

## Virtual Creature Fest: Barn and Snowy Owls

*Who is calling in the dark? Let's get to know both the barn and snowy owl.*

### Barn Owl

Gaze upon the ghostly visage of the barn owl (*Tyto alba*), and you encounter a specter of love. The pale, heart-shaped face of this nocturnal hunter is unmistakable, an effect created by the two overlapping, concave facial discs of feathers that function like satellite dishes. Barn owls are stealthy night hunters, and the discs help to funnel even the faintest sounds to ears which are located asymmetrically beside the eyes. Their night [vision](#) is incredible, but their [hearing](#) is even better. Barn owls have the best hearing of all the owls and of almost all the birds in the world. Research has shown that a barn owl's hearing is so sensitive it can catch mice in complete darkness based on the rustling of a single leaf!



Barn owls are the most widely-distributed owl, with 46 races of the raptor found throughout the world. They are present in New Jersey year-round, but many of them are migratory or winter residents and uncommon breeders in the state. Barn owls are 14 to 16 inches tall, about the same size as a crow. They are slender looking birds with sparsely-feathered legs, long rounded wings, and grey and buff colored backs. The underbellies of the females are speckled, but the males are all white. Curiously, spotting on the female may have a lot to do with the reproductive health of the female and her success in [attracting](#) a mate. The larger her spots, the better her chances!

Barn owls have amazing [adaptations](#) that allow them to hunt silently. They have very large, broad wings supporting a lightweight body which is known as low wing loading. This allows them to fly very slowly and to easily hover on rising air currents. Their slow methodical flight gives the birds ample time to locate prey scurrying on the ground below. Low wing loading also enables them to pass through the air very gently making little sound as they fly. In addition, their body feathers are light and fluffy, and the edges of their primary feathers have serrations that help to deaden the sound of air hitting the wings. Their silent flight enables the birds to hear the high frequency sounds produced by small mammals and snatch them up with their powerful feet and sharp talons.

Barn owls also have very long legs well adapted to hunting in tall grasses of meadows, marshes, and agricultural fields. Their preferred prey includes meadow voles, field mice and rats which they swallow whole. Like other owls, they cannot digest the fur, bones or teeth of the rodents they gulp down so they regurgitate the undigested rodent parts in the form of compressed balls or [pellets](#) once or twice a day.

Barn owls make their nests in tree cavities, cliff ledges, caves, and structures like barns, silos, and church steeples. They will also use nest boxes. Barn owls are usually monogamous and mate for life. Males attract their mates with display flights, including a “moth flight” where he hovers in front of a female and dangles his feet. He also shows the female potential nest sites by calling to her and flying in and out of the nest. Barn owl calls sound like screams and can be truly terrifying to hear in the dark of night, but that’s the language of love for these raptors. After a pair bonds, the male brings prey to the female starting about a month before she starts laying eggs.

Barn owls do not build their own nest. The eggs are laid on the bare surface of the nest cavity, ledge, or floor. Sometimes the female shreds regurgitated pellets with her feet to make a crude lining for the nest. The number of eggs (2 to 18!) vary widely depending on the availability of prey. Incubation lasts about a month and the owlets hang in the nest for about two months after they hatch. Unlike other owl species, barn owls can nest all months of the year although May is peak. Barn owl populations have declined because of loss of nest sites and habitat. Barn owls used to nest at Duke Farms but haven’t been observed in recent years.



### **Snowy Owl**

If you’re familiar with the iconic wizard of Hogwarts, then you recognize the snowy owl. Despite its fame in the popular series as Harry’s beloved pet Hedwig, snowy owls do not deliver mail, do not vocalize as depicted on the big screen and should never, never, ever be desired as a pet.

Snowy owls (*Bubo scandiaca*) aren’t pure snowy white either. Their faces are always white, but their coloration and pattern vary depending on their age and sex. Young owls, especially males, are dark brown/gray and get whiter as they get older. Females are darker than males, with dark spotting on the back and streaking on the breast, and never become totally white. Older males do sometimes turn completely white, though many retain small flecks of dark plumage.

Snowy owls are the largest North American owls and are among the largest in the world. They are about two feet tall with a wingspan of close to five feet. Males are typically smaller than females. Snowy owls do have tiny “ear” tufts but rarely hold them erect, so they are easy to miss. Snowy owls have enormous amber eyes and a protruding upper eyelid to provide shade from bright sunlight on snow. The



raptors have many adaptations to keep warm as the face, beak, legs, and feet of snowy owls are covered with fine, fur-like feathers and the under feathers are packed with down. Unlike most other owls, snowy owls are diurnal, meaning they will hunt during the day and dusk. They spend summers north of the Arctic Circle hunting lemmings on the tundra both day and night where there is 24 hours of daylight. Their favorite food is lemmings, and an adult may eat more than 1,600 lemmings a year! When they're not hunting lemmings, they supplement their diet with ptarmigan, rabbits, rodents, birds, and fish. They perch and hover while hunting and are surprisingly agile for such big birds. Their style is much like a large falcon pursuing and capturing its prey while in flight.

In some years with high prey populations, snowy owls stay on their breeding grounds year-round, while in other years they migrate south in Canada and the northern half of the United States for the winter. They are often observed in New York State and New England in winter but in New Jersey, snowy owls are irruptive, appearing in some winters but not in others. Irruptions happen when many a particular bird species migrate outside of their normal geographic range. These movements are not predictable, and research is ongoing. The theory is that scarcity of a food source is the driving factor but is not the only story. Harsh weather conditions or a particularly successful breeding year may also play important roles. The winter of 2013/2014 turned out to be one of the largest irruptions in recent years that brought snowy owls to New Jersey. They were observed at Sandy Hook, the Meadowlands, Newark Airport, Edwin B Forsythe National Wildlife Refuge, Long Beach Island, Cape May, and Duke Farms!



*A snowy owl spotted at Duke Farms  
(photo courtesy of Thom Almendinger)*

A scientist from Massachusetts named [Norman Smith](#) has studied the snowy owl since 1981. During migration as the birds move south from the arctic circle, the snowy owl stops or takes up residence in places that resemble their home, the Arctic tundra. It just so happens the land around Boston's Logan Airport is prime habitat. Snowy owls are common there from November till they head north again in April. Though the owls do scare away many birds that may endanger aircraft there are enough owls that they also pose a threat to aircraft. Almost 40 years ago, Norman Smith began a tagging and relocation program to move and protect the owls.

Since 1997 Smith and his co-researchers have attached tiny transmitters to the healthiest owls that are relocated. These transmitters send data such as location, temperature, and altitude allowing ornithologists to determine migration routes and rest stops, where the owls spend the breeding season, and where they spend their winters. From Smith's pioneering studies, a robust collaborative research program called [Project SNOWstorm](#) is now producing the largest and most diverse set of winter movement data for snowy owls anywhere in the world.

Snowy owls are monogamous and breed on the Arctic tundra. During courtship, male snowy owls perform acrobatic displays to attract females. First the male catches a lemming or other small prey in his talons, then rises into the air with exaggerated wingbeats. Then he plummets to the ground with wings flapping or held in a "V." If a female approaches, he drops the prey on the ground, stands erect, then lowers his head and fans his tail. If she's interested, she will take the prey. Nothing like a nice meal to impress his date! Once mated, snowy owl pairs will fiercely defend their breeding territories from other snowy owls or other trespassers. In defense, a male will lower his head while sticking it forward. He then opens his wings and raises the feathers on his neck and back to appear menacing. Both partners will resort to dive bombing when necessary.

Females lay a clutch of 3 to 11 eggs in a shallow depression in low vegetation on the ground. Clutch size depends upon the availability of food and in years where food is scarce, the female may not lay any eggs at all. Normally she will lay one egg every two days and stays with the eggs while the male hunts and brings her food. She incubates the eggs for about a month.



Snowy owls are born white, but soon turn gray. They will stay in the nest for about three weeks. They eventually lose the gray and turn white with mottling depending on their sex. By summer's end the juveniles leave the breeding grounds as do the adults, but nest mates may head in all different directions. Project SNOWstorm has been shedding light on where the [young](#) birds end up.

Because snowy owls nest in remote areas, have huge territories, and unpredictable winter migrations, it's very difficult to estimate their true population. Partners in Flight estimates a global breeding population of 200,000 with 24% wintering in the U.S., and 50% spending some part of the year in Canada. The snowy owl is listed on the [2016 State of North America's Birds' Watch List](#), which includes bird species that are most at risk of extinction without significant conservation actions to reverse declines and reduce threats. There is consensus that their populations are declining.

The big looming question about snowy owls is: how is climate change affecting this bird of prey? As their breeding grounds warm, what effect will rising temperatures and melting permafrost have on the raptors and their prey? Snow cover provides lemmings thermal insulation and protective cover from predators. What happens to the lemmings and hence the owls without the snowpack? Collaborative research from organizations like the [Owl Institute](#) and Project Snowstorm will try to determine the answers to these burning questions. Once again, the unintended consequences of human created carbon emissions may be the main culprit in the demise of this magnificent bird. Let's hope research leads to implementation of measures to save the snowy owl from extinction.

### Activity: Barn Owl Adaptations Matching

Match the adaptation to its function.

Soft feathers with  
serrated edges

Funnel high frequency  
sound to ears

Asymmetrical ears

Reach down into  
high grass to catch prey

Sharp talons

Accurate hearing  
to pinpoint prey

Long legs

Silent flight to  
sneak up on prey

Facial discs

Helps to fly slowly  
and hover over prey

Low wing loading

Catch, grasp, carry,  
and kill prey

*Answers on page 9.*



### **Activity: The Barn Owl Hunts for a Meal – A game for all ages!**

Pretend to be a Barn Owl hunting for a meal in the dark using only hearing to catch your prey  
*Why are you playing this game? To find out what it is like to be an owl trying to catch a meal using only the sense of hearing. How hard is it to get your dinner without using your eyes?*

(This game is best played with 4 or more people)

#### **Materials:**

A blindfold or scarf to use as blindfold (for the owl)

A safe, open grassy or leaf covered yard with no obstacles or holes

How to Play: The person who is the owl is blindfolded (to pretend it is nighttime and it is dark). The other people pretend to be voles or mice.

1. The blindfolded “owl” stands the middle of a circle of players who are voles or mice.
2. The voles and mice scamper around the owl while rustling and squeaking.
3. The owl tries to tag a vole or mouse using only their hearing to catch the prey.
4. When a mouse or vole is caught, it is their turn to be the owl and the owl takes a turn at being a mouse or vole.

#### **Variation**

For an activity that accommodates indoor play or for a game that includes less running than the one above, try this game.

Preparation: Students research and then prepare small illustrations (or 3D models) of the food that voles and mice eat. (Voles mostly eat roots, stems and leaves -plant matter, while mice can also eat insects, snails, nuts and berries. There are regional differences.)

How to Play:

1. The blindfolded owl “perches” on a stool. (In a safe manner – the owl can also sit!)
2. The vole and mouse food illustrations are placed beneath the stool. Some may be flat while others are balled or crumpled up. (In the wild, some food is easier to get than others.)
3. One at a time, the voles and mice try to sneak up and grab food without the owl hearing the rodent.
4. The owl can tag the mouse or vole, and once tagged, that rodent switches roles and serve as the owl.

Owls have excellent hearing, so how quiet can the rodents be?

[This game is adapted from the Barn Owl Trust.](#)

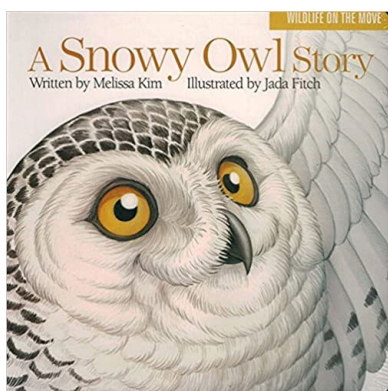
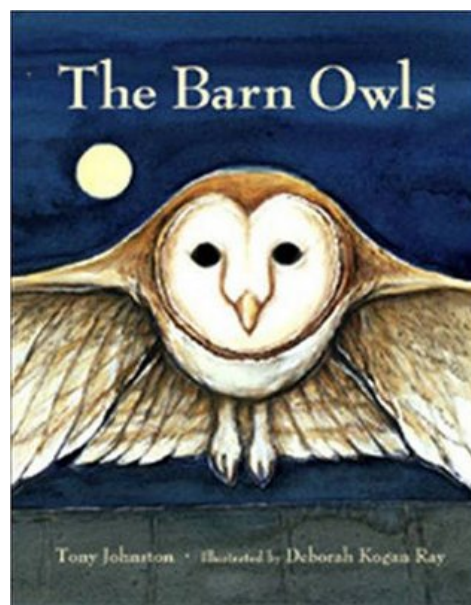
## Read All About it!



**Barn Owls** by Melissa Hill includes some Common Core Standards, a vocabulary list of terms, range map and leveled text.

Goodreads reviewed this book [here](#).

Tony Johnston's **The Barn Owls** recalls in quiet tones the memory of a barn that has stood alone in a wheat field for one hundred years at least. The owls have nested there and have hunted in the fields and circled in the night skies as time slowly slipped by. Every night, as the moon rises, a barn owl awakens and flies out to hunt. Feathered against the endless starry night, he swoops and sails to the darkened wheat field below and catches a mouse in his nimble talons. With outstretched wings, this barn owl returns to his barn nest and his hungry family, repeating the ageless ritual his ancestors have practiced here, in this barn, for at least one hundred years. Following the life cycle of the barn owl, this gentle poem evokes a sense of warm sunshine and envelopes readers with the memory of the scent of a wheat field.



**A Snowy Owl Story** was published in cooperation with Maine Audubon and is designed specifically for preschoolers and earlier learners, but still includes information about environmentally based topics such as adaptation, migration and respecting nature. The story is about one snowy owl and how it survives harsh weather when food becomes scarce. Although a board book, the story has relevant, accurate and interesting with illustrations by Jada Fitch.

### Activity: Hand Painting Snowy Owl Craft

Make a snowy owl gift bag.

#### Materials:

Paper lunch bag

White, non-toxic craft paint to make a handprint

2 acorn caps to serve as eyes

Twig about 8 inches long to serve as perch

A sunflower seed to serve as beak

Craft glue



#### Directions:

- Flatten a paper lunch bag
- Coat hand with white paint, or wear a plastic glove and coat gloved hand with paint
- Press painted hand on bag to create handprint on bag; let dry
- When dry, glue two acorn caps on “head” - palm portion of the handprint, as owl eyes
- Glue sunflower seed below the eyes to be the beak
- Cut two slits into the top layer of the bag below the “wings” and insert twig as perch

Now you can open it and use it as a gift bag!

#### Additional Resources

- [All About Birds, Barn Owl](#)
- [All About Birds, Snowy Owl](#)
- [Owl Ears](#)
- [17 Owl Facts](#)
- [Everything you want to know about owls; The Owl Pages](#)
- [Climate change and impact on spotted owls](#)
- [Snowy Owls and Climate Change](#)
- [Barn owl Trust; hearing](#)
- [Barn Owl Trust](#)
- [Barn Owl Trust hunting game](#)
- [Barn Owl Trust; Adaptations](#)
- [Norman Smith Snowy Owl Project](#)
- [More science activities about owls](#)
- [Tips for teaching about owl pellets](#)
- Fun video for kids that explains all about owl pellets: [Owl Pellets; Science Explosion](#)





## Matching Answers for Barn Owl Adaptation

- Soft feathers with serrated edges - Silent flight to sneak up on prey
- Asymmetrical ears - Accurate hearing to pinpoint prey
- Sharp talons - Catch, grasp, carry, and kill prey
- Long legs - Reach down into high grass to catch prey
- Facial discs - Funnel high frequency sounds to ears
- Low wing loading - Helps to fly slowly and hover over prey

## Ideas for Teaching and Learning

For more information about using this article in your classroom, contact Kate Reilly, Manager of Education, Duke Farms. There are many cross-curricular connections including those related to LA, math, fine and performing arts, technology, social studies, geography and, of course science.

Learning about owls is directly aligned to the NJ DOE's new mandate for the k-12 interdisciplinary instruction about climate change. [Here is the announcement about this 2021 launch on the official site of New Jersey.](#)