes:** White belly, black head and back. Murre, guillemots, puffins and other birds in the same family come to shore only to nest. They stand upright like penguins and have small, narrow wings for swimming underwater and flyingly.

**Pigeon Guillemot**

- **Size:** Medium
- **Feet:** Webbed
- **Bill:** Heavy, pointed
- **Summer Habitat:** Inshore marine waters
- **Nest:** In cliff crevices and between boulders above high tide line.
- **Food:** Fish
- **Wintering Area:** Along edge of Arctic ice pack to California
- **Notes:** Black body with white wing patch. Feet are bright red.

**Marbled Murrelet**

- **Size:** Small
- **Feet:** Webbed
- **Bill:** Heavy, pointed
- **Summer Habitat:** Inshore marine waters
- **Nest:** Inland, on ground or in trees
- **Food:** Marine invertebrates, fish
- **Wintering Area:** Coastal Alaska to California
- **Notes:** Smallest of the murre family. Upper parts are brown mottled with red or gray; underparts white mottled with brown. Flight is very rapid.
Tufted Puffin

Size: Medium
Feet: Webbed
Bill: Large, triangular

Summer Habitat: Inshore marine waters; islands
Nest: In burrows in the soil; sometimes in rock crevices
Food: Fish, marine invertebrates

Wintering Area: Coastal Alaska to California, Japan
Notes: Log, yellow tufts on head. Striking orange-and-green bill. White face and black body.

Rock Dove

Size: Medium
Feet: Perching
Bill: Short, swelling at base

Summer Habitat: Cities and towns
Nest: On building ledges
Food: Grains, fruit, seeds
Wintering Area: Does not migrate
Notes: These birds have been introduced into each Alaskan community in which they are seen. Color varies, but many are gray with two black bars on wings.

Boreal Owl

Size: Small to medium
Feet: Grasping
Bill: Hooked

Summer Habitat: Coniferous and mixed coniferous-deciduous forests; muskeg
Nest: In tree cavities
Food: Mice, small birds and insects
Wintering Area: Central Alaska
Notes: Strictly nocturnal except during the arctic summer. Seems quite tame. Like other owls, has a large head, short neck, and large eyes facing forwards. Black frame around face.

Great Horned Owl

Size: Large
Feet: Grasping
Bill: Hooked

Summer Habitat: Coniferous and deciduous forests
Nest: In trees
Food: Rabbits, squirrels, raccoons, porcupines, mice, skunks, gophers, geese, ducks, and domestic cats and poultry
Wintering Area: Throughout Alaska
Notes: Prominent ear tufts or "horns." Very aggressive. Chiefly nocturnal.
**Short-eared Owl**

*Size*: Medium  
*Feet*: Grasping  
*Bill*: Hooked  
*Summer Habitat*: Open country: marshes, muskeg, tundra and tidal flats  
*Nest*: In ground in grass-lined depression  
*Food*: Small mammals  
*Winterying Area*: Throughout Alaska and south to California  
*Notes*: Active at dawn and dusk. Bounces from side to side in flight, with long glides, and very deep wing strokes.

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**Snowy Owl**

*Size*: Large  
*Feet*: Grasping  
*Bill*: Hooked  
*Summer Habitat*: Tundra  
*Nest*: On ground on dry tundra; on cliffs  
*Food*: Lemmings, rodents and hares  
*Winterying Area*: Along ice pack to California  
*Notes*: All white, with round head and no ear tufts. Hunts by day and night.

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**Rufous Hummingbird**

*Size*: Very small  
*Feet*: Perching  
*Bill*: Long, slender  
*Summer Habitat*: Forests, woodland edges, and anywhere flowers are available  
*Nest*: In trees and bushes  
*Food*: Flower and blossom nectar, tiny insects  
*Winterying Area*: California to Mexico  
*Notes*: Orange-rufous body and iridescent orange-red throat patch. The smallest bird in Alaska.

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**Belted Kingfisher**

*Size*: Small to medium  
*Feet*: Perching  
*Bill*: Spearlike  
*Summer Habitat*: Rivers, streams, ponds, lakes and estuaries  
*Nest*: In burrows dug into a stream bank  
*Food*: Fish  
*Winterying Area*: Coastal Alaska  
*Notes*: Head, upperparts and band across chest are bluish-gray. Often hovers over water or perches nearby watching, then plunges head-first to catch fish.
Northern Flicker

**Size:** Medium

**Feet:** Two forward, two back

**Bill:** Sharp, strong

**Summer Habitat:** Coniferous or deciduous forests; open woodlands.

**Nest:** In a tree or stump cavity

**Food:** Insect larvae, ants and berries

**Wintering Area:** Washington to California

**Notes:** Gray face with red mustache; black and brown barred upperparts; white rump patch shows in flight. Strong, sharply-pointed bill for digging into tree trunks. Stiff tail feathers used as a prop for climbing.

Three-toed Woodpecker

**Size:** Small

**Feet:** Two forward, two back

**Bill:** Sharp, strong

**Summer Habitat:** Coniferous and mixed deciduous-coniferous forests

**Nest:** In a tree cavity

**Food:** Insect larvae

**Wintering Area:** Alaska

**Notes:** Black and white barring down back and sides; yellow cap on head.

Downy Woodpecker

**Size:** Small

**Feet:** Two forward, two back

**Bill:** Sharp, strong

**Summer Habitat:** Coniferous and deciduous forests

**Nest:** In a tree cavity

**Food:** Insect larvae

**Wintering Area:** Forests from coastal Alaska to Washington

**Notes:** Black and white markings, red patch on back of head, and a stubby bill that is shorter than head. The similar Hairy Woodpecker is larger, with a longer bill.

Alder Flycatcher

**Size:** Small

**Feet:** Perching

**Bill:** Slender

**Summer Habitat:** Thickets

**Nest:** In the upright crotch of a tall shrub

**Food:** Insects

**Wintering Area:** Central and South America

**Notes:** There are four small flycatcher species in the state; they are difficult to tell apart, but their calls are different and they are found in different types of habitat.
Horned Lark

**Size:** Small  
**Feet:** Perching  
**Bill:** Slender  
**Summer Habitat:** Alpine tundra  
**Nest:** On ground in tundra  
**Food:** Seeds and insects  
**Wintering Area:** Rocky Mountains southward  
**Notes:** Yellow face with black markings, brown back, white belly. Song is a weak tinkling series of notes, given from high in the air. Walks along the ground, and seldom alights on trees or bushes.

Tree Swallow

**Size:** Small  
**Feet:** Perching  
**Bill:** Slender  
**Summer Habitat:** Marshes, lakes, streams and wet muskeg  
**Nest:** Tree cavities, especially near water  
**Food:** Insects  
**Wintering Area:** California to Panama  
**Notes:** Dark blue-gray below, white below. Swallows capture insects while flying. Have big mouths and tiny bills.

Bank Swallow

**Size:** Small  
**Feet:** Perching  
**Bill:** Slender  
**Summer Habitat:** Near water  
**Nest:** In colonies; burrows are excavated in river and stream banks and highway cuts  
**Food:** Insects  
**Wintering Area:** South America  
**Notes:** Brownish-gray breast band on white underparts; brown back.

Barn Swallow

**Size:** Small  
**Feet:** Perching  
**Bill:** Slender  
**Summer Habitat:** Marshes and over water  
**Nest:** Mud cup on or in buildings; under bridges; in caves  
**Food:** Insects  
**Wintering Area:** South America  
**Notes:** Glossy blue back and cinnamon belly; deeply forked tail.
Cliff Swallow

Size: Small

Feet: Perching

Bill: Slender

Summer Habitat: Over water and open land

Nest: Bulb-shaped and made of mud; built under building eaves, or on cliffs, dams and bridges. Nests in colonies.

Food: Insects

Wintering Area: South America

Notes: Short, square tail; chestnut throat; blue-black back with white stripes.

Steller's Jay

Size: Medium

Feet: Perching

Bill: Heavy, pointed

Summer Habitat: Coniferous forests

Nest: In conifers, at least 10 feet above ground

Food: Meat, eggs, insects, berries and seeds

Wintering Area: Southeast Alaska

Notes: Deep blue and black, with a striking black crest. Voice is a harsh call: shuck-shuck-shuck-shuck. Also mimics hawks.

Gray Jay

Size: Medium

Feet: Perching

Bill: Slender

Summer Habitat: Coniferous forests

Nest: In conifers

Food: Meat, carrion, eggs, insects, berries and seeds

Wintering Area: Forests of Central Alaska

Notes: Common campground visitors. Gray Jays will take any food left unattended. Very tame; will take food from a hand.

Black-billed Magpie

Size: Medium

Feet: Perching

Bill: Heavy, pointed

Summer Habitat: Open woodlands

Nest: Tall brush or trees

Food: Meat, carrion, eggs, insects, fruit and seeds

Wintering Area: Southern Alaska

Notes: Black and white body, and unusually long tail with glossy green highlights.
Common Raven

- **Size**: Large
- **Feet**: Perching
- **Bill**: Heavy, pointed
- **Summer Habitat**: Mountains, coastal areas, cliffs and garbage dumps
- **Nest**: In trees or on cliffs
- **Food**: Mostly carrion, birds' eggs, seeds, and any available garbage
- **Wintering Area**: Throughout Alaska
- **Notes**: Large black body, with wedge-shaped tail and heavy bill. Soars like a hawk. Makes a variety of hoarse sounds.

Northwestern Crow

- **Size**: Medium
- **Feet**: Perching
- **Bill**: Heavy, pointed
- **Summer Habitat**: Coastal areas, tidal flats, marshes, forest edge
- **Nest**: In trees or sometimes under boulders near shoreline, sometimes in large groups
- **Food**: Dead fish, clams, mussels, crabs, berries and insects
- **Wintering Area**: Southeast Alaska
- **Notes**: All black. Has a square-cut tail and shorter bill than the Common Raven. Often scavenges along shorelines.

Black-capped Chickadee

- **Size**: Small
- **Feet**: Perching
- **Bill**: Short, strong
- **Summer Habitat**: Both deciduous and coniferous forests
- **Nest**: In dead tree or shrub cavities
- **Food**: Insects
- **Wintering Area**: Central and Southern Alaska, Coastal Shrublands
- **Notes**: Boreal Chickadees and Chestnut-backed Chickadees are also seen in parts of Alaska. Black-capped has solid black cap, gray back and pale sides. Boreal and Chestnut-backed both have brown caps and more chestnut color on body. All chickadees dark bibs.

American Dipper

- **Size**: Small
- **Feet**: Perching
- **Bill**: Short, strong
- **Summer Habitat**: Fast moving streams; occasionally lake and pond shores
- **Nest**: Large, mossy nests on rock wall or bank of stream, often behind a waterfall
- **Food**: Aquatic insects, small fish and fish eggs
- **Wintering Area**: Open streams throughout Alaska
- **Notes**: Slate-gray; short tail. Dips up and down while standing. Can walk and swim underwater to feed.
Winter Wren

Size: very small
Feet: Perching
Bill: Short, strong
Summer Habitat: Brush or thick undergrowth of forests; or island beaches in rocks
Nest: In brush piles, old stumps, and broken tree roots, especially along stream banks
Food: Insects
Wintering Area: Southern Alaska
Notes: Alaskan wren; all brown with tail cocked up over back.

American Robin

Size: Small to medium
Feet: Perching
Bill: Strong, slender
Summer Habitat: Forest edges, muskeg, tundra, and muskeg
Nest: In crotch of tree or bush
Food: Worms, insects, and berries
Wintering Area: Southern Alaska to California and Louisiana, Florida
Notes: Prick red breast and dark grey body. Often seen hopping on ground, eating worms. The robin is a kind of thrush; thrushes are all fine singers and have large eyes.

Hermit Thrush

Size: Small
Feet: Perching
Bill: Strong, slender
Summer Habitat: Coniferous or mixed woodlands; shrub thickets
Nest: Usually on ground, sometimes in a tree
Food: Insects and berries
Wintering Area: Oregon and California southward
Notes: Brown upperparts, reddish-brown tail. Flutelike song is a single long note followed by a rapid series of rising and falling notes.

Northern Wheatear

Size: Small
Feet: Perching
Bill: Strong, slender
Summer Habitat: Tundra, mountain ridges
Nest: In crevices under rocks and rubble
Food: Seeds and insects
Wintering Area: Africa
Notes: White rump, blue-gray back, black and white tail. A perky bird, it bobs up and down and flits from rock to rock in search of food.
Ruby-crowned Kinglet

Size: Very small

Feet: Perching  Bill: Slender

Summer Habitat: Coniferous forests, woodlands, shrub thickets and brush

Nest: In conifers, usually 20-60 feet above ground

Food: Insects and insect larvae

Notes: Whitish eye-ring, greenish-olive upperparts. The ruby crown is often hidden. Often flicks its wings.

Water Pipit

Size: Small

Feet: Perching  Bill: Slender

Summer Habitat: Tidelands, lakes, ponds, tundra, rivers and streams

Nest: In ground in tundra or mountain meadows

Food: Insects and seeds

Notes: Lightly streaked brown back, heavily brown-streaked sides. Tail bobs rapidly. Very common throughout Alaska.

Bohemian Waxwing

Size: Small

Feet: Perching  Bill: Short, strong

Summer Habitat: Wet muskeg

Nest: In a conifer

Food: Fruits, berries and insects

Wintering Area: Southeast Alaska to Mexico

Notes: Crested head, black mask, yellow-tipped tail and gray belly.

Northern Shrike

Size: Small to medium

Feet: Perching  Bill: Slender

Summer Habitat: Tundra shrub thickets, edges of coniferous forests and mixed deciduous-coniferous woodlands

Nest: In a small deciduous tree or a thorny shrub

Food: Small rodents and birds, large insects

Wintering Area: Southeast Alaska to California

Notes: This pale gray and black bird lacks talons; it impales its prey on thorns, broken twigs or barb-wires. If it kills more than it can eat it hangs food in trees, so it is called the "butcher bird."
Yellow-rumped Warbler

Size: Small
Feet: Perching
Bill: Slender

Summer Habitat: Coniferous forests, shrub thickets, mixed deciduous-coniferous woodlands

Nest: In a conifer, usually 4-10 feet above ground

Food: Insects

Wintering Area: Southern British Columbia to Mexico

Notes: Bright yellow crown, rump, and patches on either side of belly; body is gray, black and white.

Wilson's Warbler

Size: Small
Feet: Perching
Bill: Slender

Summer Habitat: Moist woodlands, shrub thickets

Nest: In or near the ground in shrub thickets

Food: Insects

Wintering Area: Mexico to Bahamas

Notes: Body is olive above and entirely bright yellow below. Black cap.

Rusty Blackbird

Size: Small
Feet: Perching
Bill: Sharply pointed, slender, strong

Habitat: Willow thickets in coastal areas; marshes inland

Nest: In a conifer, willow or alder near water

Food: Insects

Wintering Area: Rare as far north as southern Alaska, but most winter in southern central Canada and northern, central and eastern United States

Notes: Black body; yellow eyes.

Pine Grosbeak

Size: Small to medium
Feet: Perching
Bill: Short, strong, curved

Summer Habitat: Open coniferous forests

Nest: In a conifer, 10-15 feet above ground

Food: Seeds and berries

Wintering Area: Alaska to Washington; Japan

Notes: Plump, robin-sized bird. Upper body is red, belly gray; bill dark. Usually seen in flocks.
White-winged Crossbill

Size: Small
Feet: Perching
Bill: Strong, short, crossed
Summer Habitat: Coniferous forests
Nest: In a conifer
Food: Conifer seeds
Wintering Area: Central and Southwestern Alaska

Notes: Distinctive pinkish color; broad white wing bars. Only at close range can one observe the crossed bill.

Common Redpoll

Size: Small
Feet: Perching
Bill: Short, strong
Summer Habitat: Subarctic forests, tundra, shrub thickets, open fields and grasslands
Nest: On ground, in shrubs, or in lower branches of trees
Food: Seeds, insects
Wintering Area: Alaska to California, Japan

Notes: Bright red cap, blackish chin and pink breast. Has heavier streaking and longer bill than the very similar Hoary Redpoll. These two kinds of redpolls are often found together, and they interbreed.

Savannah Sparrow

Size: Small
Feet: Perching
Bill: Short, strong
Summer Habitat: Open grassy fields
Nest: On ground in grassy areas, tundra
Food: Insects, insect larvae, seeds
Wintering Area: British Columbia to California

Notes: Pale; streaked breast; yellow eyebrow; short, notched tail. Song is a buzzy tsa-tsa-tsa-tsa-tsee-tsee-tsee.

Dark-eyed Junco

Size: Small
Feet: Perching
Bill: Strong
Summer Habitat: Coniferous forests, muskegs and clearings
Nest: On ground
Food: Insects, seeds
Wintering Area: Southern Alaska to Mexico

Notes: Juncos breeding north of Yakutat Bay are all slate gray with a white belly; those breeding south of Yakutat Bay have a black hood, reddish-brown back and buffy-pink sides.
White-crowned Sparrow

Size: Small

Legs: Perching
Bill: Short, strong

Summer Habitat: Forest edge, shrub
Nest: In ground in low shrub or grass clump
Food: Seeds, insects

Wintering Area: British Columbia to Mexico

Notes: Black and white striped head; black-capped bill. Sides of head are fritted; with a yellow stripe in front of eye.

Fox Sparrow

Size: Small

Legs: Perching
Bill: Short, strong

Summer Habitat: Shrub, forest edge
Nest: In ground under shrubs, or low in a tree or shrub
Food: Seeds, insects

Wintering Area: Southern Alaska to California

Notes: Head and breast are black; broad white stripe in front of eye to side of breast; hind neck reddish-brown.

Lapland Longspur

Size: Small

Feet: Perching
Bill: Short, strong

Summer Habitat: Tundra, alpine
Nest: On grass clumps or dry knoll
Food: Insects, seeds

Wintering Area: Washington to California

Notes: One of the most common breeding land birds of the tundra.

Snow Bunting

Size: Small

Feet: Perching
Bill: Short, strong

Summer Habitat: Tundra, rocky slopes, rocky shores
Nest: On ground in tundra, rock crevices
Food: Seeds, insects

Wintering Area: British Columbia to Oregon and Japan

Notes: Black and white bird with long black and white wings. Often seen with Lapland Longspurs and Horned Larks.