

Grade 5 Science
Week of March 8 – March 12

Simple Machines

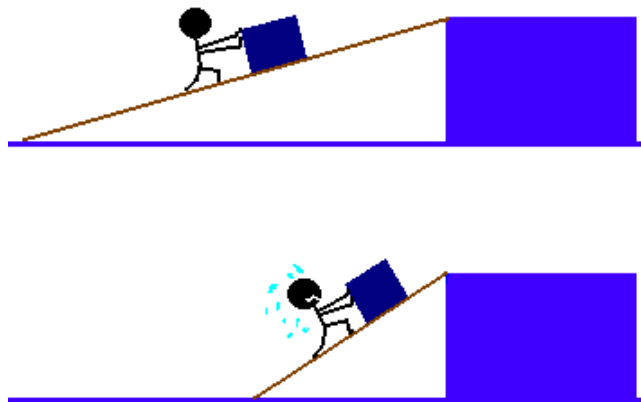
Planes, Wedges, and Screws

Inclined Plane

An inclined plane is also known as a ramp. It's simply a flat, sloping surface such as the ramp shown below:



The steeper the ramp, the more energy it will require to move a load. In the image below, which ramp would be easier to move the box up?



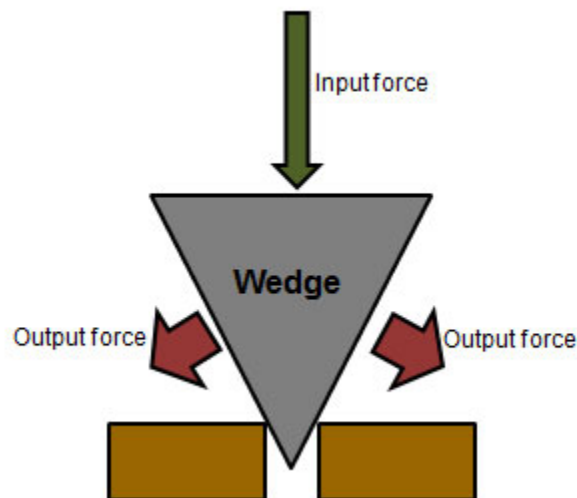
An Inclined plane, or a ramp, above helps us move heavy objects either up, or down. Watch the following video, so understand this simple machine further!



Ramps – A Super Simple Machine!: <https://youtu.be/3COvm0TtxWg>

Wedge

A wedge is simply two inclined planes put together. But, unlike an inclined plane, a wedge is mobile (does not stay in one place) and has a different function. Instead of helping you move things to a higher or lower level, a wedge helps you **push things apart**. An ax and a knife are both considered wedges.



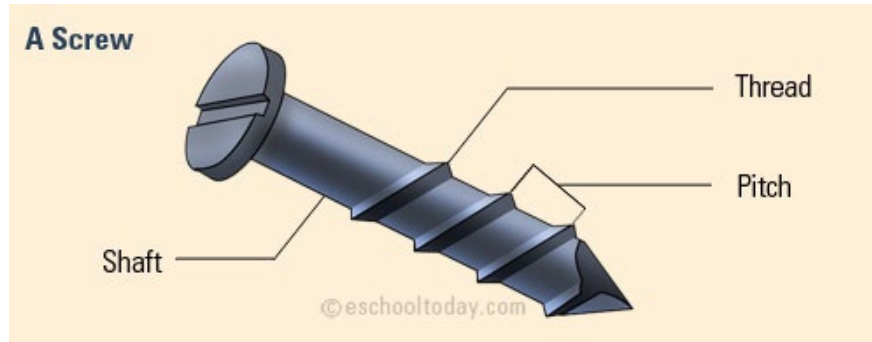
A wedge can also be round, like the tip of a nail, or the tines on your fork. Basically, the wedge works just like a ramp: The narrower the wedge (or the sharper the point of a wedge), the easier it is to drive it in and push things apart. There is a trade-off: To split something apart really wide, you have to push the wedge a long distance.

Screw

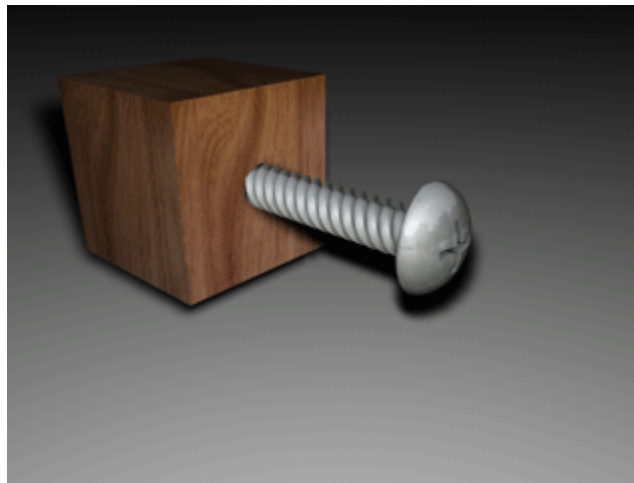
Did you know? A screw is one of the most commonly used simple machines in the world! I can guarantee that somewhere, in the room you are sitting in right now, you will find a screw.

Screws hold things together.

A screw is a simple machine made up of an inclined plane wrapped around a cylinder. The two main parts of the screw are called the **Shaft**, which is the main cylinder form of the screw, and the **Thread**, which is the ridge that is wrapped around the shaft.



The **Pitch** is the distance between the thread. The closer the thread is, the stronger the screw will be.



A screw is an object that converts **rotational motion** (turning left or right) into **linear motion** (going up or down).

If you turn the screw to the right, it goes down, if you turn the screw to the left, it goes up.

Right-y Tight-y, Lefty-Loosy!

The Auger is a machine that is used to make holes in the earth for poles or posts, it is an example of a screw.



Two staircases can be found in the Vatican Museums (Vatican City State, next to Rome); The **Bramante Staircase** is the name given to the original stair, built in 1505, and is shown below.



As well as a modern reconstruction built in 1932 shown below.



Can you see how both the above staircases can be considered giant screws?

Inclined Plane

1. In the space below, draw a diagram of an **Inclined Plane**. Make sure you label all important parts

2. Fill in the blank: The _____ the ramp, the **more energy** required to move a load.

3. Watch the following video to answer the following questions. **Video:** Ramps: A Super Simple Machine!

1. When we talk about how steep a ramp is, we call that the _____.

2. **True or False:** A longer ramp will have **less** of a slope than a shorter ramp.

a. True

b. False

Wedge

4. In the space below, draw a diagram of a **Wedge**. Make sure you label all important parts.

5. Explain the difference between an inclined plane and a wedge.

6. Fill in the blanks: The _____ the wedge, the easier it is to drive it in and push things apart.

Screw

7. In the space below, draw a diagram of a **Screw**. Make sure you label all important parts.

8. Fill in the following definitions:

Shaft:

Thread:

Pitch:

9. Which screw will be stronger? Circle, then explain your choice.



10. If I wanted to **tighten** a screw (put it farther into an object) which way would I turn it?

- a. To the right
- b. To the left
- c. No turning needed, just bang it in