

Listening to Underground Sound in New York

Description:

In this lesson, students will learn about the world of sound and noise aboveground and underground in NYC. Students will distinguish between sound and noise using the Underground Sound Project, a local exhibition exploring sound recordings beneath various natural surfaces. Students will investigate the interconnections between humans and nature – revealed by the melodic, resonant sounds occurring naturally underground in our ecosystems and later contrasted to the human impact of noise pollution.

Objectives:

- Explore the impacts of sound and noise on humans, parks, and other natural spaces
- Learn about the benefits of ecosystems in urban areas
- Understand anthropogenic noise pollution

Vocabulary:

Anthropogenic, noise, noise pollution, sound, geophone, hydrophone

Materials:

- Cellphone or tablet with mobile data access (if conducted in Prospect Park)
- Computer, tablet, or cellphone (if conducted in classroom)
- Headphones (if headphones are not available use classroom speakers/SMART Board)
- Underground Sound Project Field Journal Worksheet
- Writing utensils

Background Information:

The Underground Sound Project, created by artist Nikki Lindt, is a series of underground sound recordings from several different parks throughout New York City and upstate New York. Nikki Lindt was inspired to pursue this work after a trip to the Arctic where she recorded her first underground sound. Ever since then, she has recorded underground sounds in any place she can – including in various sites all over New York.

Through her partnership with the UFS Collaborative Arts Program, NYC Parks, USDA Forest Service and the Nature of Cities, she also designed a self-guided walking tour with designated locations of recorded underground sounds along a wooded path in Brooklyn’s Prospect Park. You can listen as you walk along this trail or from home. The Underground Sound Project encourages students to further explore parks and nature in their neighborhoods and to increase their appreciation for these often-overlooked resources. The project uses contact microphones, geophones, and hydrophones to record sound. As there isn’t much research into the world of underground sound and due to the experimental nature of this work, most of the microphones were either repurposed or purpose built for this project. The Underground Sound Project hopes to address this lack of research by helping participants create and strengthen their relationships with nature and creating awareness in the public about the noisy, intricate world beneath our feet.

Method:

Part I

- Go over the vocabulary words previously mentioned to make sure students understand the terms. Definitions can be found in the Sound and Noise Glossary.
- Ensure students understand the difference between sound and noise.

Refer to earlier lessons in DEP’s Sound and Noise education module.

- Introduce the Underground Sound Project to your students. Discuss how the artist collected underground sound recordings, and how this might be different than collecting aboveground sound recordings.
 - Watch [this video](#) for some insight from Nikki Lindt on her project.
- Have students think about and answer the preliminary questions on “The Underground Sound Project Field Journal Worksheet” found at the end of this lesson.
- As a class, discuss student responses to the preliminary questions on the worksheet.

Part II (*in-person at Prospect Park*)

- Prior to visiting the exhibit, please ensure that students have a device with internet access, either their own or one they can share with a friend. Make sure students bring headphones (over-the-ear headphones and noise-cancelling headphones are ideal, but any pair of headphones can work).
- The in-person Underground Sound exhibit begins at Prospect Park Dog Beach. It will have QR codes on display until May 2023. Afterwards, it will remain accessible online and the stops can be followed using [GoogleMaps](#).
- The first stop on the tour, located at Prospect Park Dog Beach, has a QR code that can be scanned by students. If the QR code is not working, the website can be accessed [here](#).
 - A map for the trail outlining each stop can be found [here](#).
- Allow students to work in pairs. They can listen alone on their phones/tablets/computers and together discuss what they heard after listening. Ensure students are using headphones,

preferably over the ear headphones, if possible, to maximize sound quality.

- Have students listen to the sound under the first stop titled “Welcome to the Soundwalk” before getting started with the walk. This will give the class background on the project and understanding on the importance of our connections to land and nature.
- At each stop, there are various sounds to select from. Below are a few suggested sounds your class might be interested in. If time permits, allow your students to listen to more than one sound at each stop.
 - A. Plants
 - “Recording in soil under *Phragmites*”
 - B. Bodies of Water:
 - “Recording in mud at bottom of lake” or “Recording in sandbar in Bay”
 - C. Soils
 - “Recording in soil in acorns & leaves”
 - D. Precipitation
 - “Recording in soil below melting icicles”
 - E. Streams
 - “Recording inside fallen tree in stream.
 - F. Trees
 - “Recording inside oak (with subway underneath)”
 - G. We Are Here
 - H. Human Engagement
 - “Recording 6ft deep in river by dock”
 - “Recording in soil next to trail”
- Have students work on the Field Journal and Guiding Questions portions of the “The Underground Sound Project: Field Journal Worksheet” while they listen to the sounds at each stop.

- Provide students the space to share anything they wrote or drew in their Field Journal Worksheet with their partners and the class.

Part II (*online/in the classroom*)

- This tour can still be completed if conducting this lesson in an online and/or classroom setting. Proceed to the Underground Sound Project webpage, linked [here](#).
- Allow students to work in pairs. They can listen alone on their phones/tablets/computers and together discuss what they heard after listening. Ensure students are using headphones, preferably over the ear headphones, if possible, to maximize sound quality.
 - If not working in pairs, the lesson can be conducted as a class using a SMART Board device or other classroom speakers (no laptop speakers).
- Have students listen to the sound under the first stop titled “Welcome to the Soundwalk” before getting started with the walk. This will give the class background on the project and understanding on the importance of our connections to land and nature.
- At each virtual stop, there are various sounds to select from. Below are a few suggested sounds your class might be interested in. If time permits, allow your students to listen to more than one sound at each stop.
 - A. Plants
 - “Recording in soil under *Phragmites*”
 - B. Bodies of Water:
 - “Recording in mud at bottom of lake” or “Recording in sandbar in Bay”
 - C. Soils
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- H. Human Engagement
 - “Recording 6ft deep in river by dock”
 - “Recording in soil next to trail”
- Provide students the space to share anything they wrote or drew in their Field Journal Worksheet with their partners and/or with the class.
- Optional: As a class, craft a response on your thoughts, feelings, and reactions to the Underground Sound Project. [Submit your class response](#) to be featured on the response gallery.

Discussion:

- How did what you listened to compare to what you expected to hear?
- Were there any sounds that surprised you? What was surprising about them?
- How do you think the sounds would compare between an urban park, a forest, or a farm? What noises might be present in one place but not the other?
- If you completed this activity at a park, were there any sounds that you felt didn’t belong in a park? Why don’t they belong?
- How have humans shaped the sounds heard in some of the sound clips presented on the tour? How might these sounds affect other species?

Extension:

- Have students read the article [Animals in the soil make noises. Biologists are listening.](#) This article discusses how different species incorporate sound into their lives and how underground sound can be used as a measure of soil biodiversity.
 - Compare and contrast impacts that human activity may have on soils in rural areas versus soils in urban areas using what you heard in the Underground Sound Project.
 - Do you see any benefits in studying soil sounds more intensely in the future?
- Watch [How trees secretly talk to each other](#) from BBC News. This video talks about how trees use fungi found in and around root networks to communicate information with each other.
 - How do you think noise pollution, such as what was heard in the Underground Sound Project, could affect the underground root networks mentioned in the video?
- Have students listen to several sounds from the [Sounding Soil Listening Map](#). This interdisciplinary project based out of Switzerland led by Marcus Maeder focuses on the acoustics of soil ecosystems.
 - Compare and contrast the sounds you found on the Listening Map. How does land use, cultivation, and weather affect sound?
- Watch the video [How Sound Travels Across Different Mediums](#) and complete the mini experiment explained in the video in order to understand how sound travels through solids.

NYC Department of Environmental Protection

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For more information visit www.nyc.gov/dep

Name: _____ Date: _____

The Underground Sound Project: Field Journal

Directions: Document your observations and answer the guiding questions as you listen to the recordings.

Preliminary Questions

1. Think about the last time you went to a park. Which park was it and what sounds do you remember hearing?

2. While at a park, spend three minutes in silence to listen for sounds around you. List all the sounds you heard. Circle the loudest sound and underline the quietest sound that you heard.

3. Do you have any predictions about what you are going to hear underground? Do you think underground sound will be the same or different?



Field Journal

Directions: While you are listening, use the space below to write or draw anything that comes to mind. Examples include (but are not limited to) expressing what you're feeling, what a sound reminds you of, or what you think a certain sound is.

Tour Stop In the space below, draw or write what comes to mind while you listen to sounds at each stop.	Guiding Questions Answer the questions below using the information found in the "Learn more" section of each stop.
A. Plants	What are some benefits of having more biodiverse native plant communities?
B. Bodies of Water	Which areas of New York City will be most vulnerable to sea level rise due to climate change?

C. Soils	What is a pollutant in New York City soils that fungal communities can metabolize?
D. Precipitation	What are cloudbursts and why has their occurrence increased?
E. Streams	What are some benefits of restoring streams?

E. Trees	How do you benefit from trees? Are there healthy trees in your neighborhood?
G. We Are Here	Why is it important to feel connected to nature – including underground sound?
H. Human Engagement	What are some examples of anthropogenic noise pollution in New York City?