



Build-A-Shorebird

Build-A-Shorebird Adaptations Lessons



NATIONAL
WILDLIFE
REFUGE SYSTEM



Build-A-Shorebird

Summary of Activities

This binder includes a variety of activities and background information related to shorebirds and their adaptations. The trunk also contains supporting materials for the activities in this binder as well as extra materials to use for additional activities at your own leisure. Feel free to use the lessons in this binder and materials in the trunk how it best fits your goals and needs.

Please be respectful with the artifacts and items.

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Season:

All

Objectives:

Students will be able to...

- Define the adaptations that all birds have and why they are important.
- Determine some of the adaptation's shorebirds have and how they assist shorebirds in their regular lifestyle activities.
- Describe some of the threat's shorebirds face.
- Witness the importance of a shorebird's oil gland.
- Determine what an air sac is and how it helps birds.

Key Concepts:

- Shorebirds
- Adaptations
- Threats to Shorebirds
- Oil Gland
- Air Sacs



State (SEEd) Standards

Kindergarten

Standard K.2, Living Things And Their Surroundings

Standard K.2.3, Obtain, evaluate, and communicate information about how living things affect their surroundings to survive.

Standard K.2.4, Design and communicate a solution to address the effects that living things experience while trying to survive in their surroundings.

First Grade

Standard 1.2, The Needs Of Living Things And Their Offspring

Standard 1.2.2, Construct an explanation by observing patterns of external features of living things that survive in different locations.

Second Grade

Standard 2.2, Living Things And Their Habitats

Standard 2.2.2, Plan and carry out an investigation of the structure and function of plant and animal parts in different habitats.

Third Grade

Standard 3.2, Effects Of Traits On Survival

Standard 3.2.3, Construct an explanation that the environment can affect the traits of an organism.

Standard 3.2.6, Design a solution to a problem caused by a change in the environment that impacts the types of plants and animals living in that environment.

Fourth Grade

Standard 4.1, Organisms Functioning In Their Environment

Standard 4.1.1, Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.



Build-A-Shorebird Trunk Materials List

Activity Books/Materials

- Build-A-Shorebird Lesson Plans & Handouts Binder

Build-A-Shorebird Costume Items

- Bird Adaptations & Threats Flashcards (14)
- Clothespins
- Tape
- Jacket Vest
- Costume Wings
- Drinking Straw
- Cardboard Paper Roll
- Balloons
- Camouflage Patterned Jacket
- Rubber Boots
- Tweezers
- Baby Oil Bottle
- Popcorn Packing Material
- Laminated Oil Circle Cards
- Plastic Netting
- Plastic Six-pack Ring

Miscellaneous Items

- Shorebird Down Feathers
- Shorebird Contour Feather
- Betty Crocker Kitchen Tool
- Small Pieces of Fabric (2)



What is a Shorebird?

Background Information

Shorebirds are an **extremely diverse group of birds** made up of 217 different types of species with 52 breeding in North America. As their name suggests, shorebirds are often found near shorelines or in habitats where water is present. Shorebird habitat can include the arctic tundra, wetlands, grasslands, beaches, edges of lakes, rivers, and oceans, and even in agricultural lands.

Many species of shorebirds are **long-distance migrants** traveling thousands of miles each year during their annual migration. These long distances are traveled largely due to food availability. Shorebirds eat a range of foods which predominantly includes different aquatic invertebrates. Depending on the species of shorebird, they may eat small crustaceans, worms, insects, and mollusks.

The types of food a shorebird chooses to eat largely reflects how long their beak is. Shorebirds have a range of beak sizes which allow different species of shorebirds to eat different types of invertebrates reducing overall competition among different species. Shorebirds with longer beaks will choose to find their foods in deeper mud and waters while shorebirds with shorter beaks will choose to forage for food on the surface level of shoreline habitat.

In addition to their different sized beaks, shorebirds also have a few other adaptations that set them aside from other birds. Shorebirds have much **longer legs and toes** than other birds allowing them to walk in sandy conditions without losing their balance. These **adaptations** also help them to keep their bodies dry when walking through the water.

Furthermore, many shorebirds also have **camouflaged-colored plumage** and feathers, typically black, brown, and white, to protect themselves from predators. Because these birds are ground nesters, it is important for them to protect themselves and their young as they spend a large amount of time on the ground. However, when they are in flight, especially during **migration**, shorebirds do have **long pointed wings** that help them to fly fast for their longer migration periods than many other birds.



Common Utah Shorebirds



Killdeer



Black-necked Stilt



American Avocet



Greater Yellowlegs



Lesser Yellowlegs



Spotted Sandpiper



Willet



Common Utah Shorebirds



Dunlin



Least Sandpiper



Sanderling



Long-billed Dowitcher



Wilson's Snipe



Wilson's Phalarope



Black-bellied Plover



Build-A-Shorebird

Summary

All shorebirds have important adaptations that help them to live successfully in their chosen habitats. These adaptations are essential during annual activities such as migration and nesting.

In this activity, students will discover the purposes of the different adaptation's shorebirds have and some of the threats they face by dressing up a student volunteer as a human-sized shorebird.

Materials Included

- Bird Adaptations & Threats Flashcards (14)
- Clothespins
- Tape
- Jacket Vest
- Costume Wings
- Drinking Straw
- Cardboard Paper Roll
- Balloons
- Camouflage Patterned Jacket
- Rubber Boots
- Tweezers
- Baby Oil Bottle
- Popcorn Packing Material
- Laminated Oil Circle Cards
- Plastic Netting
- Plastic Six-pack Ring

Time:
40 minutes

Season:
All

Objectives:
Students will be able to...

- Define the adaptations that all birds have and why they are important.

- Determine some of the adaptation's shorebirds have and how they assist shorebirds in their regular lifestyle activities.

- Describe some of the threat's shorebirds face.

Key Concepts:

- Shorebirds
- Adaptations
- Threats to Shorebirds



Build-A-Shorebird Activity

Instructions & Background

1. To start the activity, gather all of the needed materials and supplies.
2. Ask for a student volunteer to become a shorebird.
3. Pass out the 14 “Bird Adaptations & Threats Flashcards” to other students in the class. You may want to have students form groups or join a partner if there are not enough flashcards for each student.
4. Discuss with students that each of the flashcards represents an adaptation or threat that affect shorebirds in some way. Have them read their flashcard and try to decide if they are holding an adaptation all birds have, an adaptation unique to shorebirds, or a threat to shorebirds.
5. Start creating/dressing-up the student volunteer by going through each flashcard one-at-a-time. The student will slowly transform into a shorebird while students learn why each adaptation is important.
 1. Start with the yellow cards (Adaptations that all birds have).
 2. Continue with the blue cards (Adaptations unique to shorebirds).
 3. Finish with the red cards (Threats to shorebirds).
6. While working through the activity, for each adaptation, ask the class questions such as...
 1. What is this adaptation?
 2. What might a shorebird need this adaptation for?

Build-A-Shorebird Adaptations & Costume Parts

Yellow Cards:

1. **Down Feathers (Jacket Vest):** Feathers are a unique adaptation found only in birds. All birds have two types of feathers: Down feathers and Contour feathers. Down feathers serve as the fluffy under-feathers used for insulation and keeping the bird warm. When birds are flying through the air, it can get cold, so birds need a way to protect themselves and stay warm.
2. **Contour Feathers (Costume Wings):** Contour feathers serve as the strong outer flight feathers. These feathers aid in a bird’s ability to fly and are the colorful feathers on the outside.



Build-A-Shorebird Activity

Build-A-Shorebird Adaptations & Costume Parts

Yellow Cards:

3. Hollow Bones (Drinking Straw or Cardboard Paper Roll): Hollow bones are important because they help reduce a bird's weight allowing birds to get off the ground and fly. This is different from the bones of humans and other animals which have solid and heavy bones.

* Attach the drinking straw or cardboard paper roll to the student volunteer using a clothespin.

4. Air Sacs (Balloons): A lot of extra energy is needed to give birds the ability to fly. While birds do have lungs just like humans, birds also have additional "air sacs" which extend from the lungs allowing birds to increase the amount of air or oxygen they intake.

* Attach the balloons to the student volunteer using a clothespin.

Blue Cards:

5. Long Pointed Wings (Costume Wings): Because many shorebirds are migratory bird species, shorebirds need wings that will help them to travel and fly long distances at a fast pace. Long pointed wings assist shorebirds to travel to different habitats at fast speeds and allow them to do aerial maneuvers when attempting to avoid predators.

*No new costume piece for this step.

6. Camouflage Plumage (Camouflage Patterned Jacket): Many smaller shorebirds have camouflaged plumage in order to avoid and protect themselves from larger predators. Brown, black, and white plumage easily blend in with shoreline habitat.

7. Long Legs (Rubber Boots): Many shorebirds walk along the muddy shorelines searching for food or nesting locations. Long legs help shorebirds to wade through water or mud while keeping their body dry.

8. Long Toes (Drinking Straws): Because shorebirds are often walking through muddy shoreline conditions, long toes help them to keep their balance and to not sink into the mud. Most shorebirds do not spend their time swimming which is why they have long toes rather than webbed feet.



Build-A-Shorebird Activity

Build-A-Shorebird Adaptations & Costume Parts

Blue Cards:

* Using tape, attach three long drinking straws to each toe of the student volunteer.

8. Bill or Beak (Tweezers): Many shorebirds have beaks that allow them to pick up food found within the mud or sand. Therefore, their beaks are generally skinnier with tweezer-like motions allowing them to pick-up and hold on to smaller insects and other food items.

* Tie the tweezers on a string necklace around the neck of the student volunteer.

9. Oil Glands (Baby Oil Bottle): Oil glands help to keep the feathers of a shorebird waterproof. The oil gland can be found near the base of the tail. Feathers are kept clean and smooth with constant preening.

* Attach the baby oil bottle to the back of the jacket vest.

10. Guano (Popcorn Packing Material): Guano, or shorebird droppings, act as fertilizer to the shoreline mudflat habitat and waters where shorebirds feed. Tiny plants and animals rely on the nutrients found in guano for their own food.

* Sprinkle the popcorn packing material around the student volunteer.

Red Cards:

11. Habitat Destruction: Changing or developing shorelines and wetlands can destroy the plants and animals that shorebirds rely on for food and shelter. Without adequate habitat, shorebirds may not have enough space to raise their young or find food for themselves. This is also dangerous during the migration season when shorebirds rely on good habitat to stop at for periods of rest during their travels.

12. Oil Spill (Laminated Oil Circle Cards): Oil spills are a major threat to shorebirds, and they cause shoreline to become unhealthy with toxins and can cause birds to become sick or die-off. Oil spills also destroy habitats.



Build-A-Shorebird Activity

Build-A-Shorebird Adaptations & Costume Parts

Red Cards:

* Attach the laminated oil circle cards onto the student volunteer using clothespins.

13. Disturbance: Planes, boats, and humans can scare shorebirds away from important feeding areas and take away critical shorebird nesting areas by building along shorelines.

* Have students mimic the sounds of planes and boats and ask them why noises may be disturbing to birds.

14. Trash (Plastic Netting or Plastic Six-pack Ring): Plastic trash can often be mistaken for food and nest-building materials by shorebirds. In addition to this, shorebirds can also get tangled in discarded fishing line and six-pack can rings. Trash and items left behind by humans can cause major disruptions to shorebirds and their habitats.

* Attach plastic netting or the plastic six-pack ring to the student volunteer using clothespins.

Reflection Questions

1. What are some of the adaptation's that all birds have?
2. What are some of the special adaptation's shorebirds have and why are they important?
3. Why are shorebirds important to other animals and plants in a wetland ecosystem?
4. What are some of the threat's shorebirds face and what can you do to help shorebirds?



Shorebird Adaptation Demonstrations

Time:
15 minutes

Season:
All

Objectives:
Students will be able to...

- Witness the importance of a shorebird's oil gland.
- Determine what an air sac is and how it helps birds.

Key Concepts:

- Shorebirds
- Adaptations
- Oil Gland
- Air Sacs

Summary

All shorebirds have important adaptations that help them to live successfully in their chosen habitats. These adaptations are essential during daily activities including flight and when searching for food.

In these demonstrations, students will discover two of the important adaptation's shorebirds have, including their oil gland and air sacs, that help these birds to successfully live within their chosen habitats and when they are preparing to nest or search for food.

Materials Included

- Vaseline, Petroleum Jelly, or Baby Oil
- Small Pieces of Fabric (2)
- Balloons (2)

Materials You May Need to Provide

- Container of Water



Shorebird Adaptation Demonstrations

Oil Gland

Oil Gland Background

One adaptation shorebirds heavily rely on is their oil gland. The oil gland, or preen gland, is found on the backside of a bird just above the base of the tail. The gland secretes an oil that the bird squeezes out with its bill and spreads on its feathers and feet. This oil helps to keep the feathers of a shorebird waterproof, flexible, and in good condition.

Materials Needed

- Vaseline, Petroleum Jelly, or Baby Oil
- Small Pieces of Fabric (2)
- Container of Water

Oil Gland Demonstration Activity

This demonstration will allow students to witness up-close how the oil gland helps to keep feathers waterproof while making sure the bird does not get weighed down.

1. Apply Vaseline, petroleum jelly, or baby oil to one of the small pieces of fabric.
2. Dip each piece of fabric into the container of water and then pull both pieces out.
3. The water will run off of the oiled fabric and soak into the other fabric that does not have oil spread on it.
4. Discuss with students why this is so important for shorebirds to have their body oil over their feathers.

*** Students may also notice that the oiled fabric can float on top of the water just like birds can.**



Shorebird Adaptation Demonstrations

Lungs & Air Sacs

Lungs & Air Sacs Background

Birds are able to carry air inside of their bodies enabling them to float in water. This is largely due to air sacs. Air sacs, which are extensions of the lungs, can fill in areas between the shoulder blades, abdomen, and chest with air inside of a bird. When a bird wants to go underwater and not float, the bird will pump air out of the air sacs which allows the bird to dive underwater.

Materials Needed

- Balloons (2)
- Container of Water

Lungs & Air Sacs Demonstration Activity

1. Collect two balloons to represent how air sacs work and a container of water.
2. Fill one balloon with air and leave the other balloon with no air.
3. Put both balloons in the water and try to push them underwater.
4. Students will notice that the balloon with air in it will float and the balloon with no air in it will sink.
5. Discuss with students what the balloons represent in comparison to air sacs full of air and air sacs without air.



Reflection

Ask Students...

- 1. In your opinion, which shorebird adaptation is the most important to their survival? Why do you think that is?**
- 2. Why are shorebirds so important? What is their role in the environment and the food chain?**
- 3. What are some of the threats to shorebirds, and what are some of the things that you could do to help shorebirds?**
- 4. If you could be any shorebird, which shorebird would you be and why?**