



Camp Ah-Ha: Tech Tuesday

Morse Code and the Telegraph

Today we learn about Morse Code – a special way of communicating that you can use today

Who:

- You and your family

What:

- Do you know what this is?



- It would have been found in almost all train stations for nearly 100 years and modern versions of this can still be found in use today.
- It was used to send messages from one station to the next using electricity. These would have been attached using wires to electrical cable that ran next to the railroad tracks.
- Have you figured it out?
- This is a telegraph key and sounder and was used to communicate messages using a special language called Morse Code.

- Last week, we learned about Alexander Graham Bell and the telephone. Today we learn about another inventor.
- Samuel Morse was born in 1791 in Massachusetts. He grew up to be a painter and became famous for painting portraits.
- In 1832, though, he took a trip to Europe and while there became interested in experiments with using electricity to send messages. He and several other inventors worked to create the telegraph system which meant that messages could be sent in minutes! You could receive important news by a telegram which was a message that you could send to another person by going to the telegraph office. The message would be printed off and delivered to the house of the person you sent it to. Think of it like the text messages of today.
- Before the telegraph, news mainly travelled by mail... what we call snail mail today. You would write a letter and stick it in the mail. Horse drawn mail wagons or carriers on horseback would take your mail from place to place. It might take weeks or even months for a letter to reach you. News of important events might take weeks to reach all parts of the country.
- It is hard to imagine that today. Think if you could only communicate by mailing letters or learn the news by waiting for mail to arrive.
- Samuel Morse also invented a special language to go with his telegraph. It was called Morse Code. It is a series of 'dots' and dashes' Using the telegraph key above the operator would push the button on the left-hand side. If they pushed it quickly (down and up) that was a dot. If they held the button down longer that was a dash. Each letter had a special series of dots and dashes. You could string letters together to make words and sentences. Operators learned to make pauses between letters and words and sentences.
- The most famous telegraph message is SOS which until 1999 was used by the Navy for ships that were in emergency and needed help!

How:

- Print off the Morse Code sheet.
- Practice writing out your name in Morse Code.

- Now try writing a message. Make sure to leave spaces between letters and words. You can also use / between words and // between sentences.
- Give the message to someone else and see if they can decode it.
- You can try tapping a ruler or pencil on a table to send a message.
- You can also do Morse Code with lights. Take a flashlight and turn it on and off quickly for a dot and turn it on and off slowly for a dash.
- See if you and someone in your family can communicate using your flashlights!

Tips:

- Don't get frustrated if you can't figure out the Morse Code right away! Just keep practicing.

Extensions:

- Older children might want to learn to make their own telegraph at home. It does require a trip to the hardware store (but you may have some of these things lying around a workbench at home now.) The attached sheet from Scholastic.Com gives you the details.

Source: [Teaching Electricity: Yes, You Can!](#)

Got the Message?

Objective: to find out how a telegraph sounder works

Introduction

Today we take long-distance communication for granted. We just pick up a phone, punch a few buttons, and bingo! — we can speak to someone halfway around the world. While things like satellite links and microchips have improved the speed and quality of communication, the basic concept of instantaneous long-distance communication lies in Samuel Morse's telegraph system. In this activity, students will build their own electromagnetic telegraph and send each other messages.

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Materials

- ruler

Getting Started

1. Have the class sit quietly. Tell students that you are going to send them a secret message that they have to decode.

2. Using a ruler, make three very fast taps followed by three slow taps then three very fast taps on the desk. Ask: Who knows what the message is? (Some students might recognize the pattern as SOS.) Explain to students that SOS was chosen as the universal distress signal in Morse code because this combination of letters creates a distinct and unmistakable sound pattern. The Morse code is a way of sending messages over long distances using a device called the telegraph.

Science in Action

Divide the class into groups of four. Tell students that they will build a simple Telegraph Tapper and then send a message to other members of their group. Distribute the [activity sheet](#) and the [Morse Code Conversion Chart](#) to each student.

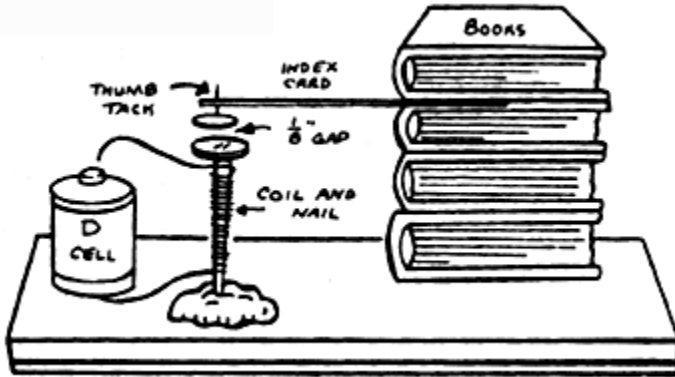
Build a Telegraph Tapper

Materials (per group of four students)

- 3-inch steel nail
- fist-sized lump of clay
- 20-inch-long piece of thin, insulated wire, with ends stripped bare (available at a hardware store or electronics store such as Radio Shack)
- 5- by 1-inch strip of index card
- steel thumbtack
- 3 or 4 large books or wooden building blocks

- "D" cell
- tape

1. Wrap at least 40 turns of wire around the middle of the nail to form the electromagnet. Make sure to leave at least 5 inches of wire on each end of the coil to attach to the "D" cell.
2. Push the thumbtack through the middle of the index card strip, about $\frac{1}{4}$ inch from one end.
3. Set up your telegraph sounder as shown. Make sure the nail rests directly under the thumbtack. The gap between the two should be about $\frac{1}{8}$ inch.



4. Securely tape one end of the wire coiled around the nail to the flat end of the "D" cell. Briefly touch the other end of the wire to the bumpy end of the cell. The electromagnet will attract the thumbtack and make a "click." Lift the wire and the thumbtack should release. (If the thumbtack stays stuck to the nail, the gap between the two is too small. Adjust the nail in the clay to add more space between the two. If the thumbtack doesn't stick to the nail, the gap is too wide.)

Questions to Think About

1. Why do you need to have at least 40 turns of wire on the nail to make the sounder work? (You need a strong magnetic field to pull the nail head and thumbtack together.)
2. Could a brass paper fastener replace the steel thumbtack in the sounder? (no) Why? (Brass is not magnetic.)
3. Why do you need to adjust the position of the nail head before sending your messages? (To get the clicking sound, you need to have a significant distance between the nail head and the thumbtack.)

Safety First

Tell students not to touch the "D" cell for more than 10 seconds at a time because they could burn their fingers.

Science Fair Project Idea

Long-Distance Tapping

The real test of any communication device is to send messages over a distance! Challenge students to build a system that would work between rooms at a distance of more than 20 feet. (Students may need to use a 6-volt lantern battery instead of the "D" cell.)

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