

Simple Machines Stations!

Inclined Plane, Screw, Wedge

4th Grade

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Benchmark:

SLC 10: Students will identify and explain how simple machines help mechanical devices operate (e.g., bicycles, pencil sharpener, fishing rod, etc.) by describing the work a machine can do (e.g., change the size of the force, change the direction of force, and/or change the distance a force moves something).

Objectives:

Students will learn the principles and uses of an inclined plane, screw, and wedge. They will also come up with every day examples of simple machines.

Materials:

Inclined plane station (1):

- Crate filled with books
- Rope
- Large board (6ft.)
- Books

Screw station (2):

- Paper plate
- Screws
- Nails
- Bolts

Wedge station (3):

- Clay
- rulers
- Books
- Square pieces of cardboard, wood, even corner of books

Initial and Target Observation:

In each station the students will see the books are too heavy to lift very high, the nail won't keep the paper plate together, and it is very hard to put a hole in the clay with your fist.

Target Model:

Students will have an easier time moving the books up an inclined plane to a high place, rather than lifting it.

The threads of the screw allow the plate to keep it folded together and tight.

Flat surfaces make it very hard, if not impossible to separate objects. Using pointy corners makes it much easier.

Procedure:

Each student is given their worksheet and placed at a station. The teacher at the station tells them the problem and shows them the initial observation. The students must brainstorm and find a solution using the materials in front of them. This leads to the simple machines and their uses. The teacher defines the simple machine. The group discusses where they see this everyday.

Problems:

Station 1 (inclined plane): lifting crate of books from floor to tabletop.

Station 2 (screw): keeping the plate folded together when someone tries to open it

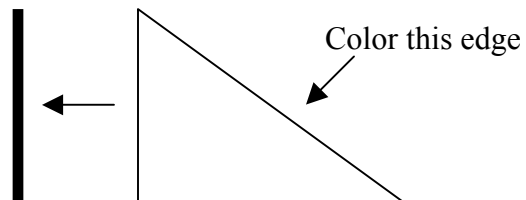
Station 3 (wedge): putting a hole in the clay (with fist first)

Discussion/Summary:

After students have their worksheet filled out, a group discussion of everyday uses will take place. Also, discuss what the world would be like without these simple machines.

Extensions Activity:

Pass out a triangular piece of paper with hypotenuse colored. Ask students what simple machine this is. They should say inclined plane and wedge. Make sure they see both of these. Then have students wrap the triangle around the pencil. Start with tall edge and wind around until tip is around. Pencil should look candy cane like, which is a screw. Discuss how all three simple machines come from the same object. Amazing!



Name:

Date:

Station 1

What are the two ways you could place the books on the table?

These are called _____.

Draw a picture of what you are going to do to make this job easier.



What is this simple machine called?

List some places we see this simple machine.

Find this simple machine in this picture.

Circle as many as you can.



Station 2

How does it feel to open the folded paper plate?

How does it feel to open the folded paper plate with a nail through it?

How does it feel to open the folded paper plate with a screw through it?

Draw a picture of the nail and a picture of the screw.



Which one is the simple machine? What kind of work does it help us do?

What do we use screws for everyday? Look around the room and list some uses.



Station 3

How deep was the hole in your clay when you used your fist?

How deep was the hole in your clay when you used your finger?

Which one worked better?

Why?

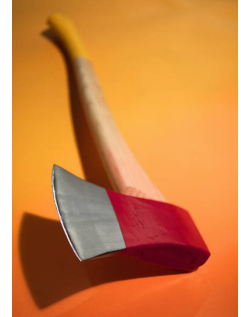
If you want to separate 2 books next to each other what kind of a shape would you want to use. Draw a picture of this:



What do we call this simple machine?

List some places we see this simple machine.

Circle the simple machine in the pictures.



Read this information and then answer the questions below.

A machine is a device that does [work](#). Machines do not increase the amount of work done, but they do make work easier. Machines make work easier by changing [force](#) or [distance](#), or by changing the direction of the force.

There are three simple machines: the [lever](#), the [pulley](#), and the [inclined plane](#).

The [wheel and axle](#), the [wedge](#), and the [screw](#) come from these three simple machines. A complex machine is a machine made up of two or more simple machines.

You are doing work when you use a force to cause motion. Machines make work easier, but they need energy to do work. A person is usually the source of energy for a simple machine. A person uses a force to operate a simple machine. A force is a push or pull.

Which simple machine did we look at today?

At least how many machines does a complex machine have?

What do machines need to do work?

What is the source of energy for a simple machine?

A machine is a device that does _____.

Machines make work_____.