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Simple Machines


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(Full teacher resource documents are included)

Lesson Focus

Simple machines: their principles and uses.

Lesson Synopsis

Students learn the basic principles of simple machines and explore everyday uses.



- Simple machines are "simple" because most have only one moving part.
- Machines do not reduce the amount of work for us, but they can make it easier.
- "Work" is only done when something is moved.
- "Work" is the product of effort and distance.

Age Levels: 8-11

Objectives

- Learn about different types of simple machines.
- Be able to identify simple machines as part of daily life.
- Build a simple machine.

Anticipated Learner Outcomes

As a result of the activities, all students should develop an understanding of:

- Properties of objects and materials
 - Position and motion of objects
 - The position and motion of objects can be changed by pushing or pulling. The amount of change is related to the strength of the push or pull.
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Introduction: Simple Machines: Introduction

Simple machines are "simple" because most have only one moving part. When you put simple machines together, you get a complex machine, like a lawn mower, a car, even an electric nose hair trimmer! Remember, a machine is any device that makes work easier. In science, "work" means making something move. It's important to know that when you use a simple machine, you're actually doing the same amount of work — it just seems easier. A simple machine reduces the amount of effort needed to move something, but you wind up moving it a greater distance to accomplish the same amount of work. So remember, there's a trade-off of energy when using simple machines. **Simple Machines: Introduction (continued) What does "work" mean in science?** Simple machines all require human energy in order to function. "Work" has a special meaning in science. "Work" is only done when something is moved. For example, when you push on a wall, you actually are not doing work, because you cannot move it. Work consists of two parts. One is the amount of force (push or pull) needed to do the work. The other is the distance over which the force is applied. The formula for work is:

$$\text{Work} = \text{Force} \times \text{Distance}$$

Force is the pull or the push on an object, resulting in its movement. Distance is the space the object moves. Thus, the work done is the force exerted multiplied by the distance moved. When we say a machine makes it easier for us to do work, we mean that it requires less force to accomplish the same amount of work. Apart from allowing us to increase the distance over which we apply the smaller force, machines may also allow us to change the direction of an applied force. Machines do not reduce the amount of work for us, but they can make it easier. **Types of Simple Machines** See Handout.

Lesson Activities

Three student handouts are provided for advance review:

- Introduction To Simple Machines
- Types of Simple Machines
- What is Work? (Worksheet)

Four student activities are provided:

- Are These Machines?
- Jumping Coin Experiment
- Make Your Own Inclined Plane
- You are the Engineer: Problem Solving with Simple Machines

Resources/Materials

See attached student worksheets and teacher resource documents.

Alignment to Curriculum Frameworks

Curriculum alignment sheet is included in [PDF](#).

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