FOREST KARAOKE: TRANSCRIBING BIRDSONG

Students describe bird songs in their journals using writing, drawing, diagramming, and numbers.

Time

Introduction: 10 minutes
Activity: 10–20 minutes
Discussion: 10–15 minutes

Materials

- ☐ Journals and pencils

optional

- ☐ Watch with second hand

Teaching Notes

Because you can't control when birds sing, this might be a "start-and-stop" activity that occurs as you and your students explore a natural area. Give the instructions at the beginning of the outing, and when you hear a bird start singing, tell students to start recording right away. If the bird stops singing before you've finished the exercise, pause, have students finish recording what they've noticed so far, then resume if the bird starts singing again.

If you can see the bird as it sings, you may be able to identify it. If it's not visible or identifiable, students can transcribe its song and call it "mystery bird #1" or come up with a descriptive name like "buzzy buzzy bounce." You might find the bird singing from an exposed perch later, and students might be able to pick its song out as well because they've paid attention to it—an exciting discovery!

As students listen to birdsong in accurate detail, they will be able to record sound in their journals. This is an experience relevant beyond listening to birdsong, as it offers an approach to describing any novel auditory phenomenon. Using these multiple modes of recording sound data can change the way students think about and interact with sound. Sound is another viable and valuable way of learning about a place.

NATURAL PHENOMENA

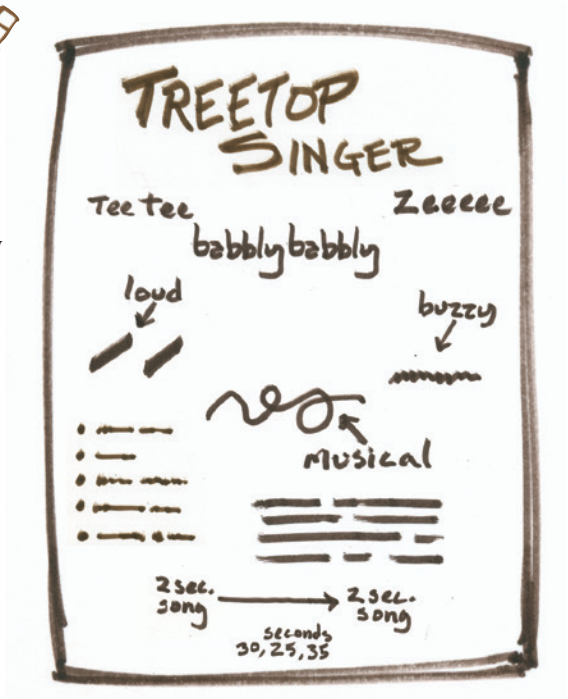
This activity can be conducted anywhere, but is richest in a complex and diverse natural area where students can hear different species of birds, as well as other natural sounds, such as creeks and rustling leaves. Mornings in early spring often are the best times to listen for birdsong. If possible, find a bird singing the same song again and again. Some species, such as mockingbirds, do not repeat a stereotyped song but sing a continuous babble. Avoid these songs when you are introducing this technique and instead focus on species that sing a simple song, pause, and repeat the same song. This activity could also take place in more controlled conditions with recorded bird songs (available on many websites), but it is more fun and relevant in the field.

PROCEDURE SUMMARY

1. Draw birdsong on paper, using longer lines to show longer notes and shorter lines to show shorter notes.
2. Use rising and falling lines to show changes in pitch, and heavier lines to show louder sounds.
3. Describe the song using words (*buzzy, harsh, bouncy,* etc.).
4. Time how long it takes for the bird to sing and the intervals between songs.

DEMONSTRATION

When the whiteboard icon appears in the procedure description: Show the steps of transcribing birdsong as you describe them to students. Draw the "shape" of the birdsong, using lines to show pitch and length of notes. Write the words to the birdsong. Use descriptive words to describe the quality of the song. Time the length of the song and the interval between songs. Describe the context of the song (where, when).



PROCEDURE STEP-BY-STEP

1. **When you hear a bird singing nearby, help students listen to the song by instructing them to "conduct" the song in the air with their hands.**
   - a. "Listen—a bird is singing! Close your eyes and focus on the sound of the bird."
   - b. "Gently lift your hand in front of you and move your arm and fingers as if you were conducting or controlling the bird's voice."
   - c. "Raise your hand higher when the bird sings high notes and lower when the bird sings low notes. Wiggle your fingers when it buzzes or warbles quickly."
2. **After a minute or so, tell students to imitate the song using words and nonsense babble, and then to compare their imitation with a friend.**
   - a. "Now quietly imitate that song to yourself. Make a set of noises that as accurately as possible mimics the bird's song."
   - b. "Compare your imitation with a friend's. Modify your song if you heard someone else give a better impression than what you initially did."
3. **Demonstrate how to transcribe the birdsong into rising and falling lines on paper, using longer lines for longer notes, rising and falling lines to show changes in pitch, scribbles for buzzes, and thick marks for loud sounds.**

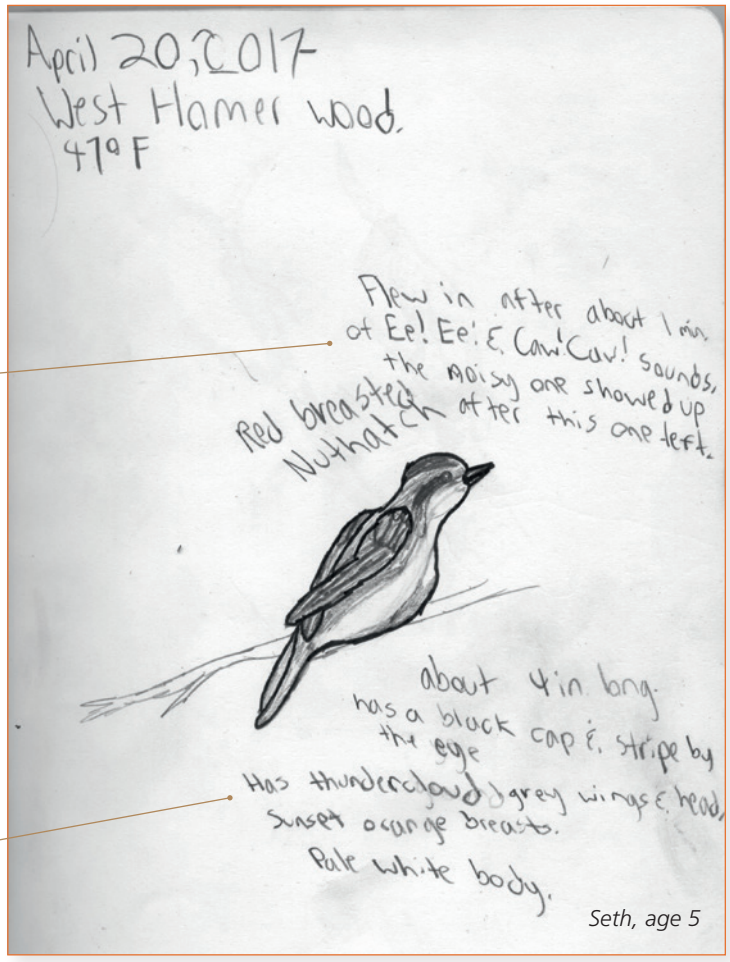
   - a. "Now let's draw the birdsong on paper! Use longer lines to show longer notes, and shorter lines to show shorter notes."
   - b. "To show changes in pitch, use rising and falling lines. Buzzes can be scribble marks. Loud notes can be heavier lines."
4. **Give students a few minutes to transcribe the birdsong using lines and to add words to describe the imitation they came up with.**
   - a. "Give it a try!! Record the birdsong in your journal."
   - b. "Above (or below) the lines showing the song, use words to add the imitation you came up with."
5. **Tell the group to use descriptive words to transcribe the "quality" of the song, offering a list of words that describe birdsong (e.g., *quiet, loud, musical, mechanical, buzzy*).**
   - a. "Let's use a few other descriptive words to describe this birdsong. Is it loud or soft? Is it the same volume all the way through the song, or does it get louder or softer at the end?"
   - b. "Here's a list of terms that describe some bird songs. Write down any that match the song: melodic, mechanical, bouncy, harsh, clear, nasal, sweet, buzzy, slow and relaxed, fast and energetic, piercing."
   - c. "Describe the speed. Is it a slow series or a fast trill?"
6. **Tell students to time and record the length of the song and the interval between songs, and to add this information to their journals.**
   - a. "Now let's count the seconds that it takes for the bird to sing one song. A second lasts about the time it takes to say 'one hippopotamus.' Record the time in your notes."
   - b. "Count how many seconds there are between songs. We will measure the time between the next four songs to see whether they are all the same."
7. **Tell the group to describe the context (location, time of day and month, and any other important details about the surrounding environment) of the birdsong.**
   - a. "To make these notes more accurate and more relevant to science, let's record some of our observations about the surroundings and the scene."
   - b. "In short sentences or in list format, describe where the bird is singing. Does it sing at the top of a tree or in the middle of a bush?"
   - c. "Now describe the surrounding habitat." (Examples might include: meadow, field, dense forest, schoolyard, park.)

How many ways can students describe the sounds they hear? Each approach helps them hear in a different way.

This is a sketch of a squirrel peeking over a log.

Samuel, age 8

These are observations of a California ground squirrel making alarm calls from behind a log. Note the different modes used to record the noise, including music notes and rests, written words, and a graph (pitch over time). The sound was first assumed to be a bird call, but was then discovered to be a squirrel. Note the correction at the top of the page—it's OK to change your mind in the face of evidence!



Description of the bird's sound and the context in which it was heard

Rich color descriptions: thundercloud grey and sunset orange!

d. (If you know the name of the park or area you're in, prompt students to record that, too.) "Let's add the city [or town or wild area] and state names."

e. "Now let's add some other metadata. What time is it? What is the date? Weather?"

f. "Is there any other important big-picture information that we should have in our field notes? This might be anything that could help us think more about the bird and its song in the future."

DISCUSSION

Lead a discussion using the general discussion questions and questions from one of the Crosscutting Concept categories. Intersperse pair talk with group discussion.

General Discussion

a. "We used words, diagrams, and timing to describe the bird's song. What kinds of information can be communicated in each of these note-taking approaches?"

b. "How might you include these note-taking approaches in future sound studies, or as we record information about other subjects?"

c. "Most people do not have a good vocabulary for describing sound. What are other things we can sense, but that are difficult to describe?"

d. "While studying birdsong, did anyone find any questions, mysteries, or things that seemed strange?"

Patterns

a. "Each species of bird makes a different song. Each time we hear this kind of bird today, let's notice where it is singing—such as the type of foliage, the height, or the distance from water—and see whether we can determine a pattern to where we find them singing and where we do not."

b. "We recorded three different bird songs today. Are there any patterns you can notice among their songs, such as the length of notes or the presence of trills?"

c. "What are some possible explanations for similarities or differences in bird songs?"

d. (If you heard many birds throughout the day) "How would you group these bird songs based on the commonalities or the differences between them?"

Cause and Effect

a. "What might be some of the reasons birds sing or call? How might it help them survive?"

b. "Were we able to observe any clues about why birds sing or what affects when and how they sing? This might include behaviors we saw them do while singing, or when they were singing more or less."

c. "Are there any ways that singing might impact birds in a negative way?"

d. "What are some possible explanations for the different types of bird songs that we heard?"

FOLLOW-UP ACTIVITIES

Exploring Pitch

Adults easily grasp the idea of high pitches being "high" and graphing them higher on a page than "low" pitches. However, there is nothing objectively low or high about pitch. They are different frequencies of sound waves. We just think of them as low and high because we have always heard them described that way and have seen music scores that show higher-pitch notes displayed above lower-pitch notes. If students do not have musical training, this is not always intuitive.

To introduce the idea of conceptualizing pitch to students, play music with clear pitch changes and let students "conduct" the music with their hands. Teach them to bring their hands up higher for high-pitch notes and down lower for low-pitch notes.

It is also fun to watch classical conductors and study the way that their hand movements reflect the music. Conductors use the movement of their hands to convey rhythm, and don't control the pitch through the height of their hand. They do often give visuals about dynamics (volume) and intensity to an orchestra. Observing this can help students be more refined in how they "conduct" the music themselves, and prepares them to convert hand movements to lines on paper.

Then play music clips or sounds and have students transcribe the sounds to a graph. Make a simple graph with time on the horizontal (x) axis and pitch on the vertical (y) axis. Search online for audio spectrograms and bird sonograms, similar graphs generated by a computer.

Twinkle, twinkle, little star

Studying Birdsong

Use this activity as a catalyst to inspire research on birdsong. Why do birds sing? How does singing help a bird survive and reproduce? Do all birds sing? What are the dangers or costs of singing? What is counter-singing? An interesting book to extend the study of birdsong is *What the Robin Knows*, by Jon Young.