

OWL EXPLORERS

FAST FACTS

- Owls are raptors, which means they are birds that hunt with strong bills for tearing flesh and muscular legs and feet with hooked talons for grasping prey. Other examples of raptors are hawks, eagles, kestrels and vultures.
- Owls do not migrate. They are thought to be monogamous and mate for life and raise their young together. After the young leave the nest, they separate but remain in the same territory until the next breeding season.
- Generally, the female owl incubates and feeds the young, but the male brings food back to her and the young. Newly hatched owls are nearly bald and their eyes are closed, but they soon grow white fluffy down. Then they are called owlets. As they get their adult feathers and venture out of the nest, they're called fledglings.
- Owls are largely nocturnal, which means they hunt at night, but some species are crepuscular, which means they are most active at dawn and dusk.
- Owls have large eyes located in the front of their head, which gives them excellent depth perception, and helps them hunt at night. Owls can hunt in complete darkness by using their excellent hearing. Owls cannot move their eyes, but they have three eyelids to protect them. They can turn their heads nearly completely around.
- Owls have excellent hearing. Their dished shaped faces may help amplify sounds.
- Owls eat small mammals, like moles, mice, and bats, as well as snakes and lizards, salamanders, fish, crayfish, large insects, song birds, and sometimes other owls. Owls eat an average of 4 mice per day.
- The Great Horned Owl has a poor sense of smell and is known to hunt skunks.
- Owls eat their prey bones and all. They vomit the indigestible bones, fur, and feathers in a pellet.
- Owls' stomach acid is not strong enough to dissolve their prey completely, which is why they vomit the pellets. Owl pellets have bones, fur, and feathers in them. Other raptors such as hawks have stronger stomach acid that dissolves bones, so only the fur and feathers remain in their pellets. Of all raptors, vultures have the strongest stomach acid. Although, vultures do vomit as a defense mechanism when startled, they likely do not produce pellets.
- As tertiary, and sometimes quaternary predators, owls are near the top of the food chain. They are subject to biomagnification of toxic substances like pesticides.
- Rachel Carson's book *The Silent Spring* alerted people to the impacts of pesticide use on song birds. DDT was a pesticide used to kill mosquitoes. Scientists learned that DDT became concentrated in raptors in a process called biomagnification as it made its way up through the food chain. DDT caused raptor egg shells to become too soft. For raptors like ospreys and bald eagles, their populations were decimated, and they were close to becoming extinct. Shortly after this book was published, the United States banned the use of DDT.
- There are many species of owls. Scientists have researched threats to owls such as forestry and logging practices, urban development, being hit by cars, eating rodents who have been poisoned, climate change, and biomagnification of pesticides.

Science Vocabulary

- **Abiotic:** The non-living factors of an environment, including sunlight, temperature, wind/water currents, soils, and nutrients
- **Biotic:** The living factors of an environment including plants, animals, fungi, algae, and bacteria
- **Raptor:** A "Bird of Prey" that is a carnivore (meat-eater) that kills and eats mammals, reptiles, amphibians, insects, rodents, and other birds. Raptors tend to have grasping feet with strong talons (claws), and strong, tearing bills (beaks) to help them hunt. Examples of types of raptors are owls, hawks, eagles, and vultures.

- **Bill:** A beak on a bird
- **Predator:** an animal that hunts and eats other animals
- **Producer:** A plant that uses photosynthesis to make its own food
- **Consumer:** An animal that eats other living things to get nutrients
- **Autotroph:** Another word for a producer, a plant that uses photosynthesis to make its own food
- **Heterotroph :** Another word for a consumer, an animal that eats other living things to get nutrients
- **Primary consumer:** These animals are herbivores, which means they eat plants. Examples are rabbits, deer, and cows.
- **Secondary consumer:** These animals are omnivores, which means they eat plants and other small animals. Examples are song birds like robins and voles, and rats, snakes, and foxes. These animals may hunt smaller animals, but secondary consumers are often eaten by other predators, too.
- **Tertiary consumer:** These animals tend to be carnivores, or meat eaters, but they can be omnivores, too. Another term used for these animals is “apex predator”, because tertiary consumers are at the top of the food chain and nothing else eats them. Examples are owls, bears, mountain lions, sharks, killer whales.
- **Adaptation:** a physical feature or inherited behavior that gives a plant or animal an advantage to survive. In biology, individual animals do not adapt, but if they survive long enough to reproduce, the traits that were an advantage to them get passed onto their offspring (babies). This is part of the concept of “natural selection.” Examples of adaptations would be an owl’s large eyes, silent flight with special feathers, grasping talons and beaks, the process of regurgitating pellets, hooting specific songs, and mating for life to raise their babies together.
- **Pesticide:** A chemical that is used to kill an unwanted insect.
- **DDT:** A pesticide used to kill mosquitoes, and that remains in the environment and affects other living organisms.
- **Biomagnification:** This is the process by which a toxin or poison gets concentrated in the environment. Small animals at the bottom of the food chain (primary consumers), but the animals that eat these smaller animals absorb more toxins. This means that animals like owls and eagles have higher amounts of concentrated poison/toxins in their systems from the many small animals they eat. In raptors like bald eagles, a pesticide called DDT was used to kill mosquitoes. So the insects absorbed the toxins, but song birds and fish that ate the insects then had more DDT in their bodies from eating many of the small insects. Then, raptors, like owls, and especially bald eagles, that eat the contaminated fish and song birds end up with high amounts of toxins in their systems. When raptors had high levels of DDT, it makes their egg shells too soft, so that their eggs broke when they sit on the eggs to keep them warm. Scientists figured out that raptors were not reproducing, and that DDT was one of the reasons that many raptors became endangered, or at risk of being extinct or gone forever. Then, DDT was banned in the United States.

Printable Handouts

1. Food Chain, Barn Owls, Food Webs: <https://www.barnowltrust.org.uk/wp-content/uploads/Science-Food-web.pdf>
2. Barn Owl’s Physical Adaptations: <https://www.barnowltrust.org.uk/wp/wp-content/uploads/Science-Barn-Owl-adaptations.jpg>
3. Carolina Biological’s Owl Pellet Bone Chart for Pellet Identification: https://www.carolina.com/pdf/activities-articles/Owl_Pellet_Bone_Chart_grid.pdf
4. Project Learning Tree’s Web of Life: https://www.plt.org/wp-content/uploads/pdf/PLT_Act45_Web_of_Life.pdf
5. If you need handouts for Build a Bird: <http://www.nhm.ac.uk/content/dam/nhmwww/take-part/dippy-on-tour/resources/dinosaurs-and-birds-learning-resource-build-a-bird.pdf>
6. NC CAP’s Owl Explorers WHOOT Is It? Game
7. NC CAP’s Owl Explorers STEM To-Go Fieldwork

Kid-Tech Spot: Supplemental Interactive Websites and Games

1. Build a Bird: Interactive software/game where students see how physical adaptations impact a bird’s survivability. <http://projectbeak.org/adaptations/build.htm>
2. Must See: Baby Barred Owls Overview from Nesting Camera: https://youtu.be/q7UB_zv5hz8

3. Cornell's Nest Camera: <https://www.youtube.com/watch?v=tbCFwnL-eBU&list=PLXJZ8Lf9Kix5yHZgAcRiCgPUbT1qll7oj>
4. Brain Pop (because this site really works) <https://www.brainpop.com/games/foodchaingame/>
5. Games that review kids' prior knowledge about food chains and food webs:
<http://www.sheppardsoftware.com/content/animals/kidscorner/games/animaldietgame.htm>
<http://www.sheppardsoftware.com/content/animals/kidscorner/seekandfind/seekandfindnocturnal.htm>
<http://www.sheppardsoftware.com/content/animals/kidscorner/foodchain/foodchain2.htm>

Helpful Websites

1. Common Owls in North America and their calls: <https://www.audubon.org/news/learn-identify-five-owls-their-calls>
2. North Carolina's Owls: <https://www.hunker.com/13425268/facts-about-owls-in-north-carolina>

Additional Resources

1. To go with Carolina Biological's bone chart, here's help to tell the difference between moles, voles, and shrews. On the Carolina Biological chart, rodents likely refer to rats and mice. Voles are considered rodents, but moles and shrew are NOT rodents. But this link is helpful for students to picture what they prey animals looked like when they were alive. <https://kids.niehs.nih.gov/topics/natural-world/wildlife/animals/moles-voles-shrews/index.htm>
2. Here's a Web Quest with handouts to explain the difference between a food chain and a food web
<https://sciencewithmsbarton.files.wordpress.com/2014/02/food-chains-web-quest.pdf>
3. If you find an injured owl, what should you do?
https://docs.wixstatic.com/ugd/e78ac8_f8695c99d92c4f5288ab8d0af546fd53.pdf

In the News

1. This article discusses how Barred Owls are doing very well in the Charlotte area.
<https://www.sciencedaily.com/releases/2007/10/071016131337.htm>
2. This article discusses how Barred Owls are invading endangered spotted owls' habitats. Scientists are hunting the barred owls to save the endangered spotted owls. <https://www.npr.org/2014/01/15/262735123/to-save-threatened-owl-another-species-is-shot>

On the Road

1. Field Trip Resource: <http://www.carolinafieldtripsmag.com/>
2. Charlotte Area's Carolina Raptor Center <http://www.carolinaraptorcenter.org/>
3. Triad Area's NC Zoological Park: <https://www.nczoo.org/>
4. RTP Area's Museum of Life and Science <https://www.lifeandscience.org/>
5. Coastal NC's Area:
 - a. Sylvan Heights Bird Park: <http://shwpark.com/>
 - b. Core Sound Waterfowl Museum and Heritage Center <https://www.coresound.com/>

Other lessons and reference materials used to develop this unit

1. <https://www.audubon.org/news/learn-identify-five-owls-their-calls>
2. <https://www.hunker.com/13425268/facts-about-owls-in-north-carolina>
3. <https://www.carolina.com/images/teacher-resources/essentials/pellet-food/Owl Pellet Food Teacher Essentials.pdf>
4. <http://w3.georgiasouthern.edu/mbi/activities/Owl%20Pellet%20Biomagnification/owl%20pellet%20activity.pdf>
5. <https://www.barnowltrust.org.uk/>
6. https://www.inhs.illinois.edu/files/4114/8494/9183/MOONprotocol_2017.pdf