

December, the Doorway to Winter: Call of the Chickadee

“Chicka-dee-dee-dee”- this beloved little bird sings its name for the whole world to hear. [Black-capped chickadees](#) (*Poecile atricapillus*) are small plump birds, just 4 to 5 inches in length with 8-inch wingspans. Both males and females look alike with soft gray backs and tails, white cheeks, a white chest and belly, and a splash of buff-colored feathers below the wings. Their most distinctive characteristics are their black caps and black masks and throats. The chickadees along with their cousins the [Carolina chickadees](#) and [tufted titmice](#) are members of a passerine family of birds called *Paridae* and are often referred to as Parids. They are common sites in the winter landscape as they are non-migratory and stay in their habitats year-round. The range of black-capped chickadees and Carolinas overlap and sometimes the birds interbreed so [identification](#) can be confusing. Black-capped chickadees are generally a northern species and are the more common bird here at Duke Farms.



Black-capped chickadees live in mixed deciduous and coniferous forests, but readily visit bird feeders in suburban backyards. The black-capped chickadee is found from Alaska east through Canada and throughout the upper two-thirds of the United States. They are year-round residents wherever they live. In winter Chickadees often form small flocks that may include other birds like titmice and nuthatches. They flit from tree branch to tree branch gleaning the dead insects, spider eggs, seeds, mosses and berries from bark and trees. Chickadees often collect and cache their food for future meals, sometimes storing food in holes in snags or under bark or lichen. Chickadees can remember thousands of hiding places.

Black-capped chickadees form mating pairs during the late fall and spend the winter together in extended flocks with other birds. Mates usually stay together in spring and summer and may continue the relationship for several years. They establish a territory and protect it while they are together. In the spring, chickadees change their diets to larvae, caterpillars, and insects and hunt for soft bodied insects to feed their offspring.

Both the male and female make a nest in a rotting snag or abandoned woodpecker hole. Pairs will often [excavate](#) several nest cavities before the female selects one to begin building a nest in. The female lines the nest with grass, feathers, or moss. She lays five to nine eggs, usually one egg per day and is the one to incubate the eggs. While she is on the nest the male brings food to her, although occasionally, she leaves the nest to find her own food.

The chicks hatch in about two weeks and both parents feed and care for the babies. The chicks fledge in 14 to 18 days but continue to be fed by their parents through the summer. The offspring head off on their own in the fall. They do not stay with the parents to join up with other chickadees for the winter. The winter flocks that do form have amazingly complex communication abilities that benefit them as well as other birds such as nuthatches, woodpeckers, kinglets, creepers, warblers, and vireos in their ecosystem.

Complex Communication

Black-capped chickadees and their Parid relatives, the Carolina chickadees and tufted titmice, are the watchdogs of the woodlands. These flocks are always on patrol and are very noisy guardians of their territories. Despite their small size, they are fearless as they physically and verbally chase intruders away. Pity the owl or hawk that winds up in the chickadees' home base. They will sound the alarm and rouse the nuthatches, cardinals, blue jays, grackles, and crows to come to reinforce their efforts to make the intruder skedaddle.

Individual birds are often out of sight of other members of their winter flocks as they move through their habitats, so their [vocal signaling system](#) is their way to convey messages related to predators, food, or social order. These calls are crucial to survival while living in a group. Because of their constant chitter-chatter, [chickadee vocalizations](#) share a number of characteristics which can be seen as analogous to aspects of human language. They employ a wide range of vocalizations for different circumstances. Though they are well known for the distinctive "*chick-a-dee-dee*" call, this is not the only call they make. The chickadee has a vocabulary of around 50 distinct sounds and 16 distinct calls that communicate essential phrases like "feed me!", "I'm single!", "danger", and "help me here".



Not surprisingly, chickadees make their biggest vocal fuss about predators. In fact, the "*chicka-dee*" call is usually made as a warning call when they see a suspicious threat around the neighborhood. The more alarmed they are, the more "dees" they add to the call. "*Chick-a-dee-dee-dee-dee-dee-dee*". They also call it faster, louder, and repeat it over and over as the threat increases. It is often a call to action and all those "dees" means "let's chase this bully outta here!" The frenzied vocalization is a call to arms for any other birds in the area to join and harass a potential predator, like an owl or a hawk, in a behavior called mobbing. Scientists have found that nuthatches eavesdrop on these chickadee warning signals and if they are perceived to be real threats the nuthatches help to "retweet" them to other birds.



Other universal danger calls that chickadees use are the *seet*, the *gargle* and the *hiss*. The "*seet*" is a high pitched, raspy one syllable warning meaning "danger". Adults sometimes *hiss* along with the other calls and nestlings will violently *hiss* and slap the inside of the nest if a threat comes close. Still another stress vocalization is the *gargling* call. There is a dominance hierarchy within flocks and chickadees "*gargle*" when rebellious lower-ranking chickadees step out of line or get too close to a higher-ranking bird in the flock. They will intermix the "*gargle*"

with the "*dee-dee-dee*" danger calls.

The black-capped chickadee's normal song for establishing territory, mate bonding or keeping in contact with a mate or offspring is a simple 2 or 3 note affair that sounds like "*fee-bee*" or "*hey sweetie*" The song differs slightly in various habitats and may sound slightly higher or deeper depending on the time

of year. Males begin singing in mid-January and they sing more frequently as the winter months move toward spring. Females sing, but very infrequently. Scientists have also found that sometimes the “gargle” is also used for mating situations.

Black-capped chickadees are acrobatic birds that also communicate through physical postures and feather manipulation. Body postures convey aggression or appeasement. Aggressive behaviors include ruffling the body or crown feathers, hopping, and pivoting between two individuals often with open mouths. Male and female black-capped chickadees perform a distraction display where one of the pair will flare its tail feathers and wings to lure predators away from the nest.



Appeasement usually occurs when the social order has been upset. Younger or lower ranking birds will often try to appease an approaching dominant individual by holding their feathers tightly to their bodies while leaning and facing away from the dominant bird.

Extraordinary Survival Adaptations

These adorable, chubby birds are quite formidable as they take on threats in their neighborhoods. But come winter, sometimes the greatest threats are brutal weather conditions. How does this tiny bird with a body temperature of a super-hot 108 degrees survive negative temperatures and nor’easters? Maintaining that high internal temperature while its below freezing outside is close to a physiological miracle. Fortunately, chickadees have adaptations that allow such miracles to occur on a regular basis.

Winter survival for all animals including chickadees depends on getting enough food. Luckily, chickadees have the ability to cache food. They begin foraging before dawn to give them more time to acquire food and they set aside and store food at every chance. They readily visit backyard feeders where they “steal” seeds and fly away to hide or eat them. Backyard feeders can have a huge impact on helping chickadees to survive winter, but they don’t solely rely on feeders. The birds are omnivorous and even in the darkness they remember the hundreds of hiding places where they cached their food. Their tiny brains literally fill up with all this survival information after one season so to compensate the neurons associated with locations of last year’s caches die off and new ones grow afresh every fall!

Besides getting enough food, the birds also must minimize heat loss. The black head is a useful solar collector. On sunny days, chickadees will turn its dark head to maximize the angle of the sun to absorb heat. They eat high fat seeds in the fall and winter and store the energy as fat. Fat is an excellent insulator, but once winter sets in the birds deplete most of their reserves very quickly. Eating more calories than they use is critical for survival.

The bird’s greatest protection against the cold is its feathers which increase by 25 percent with its autumn molt. The outer feathers are very dense and have a coating of oil that creates a coat of armor against the cold, snow, water, and wind. They have a thick undercoat of down which traps warm air next to the skin. By fluffing its feathers and making itself puff up like a balloon, chickadees can increase the insulation effect of the feathers. Eyes and beaks are poorly insulated, so when the weather is bad, the



birds close their eyes and tuck their heads under their wings to protect them. When it comes to their legs and feet, their thick scales and lack of blood flow to the extremities help to protect them.

Black-capped chickadees also stay warm during the day by keeping active intermixed with bouts of shivering. When night falls, they must seek shelter. They will head for tree cavities or any spot that provides shelter from cold, wind and bad weather. When the temperatures drop below freezing, chickadees can slip into a state of controlled hypothermia called torpor. It's like a mini temporary hibernation in which their heart rates drop and the body temperature drops by about twenty degrees. Before sunrise, chickadees emerge from torpor and they raise their body temperatures by shivering. As soon as they are warmed up, they are off searching for their hidden stashes of food and any other edibles that cross their path.

These little birds walk an energy tightrope every day. Throw in the unknown consequences of climate change and the resilience of these tough little birds will be sorely tested. Let's hope the evolutionary adaptations that these fire alarms of the forest are endowed with will be enough to keep them "*Chicka-dee-dee-dee-ing*" far into the future.

Additional Resources

- [All About Birds - Black-Capped Chickadee](#)
- [Life of a Black-Capped Chickadee Family](#)
- [How Chickadees Survive Winter](#)
- [BioKids](#)
- [The Black-capped Chickadee: Behavioral Ecology and Natural History by Susan M. Smith](#)



Activity: Learn 10 Fun Facts About Chickadees

Watch this 8-minute video "[Ten Fun Facts About Chickadees](#)" and test your knowledge based on what you've learned.

1. How big are black-capped chickadees and what are their wingspans?

Answer: 4 ½ to 5 ½ inches long with 8 ½ inch wingspan.

2. How much do chickadees weigh?

Answer: 1/3 oz. or about the weight of 3 pennies.

3. What is a flock of chickadees called?

Answer. A banditry.

4. What is the main source of chickadee food?

Answer: Insects.

5. When chickadees add more "dees" to their call, what are they trying to say?

Answer: That there is a real threat in the area.

6. Do other birds pay attention to chickadee alarm calls?

Answer: Yes, they heed the alarm and flee or join in helping to mitigate the threat.

7. How long do chickadees live in the wild?

Answer: Around two years.

8. What is caching?

Answer: Some birds, like chickadees, find food and hide it in tree hollows, under bark, or other locations so they have reserve sources of food.

9. Do chickadees migrate?

Answer: For the most part, they are nonmigratory.

10. What bird is often confused with the black-capped chickadee?

Answer: The Carolina chickadee.

11. Do backyard bird feeders help chickadees survive the winter?

Answer: Yes! For more information, check out this Duke Farms lesson about [feeding birds](#).



Activity: Observe Chickadees

Tune into the Cornell Lab of Ornithology's [bird cam](#) and watch the feeders.

Count how many black-capped chickadees visit the feeder while you watch. Observe their behavior. Can you hear them call at all? Do they eat their seeds at the feeder or take them away? What kind of seeds do they prefer? Can you name the other species that come to the feeder?

Think of other questions you can ask and look up your answers. Tune in once a week for the winter and record your observations. This will help you learn a lot about chickadees in winter!

Enjoy the show!

Activity: Go Look for Chickadees

Chickadees are woodland birds. Go on a nature walk this winter in a place with wooded areas. Duke Farms is home to lots of chickadees so it would be great if you could come for a walk in the woodlands near the Hay Barn and the bike tent or up by the reservoir. Listen for the calls of the chickadees as you walk. If you hear them then try to see them. If you have binoculars you can get a close-up view of these little feisty birds in action. Enjoy the experience and tell all your friends to do the same. It's a wonderful way to enhance your walk in the woods and lift your spirits!





Extending Your Learning

- ❖ Many organisms use alarm calls as warning signals. What are examples of animals that do this and what threats do they have? Make a list of birds and other animals and why they might display an alert. How do they do it?
- ❖ Research aquatic and terrestrial animals that have an alert behavior. Do you notice similarities and differences? Select two organisms and list these using a Venn Diagram.
- ❖ How can alert behavior impact animals that live together in groups or other species that may be in *proximity*?
- ❖ What warning signals have humans created in their communication systems?
- ❖ Do you see a trend in the colors that are used in signage that indicates danger? Why are these colors used?

Domestication and Alert Behavior

Certain breeds of dogs are considered “great watch dogs” while others are not. If you were seeking a dog that would alert you of potential danger, or even of someone approaching your house, which dogs might have the most potential of being watch dogs? On the other hand, if you do not want a dog that barks on alert, are there some breeds that might be best?

How have some breeds become better watch dogs than others? Can you train a watch dog not to exhibit alert behaviors?

How have service dogs and their alert behaviors assisted humans?

New Jersey Student Learning Standards

Teaching about chickadees opens the door to many other interdisciplinary topics such as geography, Language Arts- communication, and perhaps even the visual and performing arts where students could create skits about animals and their alert behaviors!

In science, this article would apply to ecosystems and climate change, but would also align to units of study on traits, inheritance of traits, and biological evolution based on the **NJ Disciplinary Core Ideas in Life Science:**

LS2: Ecosystems: Interactions, Energy, and Dynamics • LS2.A: Interdependent Relationships in Ecosystems • LS2.C: Ecosystem Dynamics, Functioning, and Resilience • LS2.D: Social Interactions and Group Behavior LS3: Heredity: Inheritance and Variation of Traits • LS3.A: Inheritance of Traits • LS3.B: Variation of Traits LS4: Biological Evolution: Unity and Diversity • LS4.A: Evidence of Common Ancestry and Diversity • LS4.B: Natural Selection • LS4.C: Adaptation

For more ideas, contact Kate Reilly, Manager of Education, Duke Farms. kreilly@dukefarms.org.