

Simple Machines

Making Science Work for You!

A unit of instruction by
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ED TECH 506

Unit Goals

Skill Objectives

1. The student will identify that machines help us work.
2. The student will be able to name different types of machines and how they work.
3. The student will identify the force that causes the machine to work.
4. The student will explain that force is the push or pull on an object.
5. The student will be able to identify the six basic simple machines.
6. The student will identify that an inclined plane is a simple machine that makes lifting easier.
 - a. The student will identify that a wedge is a simple machine that is also a small inclined plane that is used a tool.
 - b. The student will identify that a screw is an inclined plane that curves around a shaft or pole.
7. The student will be able to label the parts of a lever.
 - a. The student will explain how a lever operates.
8. The student will identify that a wheel and axle is a simple machine that helps us apply more force or lift a heavy load with less effort.
 - a. The student will identify gears as specific type of wheel and axle.
9. The student will explain that a pulley is a simple machine that is used for lifting heavy objects or moving objects up and down or side to side.

Curriculum Standards

Science Benchmarks—Grades 3-5 (Ohio Department of Education)

Physical Science

- C. Describe the forces that directly affect objects and motion

Science and Technology

- A. Describe how technology affects human life
B. Describe and illustrate the design process

Grade Level Indicators—Grade 3 (Ohio Department of Education)

Physical Science

1. Describe and object's position by locating it relative to another object or the background
4. Predict the changes when an object experiences a force (e.g., a push or pull, weight, friction)

Science and Technology

1. Describe how technology can extend human abilities
2. Describe ways that technology can have helpful and/or harmful results
4. Use a simple design process to solve a problem

Student Characteristics and Prerequisite Skills

Third grade students

- Are Beginning to work independently
- Have a foundation of skills, but still need support
- Tend to struggle with complicated or abstract topics
- Are usually between the ages of 8-9
- Favor different learning styles, requiring differentiated learning strategies
- Struggle to work in teams, and need support and experience in this area

Prerequisite Skills

- Students must be able to measure with non-standard units of measurement.
- Students must be able to record data that is collected and communicate it in complete sentences.
- Students must have basic computer skills, including manipulating the mouse.
- Students must be able to take basic notes about their learning, in writing or by drawing pictures.

Learning Environment and Grouping

Over the course of this unit of instruction, students will participate in whole group, small group, and independent work. Students will be expected to view resources on the Internet, collect resources and inside and outside the classroom environment to demonstrate understanding of the different types of simple machines, and maintain a learning journal throughout the unit.

Introducing the Unit

To prepare students for working through the unit of simple machines, have available a regular chair and a chair with wheels. Call each student to the front of the classroom and try to push you while sitting in the regular chair. Then have students push you in the chair with wheels. Talk to students about how the chair with wheels was easier to push. Why? The wheels on the chair are a “machine” that helped the students push you compared to the regular chair.

Tell students that simple machines help make work easier. Students will learn about each of the simple machines and how they help make work easier. Have students watch a video about simple machines, such as this video from [Bill Nye the Science Guy](#).

Another option for introducing the unit is to watch the videos for each machine built into the Glog below. You can also provide the link to the Glog to your students to review at home on their own to prepare for the unit or for each lesson. You may want to return to these videos to start each lesson during the unit. The Glog can be found [here](#).

Materials and media

See the materials list for each lesson within the unit, found at this link.

<http://edtech2.boisestate.edu/drewyorb/506/Final/Intro.html>

Lesson Outline

	Visuals	Assessment	Goals
Introduction	-- Visual showing six basic simple machines	N/A; simple introduction of unit	<ol style="list-style-type: none">1. The student will identify that machines help us work.2. The student will be able to name different types of machines and how they work.
Work and Force	-- Word map for how machines help us do work -- Chart showing items that make work easier for class to complete	-- Students complete worksheet based on experiment showing how work changes with machines -- Students complete Making Work Easier chart in pairs -- Entry in student journal	<ol style="list-style-type: none">1. The student will identify that machines help us work.3. The student will identify the force that causes the machine to work.4. The student will explain that force is the push or pull on an object.
Inclined Plane	-- Visual of steps and a ramp to show how steps are more direct route, but ramp makes less work	-- Students complete inclined plane worksheet based on pulling object up ramp -- Entry in student journal	<ol style="list-style-type: none">2. The student will be able to name different types of machines and how they work.5. The student will be able to identify the six basic simple machines.6. The student will identify that an inclined plane is a simple machine that makes lifting easier.

<p>Wedge</p>	<p>-- Visual showing how a wedge is simply two inclined planes placed back to back</p>	<p>-- Find the wedge activity worksheet -- Entry in student journal</p>	<p>2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines. 6.a. The student will identify that a wedge is a simple machine that is also a small inclined</p>
<p>Screw</p>	<p>-- Instructions, with visuals, for creating a screw from a paper spiral and a pencil</p>	<p>-- Search classroom/school for example of a screw holding something together and complete note card stating what a screw is, what that specific screw does, and name. -- Entry in student journal</p>	<p>2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines. 6.b. The student will identify that a screw is an inclined plane that curves around a shaft or pole.</p>
<p>Lever</p>	<p>-- Visual representing a lever, with label for fulcrum/turning point</p>	<p>-- Successfully complete How a Seesaw Works activity sheet -- Entry in student journal</p>	<p>2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines. 7. The student will be able to label the parts of a lever. 7.a. The student will explain how a lever operates.</p>

Pulley	-- Instruction sheet for creating message pulley system	-- Complete pulley activity sheet based on message pulley system whole-class activity -- Entry in student journal	<ol style="list-style-type: none"> 2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines. 9. The student will explain that a pulley is a simple machine that is used for lifting heavy objects or moving objects up and down or side to side.
Wheel and Axle/Gears	-- Visual showing a bicycle tire, pizza cutter, door knob, and can opener to highlight common wheel/axle/gear combinations	-- Students draw two examples of wheels/gears and axles not discussed during class in their journal -- Entry in student journal	<ol style="list-style-type: none"> 2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines. 8. The student will identify that a wheel and axle is a simple machine that helps us apply more force or lift a heavy load with less effort. 8.a. The student will identify gears as specific type of wheel and axle.
Culminating Activity	-- Link to post test for simple machines on Edheads Web site. See this link .	-- Students label simple machines correctly -- Score for collected student journal entries	<ol style="list-style-type: none"> 2. The student will be able to name different types of machines and how they work. 5. The student will be able to identify the six basic simple machines.

* Adapted from Unit Plan at http://edtech.tennessee.edu/~bobannon/unit_plans.html