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)

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

<table>
<thead>
<tr>
<th>Atlantic Flyway</th>
<th>Central Flyway</th>
<th>Pacific Flyway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black-bellied Plover</td>
<td>American Avocet</td>
<td>Black-bellied Plover</td>
</tr>
<tr>
<td>Dunlin</td>
<td>Black-bellied Plover</td>
<td>Dunlin</td>
</tr>
<tr>
<td>Red Knot</td>
<td>Dunlin</td>
<td>Red Knot</td>
</tr>
<tr>
<td>Sanderling</td>
<td>Hudsonian Godwit</td>
<td>Sanderling</td>
</tr>
<tr>
<td>Spotted Sandpiper</td>
<td>Spotted Sandpiper</td>
<td>Spotted Sandpiper</td>
</tr>
<tr>
<td>Western Sandpiper</td>
<td>Western Sandpiper</td>
<td>Western Sandpiper</td>
</tr>
<tr>
<td>Wilson’s Phalarope</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Explore the World with Shorebirds!
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://sssp.fws.gov), [http://www.manomet.org/WSRHN/Prairies/index.htm](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.

**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 Students**

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.

**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.

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*.