



# GRAPHOPHONE

## Post & Lesson Plan

# GRAPHOPHONE

The graphophone was one of the first ways to record and play sound. And without this invention we would not have things like voicemail, iTunes, or Spotify. Listening to recorded sounds is something we now do on a daily basis. Recording and playing sound is easy because of Alexander Graham Bell, Charles Sumner Tainter, and Chichester Bell over 100 years ago. They invented the graphophone in 1886. They named their invention this because the word graph means mark or record and phone means sound. The name comes from what it does.

Thomas Edison made the first recording device called the phonophone in 1877. The phonophone recorded sound waves on tinfoil. The tinfoil record did not playback the sound after a few replays.

The team of inventors for the graphophone all had different skills. Alexander Graham Bell (most well-known as the inventor of the telephone) taught about hearing and speech. Tainter and Bell were scientists and cousins who went into business together.

Bell, Tainter, and Bell wanted a machine that could record multiple copies of sound. They did science experiments with many materials. They discovered that wax was stronger than tinfoil. And wax cylinders held the grooves made by soundwaves longer. It created a clearer and stronger sound. Wax allowed for multiple replays of the record.

Bell, Tainter, and Bell were afraid that Thomas Edison would steal their invention. They sent sealed boxes to the Smithsonian Museum in Washington DC after working on their invention for months. In the tin boxes were drawings and a graphophone to prove it was their work.

One goal of the graphophone was for companies to record conversations and telephone calls. Before audio recording, the only way to record a conversation was to write down exactly what was said. Even with the graphophone and other early devices, mostly secretaries listened to recordings and wrote down exactly what was said. Even the wax recording only lasted so long.

Another use of early recordings was more fun than business meetings. Do you like music? At the time, music could only be heard live. So, recording devices were important if you wanted to hear someone beside your neighbor play the guitar. A company that is still known today--Columbia Records, originally used the graphophone. They used it to record music and sell it.

This technology is no longer just for corporations. These men started the process of recording sound and allowing for playback. Now we can record sound on cell phones, play it back, and sell it without giving it much thought at all!

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WISCONSIN 101: [www.wi101.wisc.edu](http://www.wi101.wisc.edu)

[Hear my voice](#)

Volta Laboratory Association - Graphophone

**Collecting, Preserving, and Sharing Stories since 1846**

816 State Street Madison, Wisconsin 53706

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[wisconsinhistory.org](http://wisconsinhistory.org)

<https://americanhistory.si.edu/documentgallery/exhibitions/hear-my-voice/5.html>



Image courtesy of [WikiCommons](#)



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# Graphophone

## Enduring Understanding

How do objects help us understand the story of Wisconsin?

## Essential Questions

- Why do we save things?
- What makes the things we save important?
- What questions can objects help us answer?
- How do we unlock the meanings of an object?

## Wisconsin Standards for Social Studies

Social Studies Inquiry Practices and Processes

- Develop claims using evidence to support reasoning. (**SS.Inq1**)
- Communicate and critique conclusions. (**SS.Inq4**)

Behavioral

- Investigate interactions between individuals and groups - Sociology. (**SS.BH2**)
- Assess the role that human behavior and cultures play in the development of social endeavors - Anthropology. (**SS.BH3**)
- Examine the progression of specific forms of technology and their influence within various societies. (**SS.BH4**)

History

- Connect past events, people, and ideas to the present, use different perspectives to draw conclusions, and suggest current implications. (**SS.Hist3**)

## Wisconsin Standards for Science

- **SCI.CC3.3-5:** Students recognize natural objects and observable phenomena exist from the very small to the immensely large. They use standard units to measure and describe physical qualities such as mass, time, temperature, and volume.
- **SCI.CC4.3-5:** Students understand a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They also describe a system in terms of its components and their interactions.
- **SCI.CC6.3-5:** Students understand different materials have different substructures, which can sometimes be observed; and substructures have shapes and parts that serve functions.
- **SCI.CC7.3-5:** Students measure change in terms of differences over time, and observe that change may occur at different rates. They understand some systems appear stable, but over long periods of time they will eventually change.

Science and Engineering Practices

- **SCI.SEP1.A.3-5:** Students ask questions that specify qualitative relationships. Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- **SCI.SEP3.A.3-5:** Students plan and carry out investigations that control variables and provide evidence to support explanations or design solutions.

## Suggested Performance Task

Students can show achievement through completion of these outcomes:

- Class discussion and activities on:
  - Activity #1, Creating Sound Waves
    - Student will learn how sound waves are made and travel. This experiment can occur in class or at home. Use the sheet below for students to conduct the experiment.
  - Activity #2, What's that sound?
    - Do we always know what we are hearing? We hear sound everywhere we go, can you identify the sounds in this activity? Using the Power Point to conduct this activity.
    - Have students think about sounds they hear in their community. Have them create a soundscape of a cherished activity in their community. Use the activity sheet to guide the students in listening to the sounds that make up their community and activities.
    - Have a class share day for students to share their activity sounds.
  - Activity #3, Recording the Past
    - Have students select an individual who is older than them and talk to them about how sound/music was recorded and played. Each student will write a one page report on how sound/music was recorded and played. Students will need to take a picture of the recording/playback their subject used and if possible use it themselves.
    - Have students bring in their images of the recording devices and share what they learned.
  - Activity #4, Sound Recording Timeline
    - Using the handouts of images provided instruct the students to create a timeline by posting their given image in date order on the class wall. Have a class discussion on why they placed the images where they did based on what the students can see in the images and what they know about technology.
  - Activity #5, Sound Quality Past and Present
    - Have students listen to the recording of Alexander Graham Bell from the graphophone and then play a current audio recording. Have the students compare and contrast the quality and clarity of sound and what has helped make sound recording better. (A worksheet is below to help with the activity)
      - Alexander Graham Bell's voice, 1885 (National Museum of American History)  
<https://www.youtube.com/watch?v=qf97H6cV5QQ&feature=youtu.be>
      - Alexander Graham Bell Voice, ca. 1885 (Smithsonian)  
<https://www.youtube.com/watch?v=qTpWD28Vcq0&feature=youtu.be>
      - Diary of A Whimpy Kid | Official Trailer | Fox Family Entertainment  
<https://youtu.be/T1x0bYr0bgY>
      - Braids!, 2018 (Books Read Aloud for Children)  
<https://www.youtube.com/watch?v=OWaSUDm7Kko>
      - Down the Drain!, 2019 (Books Read Aloud for Children)  
<https://www.youtube.com/watch?v=xrDojb-T03w>

# Creating Sound Waves

**Directions:** Using the instructions below create your own sound waves. Afterwards, answer the questions on the worksheet.

**Supplies:** Ruler, 4 feet of yarn, two metal spoons of different sizes.

## Experiment Instructions:

- Create a loop in the middle of the yarn.
- Tighten the loop at the end of the spoon handle.
- Wrap the end ends of the yarn on the pointer fingers on each hand.
- Hold the string against each ear. (Do not put them in your ear.)
- The spoon should hang just below the waist when the yarn is against your ears.
- Have someone gentle tap the spoon on the round part with the ruler.

## Questions:

1. What sound does the large spoon make?

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a. Does the sound change when you hit the spoon harder? How?

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b. What does it sound like? Louder? Quieter?

2. What sound does the small spoon make?

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a. How is it different than the large spoon?

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b. Does the sound change when you hit the spoon harder? How?

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c. What does it sound like? Louder? Quieter?

3. Describe the sound when the yarn is shorter?

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4. Describe the sound when the yarn is longer?

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5. Complete the experiment again with another object or string of your choosing. Investigate how sound changes.

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# Creating Sound Waves

## (Teacher Reference)

### Supplies:

- Ruler
- 4' of yarn
- Two metal spoons of different sizes
- Optional:
  - Select another metal object to experiment with (examples: fork, can, metal cup, metal coat hanger)
  - Use thinner or thicker yarn or string.

### Instructions:

- Create a loop in the middle of the yarn.
- Tighten the loop at the end of the spoon handle.
- Wrap the end ends of the yarn on the pointer fingers on each hand.
- Hold the string against each ear. (Do not put them in your ear.)
- The spoon should hang just below the waist when the yarn is against your ears.
- Have someone gently tap the spoon on the round part with the ruler.

### Terms of importance:

- Conductor – The object that sound waves travel on. This is the yarn.
- Resonate/Reverberate – Sound waves continue to travel after the initial action.

### The science behind creating sound waves

- The ruler hits the spoon creating vibrations making sound waves.
- The sound waves travel through the yarn/string to the ear.
  - The sound waves do not go into the air around you.
- The size of the spoon and length of the yarn make the sound appear higher or deeper.
- The only person who hears the higher or deeper sound is the one with the string against the ears.
- Everyone in the room hears a soft 'tink' when the ruler hits the spoon/object.

# What's That Sound?

Directions: Listen to the sounds from the slideshow and circle the best answer.

<b>Sound #1</b>	<b>Sound #2</b>
<ul style="list-style-type: none"> <li>A. Bird Calls</li> <li>B. Humpback Whale Calls</li> <li>C. Blowing Bubbles</li> <li>D. Cats</li> </ul>	<ul style="list-style-type: none"> <li>A. Book Closing</li> <li>B. Rubber Band Snap</li> <li>C. Tap Dancers</li> <li>D. Finger Snapping</li> </ul>
<b>Sound #3</b>	<b>Sound #4</b>
<ul style="list-style-type: none"> <li>A. Rock Splashing in Water</li> <li>B. Running Water</li> <li>C. Book Dropping</li> <li>D. Person Drinking</li> </ul>	<ul style="list-style-type: none"> <li>A. Crickets Chirping</li> <li>B. Dog Whining</li> <li>C. Wind Chimes</li> <li>D. Cat Meow</li> </ul>
<b>Sound #5</b>	<b>Sound #6</b>
<ul style="list-style-type: none"> <li>A. Door Knocking</li> <li>B. Books Dropping</li> <li>C. Hammering</li> <li>D. Drumming</li> </ul>	<ul style="list-style-type: none"> <li>A. Doorknob Turning</li> <li>B. Nails on Chalkboard</li> <li>C. Steel Drums</li> <li>D. Metal Rattling</li> </ul>
<b>Sound #7</b>	<b>Sound #8</b>
<ul style="list-style-type: none"> <li>A. Cat Scratching</li> <li>B. Dog Barking</li> <li>C. Frogs</li> <li>D. Wind Blowing</li> </ul>	<ul style="list-style-type: none"> <li>A. Person Sneezing</li> <li>B. Babies Talking</li> <li>C. Kids Playing</li> <li>D. Rainforest Noises</li> </ul>
<b>Sound #9</b>	<b>Sound #10</b>
<ul style="list-style-type: none"> <li>A. Traffic</li> <li>B. Train Horn</li> <li>C. Airplane Engines</li> <li>D. Skateboarding Park</li> </ul>	<ul style="list-style-type: none"> <li>A. Alarm Clock</li> <li>B. Fire Alarm</li> <li>C. Car Horn</li> <li>D. Door Bell</li> </ul>



# What's That Sound?

## (Answers)

Directions: Following with the class mark down what you think the sounds are from the slide show.

Sound #1 – (B) Humpback Whale Calls
Sound #2 – (D) Finger Snapping
Sound #3 – (A) Rock Splashing in Water
Sound #4 – (A) Crickets Chirping
Sound #5 – (C) Hammering
Sound #6 – (D) Metal Rattling
Sound #7 – (C) Frogs
Sound #8 – (D) Rainforest Noises
Sound #9 – (B) Train
Sound #10 – (A) Alarm

# Community Sounds

Directions: Select an activity from your community to record the sounds for 5-20 minutes. Take images of the activities happening while you are recording. Answer the questions below to create a poster with the images. Bring the poster and the sound recording to class to present.

1. What activity are you recording?

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2. Where does this activity happen?

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3. Who attends this activity?

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4. How often does this activity happen?

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5. Do the sounds you recorded represent the activity?

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6. What sounds are missing?

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7. Why are these sounds important to the activity?

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8. Would you want this activity recorded to remember the activity, people, and place? Why or Why Not?

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# Sound Past and Present

Directions: Make a list comparing audio from the past, over 100 years ago, and audio recorded currently. Answer the questions below thinking about how audio recording has improved and why you think that.

Old Recording	
What is bad about the sound?  1.  2.	What is good about the sound?  <input type="checkbox"/> I understand what it is said  <input type="checkbox"/> There is no background noise
New Recording	
What is bad about the sound?  1.  2.	What is good about the sound?  <input type="checkbox"/> I understand what it is said  <input type="checkbox"/> There is no background noise

1. How do we record sound now?
  - a. Is it in a separate room alone?
  - b. Is it with special equipment? (If so, what kind?)
  - c. Who can record audio now?
2. How do you think they used to record audio?
  - a. Do you think that it was in a separate room alone?
  - b. Who do you think could record audio in the past? (Everyone or just professionals)