

College Guild
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Marine Biology

Unit 5 of 5

Aquatic Birds

So far in this course, you've discovered the plethora of physical traits and behavioral adaptations that various types of life use to survive in the depths of the ocean. The family of creatures that balance their time between the air, the shore, and the water bridge the gap between the terrestrial and marine worlds. This Unit will delve into the lives of aquatic birds.

Penguins



These large, flightless birds live solely along coasts in the southern hemisphere. There are seventeen sub-species of penguins, all living in the coldest ocean waters. The smallest are sixteen inches tall, as their body mass helps maintain heat. They live up to twenty years in the wild, but all are listed on the list of endangered species. During mating season, the female in a pair lays two eggs (with the exception of king and emperor penguins, which lay one). The incubation period -- the length of time it takes for an egg to hatch after being laid -- lasts between one and two months. After hatching, a penguin may spend up to three quarters of its life in the water where it hunts within sixty feet of the ocean's surface, catching and swallowing fish whole. As social animals, penguins stay within groups called "rookeries". Each penguin has a distinct call, allowing mates to find their partners and mothers to locate their chicks within a large rookery. Here is a closer look at some of these intriguing critters:



As the largest of the seventeen species, the emperor penguin relies on its body mass and social tendencies to stay warm in its frigid Antarctic environments. While on land, a rookery creates a tight circle where each member alternates standing in the center for warmth and standing along the perimeter to allow others to warm themselves. After a female lays a single egg in the winter, her mate incubates it in his "brood pouch" -- the soft space balanced above his feet and beneath his lower feathers. The female returns two months later with the results of her long hunt and regurgitates (vomits) the nutrients into the mouth of her newborn chick. She assumes protection of the chick until it is ready to swim on its own in December (Antarctic summer).



The smallest species is the little blue or fairy penguin, which makes its home on the shores of New Zealand and Australia. At dawn, they scuttle into the sea to forage for food (anchovies, sardines, and krill), but return to the sand at dusk to burrow and rest. This schedule protects the fairy penguin from being spotted by nocturnal marine predators. This species endures a yearly molting immediately following the independence of its chicks. This begins with a two to three week forage, during which the penguin increases its body mass as much as possible. When it returns to shore and begins to shed, it loses about half its weight and expends an enormous amount of energy. If it doesn't eat enough on its forage, the molting process will cause it to perish.



While other species have yellow plumes above their eyes, the macaroni penguin's plume is orange. It lives along the southern coasts of Chile, surrounding islands, and the northern tip of Antarctica. Females lay two eggs each year: the first is small and takes longer to incubate, while the second is larger and more likely to hatch. The first egg rarely survives, but a pair will never lay eggs again if the second egg also fails. However, this species is the most plentiful with nine million breeding pairs, so there isn't much concern about its long-term survival. Its predators include sea lion and orcas when at sea and gulls, skuas, and other birds of prey while on land.



The Adelle penguin spends the winter months on Antarctic ice shelves where they can easily find krill beneath the frozen water. It migrates to coastal beaches in the warmer months to mate, lay eggs, and brood its young. In order to attract a female, a male Adelle penguin will stand in a "salute" about four feet away: this entails head bobbing, beak thrusting, and neck arching. Pairs mate for life and recognize one another by unique calls. When spending long periods in the water, this penguin "porpoises", or springs out of the water to grab a quick gulp of air. On the ice, they either waddle or "toboggan" (slide across the surface on their bellies).

1. What are some stereotypical gender roles that men and women play while running a household? How do the roles that male and female emperor penguins play counter this stereotype?

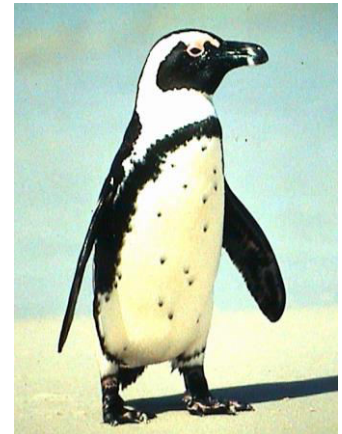
2. Many penguin species have quirky names (especially the macaroni penguin!). Create a name for the species of penguin shown at right and explain why you chose that name. (Even if you know the real name of the species, use your imagination!)

3. If you were one of these penguin species, which would you be and why?

4. Create a short comic (either a single drawing or a strip) that either teaches an audience three new facts about penguins or conveys some penguin humor.

5. Scientists warn that global climate change is causing the Antarctic ice shelves to melt. In what ways do you think this would affect certain species of penguins?

6. Penguins have been featured in numerous movies (*March of the Penguins*, *Happy Feet*), children's stories (the *Tacky* series by Robert Munsch), and aquariums around the world. Why do you think they are such popular creatures? (Why are humans enticed by them?)



7. If one could own a penguin as a pet, what would it need to survive? (Do not consider money as an issue; instead, think of the resources a pet owner could potentially provide for this animal).

Puffins



Puffins are a family of three species of marine birds: the Atlantic puffin, horned puffin, and tufted puffin. This Unit will look closely at the Atlantic puffin, native to the waters and rocky masses of the northern Atlantic Ocean. Over 60% of breeding colonies are native to the shores of Iceland, though many make their homes on Maine and eastern Canadian coasts. They mainly eat small fish such as herring or sand eels, but must avoid predators like great black-billed gulls, skuas, rats, and other land predators. Their wings make them both impressive swimmers and fliers: in the water, they use a flight-like stroke to zoom along, and they can reach speeds of fifty-five miles per hour in the air as they flap their wings 400 times per minute.

These rather small (ten inches in height) seabirds are most easily recognized by their flashy yellow and orange beaks. In the winter, the coloration fades to a dull gray, but becomes vivid in the spring as a means of attracting mates. Males and females share this characteristic, but males are slightly larger in overall size. Although puffins spend the majority of their lives at sea, they join other members of breeding colonies on specific rocks and islands to mate and brood in the warmer months. Although these environments are replete with jagged rocks, they find soft grass and feathers to create nests in the crevices.

Like penguins, females generally lay a single egg, and incubation duties are shared between mates. When the chick hatches, its parents take turns catching and feeding it small fish. About forty-three days after hatching, the chick becomes fully independent, though it may not mate for five to six years. Miraculously, puffins return to the same location, colony, and mater year after year: scientists aren't exactly sure how they find their way.



Project Puffin

The Atlantic puffin was once abundant along the coast of Maine, but became extremely rare by the early 1970s: only two surviving colonies could be spotted on Matinicus Rock and Macias Seal Island. Conservationists began to search for a way to restore colonies to Eastern Egg Rock, a small island in Muscongus Bay that once flourished with puffins.

Scientists, aided by the knowledge that puffins return to their nesting ground annually, collected puffin chicks from Great Island in Newfoundland. This was not a threat to Great Island's puffin population, as about 160,000 pairs brood there each year. Once in Maine, the chicks were placed in handmade sod burrows and fed nutrient-enhanced sardines each day. As they grew, biologists tagged them with leg bands so they could be tracked over the next several years. In total, 954 chicks were brought to Eastern Egg Island over thirteen years; of these, 914 successfully fledged. However, conservationists had another challenge: ensuring that these puffins returned to Maine and not Newfoundland.



Curious puffins began to draw near to Eastern Egg Rock approximately four years after the start of the program. To encourage them to nest on shore, biologists planted puffin decoys on the island. Soon, the real puffins landed to examine their fake counterparts. By 1981, four pairs returned to nest on the island. By 2008, the number reached 101 pairs. Currently, more than 1,000 pairs brood on five Maine islands.

The project continues today, with permanent staff working year-round at a research center at Cornell University and the Todd Wildlife Sanctuary in Maine. Volunteers and young interns also assist with efforts during the spring and summer nesting seasons.



Interestingly, sustainable businesses such as Barbara's Organic Foods have paired with Project Puffin. Part of the sale from Puffins Cereal goes towards funding the project, and the back of the box is designed to educate young children about the significance of these birds.

8. How do you suppose puffins find their way back to their nesting ground? (Use your best guess -- remember, scientists don't even know the answer!)
9. Besides the two listed in the text, what are some worries that conservationists must have had when preparing to transport and raise puffin chicks in their non-native territory.
10. Project Puffin is an enormous undertaking that successfully restored puffins to the coast of Maine. What are some smaller easier steps that individuals could take in protecting the world's puffins.
11. Create a product that aims to educate others about a specific species of penguin. You can either sketch and label your design or write an explanation of how it would aid education about and conservation of your chosen penguin.
12. Pretend you are a summer volunteer with Project Penguin. Your task is to collect, transport, and nourish a single puffin chick. Write a short story about your efforts.
13. Now imagine you are the chick that has been selected to be transported as part of the project. Write a letter from the chick to its original parents.
14. Puffins are excellent fliers and swimmers. If you could choose between the ability to swim extremely well and survive underwater or to fly excellently, which would you choose and why?

Other Seabirds

Besides penguins and puffins, marine environments are home to thousands of bird species. Here's a glimpse of three more:



With a wingspan of over eight feet and a weight of over 100 pounds, the American white pelican is breathtaking to behold. It mainly lives along the Pacific coast and Gulf of Mexico. By using its expandable bill to hold its prey, it scoops up a large catch of fish to devour. Mates help one another shovel gravel aside with their beaks to create a nest. The female lays two eggs each year, which take one month to incubate and two months to raise to independence.



A small bird (only slightly larger than a teacup) that lives along much of the African and Asian coasts, the common sandpiper uses its long, skinny beak to probe the sand for food. Its prey includes small crustaceans, worms, and insects. Two other distinctive features are long legs that allow it to scuttle across the shore quickly, and a shrill cry that sounds like "twee-wee-wee." The similar American species is known as the spotted sandpiper.



The osprey is a large (wingspan of four to six feet) bird of prey that makes its nest atop a dead tree or tall pole. It swoops down into the water to hook large fish and smaller birds in its sharp talons. They are native to lakes and ocean coasts across North America during warmer months but migrate to South America in the winter. Females lay three eggs at a time, but they hatch one at a time, up to five weeks apart.

15. Now that you've explored several species of marine birds, create your own! First, name it and draw a sketch.

16. Now, explain how it survives in its marine environment. What does it eat? How does it hunt? What are its mating behaviors and how does it raise its young? Give any other information someone might find intriguing about your new species.

Since this is your final Unit, we'd appreciate any feedback or suggestions you have for improving the Course!

Remember: First names only & please let us know if your address changes

Appendix
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Citations

- "American White Pelican." *All About Birds*. Cornell Lab of Ornithology, n.d. Web. 14 Aug. 2014.
- "Atlantic Puffins." *Animals*. National Geographic, n.d. Web. 14 Aug. 2014.
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- "Puffin (*Fratercula Arctica*)." *Wildscreen Arkive*. Wildscreen, n.d. Web. 14 Aug. 2014.