Feeling the Vibrations

OVERVIEW

ESSENTIAL QUESTION

How did the Grateful Dead make their concerts more accessible to the Deaf and Hard of Hearing (DHH) community?

OVERVIEW

One of the lasting legacies of the Grateful Dead is their dedication to their fans. Affectionately known as "Deadheads," Grateful Dead fans were considered more than just customers for records—they were, in many ways, taken in as part of the band's family. As such, the Grateful Dead made great efforts to connect with their fanbase, whether it was by constant touring, spending a small fortune on an enormous sound system to deliver pristine sound at concerts, or allowing fans to freely record and disseminate those performances.

The band's desire for a deep connection with their fanbase also meant acknowledging the vast diversity of Deadheads. Beginning in the 1980s, for example, Grateful Dead concerts began featuring American Sign Language (ASL) interpreters, so that their deaf and hard of hearing (DHH) fanbase could better appreciate the concert.

In addition to ASL signers, this community of affectionately labeled "Deafheads" employed other ways to experience Grateful Dead concerts. Many would hold objects such as inflated balloons to enhance their enjoyment of the music, using these aids in order to feel the vibrations coming from the speakers. Soon, the Deafheads were allocated specific sections during concerts, with close proximity to ASL interpreters, video screens focused closely on the band to enable lip reading, and large sound systems so as to better feel the vibrations of the music.

Inspired by the Grateful Dead's innovative approach to presenting concerts to their deaf and hard of hearing fanbase, in this lesson students consider how deaf and hard of hearing people experience music and concerts by exploring the tactile effects of soundwaves through a hands-on activity, and practicing American Sign Language.

Materials required for this lesson: balloons, plastic or glass bottles, aluminum cans, paper plates, speakers, pieces of cloth or foam

OBJECTIVES

Upon completion of this lesson, students will:

1. KNOW (KNOWLEDGE):

- How deaf and hard of hearing communities experience music and concerts
- The science of sound waves
- How sound can be experienced in a tactile way
- How different materials react to sound waves differently
- How various musical genres might be experienced in different tactile ways
- The history and use of American Sign Language (ASL)
- The diversity of Grateful Dead fans, or "Deadheads"

2. MASTERY OBJECTIVE

- Students will be able to better understand how deaf and hard of hearing people experience music by encountering sound's tactile effects and by practicing American Sign Language.

ACTIVITIES

MOTIVATIONAL ACTIVITY

1. Ask students:
   - Do you think people who are deaf or hard-of-hearing attend music concerts?
   - What might people in the deaf or hard-of-hearing community enjoy about concerts? How might they experience concerts in a different way?
   - What kind of technologies or practices might help deaf and hard of hearing people enjoy concerts?

PROCEDURE:

1. Tell students that in this lesson the class will be investigating the Grateful Dead, a band that has become known for its large and diverse fanbase, often referred to as "Deadheads." Show students **Clip 1, "The Fan Mandala."** Then ask students:
   - According to the clip, what kind of fan groups were present at a Grateful Dead concert?
   - How did Grateful Dead fans who were deaf and hard of hearing enjoy the concert?
   - Why would a sign language interpreter be helpful for the deaf and hard of hearing community at a concert?
   - In the clip, Steve Silberman notes that deaf and hard of hearing fans

held balloons so they could "sense the vibrations of the music." How is it possible to feel the vibrations of sound?

2. Explain to students that sound is air waves that hit your ears at certain frequencies, which are then interpreted by your brain as sound. Ask students:

    - If sound is simply air waves, is it possible to sense these waves in places other than your ears?
    - Have you ever had the experience of feeling the vibrations of music with your body? When?
    - Do you think different materials, such as balloons, might transmit sound better than other materials? Why?

3. Organize students into small groups and explain that they will be doing an experiment to see if different materials react differently to sound waves. (to see an overview of this experiment, watch or show your students the clip **"Tactile Listening Experiments."**) Have each group go to a tactile listening station, each of which includes:

    - A sound system that can connect to the internet. (*If classrooms have limited access to a soundsystem, teachers can also structure this activity with one central station which students can take turns visiting.*) **Clip 2, "Smells like Teen Spirit"** will be used for the first experiment, and a suggested youtube playlist can be found here for the second experiment. Alternatively, teachers can use their musical selections for the experiment.
    - An inflated balloon
    - A variety of other handheld materials: pieces of cloth or foam, paper or plastic plates of cups, aluminum cans, 2-liter bottles, etc. (*Teachers are encouraged to find and use whatever various types of materials might be found in their classrooms.*)

4. Tell students that some materials reflect soundwaves, while other materials absorb soundwaves. Ask students:

    - How might a material that absorbs sound feel like? What about a material that reflects soundwaves?
    - What kind of characteristics might determine whether something absorbs sound or reflects sound? (*Characteristics might include the shape, hardness, porousness, size, and composition of a particular material.*)

5. Display **Image 1, Acoustic Spaces**. Ask students:

    - What happens in each of these spaces?
    - Do you think the designers of these spaces considered how various materials might reflect or absorb sound during the construction process? Why might have they chosen the materials they chose?
    - Do you think the designers of these spaces considered how various materials might reflect or absorb sound during the construction process? Why might have they chosen the materials they chose?
    - Which space do you think absorbs the most sound, and which reflects the sound? Why might these qualities be important in the three locations?
    - What kind of music might you hear in these three spaces? Do you think materials react differently depending on the type of sound they are exposed to?

6. Ask students to move on to the second experiment in **Handout 1 - Tactile Listening Experiment**, and follow the directions outlined in the handout. Afterwards, ask students:

    - Did you observe that different song felt differently through the material you chose?
    - Could you describe how one of the song felt? Which had the strongest impact on you?
    - Did the songs feel to you how you hypothesized they would feel, or were the results different?

7. Show **Clip 3, Katy Perry's "Firework" by Jason Listman**. Ask students:

    - What is happening in this video?
    - After watching the video, were there any signs you remember? In what ways do those signs represent the words they refer to?

8. Pass out to students **Handout 2 - American Sign Language.** Read the handout aloud as a class.What is happening in this video?

9. Using the second page of **Handout 2**, ask students to practice spelling a word of their choice—it could be their favorite food, the state they were born in, or the name of their favorite musician. Once students feel comfortable spelling the word, ask volunteers to give the class a hint of the word they practiced (for example, "it's one of my favorite foods") and then sign the word slowly before the class. Using their worksheets for help, the rest of the class should try to discover the word being spelled, and shout out the answer. The signer should signal when a student correctly identified the word by signing a silent applause sign, as illustrated in the handout.

SUMMARY ACTIVITY

1. Ask students:

    - In what ways have bands, concert promoters, and fans made concerts more appealing to deaf and hard of hearing people?
    - In what ways do deaf and hard of hearing people experience music? What sort of skills might they have developed to experience music in their own way?
    - In what ways might concerts become more appealing to others with a disability? What could be done to ensure that people who are blind, autistic, or have limited mobility feel welcome and included at concerts and other events?

EXTENSION ACTIVITIES

1. Writing prompt: The Americans with Disabilities Act (1990) requires businesses to make 'reasonable accommodations' to make their establishments accessible to all communities. Under this law, supports like the ones the Grateful Dead provided prior to ADA to the Deafheads must be provided only if requested in advance of a live performance. This often means that if a person in the DHH communities does not request supports prior to the event,

these supports are often unavailable. However, other accommodations outlined under ADA, such as elevator requirements based on the number of floors in a newly constructed building, are mandatory. What do you think about some accommodations being by request only and others being mandatory? Write an essay arguing in support of ADA accommodations as they are now or arguing for a different way to institute supports to those who need them.

NEXT GENERATION SCIENCE STANDARDS (NGSS)

1-PS4-1: Plan and conduct investigations to provide evidence that vibrating materials cna make sound and that sound can make materials vibrate.

1-PS4-4: Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.

COMMON CORE STATE STANDARDS

College and Career Readiness Anchor Standards for Reading

Reading 1: Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

Integration of Knowledge and Ideas 7: Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.

Integration of Knowledge and Ideas 8: Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.

College and Career Readiness Anchor Standards for Writing

Text Types and Purposes 2: Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.

Production and Distribution of Writing 4: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

Research to Build and Present Knowledge 7: Conduct short as well as more sustained research projects based on focused questions, demonstrating understanding of the subject under investigation.*College and Career Readiness Anchor Standards for Language (K-12)*

College and Career Readiness Anchor Standards for Language

Language 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

College and Career Readiness Anchor Standards for Speaking and Listening (K-12)

Comprehension & Collaboration 1:Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Comprehension & Collaboration 2: Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

Presentation of Knowledge 4: Present information, findings, and supporting evidence such that listeners can follow the line of reasoning and the organization, development, and style are appropriate to task, purpose, and audience.

NATIONAL CURRICULUM STANDARDS FOR SOCIAL STUDIES – NATIONAL COUNCIL FOR THE SOCIAL STUDIES (NCSS)

Theme 1: Culture

Theme 2: Time, Continuity, and Change

Theme 3: People, Place, and Environments

Theme 5: Individuals, Groups, and Institutions

Theme 6: Power, Authority, and Governance

Theme 10: Civic Ideals and Practices

NATIONAL STANDARDS FOR MUSIC EDUCATION – NATIONAL ASSOCIATION FOR MUSIC EDUCATION (NAFME)

Core Music Standard: Responding

Interpret: Support interpretations of musical works that reflect creators' and/or performers' expressive intent.

Evaluate: Support evaluations of musical works and performances based on analysis, interpretation, and established criteria.

Core Music Standard: Connecting

Connecting 11: Relate musical ideas and works to varied contexts and daily life to deepen understanding.

RESOURCES

VIDEO RESOURCES

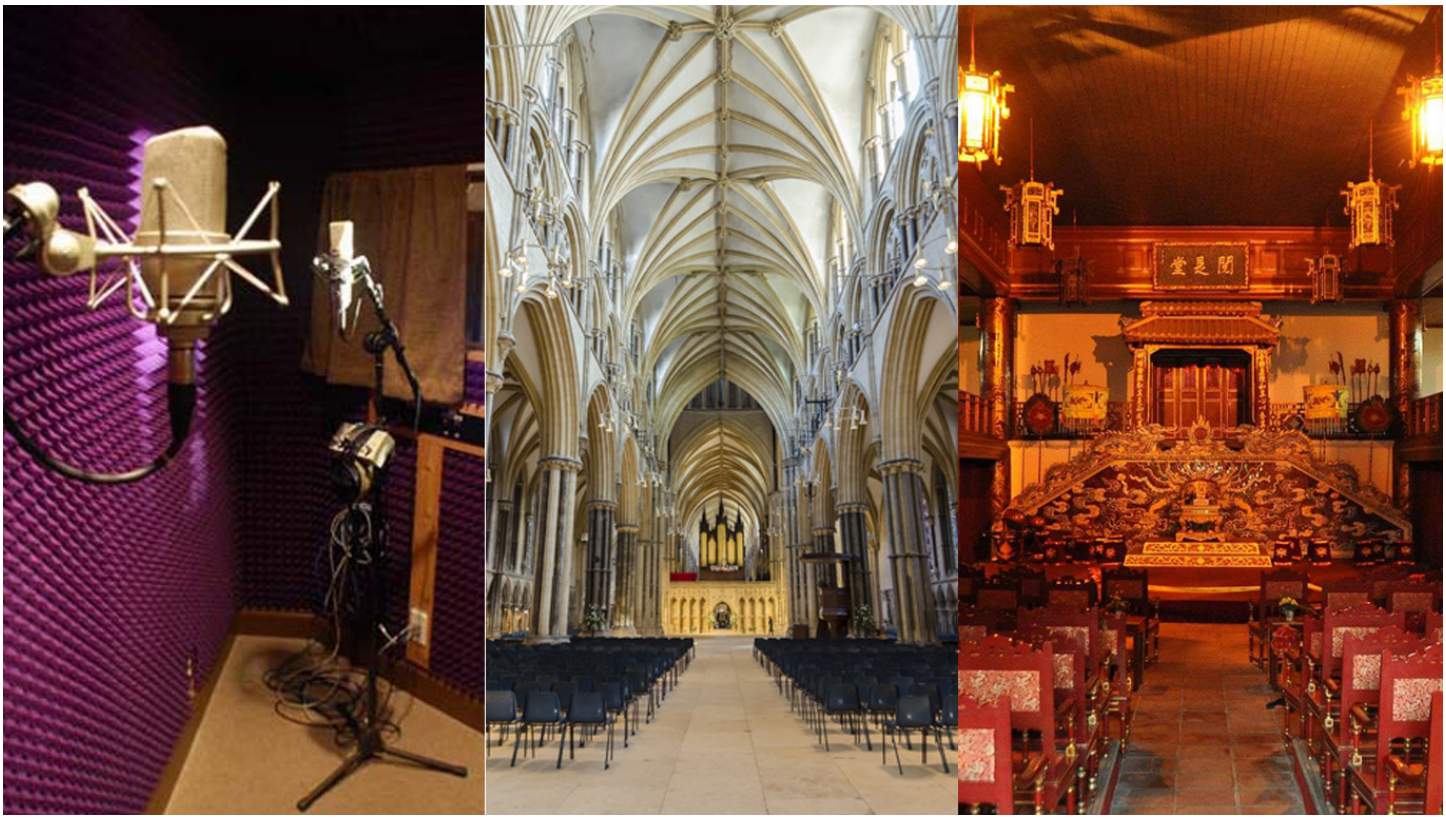
- Tactile Listening Experiments
- *Long Strange Trip* - The Fan Mandala
- Katy Perry's "Fireworks" by Jason Listman

HANDOUTS

- Handout 1 - Tactile Listening Experiment
- Handout 2 - American Sign Language

Lesson Materials

Image 1, Acoustic Spaces



Handout 1 - Tactile Listening Experiments

In these experiments, you willl be examining the ways music can be experienced in a tactile way - through touch rather than through hearing.

Experiment 1

1. In this experiment, you will be answering the **research question**, “how do various materials react differently to soundwaves?”
2. List the materials you have available at your station in the chart below, under “Material.” Then, rank the materials by which you think will respond the most strongly to sound waves. Rank objects you think will have the strongest vibration “1,” and then proceed from there (“2” would have the second strongest vibration, etc.) This will be your **hypothesis**.

Material	Rank (Hypothesis)	Observations	Rank (Result)

3. Go to the **http://bit.ly/TactileExperiment2** to locate the song you will be using for this experiment. Place each material, one at a time, a few inches away from the speaker, and play the video at a loud volume. Record your observations on how you experience the sound through each material in the “observations” tab. How well can you feel the vibrations for each object?
4. Once the experiment is finished, rank the materials again, based on your observations. How close was your **hypothesis** to your **results**?

Handout 1 - Tactile Listening Experiments

In these experiments, you willl be examining the ways music can be experienced in a tactile way - through touch rather than through hearing.

Experiment 2

1. In this experiment, you will be answering the **research question**, “do different genres of music produce different tactile results?” In other words, do different musical genres feel different?
2. Create a playlist of 5 songs of different styles. You can do this through a streaming website, from CDs, or from your own music collection (our suggested youtube playlist can be found at http://bit.ly/TactileExperiment2). Based on the title, artist, and what you may know about each song you chose, try to hyposthesize what each song might feel like. Consider words like, “strong,” “weak,” “rhythmic,” or “buzzing.” Write the name of each song under the “song” section of the chart, and your hypothesis in the hypothesis section.

Song	Hypothesis (what will it feel like?)	Observations (what did it feel like?)	Results (was the hypothesis right?)

3. Choose the material you discovered produced the best results in experiment one. Hold it in front of the speaker, and play a part of each song (30 seconds is appropriate), then make your observations in the Observations section.
4. In the Results section, note whether you feel your hypothesis was accurate or not accurate.

Handout 2 - American Sign Language

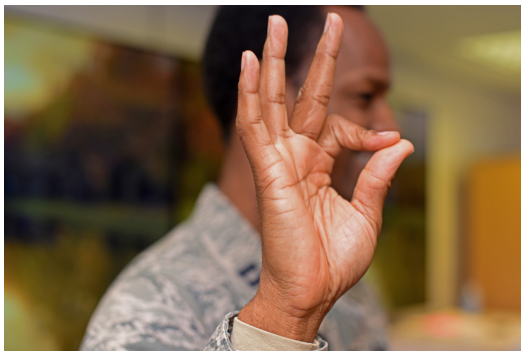


Photo: Brandon Esau

Sign language is one of the ways deaf people communicate. Like spoken languages, there are many types of sign language, with some estimating 130 distinct sign languages used around the world. As with spoken language, countries which are culturally similar develop their own dialect of sign language. For example, British sign language features different hand gestures than American sign language, which mirrors some of the differences found in the spoken and alphabetically spelled versions of Britsh and American English. For example, Americans spell the color gray with an ‘a’, while the British spell the same color grey.

Signers also develop accents. Accents develop naturally when those who share a language are isolated and develop an exaggerated form of the language which allows them to be identified as part of a specific community. Accents can develop based on geography, age, ethnicity, and a variety of cultural lines. For example, New Yokers are known for their quick, direct, and blunt way of speaking, which reflects the frenzied energy of living in New York City. ASL signers in New York City are known to use their hands to issue a similarly rapid succession of signs as their speaking counterparts. ASL signers from the southern United States use a slower, more drawn-out delivery in their signing which reflects the spoken drawl many associate with the region.

While grammar and accent vary in signed languages, all feature the same elements: handshape, movement, location, palm orientation, and non-manual signals like facial expression. By changing these elements, signers communicate subtleties, for example, inflating one’s cheeks while signing about an object can signal that the object being referenced is large.

American Sign Language (ASL) Alphabet and Numbers 1-9