

EDUCATOR'S GUIDE

Simple Machine Scavenger Hunt

Preparation

Overview and Objectives

This lesson is geared toward students in grades 3-8.

Participants will learn about the six simple machines used in everyday life. They will then use Google Arts and Culture to examine the fo'c's'le area on the USS *Intrepid*. The six simple machines include the screw, lever, pulley, wedge, incline plane and wheel and axle.

Large equipment was used in the fo'c's'le to help moor *Intrepid* in a deep water port or to secure the ship to a pier. The equipment was much too large and heavy for the men to handle on their own, therefore simple machines were used to help make the work of the men easier. Each of the simple machines can be found in the fo'c's'le.

This lesson includes a [slide show](#) in which the instructor can review the simple machines. The instructor and students will also use [Google Arts and Culture](#) to navigate the fo'c's'le for the scavenger hunt.

Materials

- [Simple Machines Slide Show](#)
- [Google Arts and Culture fo'c's'le view](#)
- [Simple Machines Worksheets](#) (p. 6-8)
- **Vocabulary list** (p. 9)
- **Pencils**
- **Crayons or Coloring Pencils**

Standards

Common Core Anchor Standards

CCSS.ELA-LITERACY.CCRA.R.7

National Core Arts Standards

Creating Anchor Standard #1

Lesson

1. Introductory Activity

- Instructor will introduce students to the six types of simple machines. For each slide reviewed, students will be asked:
 - **What objects in our everyday lives could be:**
 - **A wedge?**
 - **A lever?**
 - **A pulley?**
 - **A screw?**
 - **An inclined plane?**
 - **A wheel and Axle?**
- When asking the above questions ask students to describe the components that make them the specified simple machine.
- For discussion, ask the students to describe why these simple machines are important in our everyday lives and how they might be used. Ask students to provide examples.

2. Core Activity

- The instructor should open up [Google Arts and Culture fo'c's'le view](#) and explain to students that simple machines were used in many different areas of *Intrepid*. The fo'c's'le, which was located at the front of the ship, contained each of the simple machines. Large equipment was used in the fo'c's'le to help moor the USS *Intrepid* in a deep water port or to secure the ship to a pier. Because equipment was much too large and heavy for the men to handle on their own, machines were used to help make the work of the men easier.
- Provide students with [worksheets](#) that have photos of different simple machines on them from the fo'c's'le. Upon examining the photos, students will determine which simple machine they are looking at and write in the name of the simple machine in space provided. Use Google Arts and Culture to examine each photo.

- Educators can have the students talk out what they are seeing as a class and fill out their worksheets or work in pairs or on their own.
- Students can use the vocabulary list to help you review the definitions of the six simple machines.

Asynchronous Adaptation

Have participants go through the [slideshow](#) on their own, view the fo'c's'le on Google Arts and Culture and use [worksheets](#) to determine what simple machines are represented. Students can use the vocabulary list to help you review the definitions of the six simple machines.

Extension Activities

To deepen student engagement with this content, you may choose to add the following activities :

Review other areas of Intrepid:

Have students examine other areas of the ship using [Google Arts and Culture](#) to find other simple machines aboard *Intrepid*.

Additional Resources/ References

Background information on the Fo'c's'le:

The fo'c's'le (pronounced foke'-sull) is the name given to the area at the front of a ship. This term is a shortening of the word forecastle, and comes from the castle-like structure which rose above the main deck forward on old sailing ships. Aboard Intrepid, a large part of the fo'c's'le deck is taken up by the anchor chain room. When former crew members mention the fo'c's'le, they are generally referring to this space. This area is for anchor and line handling as well as deck gear lockers. During anchor details (dropping and weighing anchor), the fo'c's'le was dangerous--only boatswain's mates and personnel on the detail were allowed in the area. In addition to the anchor chain room, Intrepid's fo'c's'le housed sleeping quarters for some of the ship's junior and senior officers, including pilots. As one of the largest spaces aboard, the fo'c's'le was sometimes used for social gatherings, church services, ceremonies and captain's masts.

Intrepid has two large anchors, which were raised and lowered using the equipment found here. Men of the 1st Division operated ground tackle (equipment associated with anchoring a ship) and maintained the fo'c'sle deck. The size of 1st Division varied year to year. For example, during Intrepid's 1961–1962 cruise, the 1st Division consisted of one officer and 44 enlisted men, six of whom were petty officers.

Other Reference Points:

Chain Stoppers

Chain stoppers (photo 1) are short lengths of chain used to secure the larger anchor chains. The stoppers also relieve strain on the wildcat. In the middle of each stopper is a large turnbuckle (photo 2) used to adjust tension on the stopper, ensuring there is no slack once the stopper is attached to the chain. Turnbuckles are adjusted with large wrenches (photo 3). The stoppers are fastened to the ship's deck by a deck cleat. Finally, a pelican hook (photo 4) connects the chain stopper to the anchor chain.

Wildcats

The wildcat is a sprocketed wheel that is part of the anchor windlass. It has indentations, known as "whelps" that fit the links. When engaged, the wildcat can either haul in or pay out the anchor chain. When disengaged from the anchor windlass, the wildcat turns freely, leaving sole control of the anchor chain to the friction brake.

Rope vs. Line

Many people think the words "rope" and "line" are interchangeable. However, there is a difference. Rope is unemployed cordage. In other words, it is coiled on a reel and has not been assigned a job. On the other hand, when rope is employed for a specific task, it becomes line.

Watertight Door

Naval ships have watertight doors that keep water out of various parts of the ship, while keeping air in. Originally on *Intrepid*, the anchor chain room had no walls and so was open to the elements. The watertight doors in this case were able to stay closed so water did not come up into passageways where some of the junior officers on *Intrepid* lived.

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ACTIVITY: Finding Simple Machines in Intrepid's Fo'c's'le

Directions:

On *Intrepid* the fo'c's'le was located in the front of the ship and held equipment which was used to keep *Intrepid* in one place while moored in a harbor or attached to a pier. Several simple machines were used in this area to make mooring easier.

Use what you learned about simple machines to find them in the fo'c's'le of *Intrepid*! Look at the photos below and determine which simple machines are being represented. Remember, an object might have more than one simple machine that makes up its whole, so if you see more than one simple machine for a photo, list all that you see!

Watertight Door:



What simple machine do you see here? Are there more than just one? List them all!

“Wild Cat”:



What simple machine do you see here? Are there more than just one? List them all!

Rope Reel:



What simple machine do you see here? Are there more than just one? List them all!

Stairs:



What simple machine do you see here? Are there more than just one? List them all!

Chain Stoppers:



What Simple machine do you see here? Are there more than just one? List them all!

Vocabulary list:

Simple Machine: Simple machines are basic mechanical devices used to apply force, making work easier for humans. Typically, simple machines have only a few parts and have few or no moving parts. Complicated machines are made up of two or more simple machines.

The Wedge: A wedge is a simple machine that helps to separate two objects from each other. The front of a ship can act as a wedge. As it moves, it slices through the water.

The Lever: A lever is a simple machine consisting of a rigid bar that moves around a fixed point. One end of it can be pushed or pulled to control the other end which can move a heavy object. A balancing scale is an example of a lever.

The Pulley: A pulley is a simple machine that is made up of a wheel with a grooved rim through which cord passes through. It is used to change the direction of a force. Sailboats use pulleys to help lift, lower and tighten ist sails.

The Screw: A screw is a thin, rod-shaped simple machine that has a spiral groove that is designed to pierce a material by rotating it, often using a screwdriver to do so. It can also hold two pieces of material together. A nut and bolt is an example of a screw

The Incline Plane: An inclined plane is a simple machine in which a surface is sloped so that one end is higher than the other. It runs at an angle to a horizontal surface. Ramps and stairs are both considered inclined planes.

The Wheel and Axle: A wheel and axle is a simple machine in which a wheel rotates on a stationary rod or axle. The wheels on a bicycle or a ferris wheel are examples of a wheel and axle.