

Lesson Plan

Assessment
Cross-curricular

Peer assessment, exit cards
Social Studies, Technology

Big Ideas

- Static and current electricity have distinct properties that determine how they are used.

Learning Goals

- Learn what a telegraph is and how it functions.
- Learn how to use a series circuit to send messages.
- Learn how Morse code works and practice sending coded messages.
- Think about how changes in communications technology affect society.

Specific Expectations

A2.1 identify and describe a variety of careers related to the fields of science under study
A2.2 identify scientists, including Canadians (e.g., Kim Fernie, Robert Ackman, Helen Hogg, Kenneth Hill), who have made a contribution to the fields of science under study
E2.1 use appropriate terminology related to static and current electricity
E2.2 use an inquiry process to determine and compare the conductivity of various materials
E2.4 design, draw circuit diagrams of, and construct simple series and parallel circuits
E3.3 identify the components of a simple direct current (DC) electrical circuit (e.g., electrical source, electrical load, switch, fuse), and describe their functions

Description

In this lesson students will learn about the history of the telegraph. They will create their own telegraph following the instructions on the included handout, Making a Telegraph. Students will benefit greatly from a previous understanding of how an electromagnet works.

Materials

For each pair or quad of students:

1 large chunk of Styrofoam	1 large iron nail	2 paperclips
1 small chunk of Styrofoam	150 cm very thin copper wire	Terrific Telegraphs Handouts (3)
2 D Batteries	1 metal tack	Making a Telegraph instructions

Safety Notes

If you leave your button pressed you create a SHORT CIRCUIT and the wire may get hot.

Introduction

- Students will be introduced to some facts and history of communications technology through a kinesthetic activity called Cross The Line. An open space in the classroom should be separated into two halves (ex. with masking tape) with one side marked True and the other False.
- The teacher makes a series of statements about telecommunications (below) and students move to the part of the room that matches what they suspect the answer is. They may choose to straddle the line if they cannot decide. The teacher then reveals who is right and may encourage follow up discussion or questions. Teacher answers are included with the questions below. The accompanying PowerPoint presentation (Terrific Telegraphs Visuals) may be used to emphasize the recent news stories associated with questions 1-3. Slides 2-4.

Cross the line - History of Telecommunications

1. More people around the world have cell phones than ever had land lines (T)
2. There are more working toilets in the world than working cell phones (F)
3. There are more mobile devices in the world than people (T)
4. There were more than 29 million mobile phone subscriptions in Canada in 2015 (T – it was 29,202,796)
5. Cellular car phones were first introduced in 2001 (F - In 1985)
6. In the early 1880's some well-to-do telephone owners started the unusual trend of paying to have a theatre employee hold a telephone receiver backstage, transmitting live plays and operas into their living rooms. (T)
7. The wireless phone was first introduced in 1992 (F - was actually 1982)
8. In the first month of the Bell Telephone Company's existence in 1877, only sixty thousand telephones were sold! (F - It's actually only 6 phones!)
9. Being rude to a telephone operator in Prussia was once a crime (T)
10. During American President Lyndon Johnson's term, many people misdialled the White House number and instead reached the New York home of Rose Brown who had a near identical phone number. (T) He wrote and thanked her for her diplomacy in receiving his highly sensitive calls and promised to return the favor when her friends and family accidentally dialed the White House.

Action

- After 'Cross the Line' the teacher will read the quotation by Alexander Graham Bell (slide 5) and discuss how students will be building and using the precursor to the telephone.
- The teacher will lead students through brief slides and supporting video clips regarding Morse code. (slides 7-8)
- Students will write their own name in Morse code on a notecard. The teacher will collect the notecards, then redistribute them to the class and students must translate the name and return it to its rightful owner. (slide 9)
- The teacher will walk students through the construction process for a telegraph (slides 14) and show brief clips of it being used to relay messages (slides 10-15). *Note: Slide 15 contains important safety information regarding short circuits and the heating of wires.
- Students in pairs or quads retrieve their materials and work to create their own telegraph. Note: placing the paperclip the right distance from the top of the electromagnet is tricky business. Students may become frustrated and should be reminded that they will need to engage patience and problem solving skills.
- In pairs, students are given their 'Secret Messages' dossier. In pairs, students take turns using their telegraph to convey their first two secret messages. Once completed students write their own secret message to convey to their partner.
- If some students finish early they should be directed to play 'Telegraph Hangman'. It is played like the traditional hangman word game but in order to choose a letter students must convey it through their telegraph.

Consolidation/Extension

- Students should be given 'Changes, Changes Everywhere' and will complete the following:
 - They will be prompted to draw a circuit (schematic) diagram of their telegraph. On it they should draw arrows to indicate the direction of current flow and state if their circuit is series or parallel (it's series, which they should know from their secret message exchange or prior learning).
- Watch the video and read the article at the link below and answer the following questions:
 - <http://www.cnn.com/2013/07/15/world/asia/last-telegram-india/> (French video: <https://www.youtube.com/watch?v=satS8NTYF5U>)
 - What type of person do you think is more likely to adopt newer communications technology? What type of person do you think is less likely? Make a chart showing their possible characteristics.
 - Should people be forced to adapt to new forms of communication or should we try to accommodate those who want or need to continue to use older forms (opinion).
 - What do wealth and poverty have to do with adopting new forms of communications technology? Are new technologies always 'fair'?

Additional Resource

The “What’s a Telegraph Anyway” activity is available in English and could be done after the Cross the Line activity, but before Secret Messages, in the introduction.

- If school internet resources are available or Bring-Your-Own-Device policies allow, students will watch a brief video from History.com, read the accompanying article, and answer questions on their handout ‘What’s a Telegraph Anyway?’. See slide 6.
- Students will discuss their answers on their handout through class debrief or Think-Pair-Share.