Sound Pioneers

Read how scientists studied sound and sent messages.

P.4.6C.3 "Obtain and communicate information about scientists who pioneered in the science of sound, (e.g., Alexander Graham Bell, Robert Boyle, Daniel Bernoulli, and Guglielmo Marconi)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each scientist's name. Circle one detail that tells what that scientist learned or made.

From Vibrations to Messages

1. A plucked guitar string shakes the air around it. In the 1600s, Robert Boyle placed a ringing bell inside a glass jar and pumped out much of the air. The bell became harder to hear. His test showed that sound needs a material, such as air, to travel. Later, Daniel Bernoulli studied how strings vibrate. He showed that several patterns of vibration can happen at once.

2. In the 1800s, Alexander Graham Bell wanted to send a person's voice across a distance. His telephone changed sound vibrations into electrical signals that traveled along a wire. At the other end, the signals made a device vibrate and produce sound again. Now two people could speak from places far apart. Bell's work built on the idea that sound starts with vibrations, even when a wire carries the message.

3. Guglielmo Marconi found another way to send messages over long distances. In the late 1800s, he developed wireless systems that sent coded signals using radio waves. Early wireless messages were dots and dashes, not voices. Radio waves are not sound waves. A receiver could turn the coded signals into clicks a person could hear. Each scientist asked a different question about sound or how its messages could reach people.

2 ANSWER WITH EVIDENCE

Use the passage

1. What happened to the ringing bell in Boyle's test, and what did he learn from it?

2. What did Bernoulli discover about a vibrating string?

3. How did Bell's telephone send a person's voice to someone far away?

4. What did Marconi's early wireless systems send, and how could a person hear the message?

3 YOUR TURN

Your own words

Write a three-sentence museum label about two scientists in the passage. Give one accurate fact about each scientist, then explain a connection between their work that the passage does not state directly.

ANSWER KEY

Sound Pioneers

GRADE 4 · P.4.6C.3

PART 1 · READ AND MARK

Underline each scientist's name. Circle one detail that tells what that scientist learned or made. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What happened to the ringing bell in Boyle's test, and what did he learn from it?	**The bell became harder to hear as Boyle pumped out air. He learned that sound needs a material, such as air, to travel.**
2	What did Bernoulli discover about a vibrating string?	**Several patterns of vibration can happen in a string at once.**
3	How did Bell's telephone send a person's voice to someone far away?	**It changed sound vibrations into electrical signals that traveled through a wire. At the other end, the signals made a device vibrate and produce sound.**
4	What did Marconi's early wireless systems send, and how could a person hear the message?	**They sent coded signals using radio waves. A receiver turned the signals into clicks a person could hear.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Daniel Bernoulli studied how strings can vibrate in several patterns at once. Alexander Graham Bell used sound vibrations to help send voices through a telephone. Both scientists' work shows why vibrations are important to sound.

Accept accurate details supported by the passage. For the museum label, look for three sentences, two named scientists, and a reasonable connection between their work.