Educator Guide

Introduction

Shorebirds are amazing: their spectacular migrations are one of the longest on Earth. As the name suggests, they are found along shorelines, but they are uniquely adapted to a variety of habitats, and can be found from tundra in the Arctic to saline lakes in the desert. With funding from Environment and Climate Change Canada, the Executive Office for the Western Hemisphere Shorebird Reserve Network, Manomet, and Raincoast Education Society created this curriculum to highlight these unique flyers and their conservation needs.

This teacher's guide introduces each of the lessons and their activities in the curriculum and provides educational resources to help you and your students learn about shorebirds. With supplemental materials and real world examples, shorebirds will teach objectives in biology, habitat, migration, threats, ecosystem services, and stewardship.

Each lesson will begin with engaging, student-led, hands-on activities, followed by opportunities for synthesis and teacher guidance, additional rounds of hands-on learning to deepen the experience and allow students to apply their initial learning, and opportunities for assessment. Individual activities within the lesson are also structured this way to the extent possible. The online portal for the curriculum has all supplemental materials including printable worksheets, slideshows, and an interactive map. The online portal makes it easy to select and access materials for the lessons that are best for your class. Visit https://whsrn.org/discover-shorebirds/ to explore.

If your school or interpretive center is located near an important shorebird site, this curriculum can be a great resource for your students to connect to the importance of your local ecosystems. Stronger connections to sites will also promote and motivate children to engage in conservation and stewardship of the lands that surround them.

Alignment with Curricular Standards

The material included in this package was designed by consulting several different teaching standards identified for Grades 3-8 (ages 8-13) in Canada. Focus was given to the competencies and skills in British Columbia teaching standards (https://curriculum.gov.bc.ca/curriculum/science), however these objectives can be adapted for schools across the Western Hemisphere. Where possible curriculum includes elements that are related to additional priorities including math, enrichment, and traditional ecological knowledge.

Scalable: These lessons have been designed so that they are scalable and made relevant to younger or older students, depending on your needs.

Modular: Lessons complement one another but can also be offered as standalone units. Similarly, within lessons, activities complement one another but most can also be offered alone.

Know-Wonder-Learn Approach

The Know-Wonder-Learn (K-W-L) approach is used in most of the lessons. The K-W-L approach can be used to provide a structure for students' learning processes. It reinforces the idea that knowledge is accumulated, and empowers students to take ownership of their own learning process. During a K-W-L lesson, students begin by identifying things that they already know about a topic, and then things that they wonder about it. These are recorded in a chart, and the teacher then uses this information about prior knowledge and gaps in understanding to guide the rest of the lesson. At the end of the lesson, students return to the K-W-L chart to identify what they have learned about the topic, providing students with immediate positive feedback and the teacher with a way to evaluate the learning that took place.

Overview of Lessons

Key concepts: shorebirds, habitat, adaptation, camouflage, migration, tracking technologies, conservation, community stewardship

Lesson One: What is a shorebird?

1. Know-Wonder-Learn about Shorebirds
2. Hidden Eggs
3. What can I Eat with this Beak?
4. Fabulous Feet
5. Superfood for Shorebirds
6. Know-Wonder-Learn about Shorebirds, revisited

Students will use prior knowledge and observations of shorebirds and their habitats to construct explanations for how shorebird adaptations help them survive in their various habitats.

Students will analyze and interpret data on food availability in different habitats. Using this evidence students will prepare an argument for where particular shorebirds are likely to forage for food.

During these student-led, hands-on activities, students will explore shorebird adaptations and habitats. There is a strong focus on how the physical features of shorebirds (camouflage, bills, legs, feet) help them succeed in their habitats. Activities are designed for younger students, with suggested modifications for older students

Lesson Two: Migration Mania

1. Know-Wonder-Learn about Migration
2. Migration Headache
3. Shorebird Needs and Migration Map
4. Precarious Paths
5. Know-Wonder-Learn about Migration, revisited

Students will use prior knowledge and their experiences during a kinesthetic game to make predictions and construct explanations for why shorebirds migrate, and to identify what shorebirds might need during migration.

Students will identify patterns in the timing and geography of shorebird migrations, and use storytelling to communicate scientific information about migration to their peers.

This lesson will give students the opportunity to engage in interactive activities to learn about migration, expand on habitat needs, and introduce threats and conservation actions. Lesson three provides additional activities to discuss threats and actions to mitigate threats. Lesson four provides expanded learning opportunities for students with strong existing knowledge of migration.

Lesson Three: Making tracks with Shorebirds

1. Tracking with Satellite Transmitters
2. Resighting Flags
3. Motus Wildlife Tracking System
4. Design a Tracking Program

Students will investigate different technologies used to track shorebird migration, interpret and evaluate scientific datasets collected using those technologies, and identify the pros and cons of the different research methods.

Students will use prior knowledge of shorebird migration and their assessments of current tracking technologies to design a tracking plan for a selected species and share their plans with their classmates, clearly communicating their design rationale.

This activity introduces the science and technology behind several techniques used to better understand migration. Three types of technology will be reviewed and discussed through engaging activities. Students will discuss the advantages and disadvantages of each technology. The lesson culminates with students tasked to design their own tracking plan to answer questions about a selected species. This lesson is most appropriate for older students, with modifications possible for younger students.

Lesson Four: Shorebirds at Risk: Threats and Action

1. Know-Wonder-Learn about Threats to Shorebirds
2. Can't We Share?
3. What is WHSRN?
4. Protect your Site with your Voice
5. Know-Wonder-Learn about Threats, revisited

Students will use prior knowledge and their experience during a kinesthetic game to analyze how human behavior and environmental factors threaten shorebird habitats and then use these observations to make predictions about other potential threats facing shorebirds.

Students will utilize online resources and provide evidence from the WHSRN website to answer questions highlighting the importance and scope of WHSRN and its role in shorebird conservation.

Students will consider their own roles in shorebird conservation by examining the link between shorebird threats and human activity. Students will then advocate for a local shorebird species using artwork, poetry, press releases and other platforms to share their message with their peers.

Building off the introduction of threats and actions in Lesson Two, this lesson reviews what was learned about threats and expands on this knowledge with discussions about conservation action at important shorebird sites. The Western Hemisphere Shorebird Reserve Network will be introduced as one tool for conservation. Students will research a WHSRN site and use art to tell the story of their site. Activities have modifications for all ages.

Lesson Five: Understanding why Nature Matters

1. Know-Wonder-Learn about People and Natural Resources
2. The Ecosystem and You
3. Town Hall
4. Know-Wonder-Learn about People and Natural Resources

Students will explore local ecosystems and examine the relationships between living and non-living and natural and unnatural factors that they record in order to identify the different ecosystem services present.

Students will analyze different perspectives of environmental issues facing people and shorebirds and use prior knowledge of shorebirds, conservation and ecosystem services to develop an opinion on conservation action. Students will then communicate their stance on the issue in a debate format.

In Lesson Five, students will explore how they interact with natural resources by discussing the benefits that people receive from the environment. For younger students there is an observational activity that will open their eyes to the habitats near them. Older students will engage with each other in a role-playing scenario to better understand community perspectives in shorebird conservation.

Supplemental Material

Throughout the curriculum, icons will indicate where there are additional resources available. All resources are available online or to download individually. Activity Sheets for each lesson are also included after each lesson in the full curriculum.

Learning resources

Informational content for students and teachers for each lesson.

Activity sheets

Worksheets and materials needed to conduct the lessons.

Shorebird cards

Informational cards to help students learn the biology and ecology of shorebirds.

Slideshows

Photo slideshows that provide examples within the lessons.

Going Further

The learning resources included in this curriculum provide content to build a working familiarity with the concepts and information these lessons cover. Additionally, we stress the importance of identifying locally relevant material to support the lessons. To strengthen the connection to the lessons and to the site, consider a field trip to apply new knowledge to exploration of local shorebird habitats. WHSRN site partners often conduct educational activities or may have site-specific guidance or information.

Many of the lessons and resources in this curriculum are adapted from *Explore the World with Shorebirds! - Educator's Guide for the Shorebird Sister Schools Program* created by the United States Fish and Wildlife Service. These resources have educated students since 2004. In addition to the lessons found here, there are many more activities and resources available in the full curriculum: www.whsrn.org/outreach-resources/student-and-informal-education/

For more information or to connect with a WHSRN site visit www.whsrn.org or email whsrn@manomet.org.