Day 3 Sound: Communication

Science

Today, our cell phones work by sending information to radio towers, which then transmit the signals to the people on the other end of the call. However, early telephones were not as sophisticated. The early “message transmitters” channeled sound through pipes or other similar materials.

Create your own version of a simple telephone by following the instructions below:

Make a String Telephone

Materials:

- 2 paper cups
- Scissors
- Tape
- A sharp pencil
- 30 feet of string (kite string and fishing lines work well)

Instructions:

1. Measure and cut your long piece of string
2. Using a sharp pencil, poke a small hole in the bottom of each cup in the middle
3. Thread the string through each cup and tie knots at each end to stop it pulling through the cup and use a piece of tape to secure it
4. Move into position with you and a friend holding the cups at a distance that makes the string tight (make sure the string isn't touching anything else).
5. When one of you talk into the cup, the other person puts the cup to their ear and listens, can you hear each other?

WQED education

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Social Studies

The invention of the telephone was very important because it helped people communicate in real-time, without having to physically be right next to each other.

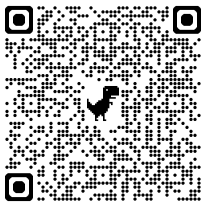
Many inventors worked to create different forms of the telephone. However, Alexander Graham Bell is the inventor most commonly known for this invention. Read more about Bell and his work (see attached) and then take a few minutes to discuss the question below with a family member:

How do you think the invention of the telephone changed peoples' daily lives? What would be different in your life if you did not have access to a telephone?

Looking to learn more?

From the Telephone and Telegraph Comes the Phonograph | AMERICAN EXPERIENCE

pbslearningmedia.org/resource/amex27-soc-edphonograph/from-the-telephone-and-telegraph-comes-the-phonograph-american-experience/



WQED education

Alexander Graham Bell

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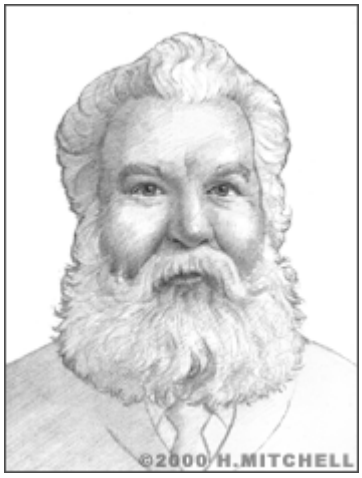
Celebrating invention, inspiring youth



The Telephone

When the word "inventor" is mentioned, Alexander Graham Bell, creator of the telephone, is undoubtedly one of the first names that springs to mind.

Bell was born on March 3, 1847 in Edinburgh, Scotland and was educated at the University of Edinburgh and the University of London. He immigrated to Canada in 1870 and to the United States in 1871. He was an early student of sound and speech, inspired, perhaps, by the fact that his mother, Eliza, was almost totally deaf, and his father, Melville, developed the first international phonetic alphabet. In his early 20s, Bell himself taught deaf children to speak and gave speech lessons at schools in his community.

As a boy, Bell built a speaking robot and found that he could touch his dog's throat in ways that seemed to form his barks and growls into words. Once, he successfully obtained a human ear from a medical school, which he used to conduct experiments tracing sound patterns. Bell was also a gifted pianist, who learned to discriminate pitch very well. As a teenager, he noticed that a chord struck on a piano in one room would be echoed by a piano in another room. He realized that chords could be transmitted through the air, vibrating at the other end at exactly the same pitch.

With this discovery, Bell set out to develop a multiple telegraph, using Morse code to convey several messages simultaneously, each at a different pitch. He knew his greatest challenge would be finding a way to convey pitch across a wire. He ascertained, eventually, that this could be accomplished by reproducing sound waves in a continuous, undulating current. That's when he realized that this could also apply to human speech, which is composed of many complex sound vibrations.

In 1875, Bell developed his first version of what came to be known as the telephone. He received a patent for it on March 7, 1876, just after his 29th birthday. Five days later, on March 12, he tested his device, speaking into the phone to his associate, Thomas Watson, when he said, "Mr. Watson, come here. I want to see you."

Bell first demonstrated his most famous invention on June 25, 1876 at the Centennial Exhibition in Philadelphia. There, he showed that the sound of the human voice could be reproduced, which confirmed his theory that speech patterns can be made to change the intensity of an electrical current.

A year after Bell's initial public demonstration, he placed the world's first phone call over telegraph wires between two towns in Ontario, Canada – a span of eight miles. Just two months later, the long-distance reach of telephone technology was expanded to 143 miles. Today, of course, telephone calls may be placed to virtually any location around the globe. The Bell Telephone Company was established in 1877 to bring telephones to the masses. The company provided the foundation for today's telecommunications industry.

While Bell is best known for his telephone invention, he worked on hundreds of projects throughout his life and received a number of patents in various fields.

In 1880, Bell patented the photophone, which applied his telephone principle in order to transmit words on a beam of light. This has been recognized as the first wireless transmission of speech. Not until more than a century later would this idea have any widespread use. The principles behind the process enabled the development of what we know today as the cellular phone.

Bell was also an aviation enthusiast. He worked on designs for airplanes, kites, and helicopters with members of the Aerial Experiment Association. In 1909, Bell's Silver Dart airplane flew for a half mile in Baddeck, Nova Scotia, six years after the Wright Brothers took their first flight in North Carolina. Later, Bell developed the tetrahedron while he worked on the design for a kite that could carry a man. The figure, made up of four equilateral triangles, is one of nature's most stable structures and forms the basis for many modern bridges and towers. At the age of 75, Bell received a patent on one of the fastest watercrafts in the world, the HD-4.

To sum up his approach to invention, Bell once said, "Leave the beaten track behind occasionally and dive into the woods. Every time you do you will be certain to find something that you have never seen before. Follow it up, explore all around it, and before you know it, you will have something worth thinking about to occupy your mind."

Bell's notebooks are still available for public consultation. Researchers believe his early ideas may still hold clues that can help provide the solutions for modern technological problems.

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Day 3 Sound: Communication

Math

Phones often have alphanumeric keys. This means that certain numbers and letters correspond. Can you use the phone below to decode these secret messages?

NAME _____

Secret Agent Message Decoder

Directions: Use the keyboard to match the numbers with the correct letters to decode the message.

OK kid, we need your help. The dastardly Dr. Von Slick has sent a secret message to his double agent in the SKO (Secret Kid Organization), Annie Can. The SKO intercepted the message and has to crack the code using only a telephone keypad. Your mission, should you choose to except it, is to crack this code in less than ten (10) minutes, or she'll get away. We need you to utilize all of your logic and deduction skills to decode this note!

SORRY, 4 5669 8463 47 RUNNING 688. 8439 5669 946 968 273. 968 NEED 86 786!

Extra Practice: Create your own code message for a friend or family member to decode.

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Answer: I know time is running out. They know who you are. You need to RUN!

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English Language Arts

Prior to the invention of the telephone, it was often difficult to get messages to people far away. People would need to write letters and wait weeks for the letters to arrive and/or get a response, OR, they would need to pass information along verbally and hope that the correct person got the message. Don't believe how hard that was? Try it out!

Play the game "Telephone." Tell your someone at home a message and ask them to retell it to someone else. Have that person retell the message to a new person. After a few rounds, see how much of the message remains intact--did the message change over time?

Day 3 Sound: Communication
English Language Arts

NAME _____

Telephone Game Rules

Materials: Message Giver, group of people

1. Ask everyone to form a circle. The message giver takes a place in this circle.
2. The message giver then whispers a message to one neighboring person.
3. The message will now be passed round the circle by whispering to the next person and the next, until it reaches the last person at the other end of the circle (just before the message giver).
4. Ask the last person to say the sentence aloud.
5. Ask the first person who received the message from the facilitator if the message is correct.
6. Discuss the activity.
7. Brainstorm ways to communicate more effectively.
8. Play the game again with a new message giver.

Sample Telephone Game Sentences:

- Wednesday is the hump day, but is the camel happy about it.
- I'd love eating toasted cheese and tuna sandwiches.
- A pink pig and a pesky donkey flew a kite at night.