

Colorful Changes

Grade Level: lower elementary, upper elementary/middle school; upper middle school/ high school
Duration: one class period for research, two or more class periods to complete the art work depending on the medium used.
Skills: communication, observation, and visualization
Subjects: science and fine arts

Concepts

- During a shorebird's breeding season, its habitat is where it courts, nests, and raises its young.
- Most shorebirds look different during the nonbreeding and breeding seasons.

Vocabulary

- camouflage
- courtship
- plumage
- breeding season
- nonbreeding season
- cryptic coloration
- polyandrous
- breeding plumage

Overview

Students discover that some shorebirds have dramatically different breeding and nonbreeding plumage. They then create an artistic representation of a shorebird species in both seasons.

Objectives

After this activity, students will be able to:

- Define the term plumage.
- Name at least one shorebird that looks different during the breeding and nonbreeding seasons.
- Explain the purpose for this change in appearance.

Materials

- *Shorebird Coloring Pages* (for lower elementary students)
- *Shorebird Field Guides* (refer to the *Appendix* for a list of suggested books)

- Magazine or newspaper photographs of shorebirds
- Shorebird posters (including those in this education guide)
- Illustration and coloring materials (depending on the medium you and your students choose)

Introduction

In the world of shorebirds, it is often hard to distinguish between males and females, as well as juveniles and adults, of the same species. This is partly due to their *cryptic coloration*. The colors and patterns on their feathers, or *plumage*, provide effective *camouflage* and makes it a challenge to tell them apart.

For some shorebirds, however, this is not true during the short and hurried *breeding season*. Males rush ahead of females to establish a breeding territory, sometimes even selecting a nesting site before finding a mate. It is in the best interest of the pair—and the species for that matter—that males and females find each other quickly. They may have as little as three months to breed before winter returns. A more colorful male stands out against other species, females of the same species, and the surrounding habitat. The males' colorful breeding *plumage*

helps a female find an appropriate mate more quickly on the crowded nesting grounds.

While it is male songbirds that have the brighter breeding colors, that is not always the case with shorebirds. In *polyandrous* species, such as the Red-necked and Red Phalaropes, it is the female that is more brightly colored in the breeding season.

Shorebirds do not rely only on *breeding plumage* to attract a mate. They also use a complex and elaborate set of breeding rituals, including gestures and calls to get each other's attention.

For more information on shorebird breeding, refer to *Shorebird Nesting and Breeding* in the *Shorebird Primer*. For a list of shorebirds in your flyway that have significantly different breeding and nonbreeding plumage, refer to the table below.

Activity Preparation

For Lower Elementary Students

1. Make a list of shorebirds found in your area that display different breeding and nonbreeding plumage. Use the information in this activity and in the *Shorebird Profiles*, located in the *Appendix*, for help making your list.

Shorebirds with Different Breeding and Nonbreeding Plumage

<i>Atlantic Flyway</i>	<i>Central Flyway</i>	<i>Pacific Flyway</i>
Black-bellied Plover Dunlin Red Knot Sanderling Spotted Sandpiper Western Sandpiper	American Avocet Black-bellied Plover Dunlin Hudsonian Godwit Spotted Sandpiper Western Sandpiper Wilson's Phalarope	Black-bellied Plover Dowitcher Dunlin Pacific Golden-Plover Ruddy Turnstone Sanderling Spotted Sandpiper Western Sandpiper

2. Photocopy the *Shorebird Coloring Pages* that match the birds on your list. Make enough copies so each student in your class will have two copies of the same shorebird illustration.
3. Display pictures of these shorebirds in both breeding and nonbreeding plumage around the room. Use shorebird posters (included in this guide) and shorebird pictures from magazines or newspapers, or pictures from these Web sites: <http://sssp.fws.gov>, <http://www.manomet.org/WSRHN/Prairies/index.htm>

For Upper Elementary/ Middle School Students

1. Make a list of shorebirds found in your area that display different breeding and nonbreeding plumage. Use the information in this activity and in the *Shorebird Profiles*, located in the *Appendix*, for help making your list.
2. Set up a shorebird reference corner in your classroom that includes magazine and newspaper photographs of shorebirds, shorebird posters (provided in this education guide), and shorebird field guides. Use the resource list in the *Appendix* for ideas.

For Upper Middle/ High School Students

1. Ask your students to make a list of shorebirds found in your area that display different breeding and nonbreeding plumage. Provide them with the list in this activity and the *Shorebird Profiles*, located in the *Appendix*, for help making the list.
2. Have your students work together to assemble a shorebird reference corner in your classroom that includes magazine

and newspaper photographs of shorebirds, shorebird posters (provided in this education guide), and shorebird field guides. For ideas, provide them with the resource list found in the *Appendix*.

Procedure

1. Discuss the term *plumage* with your class. Ask them why they think some shorebird species have a different plumage during the breeding and nonbreeding seasons. Do all shorebirds have a dramatic change in coloration during the breeding season? Ask them to speculate why they do not.
2. Show the students the shorebird resources you have. Explain that their task is to create an artistic representation of one shorebird that does have dramatically different breeding and nonbreeding colors. Assign or let the students choose from the species list you have prepared.

Lower Elementary Students

3. Ask them to color two *Shorebird Coloring Pages* for the shorebird they selected, using crayons, colored pencils, markers, or chalk. One coloring page should represent the shorebird in its nonbreeding plumage and the other in its breeding colors. Encourage them to be as realistic as possible.

Upper Elementary/Middle School

3. Ask these students to make two drawings of their shorebird species using the reference material provided. These can be simple outline drawings (similar to the *Shorebird Coloring Pages*) or more elaborate pencil or pen and ink drawings. Instruct them to add color to their drawings so that one illustration represents the shorebird in its nonbreeding plumage and the

other in its breeding colors. Encourage creativity and artistic expression. For example, an enthusiastic student might choose to add habitat to their drawings. Make sure they have done their research and know where their shorebird spends its summers and its winters.

Upper Middle/High School

3. Encourage older students to create three-dimensional models of their shorebirds. Suggest using clay, cardboard, fabric, or papier-mâché. The only requirement is that their work show the shorebird in both its breeding and nonbreeding plumage.
4. Arrange a shorebird art show to display the students' work within the school or the community. Upper Middle/High School students may want to include a brief description of their work that explains their choice of medium and how their work progressed.

Additional Activities

Shorebirds on Display and Shorebird Fair

Make *Colorful Changes* one part of a larger shorebird fair. Look up *Shorebirds on Display* and *Shorebird Fair* found in the section *The Big Shorebird Picture*.