Curriculum Connections

An American Story: The Multiphone

- Background information for the educator

Learning by Doing: Design a Music Machine

- Classroom activities based on the object

Interdisciplinary Content Standards

WR 3 - use critical thinking and problem-solving skills

WR 4 - demonstrate self-management skills

VPA 1.2 - refine skills through creating art

VPA 1.3 - utilize arts elements to produce artistic products

LA 3.1 - speak in a variety of contexts

LA 3.2 - active listening, interpreting, responding

LA 3.5 - view, understand, use non-textual information

S 5.1 - identify and understand systems of interacting components

S 5.2 - develop problem-solving skills, formulate hypotheses, interpret data

S 5.4 - develop understanding of technology as application of scientific principles

SS 6.4 - acquire historical understanding of societal ideas/forces

Learning Styles & Multiple Intelligences

auditory

visual

linguistic

logical-mathematical

spatial

intrapersonal

bodily-kinesthetic

Related Subject Areas

technology

music

inventors and inventions

sound waves

The Newark Museum
AMERICAN STORIES
New Jersey Historical Society

An American Story

The Multiphone explained

This Multiphone is one of many different models of coin-operated phonographs that emerged from the late 1880s on. The Multiphone Company was in operation from 1905-08. Although the Multiphone contains parts invented by Thomas A. Edison, it is not an Edison company product.

The Multiphone was a precursor to the modern jukebox. However, the Multiphone did not play records as we know them; it played wax cylinders that had grooves, like records that created sound when read by a stylus. It was these cylinders and the phonograph motor that were some of Edison's inventions. The Multiphone was developed within the context of Edison's work on the phonograph, one of his most famous and culturally significant inventions.

Multiphones and other coin-operated phonographs were placed in public spaces such as penny arcades for entertainment purposes starting in the 1890s. They proved to be popular, especially because home phonographs were not available at that time. The Multiphone, a large piece of machinery, was one of the more elaborate versions of the coin-operated phonograph. A person put in a nickel, and turned a hand-crank to choose from a selection of 24 cylinders (songs).

How did the phonograph revolutionize entertainment?

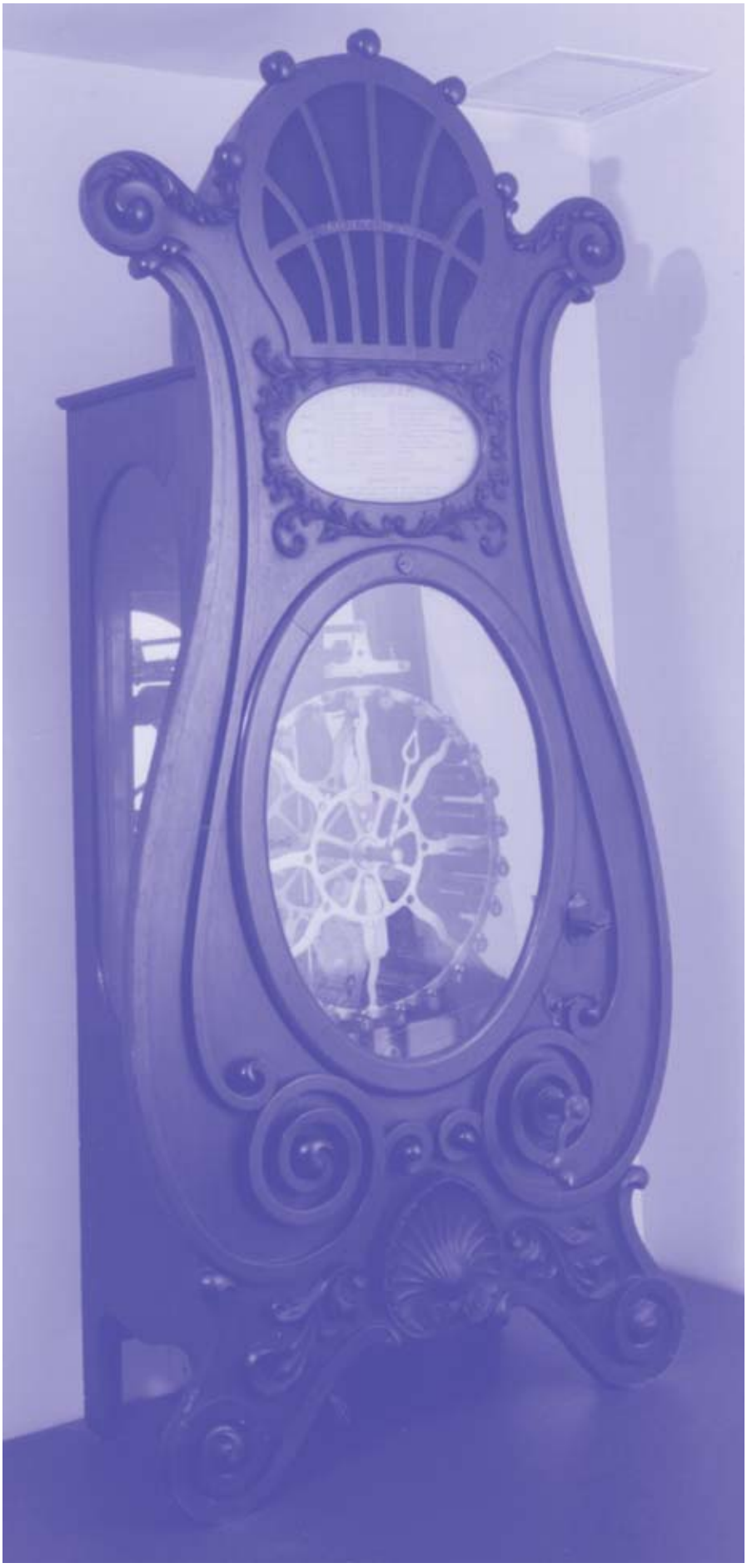
The idea for the phonograph originally came when Edison was working on a device for recording messages over the telephone. In the course of his research, Edison hypothesized that it might be possible to record sound waves and at a later time, play them back. In 1877 when Edison and his staff played back the first ever recorded words, "Mary had a little lamb," even he was surprised with the success of his experiment. His purpose in creating the phonograph had been for use in office dictation machines and for the recording of telephone messages. While today we think of a phonograph as specifically being a record player, the word "phonograph" means a device that reproduces sounds by means of a vibrating stylus on a groove.

Unfortunately due to Edison's intense work for the next ten years on the incandescent (electric) light, the work on the phonograph was put aside. However, in 1888, when a patent was awarded for the graphophone, an instrument similar to the phonograph and marketed by its inventors for office and entertainment purposes, Edison returned to his phonograph. In 1888, driven by his competitive spirit, he began selling his cylinders and phonograph motors to various companies.

Edison's West Orange laboratory has been said to have set the standard for all industrial research laboratories of the future. Working with Edison was a diverse group of inventors, legal specialists, and lab technicians, the closest of which formed a group called the "Edison Pioneers" in 1918. Among those nominated for membership was Lewis Howard Latimer (1848-1928), an African American inventor from Boston.

Although Latimer never worked in Edison's laboratory, he contributed significantly to the development of electric lighting. In 1881 he received two patents for his improved method of manufacturing the carbon filament used in electric lighting, which Edison had originally developed.

The industrial age in the United States was one of sweeping changes that altered our lifestyles permanently. The Multiphone and its use of phonograph cylinders and motors would bring music and entertainment to public places at a time when home entertainment systems were not yet available. Edison's work was the basis for the modern recording industry and for the introduction of contemporary home and compact stereo units. The way we listen to music and entertain ourselves was changed by the vision of one man who, ironically, suffered an increasing deafness throughout his life.



Multiphone, c. 1906
Collections of the New Jersey Historical Society, Newark

Design a Music Machine

OBJECT: The Multiphone

SUMMARY:

Students begin this activity by reading, observing, and analyzing the object – the Multiphone. Students investigate the design, function and operation, and mechanics of the Multiphone. Through a series of discussions and activities, students understand the impact that Edison's inventions had on sound technology, industry, and entertainment in the United States. In this activity, students design a music machine for the future.

LEARNING OBJECTIVES:

Students will:

- Observe, analyze, and respond to the object – the Multiphone.
- Understand the design, function, operation, and mechanics of the Multiphone.
- Practice creative thinking and problem-solving skills.
- Develop drawing and design skills.
- Understand the impact that Edison's inventions - the wax cylinders and the motor -had on sound technology, industry, and entertainment in the U.S.

MATERIALS:

Paper

Pencils

Color Photocopy of the Multiphone

Overhead Projector

Transparency of the Multiphone

Design Activity

White paper for each student, 9" x 12" or larger

Colorful drawing materials such as colored pencils, oil pastels, crayons, and/or markers

The Newark Museum
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New Jersey Historical Society

PROCEDUR

INTRODUCTION

WR 3 - use critical thinking and problem-solving skills

LA 3.1 - speak in a variety of contexts

LA 3.2 - active listening, interpreting, responding

Begin this activity with a discussion about the sound machines students know, such as radios and compact disc players. These questions will prepare the students for their subsequent discussion of the Multiphone.

SUGGESTED QUESTIONS:

- **What machines today play, record, or transmit sound and/or music?**
- **Why do we need these machines or inventions? When and where do we use them?**

READING AN OBJECT

WR 3 - use critical thinking and problem-solving skills

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SS 6.4 - acquire historical understanding of societal ideas/forces

The following series of discussion questions will help your students "read" (observe and analyze) the object – the Multiphone. These questions will help your students to discover the design, function, operation, and mechanics of the Multiphone.

Describing the object
Describe the object in terms of design, size, decoration, and pattern. These questions will help the students look at the design of the Multiphone so they can begin to discover its function.

SUGGESTED QUESTIONS:

- **Make a list of words that describe the object.**
- **What materials do you think the object is made of?**
- **What mechanical parts do you see on the object? Describe them.**
  (The crank, slot, legs, cylinder, arrow)
- **What are some of the decorative elements and patterns on the object? Describe them.**

The function of the Multiphone

After describing the object, students are introduced to the basic function and use of the Multiphone – a new invention in sound technology of the Industrial Revolution. These questions will introduce students to the mechanics and machines of the time.

SUGGESTED QUESTIONS:

- **This was an invention of the Industrial Revolution called a Multiphone – built in 1906. Read the words on the Multiphone.** *(Words on the object include - place nickel in slot, Multiphone, program, song titles, directions, numbers)*
- **What do the words tell us about the object?** *(It plays music if you place a nickel in the slot, it is called a Multiphone)*
- **What is a Multiphone? What does the prefix "multi" mean? What does the word "phone" mean? Think about telephone, phonograph, or microphone.**
- **If you placed a coin in the machine, what would you hear? How many different songs were played on the Multiphone? What were the names of the songs?**
- **Where do you think people used this machine or new invention? How do we know this?** *(Coin-operated needed for public not private use)*
- **What do we use today in an arcade or public place that allows us to choose the songs we want to hear?** *(Jukebox)*

How the Multiphone Operates

Students investigate the mechanism of the Multiphone and how it works and operates. These questions will help students to understand that the Multiphone was an example of the technology and machinery that created major changes during the Industrial Revolution.

SUGGESTED QUESTIONS:

- **The Multiphone does not use electricity as power. How does it operate?**
- **What do we see through the large window or hole? Describe the parts you see. What do we see on the wheel?** *(Cylinders, numbers, an arrow)*
- **The Multiphone played cylinders. Sound was created when the needle/stylus passed over the grooves in the cylinders. What do you think turned the cylinders?** *(The wheel)*
- **What turned the wheel on the Multiphone? (***The motor)*
- **This was not powered by electricity. How does the motor work with no electricity?**
- **What part of the Multiphone made the motor start, which turned the wheel, which then made the cylinders move?** *(The cranks)*
- **What or who turned the cranks?** *(A person)*
- **What was the function of the small crank?** *(It turns the pointer to the song the Multiphone should play)*
- **What needed to be done after turning the large and small cranks?** *(Put a nickel in the slot)*
- **How did people know how to work the Multiphone?** *(The directions are on the Multiphone)*
- **People can see the machine work and the cylinders turn. Why do you think the inventor or the company who designed the machine wanted people to see how it worked?**
- **What would happen if someone didn't follow the directions in the right order?**
- **All the parts of the Multiphone must work together and in order. What would happen if one part of the Multiphone broke and did not move?**

Learning by Doing

Design a Music Machine

BECOME THE MULTIPHONE – Movement Activity

WR 3 - use critical thinking and problem-solving skills

WR 4 - demonstrate self-management skills

VPA 1.2 - refine skills through creating art

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LA 3.5 - view, understand, use non-textual information

This is a role-playing activity. The class dramatizes how the Multiphone works. This helps students to understand the mechanics of wheels and machines invented during the Industrial Revolution. Each student pretends to be a different part of the Multiphone.

First, the class makes a list of all the parts of the Multiphone they can see including the crank, the slot, the decorations, the front piece, the legs, each cylinder, the arrow, etc. Each student chooses to become one of the parts.

All the students gather together as parts to form the Multiphone by attaching to each other. The rule is each student (one part) must be touching another student (another part). A designated person (usually the teacher) pretends to put a nickel in the slot (one of the students) and then each student (or part) in succession begins to move as the Multiphone would work. For example, the nickel moves down a hole, which turns the crank, which turns the arrow, which turns the wheel, which moves the cylinders, and so on until sound comes from the speaker.

The Long and Short of It – Sound Activity:

In the beginning, the cylinders only had enough space to record 2½ minutes of sound. This music activity explores how this limitation affected the recording of music and its effect on the listener.

The class brings their favorite songs to school on audiotapes or compact disks. You will need a tape player and/or compact disc player. Play each song for only 2½ minutes. Discuss how the length of a song affects the listener. Discuss methods of storing songs/music on 2½ minutes of space. Suggested questions are below. Now, have each student sing and/or rewrite their favorite song so it is only 2½ minutes in length or is divided into two or more 2½-minute sections.

SUGGESTED QUESTIONS:

- **What was it like to hear your favorite song for only 2½ minutes? What part of the song was left out?**
- **How would you store songs/music if you only had 2½ minutes of sound?**
- **How would this affect the listener's understanding of music?**

The Multiphone and the Industrial Revolution

Students discuss the Multiphone and its impact on machine and sound technology during the Industrial Revolution. These questions will help students understand that Edison's inventions – the wax cylinders and the motor – had an impact on industry and entertainment in the United States at the time and influenced the future.