

### 3 Soundscapes Around Us

**Expected Time:** 45 minutes

**Group Size:** All students

**Setting:** Indoors

#### **Learning Objectives:**

Students will 1) identify different sounds, 2) learn the difference between “sound” and “soundscape,” 3) categorize sounds by their source (biophony, geophony, and anthrophony), and 4) recognize the diversity of sounds in their surroundings.

#### **Materials:**

- Bingo cards from Student Guide or Sheet 6.1
- Bingo Audio Library #1 (Isolated Sounds)
- Bingo Audio Library #2 (Soundscapes)
- Device to randomly play sound files
- Bingo tokens (preferably natural objects that can be used to represent biophony, anthrophony, and geophony)
- Printed words: “geophony,” “biophony,” and “anthrophony” for each group (Sheet 6.2) (optional)
- Speakers

## Activity 6: Audio Bingo

Forests, oceans, wetlands, deserts, and other ecosystems host particular species adapted to these particular environments. The biodiversity of a given ecosystem can include both native and exotic species that contribute to the unique soundscapes of that ecosystem. A soundscape is the collection of all sounds in a particular place over a certain time period.

We can say that soundscapes on Earth are composed of three broad categories of sounds:

- Geophony—the sounds created by non-biological natural elements like wind, running water, and seismic events.
- Biophony—the sounds produced by animals like frogs, wolves, geese, and crickets.
- Anthrophony—the sounds produced by humans (e.g., talking and laughter) as well as those produced by human-built machines like cars, musical instruments, and construction equipment.

Within each of these three categories, sounds can be quite diverse due to varying methods of sound production and differing environmental conditions that affect sound propagation.

A “soundscape” is the combination of all the sounds happening at a given place over a given period of time. Earth is home to a wide variety of soundscapes! For example, city soundscapes are composed of honking cars, laughing humans, and peeping sparrows. Desert soundscapes consist of howling wind, chirping crickets, and rumbling thunder. Natural and human-made sounds both contribute to soundscapes. One can think of any soundscape as a mix of anthrophony (human-produced sounds), biophony (non-human animal-produced sounds), and geophony (atmospheric and geophysical sounds) (Figure 11.1).

## INSTRUCTOR DIRECTIONS

This activity is composed of two parts. There are two audio libraries—one that contains isolated sounds and another that contains soundscapes. The first part encourages students to listen to recordings and identify sound sources. In the second part of this activity, students categorize sources of sounds within soundscapes.

### Pre-Activity

Load all sounds to a playback device. Connect to speakers, and test functionality. If students do not have Student Guides, or if more than four bingo cards are desired, print bingo cards. Optionally, ask students to go outside to collect different natural items like pebbles, small sticks, or acorns to use as tokens.

### Activity Part 1: Bingo!

1. Print bingo cards if students do not have Student Guides. (Sheet 6.1).
2. Instruct students to be silent and attentive to all the sounds around them during the game.
3. Have students fill out one bingo card using the list of sounds given in Table 6.1.
4. Load Audio Library 1 on a computer or MP3 player that is connected to speakers.
5. Using the shuffle feature on the playback device, play the sounds.
6. Note which sounds have been played to keep track of correct answers. This list will be used to validate a winner's list at the end of the game.
7. Students will place a token on each space that matches a sound they heard.
8. The objective of the game is to place a token on every space.
9. When a student completes their bingo card, he or she should shout "AUDIO BINGO!" The winner(s) will then read sounds on their card to verify their win. If they would like, they can also recreate the sounds.
10. Repeat the game, but use Bingo Audio Library 2, and have students create their bingo cards using sounds in Table 6.2. In this version, there may be multiple sounds in each sound file, and students can mark as many sounds as they can distinguish.

## KEY QUESTIONS

### What is the difference between a sound and a soundscape?

If students have difficulty explaining the difference, play one sound followed by one soundscape (from Audio Library 2), and ask students how they would differentiate between the two.

*Answer:* A sound has one source while a soundscape is composed of different sources.



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**Table 6.1. Sounds in Bingo Audio Library 1**



Geophony	Biophony	Anthrophony
Avalanche	Bees	Airplane
Breaking ice	Chipmunks	Applause
Bubbles	Cicadas	Breaking plate
Falling tree	Crows	Clock
Hail	Dogs	Creaking door
Lightning	Dolphins	Evil laughter
River	Horses	Fireworks
Splashing water	Lemurs	Footsteps
Thunder	Lions	Guitar
Wildfire	Rattlesnakes	Laughing baby
Waterfall	Roosters	Opening soda bottle
Wind	Snapping Shrimp	Piano
	Starlings	Traffic
		Train
		Typing
		Yawning

## Activity Part 2: Categorize Sound

- Without defining the terms “biophony,” “geophony,” and “anthrophony,” ask students to categorize the sound sources on their bingo cards. Students might follow the divisions of biophony, geophony, and anthrophony, or they might invent their own classification systems.
- The instructor can provide more hints if students are confused. One can ask students about natural and human-made sounds or about the difference between birdsong and rain, as both are natural.
- Before giving students the new terms ask them to explain the reasons behind their own classifications. Possible invented classifications might include:
  - Sounds I like vs. sounds I don't like
  - Loud sounds vs. soft sounds
  - Sounds I have heard vs. sounds I have never heard
  - Natural sounds (both biophony and geophony) vs. human-made sounds (anthrophony)
- Pass out the three term cards, “biophony,” “geophony,” and “anthrophony,” (Sheet 6.2), or write these terms on a whiteboard or flipchart without defining the terms (Appendix B). Explain to students that scientists use these three categories to discuss components of soundscapes and ask students to discuss which sounds from the bingo cards they might place in which category. In this way, students can discuss the terms and draw connections between past knowledge of concepts like “biology“ and “geology“ with the new terms, “biophony” and “geophony.” Encourage students to share their ideas with their group members.
- Check their answers and explain the meaning of each category. Ask students to provide examples of sounds within each category.
- Ask students to compare this classification system with their own systems and to consider how this system might be superior or inferior to their own systems.
- Ask if this system presents any problems.
- Play some of the soundscapes from Bingo Audio Library 2 and ask them to dissect the soundscape and categorize the sources of sound using scientific terminology.

## KEY QUESTION

### How might biophony, geophony, and anthrophony differ between ecosystems?

*Answer:* Different landscapes and structures within ecosystems provide habitats for various species which produce varying levels of biophony, and climate strongly affects geophony. Some ecosystems like temperate forests are more accessible to humans, so they are full of anthrophony while other ecosystems like tundra are less accessible and less affected by human sound.

## POSSIBLE EXTENSIONS

- Ask students to mimic one of the soundscapes from Sound Library 2. Each student can choose to produce one of the sounds within the soundscape, and together they can produce the soundscape. Record their symphonic sounds as a “soundscape.” Play back the recreated soundscape and compare it with the original.
- Take students outdoors to experience the sounds in their surroundings. Ask them to categorize sounds as biophony, anthrophony, or geophony.
- Create customized sound bingo cards for your local area. Distribute cards to students with clipboards or weights, and bring students outdoors with the custom cards. Play bingo counting any sound when it is heard in the live outdoor soundscape.

## ADAPTATIONS FOR ACCESSIBILITY

Use braille cards.

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## Sheet 6.1: Bingo Cards

<b>B</b>	<b>I</b>	<b>N</b>	<b>G</b>	<b>O</b>

<b>B</b>	<b>I</b>	<b>N</b>	<b>G</b>	<b>O</b>

Sheet 6.2: Sound Categories



Sheet 6.2: Sound Categories (continued)



# Biophony

Sheet 6.2: Sound Categories (continued)

