

Bird Songs and Calls

Objective(s): Students will (1) examine the biology of bird sound, (2) describe the differences between bird songs and calls, and (3) identify the songs and calls of at least three local species.

Overview

Students will explore the role that sound plays in bird behavior and develop their listening skills.

Georgia Standard(s) of Excellence (GSE)

S1P1; S4P2; S5L2; S6E6; S7L1; S7L4; SB5; SEC1; SEC2; SEC3; SEC5; SEV4; SZ3; SZ4; SZ5.

Essential Terms

Call
Frequency
Mnemonic
Pitch
Song
Spectrogram
Syrinx

Suggested Materials

- *LAB: Songs and Calls Student Guide*
- Merlin Bird ID app
- *eBird.org*

Additional Resources

- *LAB: Cheep Sheet for Bird Songs and Calls*
- *Bird Song Hero (Cornell Lab of Ornithology)*

Background

Birds are everywhere, and attuning to their sounds and learning to identify the unique vocalizations of different species sparks curiosity and expands students' connection to the natural world around them.

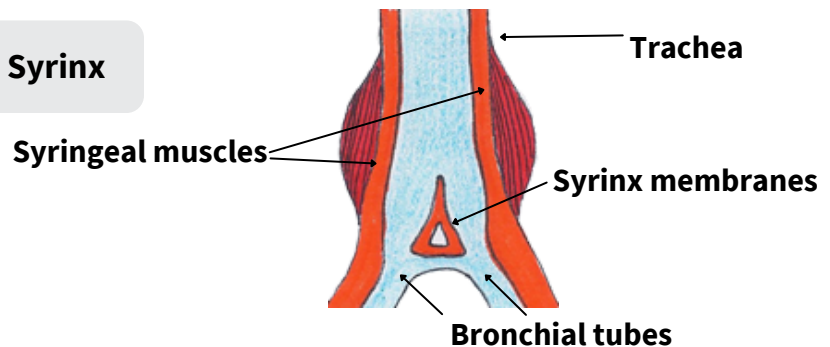
Sound Science

Sound is a form of energy caused by vibrations moving through air or matter that can be heard. These vibrations moving through space and time are called sound waves. One complete vibration is equal to one wavelength of energy. How fast a vibration occurs is called **frequency**, which determines the highness or lowness of a sound, the **pitch**. The loudness of the sound is determined by the amount of energy the wave carries, the amplitude.

Biology of Bird Song

Birds do not produce sound like humans. Instead, their "voice box," the **syrinx**, is made up of membranes that vibrate when air is forced over them. This organ has two halves, located where the two tubes to the lungs split off from the windpipe. Birds control the the sound frequency and loudness of their sounds with muscles attached to the syrinx. These muscles control the amount of air passing through the syrinx and alter the tension of the syrinx membranes. These membranes resonate on both the inhale and the exhale, enabling some birds to sing continuously for several minutes without stopping. Because the syrinx has two halves, some birds can also produce different sounds simultaneously by controlling each side of their syrinx separately.

The Syrinx

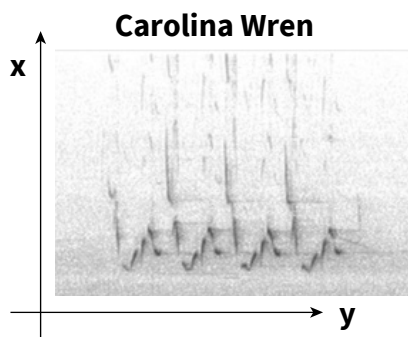


Calls versus Songs

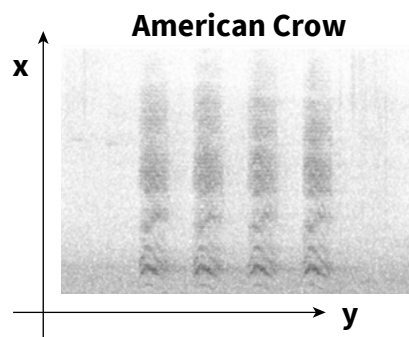
Birds produce two types of sounds, **calls** and **songs**, and each species has its own unique vocalizations. Calls communicate a bird's location, orient a flock, signal food or water, and alert others to danger and are inherited biological traits passed from parents to their young. Songs are complex learned sounds used for courtship and holding territory. They advertise a bird's species, age, gender, fitness, and breeding status. Singing serves as a way for individuals to recognize one another, even at a distance, and strengthens pair bonds between mates. For many species, song repertoire may be as important as plumage in choosing a mate. Singing also signals to competing males that a territory is claimed. Interestingly, a population of the same bird species in a geographic area may have songs that differ from populations in other areas. These differences are called dialects.

Song Spectrograms

A **spectrogram**, or sonogram, is a scientific way of looking at sound that is similar to reading musical notation. Time is on the x-axis. **Frequency** is on the y-axis. The song runs from left to right on the graph, with high-pitched notes near the top and lower notes below. Loud sounds appear darker on a spectrogram, while softer sounds are lighter. Spectrograms can be helpful tools when teaching students to identify bird songs and calls, especially for visual learners.



This spectrogram shows rising and falling notes, repeated four times, of a Carolina Wren's song.



The American Crow's loud, nasal call is represented by the dark, blurry lines on this spectrogram.

Preparing for Flight

Use the [Merlin Bird ID](#) app on a mobile device or visit [eBird.org](#) (under the "Explore Species" tab) to access spectrograms and other information for various bird species. Play the song and calls of a few local species and ask students if they can tell the difference between a song and a call. Then focus on the songs of those species, asking students to listen closely to pitch, rhythm, tempo, and quality and to describe those elements or to create **mnemonics** for the sound. Finally, look at the spectrograms for those songs and ask students to consider how the pictures represent the sounds they heard.

Use the *LAB: Songs and Calls Student Guide* to have students complete Activity I: Sound Pictures. Have students practice creating their own spectrograms for a few different local species.

Extra practice: As a class, try playing *Bird Song Hero* (Cornell Lab of Ornithology), a fun online game that asks players to match birdsongs to their spectrograms.

Activity 1: Sound Pictures

Students will practice drawing their own spectrograms and qualitatively describing songs and calls.

1. Review the *LAB: Bird Songs and Calls Student Guide* with the group. Using eBird or Merlin, select songs of four, preferably local, species to play aloud. Play the sound for the group several times, asking students to draw a picture of what they hear.
2. Instruct students to write down some adjectives that describe each song (pitch, rhythm, tempo, quality). Examples include fast, slow, loud, soft, harsh, sweet, buzzy, squeaky, trilling, whistle/bell-like, insect-like, scratchy, etc. Quality is subjective and can be described in many different ways.
3. Ask several students to share their work, and compare and contrast students' spectrograms and descriptions of the songs. How closely do their spectrograms match with those on Merlin or eBird?

Activity 2: Sound Mapping

Students will listen for birds and map their observations by drawing sound maps.

Students can take inventory of the sounds around them by creating a sound map.

1. Bring students outside and have them spread out with a paper and pencil.
2. Instruct students to draw a dot in the center of the paper to represent themselves. Ask them to remain quiet and focus on the sounds they hear around them, both natural and manmade.
3. Once everyone is focused, instruct students to draw a map of the sounds they hear around them for one to two minutes, using pictures or symbols—or spectrograms! to represent different sounds they hear in relation to where they are sitting. These should be quick, simple sketches to keep a visual record of what they hear. Each time they hear a repeated sound, they should record it again, using the same sketch or spectrogram.
4. After the activity is completed, ask students about the sounds they heard. Did they hear more natural or manmade sounds? Were certain sounds concentrated in one location, or were the sounds spread out? How many different bird sounds did they notice? Was there more than one bird making the same sound? What sounds were the most noticeable?
5. Encourage students to share their maps, explaining why they represented a sound a certain way.