



CONNER PRAIRIE

Ft. Hoosier Connections

Recommended for Grades 3-6

OBJECTIVE:

Students will learn about the significance of Morse Code and experiment with different ways to send a message to a classmate.

Did you know your students can send a message in Morse Code while at Ft. Hoosier (located in Treetop Outpost)? They can, but first, students might find it interesting to learn a little about Morse Code, who invented it, how it was used and the unique way it is still being used today.

WHAT TO DO:

- What is Morse Code? Generate interest with these quick interactive videos:
- Short 1 minute YouTube video with facts and a brief example:
<https://www.youtube.com/watch?v=L6gxfX4Grbl>
- Create a message and listen to it with this online translator: Visual code is included in translation. https://morsecode.scphillips.com/translator.html?utm_source=hootsuite
- Research and create a timeline representing when Morse Code was invented, marking its use in WWII, other technologies invented along the way that have been influenced by Morse Code, when it was retired as a means of communication, and how it is still useful today (watch video above).
- Practice using Morse Code to send messages in your classroom. Experiment with different methods – a flashlight, blinking your eyes, tapping a pencil or another idea you come up with on your own. Which was more effective and why?
- Try incorporating Morse Code into a popular song. Rewrite the lyrics with facts you've learned about Samuel Morse, how it has been used and still is today and even include a Morse Code message "Rap" in the song.

RESOURCES:

- Samuel Morse, by Mona Kerby
- The following excerpt can be found at <http://monakerby.com/book/samuel-morse>.
- The Opening Paragraphs of Chapter 4 Experimenting with Morse Code
- *"You don't need a telegraph key to send the Morse code. Write the code on paper. Tap the code with your finger. Blink the code with your eyelids. Flash the code with a flashlight. You can even talk in Morse code.*

- Perhaps the easiest way to learn the code is to say it out loud. You'll have more fun if you practice it with a friend. Don't memorize the code by the way it looks. Memorize it by the way it sounds.
- Look at the code. Do you see that it is entirely made up of dots and dashes? Each letter and number has its own combination of these symbols. When you say the Morse code, however, don't say "dot" and "dash." Instead, say "dit" for the dot and "dah" for the dash. The "t" of the "dit" is pronounced only when it ends a code.
- Just like music, the Morse code has rhythm and beat. A "dit" receives one count and a "dah" receives three counts. (The word "dit" lasts the same length of the time it takes you to count to one. The word "dah" lasts three counts.) In code, the letter "A" sounds like "di-DAH." Accent the "dah" sound."
- How is Morse Code used today? Check out this [video](#) about Tania Finlayson, a woman with Cerebral Palsy who uses Morse Code every day.
- Other resources for Morse Code:
<http://www.firstladies.org/curriculum/curriculum.aspx?Curriculum=1105> –a very good lesson plan with additional resources – History channel video about the man behind Morse Code, Alfred Vale, how to build a Hila Code, and an online Morse Code translator with sound.
- Lesson on Morse Code, video, and graphic on how to build a cell:
<https://betterlesson.com/lesson/644804/morse-code> - sent a message 9/19 for permission to use.

Another link at Ft. Hoosier is the pulley. Learn about pulleys and how they work.

A pulley system makes it easier to lift an object than lifting the dead weight by hand. A single pulley essentially changes the direction of the pull or force applied. When a person uses two or more pulleys in a system, then the system also multiplies the force applied besides changing its direction. With one fixed and one movable pulley in a system, it essentially doubles the weight of the load you could lift without help from another person based upon the weight you can lift.

The Pulley: A Simple Machine

As one of the six simple machines, the pulley has two equal arms and operates on a fulcrum like the lever does, though it is a wheel with rimmed edges on an axle threaded with a rope. A single pulley hanging from a ceiling with a rope wrapped around its wheel allows you to lift a box on the floor up to a table or higher using only half the force it would take to lift it with your hands.

A Mechanical Advantage

Simple machines like the pulley give you a mechanical advantage, essentially making you stronger than you are in real life. Physicists quantify the work the system does by calculating mechanical advantage in Newtons, named after Sir Issac Newton, the originator of the laws of motion. It takes 1 newton to move 1 kilogram of mass at the rate of 1 meter per second squared in the direction of the applied force. To calculate the mechanical advantage of a pulley, divide the output force, the weight of the load by the input force, the force needed to lift the load.

Taken from Brenner, Laurie. "How Does a Pulley System Work?" Sciencing, <https://sciencing.com/pulley-system-work-5004272.html>. 26 April 2018.

Check out this website for a lesson plan about pulleys and how to make your own. https://www.teachengineering.org/activities/view/cub_simple_lesson05_activity1

Another great activity after learning about force is to supply students with a variety of objects and ask them to make their own pulley (given a budget and items they must buy to make their pulley), test it and present to other students what materials they used, what they tested and what their results were. They should also be able to explain what worked or did not work and how they could improve their design.

What tasks could a pulley help you with in everyday life?

Depending on answers, ask students to evaluate the pulley they created as to its effectiveness of use for the tasks they've thought of. Do they need to build a new pulley? What materials would they need? What is the projected cost? Use the planning worksheets that follow with your students.

STANDARDS:

Social Studies

3-5.E.1 Identify a simple problem with the design of an object that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost.

3-5.E.3 Construct and perform fair investigations in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Music

3-5 (Cn.1.5.1) Demonstrate and explore how personal interests and skills relate to choices when creating, performing, and responding to music.

3-5 (Cn.1.5.2) Identify and practice life skills developed in music studies and activities such as cooperation, effort, perseverance, and respect that transfer to other disciplines and contexts.

3-5 (Cn.2.5.1) Discover, identify, and explore how music connects to language arts and/or science, mathematics.

3-5 (Cr.9.5.1) Improvise independently and cooperatively successive melodic phrases to create a song.

Pulley-ing It Around

Name: _____

Each student group has \$5 to spend per pulley

Materials:

Cost:

String (at least one meter) \$1/meter

Choose one wheel:

- Spool \$1.00
- Water bottle cap \$0.50

Choose one axle:

- Pencil - \$1.00
- Chopstick - \$2.00
- Wood skewer - \$2.50
- Toothpick - \$0.25 each

Choose one weight:

- Bar of soap \$2.00
- Plastic water bottle \$1.50
- Bag of sand \$1.00
- Bag of dirt \$1.00

Total Cost:

Pulley-ing It Around

Draw a diagram of the pulley you built. Label each part.

Describe how you built your pulley system, what item you used for the weight and if your pulley accomplished your task.

What would you change about your pulley? What other items could be used for the wheel or axle?

How do you use pulleys in your everyday life? Can you think of another use for a pulley that would benefit you or someone you know?
