

Title: Encoding and Decoding Morse Code
Grades 3-5
Topic: Cryptography, Morse Code, Coding



Standards:

MA STE:

4-PS4-3. Develop and compare multiple ways to transfer information through encoding, sending, receiving, and decoding a pattern.

* Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1s and 0s representing black and white to send information about a picture, and using Morse code to send text.

MA DLCS:

3-5.CT.a.1 Use numbers or letters to represent information in another form (e.g., secret codes, Roman numerals, abbreviations).

Understandings:

Students will understand that...

- Almost anything can be used to create a code providing at least 2 people understand how to decode it. (sounds, gestures, smoke signals, symbols, etc)

Essential Questions:

- How did the dots and dashes of the modified Morse Code make it the internationally accepted communication code?
- Why do people create codes to communicate?

Students will know that...

- Accuracy is vital when encoding and decoding to communicate well.
- There are endless ways to communicate with and create codes.

Students will be able to...

- Encode and send a message in Morse code to a partner using the telegraph key.
- Decode a message sent in Morse code from a partner via the telegraph key.

Assessment Evidence:

- Partners work to successfully send and receive the correct single-word message.

Resources:

- CMMC STEM Lesson Plans
<http://stem.chathammarconi.org/LessonPlanViewer.php?action=CurriculumMatrix>
- Video of Morse alphabet <http://www.teachertube.com/video/morse-code-136345>
- Brainpop Computer Programming
<https://www.brainpop.com/math/dataanalysis/computerprogramming/>
- Video for very young, but thorough explanation
https://www.youtube.com/watch?v=ORIDAMGf_yQ

- History of Morse Code <https://www.youtube.com/watch?v=bNoOYeS0gs0>
- Invention of the Telegraph <https://www.youtube.com/watch?v=RNhinA8ajol>

Activity Plan:

Prior knowledge question:

- Has anyone used a secret code to communicate? What did you use for code symbols?

Vocabulary:

- Encode
- Decode
- Cryptography
- Telegraph key

Materials:

- Telegraph keys connected with wires to allow send/receive messages (1 set per 2 students) available at the museum
- Encode/Decode paper with Morse code chart
- Pencils

Suggested Procedure:

1. Demonstrate with a student how to go through the process using the sheet:
 - a. Write your word with one letter per box, then add the morse code for each letter in each box
 - b. Tap out one letter at a time to your partner. The partner writes down the dashes and dots s/he hears
 - c. Then the receiver partner matches the codes to letters to check if s/he has decoded the word correctly. If not, the transmitter partner re-sends each letter that seems not to fit, or the whole word again until the correct word is decoded.
 - d. Mention to the children that it is not easy when first trying to send codes accurately and takes practice and accuracy so there will be trial and error.
2. Hand out the telegraph keys, recording papers and pencils to student pairs and ask them to begin.
3. Circulate to help and intervene when encouragement or assistance is needed.

Follow up suggestions/Extensions:

- Follow up in classroom with cryptography, make own codes to communicate, binary code, link to computer coding
- Story starter: He opened the safe and it had gone. No one had the code, who could have opened it?

A collaboration with the Cape Cod Regional STEM Network© 2017

For personal or classroom use only. Please cite source and use copyright and Cape Cod Regional STEM Network logo when reproducing. This material is based upon work supported by the National Science Foundation under Grant No. 134760. Any opinions, findings, conclusions, or recommendations expressed in this material are those author(s) and do not necessarily reflect the views of the National Science Foundation.