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Simple Machines Used in History

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Title: Simple Machines used in history

Overview

This lesson will encourage students to analyze photographs and evaluate details depicting simple machines during individual and group work practicing speaking and listening skills

Goal

Students will identify simple machines and understand simple machines help people accomplish work more efficiently

Objectives

Students will be able to use images from the Library of Congress to:

- Observe images for simple machines
- Reflect on image details to identify specific simple machines
- Question image during collaborative learning activity
- Prove effective uses of simple machines by describing mechanics
- Share and discuss findings with others building knowledge
- Share and discuss the image with others through speaking and writing
- Write and support thoughts with details found in the image pre- and post- discussion

Investigative Question

Why do people use simple machines?

Time Required

The lesson can be completed in one hour, divided into two separate 30 minute lessons or extended through various learning scenarios.

Recommended Grade Level

Grades 3-5

Topic

Science, Technology and Business

Era

Rise of Industrial America, 1876-1900
Progressive Era to New Era, 1900-1929
Great Depression and WWII, 1929-1945

Standards

CC.3.W.1 Text Types and Purposes: Write opinion pieces on familiar topics or texts, supporting a point of view with reasons.

CC.3.W.2 Text Types and Purposes: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

CC.3.W.8 Research to Build and Present Knowledge: Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.

CC.3.RI.3.1 Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.

CC.3.SL.1 Comprehension and Collaboration: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

CC.3.SL.2 Comprehension and Collaboration: Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

CC.3.SL.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.

CC.3.SL.4 Presentation of Knowledge and Ideas: Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

CC.3.SL.6 Presentation of Knowledge and Ideas: Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

CC.3.L.1 Conventions of Standard English: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

CC.3.L.2 Conventions of Standard English: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

CC.3.L.3 Knowledge of Language: Use knowledge of language and its conventions when writing, speaking, reading, or listening.

CC.3.L.4 Vocabulary Acquisition and Use: Determine or clarify the meaning of unknown and multiple-meaning word and phrases based on grade 3 reading and content, choosing flexibly from a range of strategies.

Preparation

Resources

Using Primary Sources

Teachers Guide to Using Primary Sources

Teachers Guide to Analyzing Photographs and Prints

Teachers Guides and Analysis Tool Primary Source Analysis Tool

Students' Primary Source Analysis Tool

<http://www.loc.gov/teachers/>

Provide copies for each student:

Students' [Primary Source Analysis Tool](#)

Number of index cards per student matching number of groups/images used

Materials

Near Woodstock, Vermont, <http://www.loc.gov/pictures/resource/fsa.8a14958/?co=fsa>, Edwin Locke, 1937.

Untitled photo, possibly related to: Near Woodstock, Vermont, <http://www.loc.gov/pictures/resource/fsa.8a14957/?co=fsa>, Edwin Locke, 1937.

Going from ship to dock, <http://www.loc.gov/pictures/collection/ffcarp/item/99614410/>, unknown, between ca. 1900 and 1916.

Ludlow Striker and Children, <http://cdm15330.contentdm.oclc.org/cdm/ref/collection/p15330coll22/id/35344>, unknown, 1914 (?)

Removal of Lincoln's Body, <http://www.loc.gov/pictures/resource/cph.3c32051/?co=cph>, unknown, c. 1901.

The "Ideal" Sash Pulley (advertisement), <http://digital.library.cornell.edu/cgi/t/text/pageviewer-idx?c=manu;cc=manu>, (unknown) 1894.

Negro working levers for baling machine in cotton seed oil mill. McLennan Count, Texas <http://www.loc.gov/pictures/resource/fsa.8b23376/?co=fsa>, Russell Lee, 1939.

Member of the Ola self-help sawmill co-op working in the woods, rolling log to truck with peavey, a hooked and spiked stick used as a lever. Gem County, Idaho.

<http://www.loc.gov/pictures/collection/fsa/item/fsa2000005058/pp/> , Dorothea Lange, 1939.

Military railroad operations in northern Virginia: men using levers for loosening rails,

<http://www.loc.gov/pictures/resource/ppmsca.10396/?co=cph>, Andrew Russell, 1862 or 1863.

Military railroad operations in northern Virginia: men using levers for loosening rails,

<http://www.loc.gov/pictures/resource/ppmsca.10394/?co=cph>, Andrew Russell, 1862 or 1863.

Sargent Locks at Lever House. VII, <http://www.loc.gov/pictures/item/gsc1994002743/PP/resource/>, Gottscho-Schleisner, Inc., 1952

Hauling logs on the big wheels, Flagstaff, AZ

<http://www.loc.gov/pictures/collection/cph/item/2012647889/>, B. Hock, c. 1910.

Homemade wagon with wheels of black gum on the Will Turgin farm in northwest Georgia, near

Clarsville, <http://www.loc.gov/pictures/resource/fsa.8b38427/?co=fsa>, Carl Mydans, 1936.

Members of Ola self-help sawmill co-op rolling white fir log to lumber truck with peavies, Hooked and spiked sticks used as levers. Gen County, Idaho. General caption 48,

<http://www.loc.gov/pictures/item/fsa2000005140/PP/resource/>, Dorothea Lange, 1939.

School on wheels interior view, <http://www.loc.gov/pictures/item/npc2008008264/>, unknown, between 1912 and 1930.

Privy on wheels for use of field workers at the King Farm near Morrisville, Pennsylvania,

<http://www.loc.gov/pictures/resource/fsa.8b29421/?co=fsa>, John Vachon, 1938.

To harvest the crops of California thousands of families live literally on wheels, San Joaquin Valley,

<http://www.loc.gov/pictures/item/2004670049/resource/>, Dorothea Lange, 1935

Closures on bottles and jars. Screw-top II. <http://www.loc.gov/pictures/resource/thc.5a47375/?co=thc>, Theodor Horydczak, ca. 1920-1950.

Detail of screwing one pipe into another at an oil field drilling operations, Kilgore, Texas,

<http://www.loc.gov/pictures/resource/fsa.8a26071/?co=fsa> , Russell Lee, 1939.

Conversions. Toy Factory, <http://www.loc.gov/pictures/resource/fsa.8e10868/?co=fsa>, Howard R. Hollem, 1942.

Portable ladder, <http://www.loc.gov/pictures/resource/cph.3c10288/?co=cph>, unknown, 1475.

Production. Willow Run bomber plant. Negro worker at Willow Run installs screws in wing segment of a bomber. Note underside of wing, above. Ford Plant, Willow Run.

<http://www.loc.gov/pictures/resource/fsa.8e11160/?co=fsa>, Ann Rosener, 1942.

Wheelchair ramp at Minneapolis Federal Building, Minneapolis, Minnesota,
<http://www.loc.gov/pictures/resource/highsm.18562/?co=highsm>, Carol M. Highsmith, 2012.

Spiking and guiding logs ramp into mill where they are sawed. Erwin, West Virginia,
<http://www.loc.gov/pictures/resource/fsa.8a39866/?co=fsa>, Marion Post Wolcott, 1938.

Detroit, Michigan. Driving an army car up a ramp on to the haulaway truck.
<http://www.loc.gov/pictures/resource/fsa.8d15689/?co=fsa>, Arthur S. Siegel, 1943.

Bethlehem-Fairfield shipyards, Baltimore, Maryland. Preparations for launching a ship. Driving wedges to lift the ship from the keel blocks, <http://www.loc.gov/pictures/resource/fsa.8d18113/?co=fsa>, Arthur S. Siegel, 1943

Tie workers driving steel wedges into a pin log to split it, Pie Town, New Mexico,
<http://www.loc.gov/pictures/resource/fsa.8a28976/?co=fsa>, Russell Lee, 1940.

Untitled photo, possibly related to: Using the broad-axe to make wedges at camp near Effie, Minnesota,
<http://www.loc.gov/pictures/resource/fsa.8a21999/?co=fsa>, Russell Less, 1937.

Driving in wooden wedge to split logs which will then be cut with broad axe into ties, Pie Town, New Mexico, <http://www.loc.gov/pictures/resource/fsa.8a28880/?co=fsa>, Russell Lee, 1940

Snow plow, <http://www.loc.gov/pictures/resource/stereo.1s00570/?co=stereo>, Alfred A. Hart, (between 1865 and 1869).

Procedure: Simple Machines used in history

Lesson Procedure

1. This lesson is one in a series of lessons on simple machines and can be completed in one hour, divided into two thirty minute lessons or extended with additional activities. This lesson follows individual lessons on wheels, inclined planes, wedges, levers, screws and pulleys that will provide the background knowledge needed for critical thinking, using evidence to support opinion, collaboration, reflection in speaking and writing.
2. Introduce the lesson by beginning a group discussion on simple machines explaining that today we will use our knowledge of simple machines to real images.
 1. In a large group discussion, review the name of different kinds of simple machines.
 2. Develop the focus question, "Why do people use simple machines?" Instruct the students to wonder, make predictions and hypothesize. Select questions from the teacher's guide to focus and prompt analysis and discussion. The questions should prompt students; to connect personal experiences with simple machines, wonder by developing more questions, investigate through

collaboration, construct new meaning by drawing conclusions, express ideas with evidence, reflect on own learning and use technology and digital media in analysis.

3. Before further discussion and activity each student constructs a written response to the focus question. Instruct students to include in their essay an example of a time when they or someone that they know used a simple machine. Remind them to use details in their writing to support their main idea.
4. Divide the class into groups. Assign each group an image for review. Students investigate images and construct understandings by connecting information from the image to their prior knowledge.
5. Working in groups; students analyze images of simple machines, collaborate and record their thoughts on the [Primary Source Analysis Tool](#).

Observation: What do you notice? What do you see? How does it move? What people and objects are shown? What is the setting?

Reflect: Why do you think this was made? Who was it made for? What job is it used for?

Questions: Could you use the item? What could you use the item for? What do you wonder about regarding this item? What was the creator's purpose for making this primary source?

Further Investigation: What more do you want to know, and how can you find out?

6. One student from each group uses their [Primary Source Analysis Tool](#) to present evidence supporting their findings on their simple machine image to the class.
7. Working in pairs, students examine images from www.loc.gov of simple machines. Images can be printed and distributed or students can view images on tablets. Collaboratively, students analyze the image using [Primary Source Analysis Tool](#). Before the students begin, select questions from the teacher's guide, Analyzing Photographs and Prints to focus and prompt analysis and discussion. The questions through the Stripling Model of Inquiry should prompt students; to connect personal experiences with simple machines, wonder by developing more questions, investigate through collaboration, construct new meaning by drawing conclusions, express ideas in writing and speaking with evidence, reflect on own learning and use technology and digital media in analysis.
8. Each group of students expresses their discoveries to the group using their written responses on the Primary Source Analysis Tool. All the other students listen and construct new learning from the group presentations. As they wonder, connect and reflect on new information, students record their thoughts on index cards. At the conclusion of each presentation students have the opportunity to investigate and hypothesize the information through new questions posed to the presenters in a Q&A session.

9. After listening to all groups, students are instructed to use newly acquired information from the presentations and group work to answer the focus question, “Why do people use simple machines? Direct the students to include new examples discussed during the lesson.

Extension

- Students share their images and [Primary Source Analysis Tool](#) in a gallery walk.
- Students build inventions using simple machines to solve present day problems
- Students discover and photograph simple machines in their homes and report their findings to the class.
- Students search www.loc.gov site to locate additional simple machines in images

Evaluation: Simple Machines used in history

- Assess time on task and individual contributions to group work and pair share.
- Evaluation of the student pre- and post-writing activity to answer the focus question.
- Teacher observation of students demonstrating critical thinking during discussions.
- Teacher observation of students’ speaking and listening skills
- Teacher observation of collaborative work.
- Evaluation of the student’s use of the Primary Source Analysis Tool.

Credits

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2014

Teacher Reflection:

Materials: Using page protectors kept the paper copies of the images intact, but printing out larger sized images may assist the students in observing details in the images.

Lesson Procedure: The procedure/steps of the lesson were clear and understood by the students. We continued the presentations after lunch, but ran out of time to 'walk' through all the images to wrap up the lesson. The images were then displayed in the hall which sparked further discussion among the students informally.

Instruction: When pairing students in groups of two I will look to put an average or above average reader/writer with a struggling reader/writer for support. Students are unsure about how to get answers to questions so we will visit the local library again and make sure to ask the librarian resource questions.

Unexpected: I was surprised by the difficulty some students had with describing what they see in the images. I will use this information in instruction. When the students write their next essay I will provide support and help them use descriptive words in their writing.