

Simple Machines and Work

Lesson Overview

In this lesson, students will apply prior knowledge about the six simple machines and make connections to how each simple machine makes work easier.

Standards Addressed

- SC 2005 6-5.6 Recognize that energy is the ability to do work (force exerted over a distance).
6-5.7 Explain how the design of simple machines (including levers, pulleys, and inclined planes) help reduce the amount of force required to do work.
6-5.8 Illustrate ways that simple machines exist in common tools and in complex machines.
- SC 2014 6.P.3B.1 Plan and conduct controlled scientific investigations to provide evidence for how the design of simple machines (including levers, pulleys, inclined planes) helps transfer mechanical energy by reducing the amount of force required to do work.
6.P.3B.2 Design and test solutions that improve the efficiency of a machine by reducing the input energy (effort) or the amount of energy transferred to the surrounding environment as it moves an object.

Disciplinary Literacy Best Practices

Paraphrasing
Frayer Model
Think-Ink-Pair-Share
Graphic Organizer
Making Thinking Visible (MTV)
Exit Ticket/Exit Slip

Lesson Plan

Time Required – One 50-minute Class Period

Disciplinary Vocabulary: wedge, wheel and axle, pulley, lever, inclined plane, screw, work, force, energy

Materials Needed:

- Chart Paper
- Markers
- Frayer Model template (1 per student)
- Paper and Pencil
- Popsicle Sticks

Assessment: Completed Frayer Models, Questioning after MTV, Exit Ticket/Exit Slip

Engage

- The teacher reminds students that they have learned about simple machines in fourth grade.
- The teacher uses popsicle sticks to randomly select students to answer questions. Who can recall the six simple machines? Who can provide an example of a simple machine?
- The teacher introduces the mnemonic device www.lips (the 3rd (w) does not represent anything) as an easy way to remember the 6 simple machines.
- The teacher uses popsicle sticks to select students to answer bell ringer questions related to simple machines. The first student reads the question and provides an answer. If the answer is correct, the teacher repeats the correct response for the class and everyone makes a note in their notebooks. If the answer is incorrect, the teacher provides questioning that guides the student to choosing another response. The teacher uses popsicle sticks to randomly select students to repeat the response. This is done to allow everyone a chance to write down the notes. The teacher uses popsicle sticks a third time to select a final student. The third student paraphrases the correct answer given by the previous responders.

Explore

- Elbow partners are assigned and collaborate to complete a Frayer model on one of the six simple machines. The students then Think-Ink-Pair-Share ideas to complete the model. Student pairs come up with characteristics, examples, non-examples, and the operational definition of their assigned simple machine. Students also illustrate an example and non-example of their assigned simple machine.
- The teacher calls on student groups to share information about each simple machine and students hear multiple perspectives and examples from other student pairs.

Explain

- The teacher facilitates thinking by asking probing questions to check for student understanding of each simple machine.
- Students from each group come to the front of the classroom and transfer the information on a specific simple machine to an enlarged Frayer model on chart paper. Students include illustrations of each simple machine.
- Students will take notes at their seats as each student takes turns Making Thinking Visible on the chart paper at the front of the room. This activity will help students make connections to the concepts they need to understand. The teacher will explain to the students that each simple machine makes work easier.

Extend

- Students complete an Exit Ticket/Exit Slip reflecting on their learning from today's lesson on simple machines.
- Students will realize the usefulness of simple machines in their daily lives by completing a simple machine project.

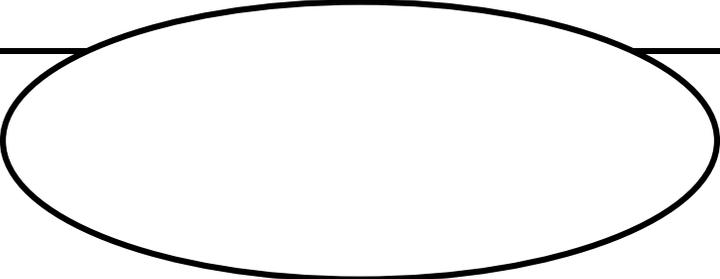
Teacher Reflections and Biographical Information

The Frayer Model provides students with an excellent way to mentally and visually process vocabulary terms. I would have loved to do a Gallery Walk with the Frayer Model/MTV posters the students made but due to the limited space in my room and limited time for the lesson, I decided to have the students complete the activity as described above.

Lesson Author: Cathelyn Quick, 6th grade math and science teacher at School of Discovery in Marlboro County in Clio, SC. This lesson was created during her forty third year of teaching.

Frayer Model Template

Operational Definition:	Characteristics:
Examples:	Non-examples:



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