

Water Birds

Lesson Plan

Grades: 2-5+



The lesson plan introduces students to water birds, their habitats and ecosystem dynamics, bird migration, emphasizes the importance of migratory bird sanctuaries in Nova Scotia, and encourages citizen science and stewardship action for biodiversity conservation.

LEARNING OUTCOMES

- Environmental protection
- Biodiversity
- Local habitats
- Animal Growth and the Environment
- Liquids, solids, and mixtures
- Gaelic, French and Mi'kmaw language
- The interconnectedness of living things and the environment.
- Local natural habitats and interconnectedness.
- Invisible forces Magnetic fields and Migration

THEMES

- Scientific Reasoning
- Environmental Stewardship
- Climate Change
- Species at Risk
- Sustainability

CONTENT

- Photo ID guide
- Word Definition Search
- Migration
- Migratory Bird Sanctuaries
- Understanding Oil and Water
- Poster or Presentation on Species

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For more info on water birds and other species at risk/forest topics: www.naturens.ca, info@naturens.ca



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ADDITIONAL ACTIVITIES

- 1.) Define the underlined terms in this document
- 2.) Have students pick a species in this lesson plan and make a poster or Short presentation

5

REFERENCES

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What are Water Birds?

A water bird is a bird that lives on or around water. Water birds encompass a large group of birds including waterfowl, wading birds (e.g., herons, egrets, cranes), shore birds (e.g., sandpipers, plovers), as well as loons, grebes, coots and cormorants!

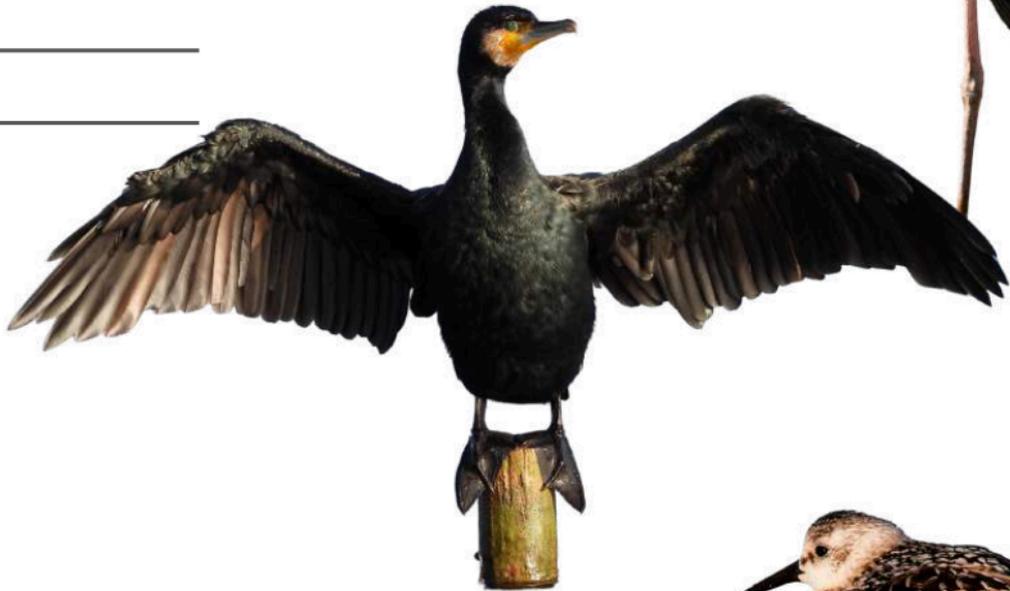
Can you list one similarity and one difference for each of the birds below?



Mallard Duck

Great Blue Heron





Double Crested Cormorant



Common Loon



Sand Piper

Let's dive into water birds and explore the distinct characteristics that help them thrive in their aquatic habitats!



Beak Variety

Water birds have a diverse range of bills – straight, curved, pointy, you name it!

Each different beak is specialized for specific feeding methods: some birds prefer plucking crustaceans from muddy areas, pulling worms from sandy or rocky shores, to catching fish and swallowing whole.

Webbed Feet

Ever wondered why geese, pelicans, and cormorants have webbed feet? These specialized feet help them navigate water like pros. They swim with better control, take off with speed, and even 'ski' on water during landing.

Leg Length

Birds with long legs, like herons, excel at finding food in shallow waters. Their elevated vantage point minimizes sun reflection, making it easier to spot fish. On the flip side, short legs pair perfectly with webbed feet, giving swimming and diving birds precise control.



Great Egret

Neck Flexibility

Wading birds, equipped with long, flexible necks, have a clever advantage when hunting fish. Their extended reach allows for more efficient fishing maneuvers.

Salt Glands

Some water birds face the challenge of drinking salty ocean water which is why they have special glands that extract excess salt, and they dispose of in a unique way – through sneezing!

Preening Glands for Waterproofing

Most birds have a special gland called the preening or uropygial gland, but for water birds, they play a crucial role. It is a bilobed structure located right on top of their tail, towards the lower back, just in front of their tail feathers. These glands secrete fats and waxy material used by water birds to keep their feathers waterproof, stay warm, and glide smoothly through the water.

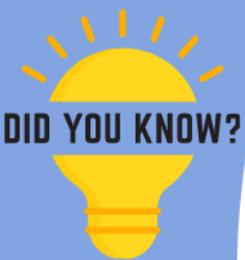


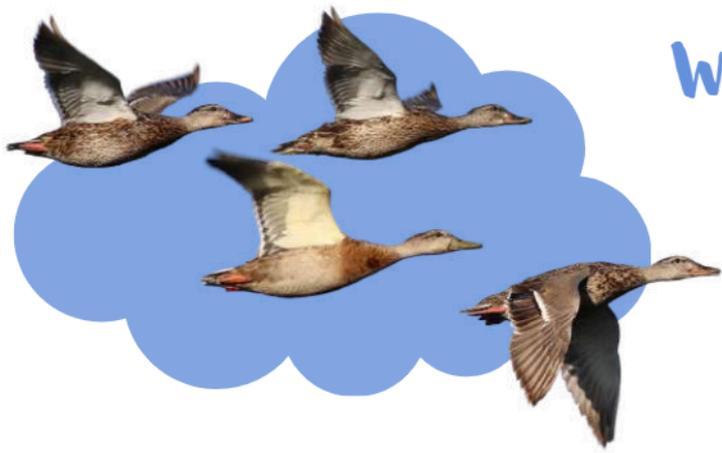
What's a waterfowl?

"Waterfowl" is a more specific term that refers to a group of water birds belonging to the family *Anatidae*. This family includes ducks, geese, and swans. Waterfowl are characterized by their webbed feet, which make them well-adapted to aquatic environments. They are also known for their distinctive bills and are best known from freshwater habitats such as lakes, rivers, ponds, and marshes, where people also live, but they also live on the ocean! Remember! All waterfowl are water birds, but not all water birds are waterfowl.

Waterfowl are found on every continent except Antarctica and inhabit a variety of habitats including the high Arctic, the tropics and even the ocean. They may be some of the most recognizable birds, as many species are commonly seen in city parks and on freshwater beaches. Throughout North America, the most common waterfowl are Mallard Duck (*Anas platyrhynchos*, le canard colvert, tunnag mallard, apji'jkammu'j) and Canada Goose (*Branta canadensis*, bernache du canada, gèadh canada, Sinumkw).

★ The sequence of the species name follows this pattern throughout the lesson plan: English (Scientific name, French, Gaelic, and Mi'kmaq)





Why do birds migrate?

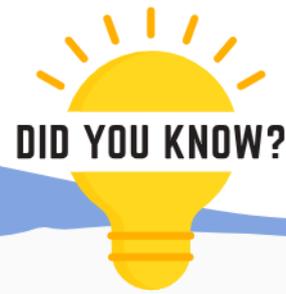
Scientists don't fully understand why some birds migrate. They believe it is triggered by a combination of changes in day length, cooler temperatures, changes in food

supplies, and genetic predisposition. The primary resources sought are food and nesting locations. Northern Hemisphere birds head north in spring to enjoy bug feasts, blooming plants, and great nesting spots. As winter arrives and food becomes scarce, they head south for warmer places. Certain species, like waterfowl and cranes, follow specific pathways during their migrations. These routes often lead to crucial stopover locations providing essential food supplies for their survival.

KNOW THE FACTS

World Migratory Bird Day is celebrated twice a year!

The day is marked on the second Saturday of May and October (13 May and 14 October in 2023), reflecting bird migration's cyclical nature. Over the years, birds have stuck to a schedule, using cues like temperature to decide when to take off. However, due to global warming, their annual migration rhythm is changing. Many migratory birds have to alter their routes, shorten or completely cancel their journey due to changing temperatures.



DID YOU KNOW?

Most species of waterfowl are migratory and fly at speeds of 80 km per Hour.

MIGRATORY WATERBIRD AWARENESS



Some water birds are at high risk of extinction as they rely on wetlands for part of their yearly cycle. Global threats loom over their habitats due to rising human water needs, pollution, and climate change. It's a critical situation for ecosystems and the migratory birds that call them home.



How do birds navigate?



Migratory birds are good at navigating—some can even find their way back to exact locations from previous years. Depending on the species, they use cues like the position of the sun, the stars and magnetic fields (like a compass). They can also use visual cues like mountains as landmarks, to understand where they are.



Migratory bird flyways in North America., North Dakota Game and Fish Department, Public Domain, <https://www.fws.gov/media/migratory-bird-flyways-north-america>

Just like people use highways, birds like ducks and geese often follow specific pathways called flyways to get from one area to another. It's important to note that "flyways" describe broad, generalized pathways; they are not rigid or narrowly defined routes, nor are they used by all migrating birds. In North America, these "avian superhighways" are generally grouped as the Atlantic, Mississippi, Central, and Pacific Flyways.

To learn more about the flyways:

1. <https://www.ducks.ca/migratory-birds/>,
2. <https://abcbirds.org/blog/north-american-bird-flyways/>
3. <https://www.perkypet.com/articles/north-american-bird-migration-4-flyways>

Migratory Bird Sanctuaries

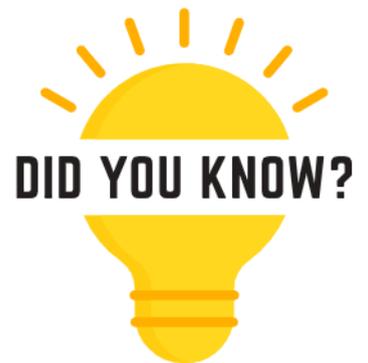
While Important Bird and Biodiversity Areas (IBAs) are a global initiative designating areas across the world for bird conservation, Migratory Bird Sanctuaries (MBS) are unique to Canada and overseen by the Canadian Wildlife Service. As part of the Migratory Birds Conservation Act, the first MBS was officially designated in Quebec in 1919.



Migratory Bird Sanctuaries (MBS) are designated in vital bird conservation areas, focusing on seasonal gatherings and rare species. Another reason MBS can be established is if bird populations face area-specific threats like overhunting or development during nesting, moulting, wintering, or staging times. These areas safeguard migratory birds by preserving their habitats and reducing disturbances.

Name	Year Established	Size in Hectares
Amherst Point MBS	1947	433
Big Glace Bay Lake MBS	1939	393
Port L'Hebert MBS	1941	346
Kentville MBS	1939	506
Port Joli MBS	1941	397
Sable River MBS	1941	313
Sable Island MBS	1977	3,100
Haley Lake MBS	1980	95

(Environment and Climate Change Canada, 2023)



DID YOU KNOW?

There are currently **92 MBS** across Canada, and **8** of them are in Nova Scotia!



Common Waterbirds in Nova Scotia

Mallard

Scientific name: *Anas platyrhynchos*

Average weight: Male(M)- 2.7 lbs,
Female(F)- 2.4 lbs

Conservation status: Least Concern(LC)

Diet: They are omnivorous, feeding on a diet of seeds, plants, insects, and small aquatic organisms.

Sound: Male utters soft, reedy notes; female, a loud quack.



Physical Characteristics:

- The male mallard has a white neck ring that separates their brownish-gray body.
- The female mallard has a brown body with a darker head and violet wing patches bordered by black and white.
- Males have yellow-green bills and coral-red legs; females have orange bills with brown spots and orange legs and feet.

Canada Goose



Scientific name: *Branta canadensis*

Average weight: M 3-13 lbs, F 3-11 lbs

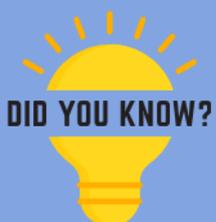
Conservation Status: Least Concern (LC)

Diet: They are herbivores, relying on grasses, sedges, berries, and seeds for their diet.

Sound: Honk

Physical Characteristics:

- Both males and females have black heads and necks with white cheek patches. The females have usually smaller bodies.
- The colour of their bodies range from light gray to dark brown, either blending into the black neck or being separated from it by a white collar.
- Their bill, legs and feet are black.



DID YOU KNOW?

There are 7 recognized subspecies of Canada geese: Atlantic, Hudson Bay or Interior, Giant, Moffitt's or Great Basin, Lesser, Dusky and Vancouver. The Giant Canada goose is the largest goose in the world, with some individuals weighing more than 20 pounds.

Common Waterbirds in Nova Scotia

Photo ID Guide



Mallard (*Anas platyrhynchos*), le canard colvert, tunnag mallard, apji'jkammu'j



Canada Goose (*Branta canadensis*), bernache du canada, gèadh canada, Sinumkw



American Wigeon (*Mareca americana*), Canard américain, wigeon Ameireaganach



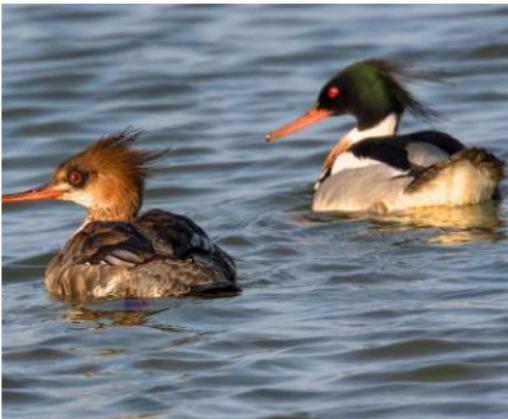
Northern Pintail (*Anas acuta*), Canard pilel, Pintail a Tuath, Aptcitckamutc



Northern Shoveler (*Spatula clypeata*), Pelleteur du Nord, Sluasaid a tuath



Common Goldeneye (*Bucephala clangula*), garrot à œil d'or, sùil bhuidhe chumanta, jikwej



Red-breasted Merganser (*Mergus serrator*), Harle à poitrine rouge, Merganser broilleach ruadh, tima'qani



Gadwall (*Mareca strepera*), canard chipeau, gleidhidh



Wood Duck (*Aix sponsa*), canard branchu, tunnag fiodha, hawyawlkes



Great Blue Heron (*Mareca strepera*), grand héron bleu, corra-ghritheach mòr, dmgwadignech



Common Loons (*Gavia immer*), plongeon huard, loon cumanta, Kwimu



Spotted Sandpipers (*Actitis macularius*), bécasseaux tachetés, piobairean biorach, Jijiwikate'j

Common Waterbirds in Nova Scotia

Photo ID Guide



Bufflehead (*Bucephala albeola*), petit gardon, ceann buffle



Hooded Merganser (*Lophodytes cucullatus*), harle à capuchon, merganser le cochall, pitu'gunima tìma'qani'



Common Merganser (*Mergus merganser*), harle commun, merganser cumanta, tìma'qani



American Bittern (*Botaurus lentiginosus*), butor américain, searbh Ameireaganach



Green Heron (*Butorides virescens*), héron vert, corra-ghritheach, Stoqnamu'k apji'kmuj



Great Egret (*Ardea alba*), grande aigrette, adh mòr



Herring Gull (*Larus argentatus*), Goéland, faoileag an sgadain, weegädigünaak



Double-crested Cormorant (*Nannopterum auritum*), cormoran à aigrettes, sgarbh dà-fhillte, mqatawapu



Eider Duck (*Somateria mollissima*), canard eider, tunna eider, wa'bietchkamutc



Great Northern Gannet (*Morus bassanus*), Fou de Bassan, Sùlaire Mòr a Tuath, tädägoo



Greater Scaup (*Aythya marila*), Grand Fuligule, Sgudal nas motha



Ring-necked Duck (*Aythya collaris*), Canard à collier, Lòn le muineal

Species at Risk in Nova Scotia

Species at risk is a term which refers to a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

Endangered- a species facing imminent extirpation or extinction

Threatened- a species likely to become endangered if limiting factors are not reversed

Vulnerable- a species of special concern because of characteristics that make it particularly sensitive to human activities or natural events

Extirpated- a species that no longer exists in the wild in the Province but exists in the wild outside the Province

Extinct- a species that no longer exists

Piping Plover



Scientific name: *Charadrius melodus*

Average weight: Adults weigh from 43-64g (6-8 toonies), whereas the Plover chicks weigh approximately the equivalent of 2 pennies.

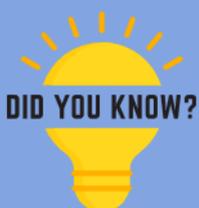
Conservation status: Endangered.

Diet: They feed on aquatic and terrestrial invertebrates, including marine worms, fly larvae, beetles, crustaceans, and molluscs.

Sound: A Clear Whistled Peep-lo

Physical Characteristics:

- Small, plump bird with sand-colored body with white undersides, bright orange legs, and black-tipped bill.
- Males and females look alike, but males have broader black bands on head and breast and a brighter orange bill.
- They have a white rump, partly black tail, black band on forehead, and incomplete black "belt" across their chest.



Piping plovers are particularly vulnerable to human disturbances as they nest on open, sandy shorelines. Habitat loss resulting from coastal development, combined with increased disruptions such as traffic and pets, has led to a decline in their population. Notably, their unique footprints, characterized by inward-turned feet, serve as valuable identifiers for researchers and conservationists tracking their movements and protecting their habitat.

Harlequin Duck

Scientific name: *Histrionicus histrionicus*

Average weight: M 1.44 lbs., F 1.22 lbs.

Conservation status: Endangered. Their decline is attributed to excessive hunting, oil pollution, and hydro development along northern breeding rivers.

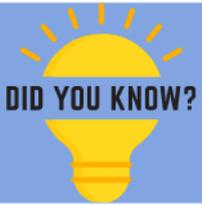
Diet: They dive to feed on crustaceans, mollusks, insects, small fish, and roe found in riverine and marine habitats.

Sound: A mouse-like squeak and various low whistles



Physical Characteristics:

- **Male:** Slate blue body with white stripes, crescents, and spots on head, neck, and back; has chestnut-coloured sides and flanks and grayish bill and legs.
- **Female:** Black-brown body with three white spots on the head; also has an oblong white spot behind the eye.



Harlequin ducks are one of the toughest waterbird species. They live near rocky shores like Peggys Cove in the wintertime and sometimes break bones from crashing into the rocks. They're good at healing those injuries though! They are tough little birds!

Red Knot



Scientific name: *Calidris canutus*

Average weight: 125-205 g

Conservation status: Endangered

Diet: They mainly eat aquatic invertebrates such as mussels, crabs, and shrimp. During spring, they rely on horseshoe crab eggs found in Delaware Bay, an important stopover for migration. Due to the heavy harvesting of horseshoe crabs, their populations are declining.

Sound: whit-whit, males in flight sing poorr-mee that becomes a series of poorr-poorr

Physical Characteristics:

- **Breeding adults** have orange undersides with a mix of gold, pale yellowish-brown, reddish-brown, and black colour on top, complemented by silvery wings.
- **Nonbreeding adults** have brownish-gray bodies with paler undersides and a white eyebrow. Juveniles resemble nonbreeding adults but have a scaly pattern on their wings.

Activity: The Migration Game

THIS ACTIVITY IS BASED ON THE MIGRATION GAME BY PBS KIDS, PLUM LANDING



Objective:

Students will model a flock of migrating birds and identify, model, and communicate the advantages and disadvantages of migrating through cities.

Materials Required:

- Bird Migration Route handout
- Colored pasta or beans for food and water
- Open area for simulation game



Introduction (5 minutes):

- Take a look at the "Bird Migration Route" handout on page 13.
- Discuss: Where do migrating birds go? For example, snow geese fly north in the spring to Arctic Canada and south in the fall to Texas and other southern U.S. states. You can explore the migration route at <https://www.audubon.org/bird-guide>.

Simulation Game (10-15 minutes):

- The participants will role-play a flock of birds migrating through a city or town.
- Choose a common local bird for the attendees to imitate.
- Start the simulation at the "north" side of the open area.
- Instruct attendees to migrate to the "south," picking up one "food" and one "water" (colored pasta or beans) at each stopover point (put small piles of pasta or beans).
- Reverse the migration—south to north—with fewer resources available.
- Continue until some "birds" can't find enough food and water, similar to a "Musical Chairs" game.

Discussion (10-15 minutes):

- Ask attendees: What makes a good stopping point for a migrating bird? If they have seen migrating birds in the area.
- Discuss whether the city or town would make a good stopover point for migrating birds, considering the availability of food, water, shelter, and potential dangers like window collisions, traffic, and pollution.
- Ask students to propose solutions to reduce migration hazards, such as creating more open or green spaces, installing stickers on windows, or reducing traffic and human activity.

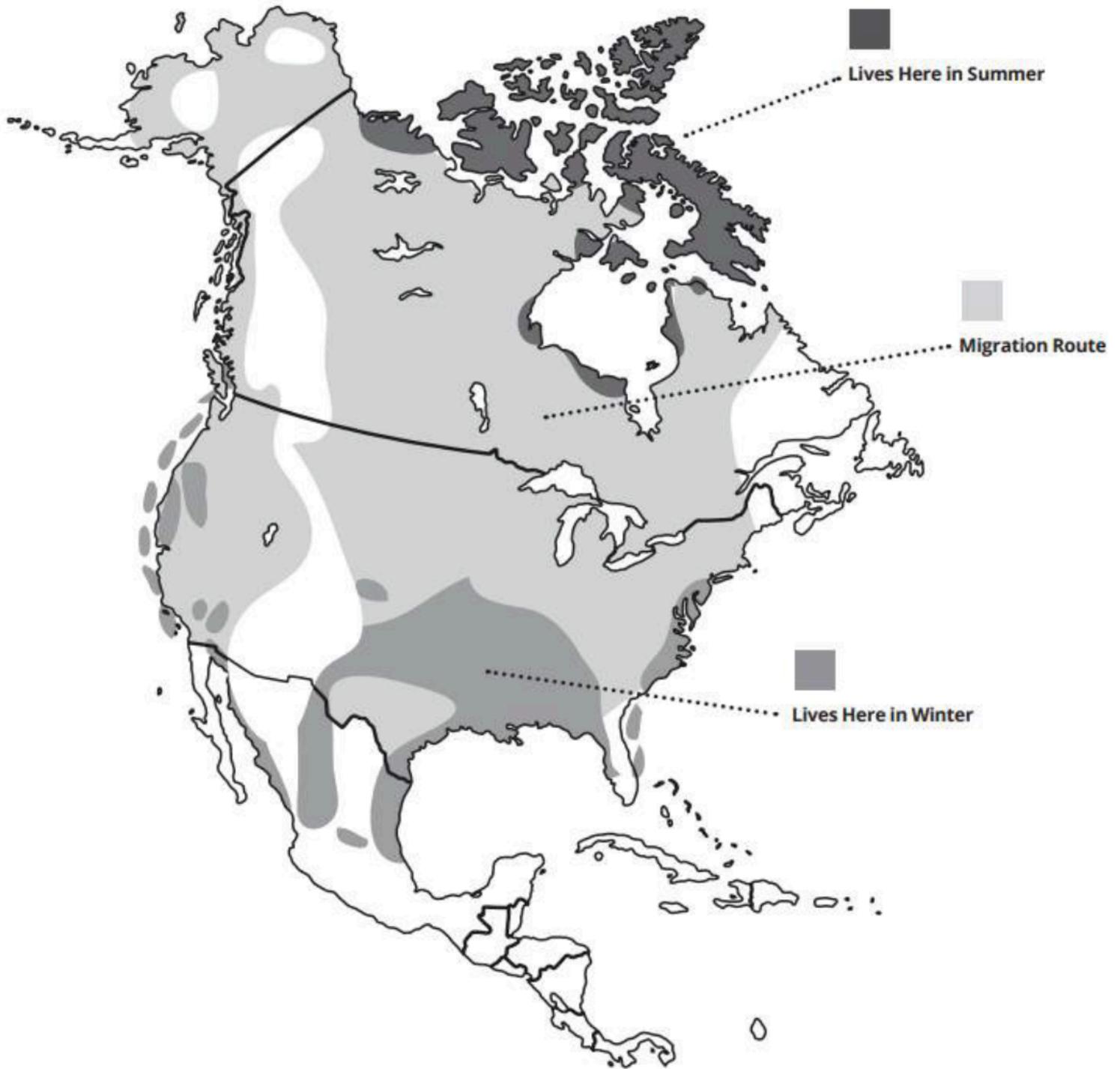


created by:

handout
**Bird Migration
Route**



Exploring your world,
one mission at a time
pbskids.org/plumlanding





Activity: Oil and Water Experiment

THIS ACTIVITY IS BASED ON THE OIL AND WATER EXPERIMENT BY WISCONSIN WATER LIBRARY

Objective:

Students will understand the purpose of preening in waterfowl and learn about the properties of oil and water.

Materials Required:

- Transparent containers with lids that seal tightly (about 10 -16 oz.)
- Droppers
- Tablespoon (or some liquid measure to dispense the oil)
- Food coloring
- Vegetable oil
- Oil and water investigation sheets, page 15



Introduction (5 minutes):

- Discuss what the attendees know about preening, refer to page 4, or search on the internet.
- Discuss the importance of oil in maintaining feathers' structure, insulation, and waterproofing.

Activity (10-15 minutes):

- Divide attendees into small groups and provide each group with a transparent container and an oil and water investigation sheet.
- Fill each container halfway with water and instruct attendees to add three drops of food coloring.
- Have attendees seal the lid and shake the container, then record their observations of what happens.
- Next, add 3 tablespoons of vegetable oil to each group's container, seal the lid, and shake again.
- Ask attendees if they think shaking the containers hard enough will keep the oil and water mixed together. Allow them a couple of minutes to attempt to dissolve the oil in water, then record their observations.

Discussion (10-15 minutes):

- Ask attendees: What happened when you added the food coloring to the water and shook it?
- What happened when we added the oil and shook it?
- What happened when you left the container and waited a few minutes?
- Was it possible to shake the mixture hard enough to make the oil and water stay together?
- How does this activity relate to why ducks and other birds preen with oil?

waterfowl Expressions

"Lovely weather for a duck"

A saying that dates from the 1800s and is a joking way of saying the weather is wet and rainy; maybe good for ducks, but not for people



"Goose bumps" (or "goose pimples")

A saying dating to the early 1800s that compares the way a plucked goose's skin looks to the little bumps we get on our arms when we're chilled or frightened. We might say that a scary person, thing or event, "gives me goose bumps."



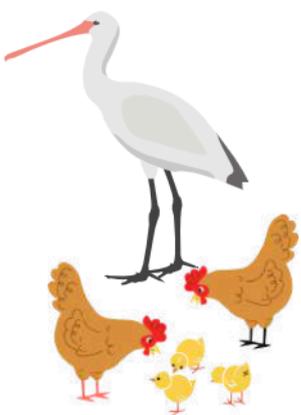
"Graceful as a swan"

comes from the fact that the swan is considered a symbol of beauty and gracefulness in many cultures.



"A crane standing among a flock of chickens"

A Chinese saying that signifies someone who stands out distinctly among others due to their exceptional qualities or abilities. In essence, it highlights the remarkable presence of an individual amidst a crowd of mediocrity.



Advocacy letter

To:

Premier Tim Houston, Minister of Natural Resources and Renewables Tory Rushton,
Minister of Environment and Climate Change Timothy Halman

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Dear Premier Houston, Minister Rushton, and Minister Halman

My name is _____, I am _____ years old and I live in _____

Today I learned about water birds from Nature Nova Scotia's water bird lesson plan. I learned about common species and endangered species of water birds like the Piping plover, the Harlequin duck and the Redknot. I also learned about some of the threats these birds are facing in Nova Scotia such as oil spills, loss of habitat and overfishing causing food declines. Did you know that shorebirds are down by as much as 60% from their 1970s populations? That's half the birds that you grew up seeing, just gone!

I care about the future of these birds because: _____

Canada has 92 Migratory Bird Sanctuaries 9 of which are in Nova Scotia. These sanctuaries are supposed to protect birds from extinction. But I learned that thousands of nests are lost on beaches in Nova Scotia and that many birds have fewer wetlands to return to each year as we continue to lose their habitats.

I am writing this letter to ask for better protection, I was hoping that you might do something about the loss of habitat and destruction of nests happening in our province. could you: 1) put an end to beachside developments, 2) require a "singing season" on public lands, ensuring more time for safe nesting before forestry operations would start, and/or 3) create more Migratory Bird Sanctuaries for birds to find more permanent homes in.

I don't think it's fair that so many birds may go extinct before I have the chance to work in one of your jobs. Please keep Nova Scotia's birds safe until I can take over.

Sincerely, _____

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