

SOUNDSCAPE MAPS

Students listen to the soundscape around them, then diagram and map the soundscape using symbols, different colors, and other ways to graphically represent sound.

Time

Introduction: 5 minutes
Activity: 10–20 minutes
Discussion: 10–15 minutes



Materials

- Journals and pencils
- Colored pencils



Teaching Notes

Practice transcribing birdsong with the *Forest Karaoke* activity before asking students to make soundscape maps. Once students have experience listening to and describing a single bird, they are ready to explore the soundscape and listen to the forest as a whole.



Soundscape maps can be constructed in physical space (an overhead map of an area with points for sounds) or in acoustic space (a graph that shows the relative pitches and loudness of different sounds). They will prompt different kinds of observations and will stimulate different kinds of questions. Students could make either or both types of maps.

We seldom pay deep attention to what we hear. When students slow down to listen, they are often surprised by how many sounds surround them! This activity enhances students' perception of sound and brings them into contact with place. There is significant ecological information contained in the sounds of a place. Just as radio frequencies must be calibrated so as not to interfere with each other, so too with natural sound. If two birds sing at the same frequency, their voices will interfere with each other. By using different frequencies and timing, birds can share the same acoustic environment without interfering with each other. Sound frequency also has implications. Both very high and very low sounds are difficult to locate. Low-frequency sound is not as easily absorbed and can be heard farther away. Making a soundscape map will tune students in to another layer of information in nature, offering more to explain and wonder about. It also challenges students to describe novel phenomena in creative ways.

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 and other natural sounds, such as creeks and rustling leaves. Mornings in early spring often are the best times to listen for birdsong. You may also map the sounds of an urban setting or an urban-wild interface. Compare natural and disturbed systems by repeating the activity in different environments.

PROCEDURE SUMMARY

For a sound map:

1. Listen to sounds and map their location.
2. Put yourself in the center of the map, then start with the most distant sounds, putting them at the edge of your paper, then working in.
3. Find creative ways to show sounds, using symbols and diagramming along with words and sketches.

For an acoustic space map:

1. Make a diagram using lines to show sounds in the environment.
2. Use different colors to show the biophony (sounds from living things), the geophony (sounds from natural, nonliving things), and the anthrophony (sounds from humans and things humans have made).

DEMONSTRATION

When the whiteboard icon appears in the procedure description: Draw yourself



in the center of the page and add representations of sounds that you hear, starting with the most distant noises and working your way in.

make a little North arrow (pointing up) if you wish. Make a little drawing of you sitting and listening in the middle of the page."

PROCEDURE STEP-BY-STEP

1. Begin the activity by asking students to listen deeply, drawing their attention to some of the more subtle noises around them.

- a. "Sit comfortably so that you do not need to move or rustle the leaves or branches around you. Close your eyes and breathe deeply and slowly. Listen in silence to the sounds around you."
- b. "What draws your attention first? What else do you hear? Listen beyond that to other, more subtle sounds around you. Hold up your hands and lift one finger to count each of the different kinds of sounds around you."
- c. "Let's listen for one minute and see how many we can hear. [Let students count.] When you're ready, you can open your eyes. What did you hear?" (Collect student responses.)

4. Suggest that students start by placing the most distant sounds at the edges of the paper, then working inward.

- a. "Start with the most distant sounds that you hear and put them around the edges of your paper. Then slowly work your way in."

5. Tell students that they will need to get creative and come up with symbols to show sounds, then ask them to share some ideas about symbols with the group.

- a. "You will have to be creative to show some of the sounds you hear. You can use words, pictures, and diagrams."
- b. "How might you show the sound of leaves rustling in the trees all around you? How about the sound of the creek over there? You may invent distinctive symbols for sounds you hear in several locations. Label any symbols you make."

6. Ask whether there are any questions, set up a signal for students to return, remind them to be quiet, and send them out to make their maps.

Sound Map

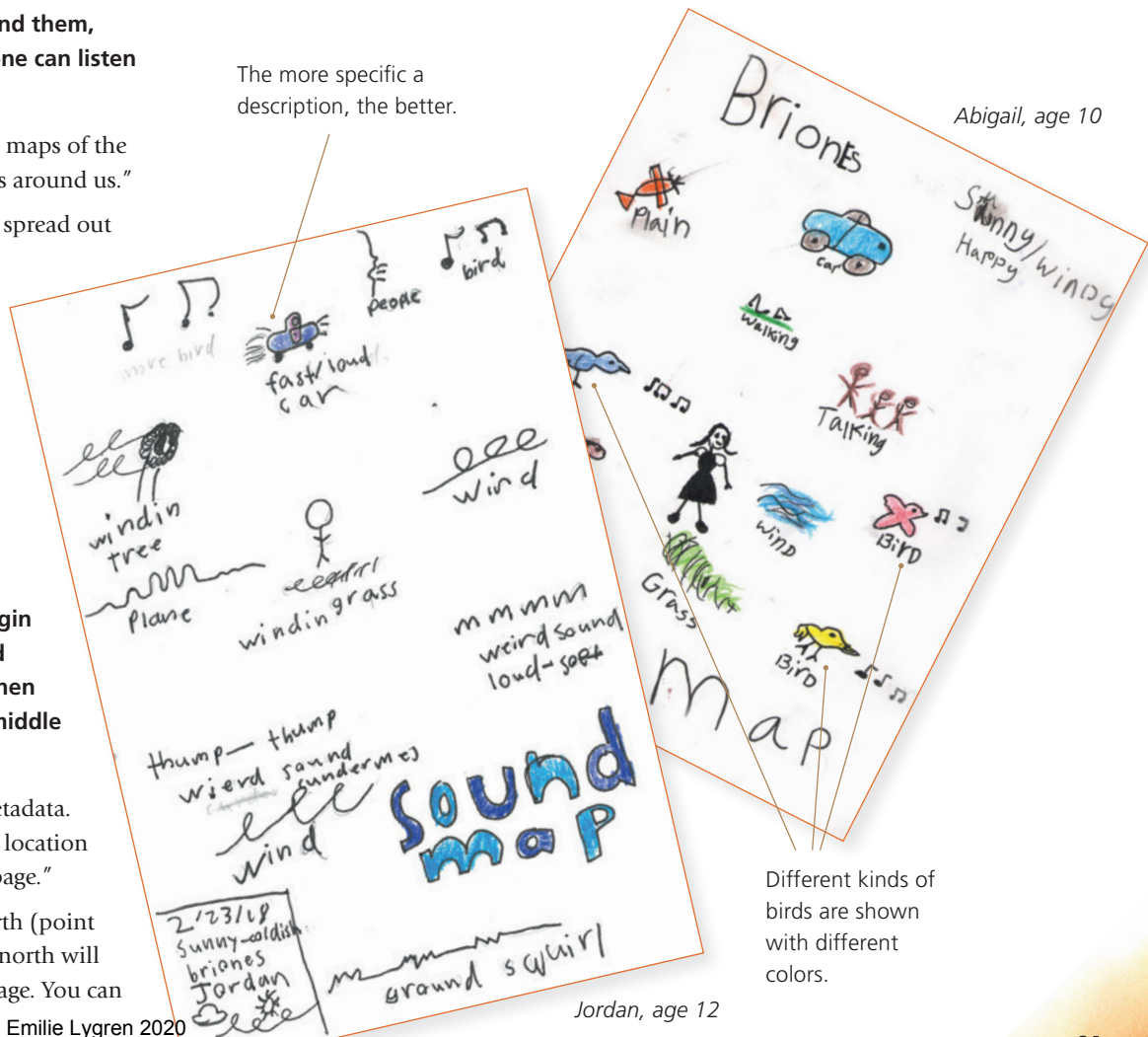
2. Tell students that they will make a map of the sounds around them, spreading out so everyone can listen well.

- a. "We are going to make maps of the locations of the sounds around us."
- b. "In a moment, we will spread out so that you will not be distracted by the small sounds made by people sitting too near you. Then you will sit, listen, and begin to draw and describe the locations of the different sounds you hear."

3. Demonstrate how to begin by adding metadata and adding a North arrow, then placing yourself in the middle of the map.

- a. "Let's start with the metadata. Write the date and our location on the bottom of the page."
- b. "You will sit facing north (point north). On your map, north will be at the top of your page. You can

The more specific a description, the better.



Different kinds of birds are shown with different colors.

- a. "You will have nine minutes to complete your map. Come back when you hear my whistle."
- b. "As you work, stay still and be as quiet as you can. Do not move from your spot during this exercise. Even the sound of your shoes in the leaves can disturb other people."

7. After the time has elapsed, call the group back together and facilitate discussion about how students chose to record sounds and about interesting or surprising observations.

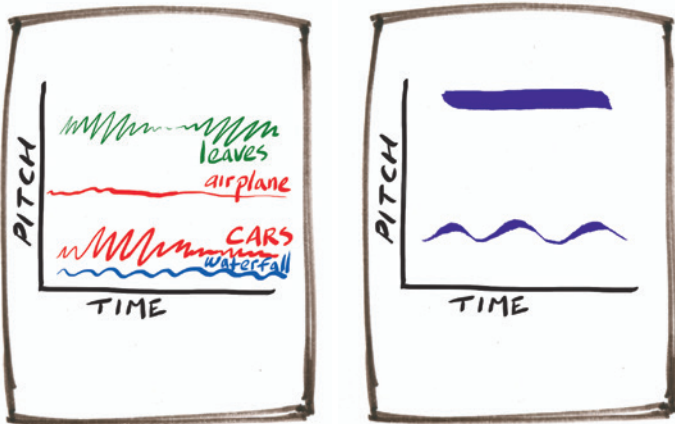
- a. "Find someone and compare your maps. What kinds of things did you hear? How did you decide to record them in your journal?"
- b. "Was there anything surprising that you heard?"

DEMONSTRATION



Acoustic Space Map

When the whiteboard icon appears in the procedure description: Make a graph of the sounds you hear using different colors



for living and nonliving natural sounds, and sounds from the human world.

- 1. Focus students' attention on the soundscape, calling attention to different types of sounds and how they reveal information about the environment.**
 - a. "A soundscape is like an orchestra. Some sounds are high, some low. Sounds can be constant, rhythmic, or random. Tuning into the sound space will help you notice new things about the environment."
- 2. Explain how to classify sounds into the biophony (sounds made by living things), geophony (natural sounds made by nonliving things), and anthrophony (sounds made by humans and machines).**

- a. "You can classify the soundscape into three parts. The biophony is all the natural sounds that are made by living things. Can you think of some examples?" (Birdsong, cricket chirps, buzzing bees, etc.)



- b. "The geophony is all the natural sounds that are made by nonliving things. What might that include?" (Wind in the trees, a babbling brook, waves on the shore, etc.)
- c. "Finally, the anthrophony are all the sounds made by humans and their machines. What examples can you think of?" (Airplanes overhead, people talking, cars driving by, etc.)

3. Describe how to make an acoustic space diagram by using different lengths, heights, and widths of lines to place sounds on a graph with pitch and time as the two axes.

- a. "You can use writing and expressive lines to describe sound. We are going to make a graph of this sound environment."
- b. "Along the vertical axis, we will have pitch (low or deep to high). The horizontal axis will be time."
- c. "When we hear a high sound, we'd put it in this part of the graph. A low sound, we will put down here."
- d. "We can show volume, or how loud something is, by pressing hard to make a bold, dark mark."
- e. "A loud, high train whistle that stays at the same pitch might look like this. Rhythmic waves washing up on the shore might look like this."

4. Suggest that students begin by recording living and nonliving natural sounds, using a different color for each category.



- a. "Start by recording living and nonliving natural sounds. Use a different color of pencil for each category."
- b. "For instance, if I can hear the high-pitched rustle of leaves and the low babble of the creek, I would put them both on my chart with the same color because they are natural, nonliving sounds."
- c. "Birds and crickets would be in a second color."
- d. "Finally, human-related sounds would be a third color."

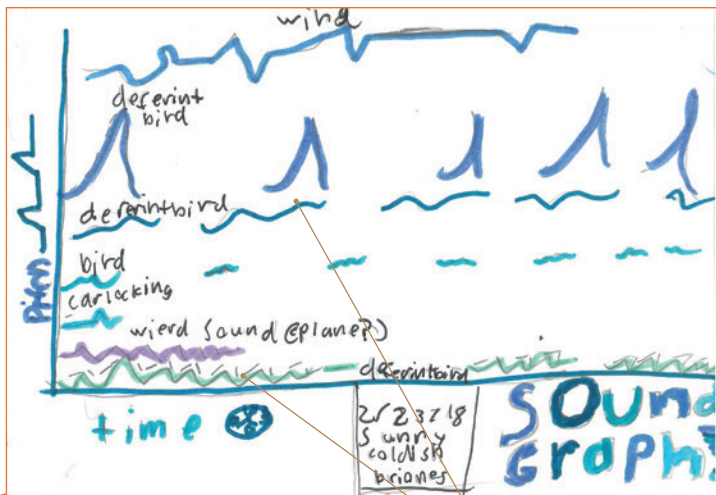
5. Tell students to begin, and to pay particular attention to which sounds stand out from the rest of the noise.

DISCUSSION

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

General Discussion

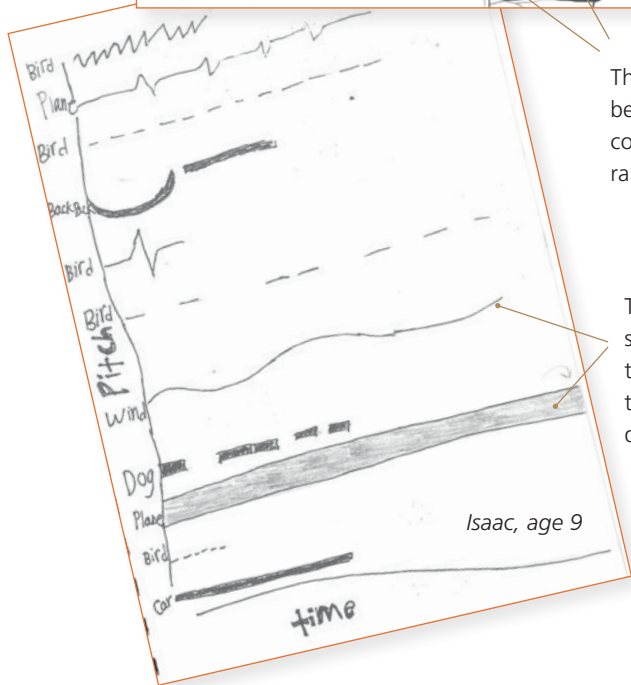
- a. "Let's look at our maps and diagrams. How are they similar to and different from one another? Can you find the same sound event shown on different graphs in different ways? What are some of the creative ways people showed what they heard?"



Jordan, age 12

This graph distinguishes between noises that are constant, repeated, or random.

This graph also shows volume as the thickness of the bar—a three-dimensional graph!



Isaac, age 9

- b. "Each variable you track on your graph is a dimension. Here we graphed pitch across time. Can you find any graphs that also show volume or the loudness of sounds? These graphs are three-dimensional!"
- c. "How many different sounds did everyone hear?"
- d. "What sounds stood out from the rest of the noise? What made these sounds stand out?" (Different pitch, rhythm, volume)
- e. "What sounds were constant? Which ones were less frequent?"
- f. "How does human-generated noise show up in this soundscape?"
- g. "What was it like to focus on sound in this way? How did you feel while you made your map?"

Patterns

- a. "What are some general statements you can make about the soundscape in this area?"
- b. "Did you notice any patterns in this soundscape?"

- c. "How might these patterns be different in different places? What kinds of patterns would you expect to see in a desert [arctic, jungle, marine, etc.] soundscape? What do you think would be similar, and what would be different?"
- d. "What about animal sounds? What patterns did you notice? You could consider the structure of the sound (pitch, rhythm, and volume), when the animal made the sound, or any synchronization with other sounds."
- e. "What kinds of patterns in animal sounds would you expect to see in a different ecosystem?"

Cause and Effect

- a. "Did you hear any animal sounds? Were these intentional or accidental on the part of the animal? Describe the animal sounds you heard."
- b. "What made the sounds stand out from the background noise? Did the sound expose the location of the animal that made it?"
- c. "Why might the animal have made the sound? If the sound made the animal's location apparent, what are the possible benefits and costs of making it? When might the animal make this sound, and when might it not?"
- d. "What effects do you think human-made sounds have on the animals here?"

FOLLOW-UP ACTIVITIES

Reading Connection

Read *The Other Way to Listen*, by Byrd Baylor, to set a tone of reverence and reflection.

Repeated Listening

Have students make sound maps at different locations around your campus or other areas (urban, urban-wild interface) to compare the differences among them.

Writing Poems

Instruct students to write poems based on the experience of deep listening.

- a. "Think about what you felt like when you were making your sound map. What does it feel like to really listen to a place? Write a poem about what you can hear if you take the time to slow down and listen."
- b. "If you don't know what to write or where to start, begin by just saying 'I hear' and listing some things you hear, and then saying 'I feel' and writing about how you feel when you hear these sounds, or as you listen."