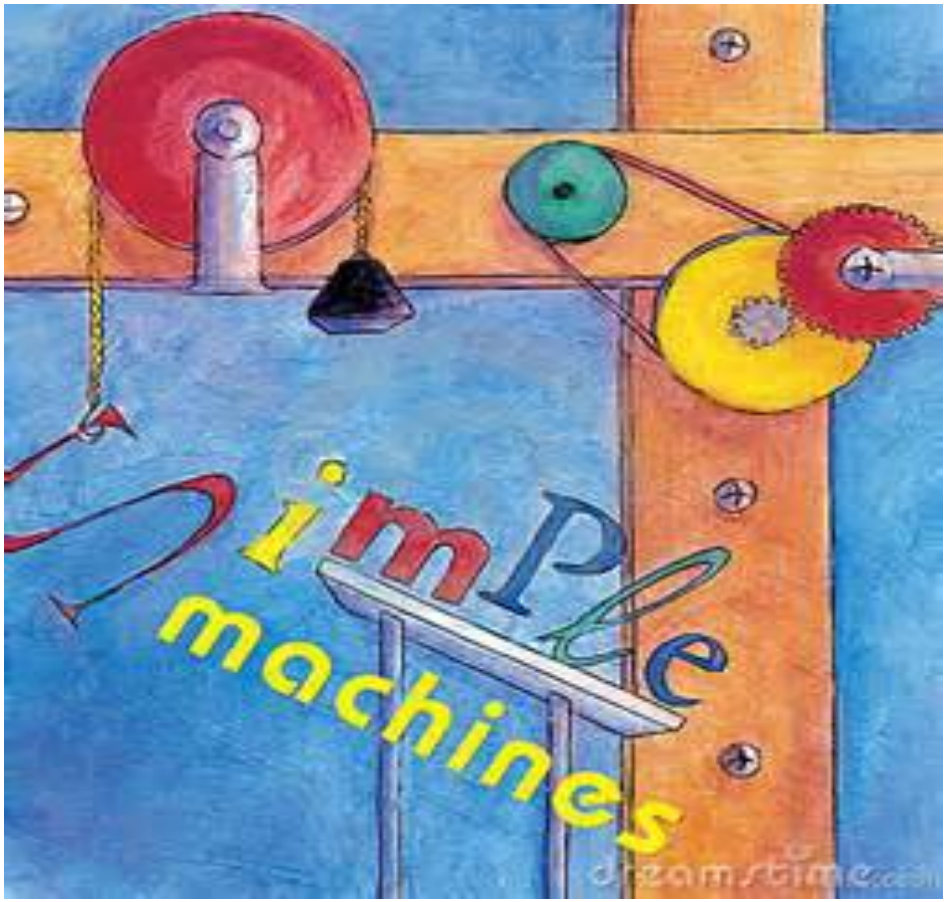
Simple and Compound Machines

Simple Machines can work together to make one machine.

The compound, or complex, machine can do more work by either accomplishing different tasks at the same time, or making the work even easier.



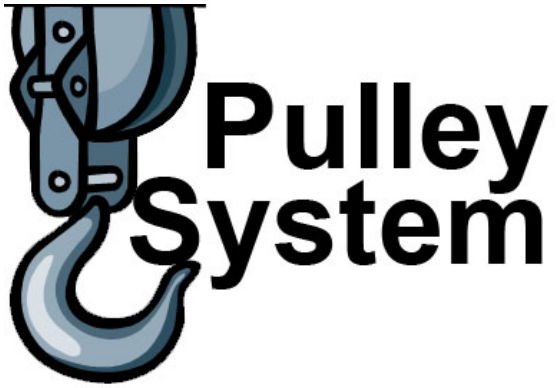
What are Simple Machines?

- A device that allows work to be performed with less effort
- A device with few or no moving parts
- A device that makes work easier by changing force, distance, or by changing the direction of the force

What are Compound Machines?

Two or more simple machines working together to make the work easier

The 6 Simple Machines

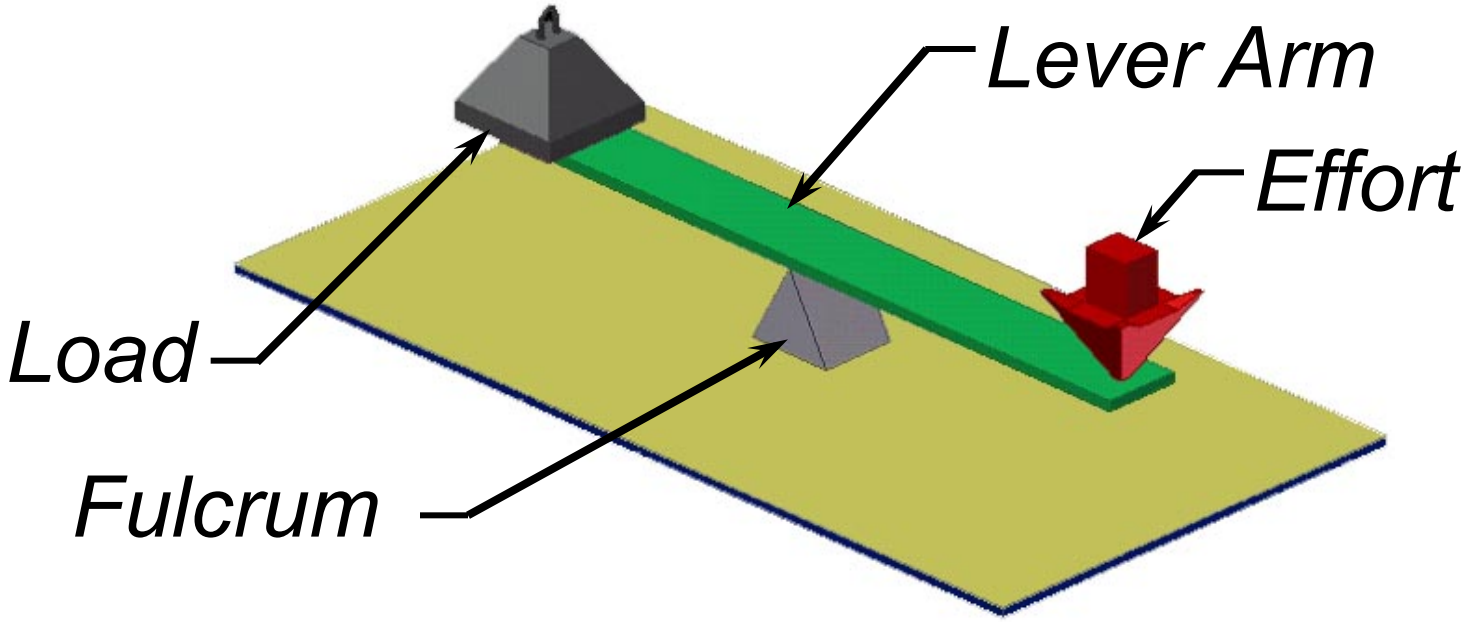


Lever

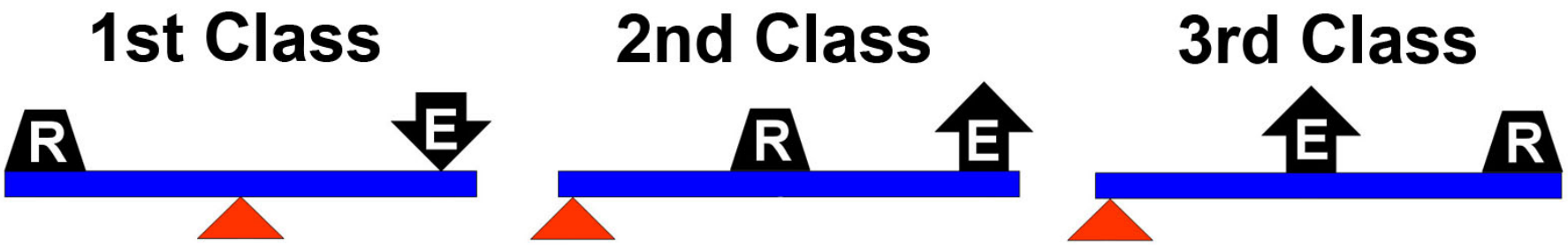
A rigid bar used to exert a pressure or sustain a weight by pivoting on its ***fulcrum***

Parts of a Lever

If the ***fulcrum*** is located at the midpoint of the ***lever arm*** and the ***effort*** is equal to the ***load***, then the lever will be perfectly balanced.



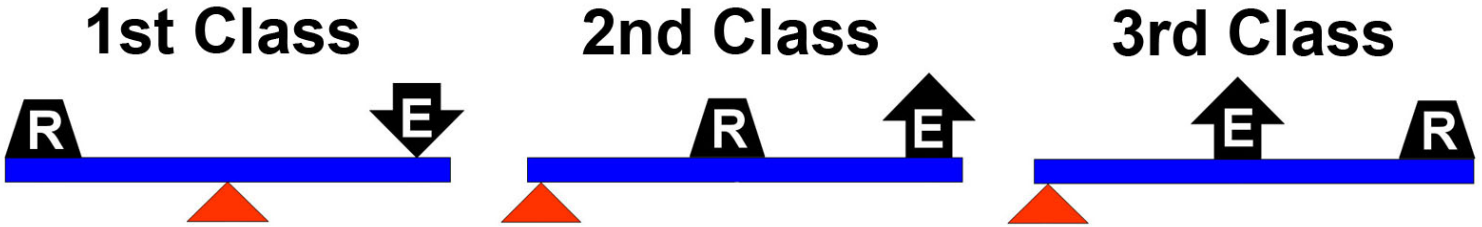
Types of Levers

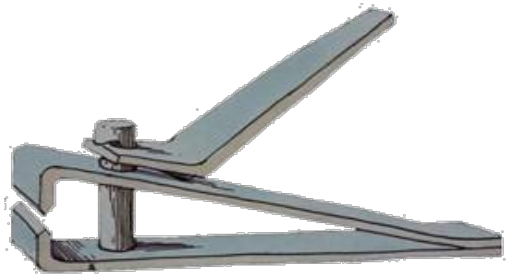


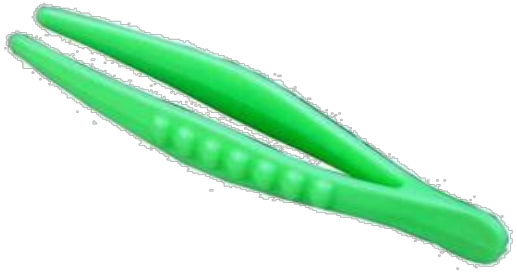
You can identify the different types of levers by the middle component.

Can you identify each type of lever on the next slide?

Examples of Levers





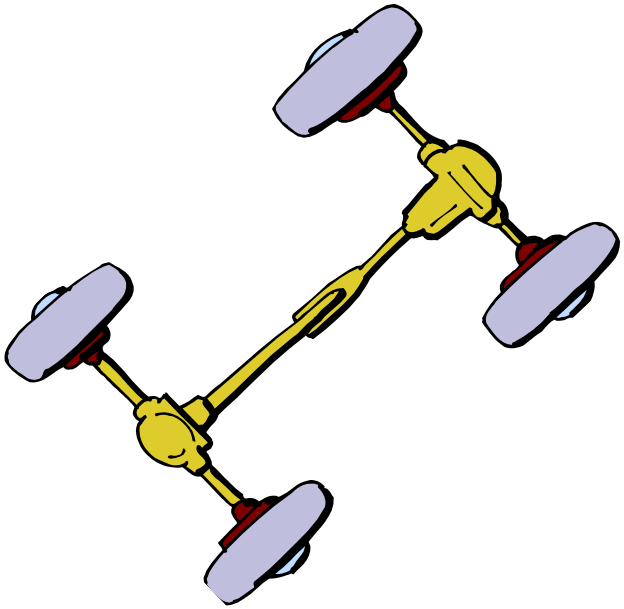


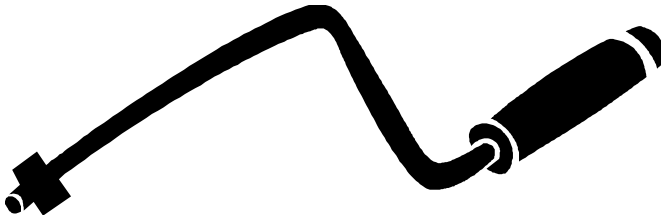
Wheel & Axle

A ***wheel*** is a lever arm that is fixed to a shaft, which is called an ***axle***.

The ***wheel and axle*** move together as a simple lever to lift or to move an item by rolling.

Examples of Wheel & Axles



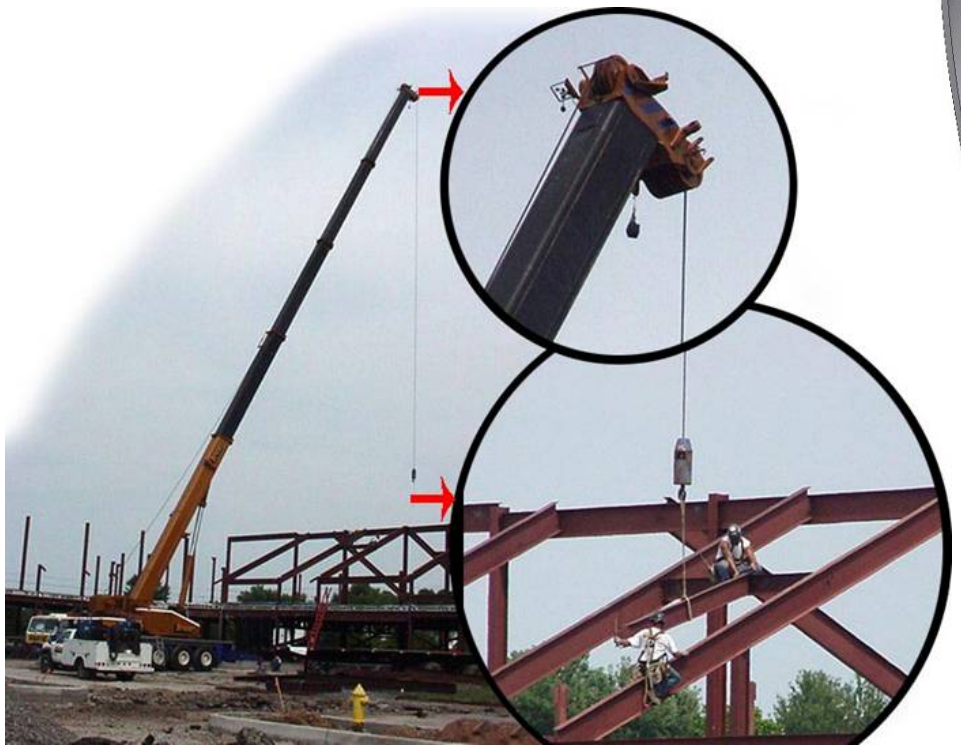


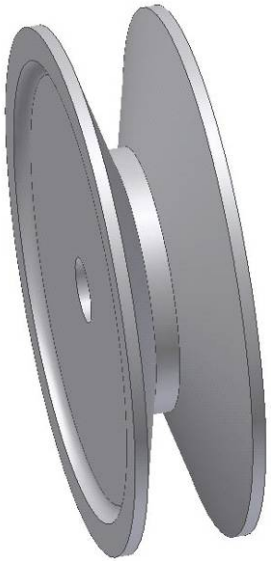
Pulleys

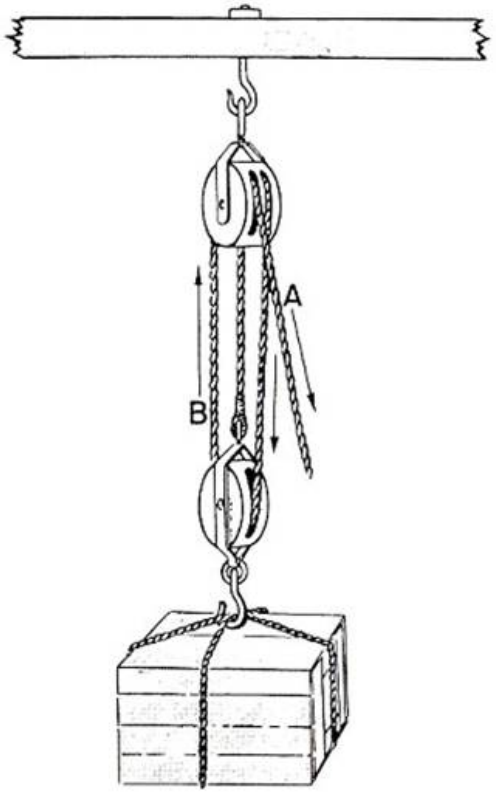
A grooved wheel around which a rope, belt, or chain passes

Used to change the direction or magnitude of a force

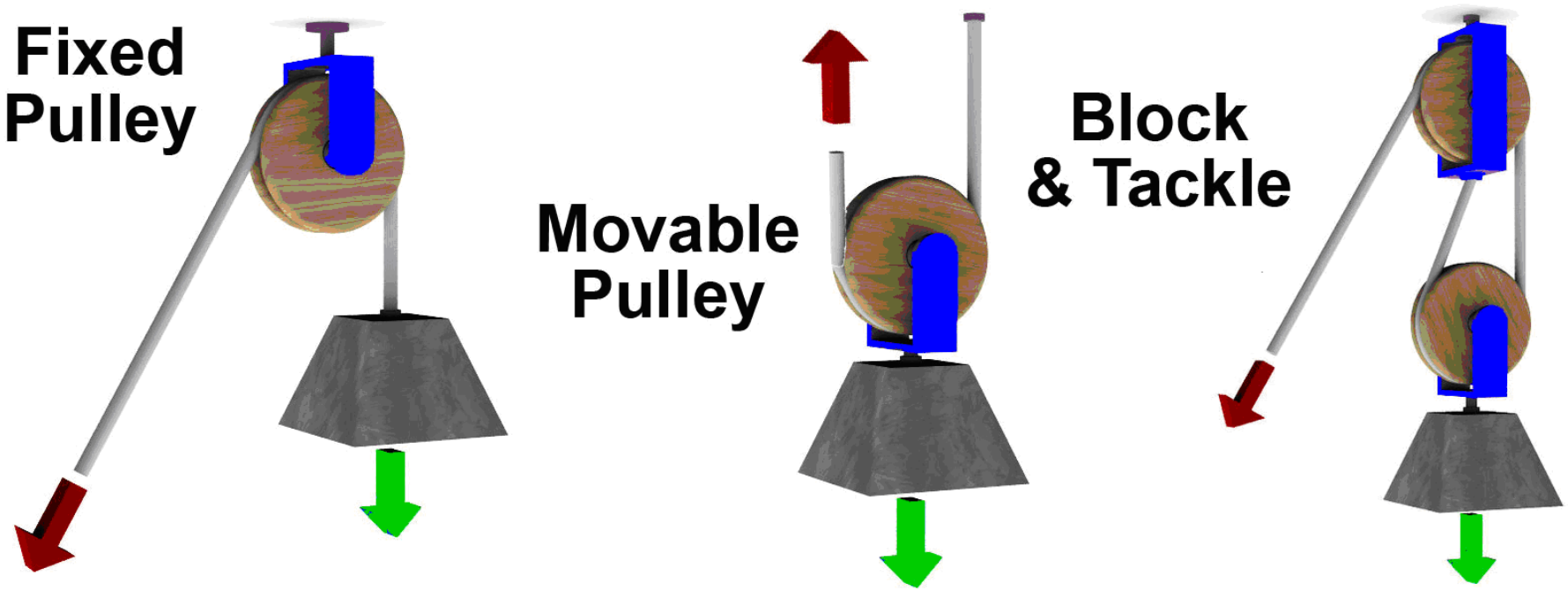
Examples of Pulleys







Pulley Systems



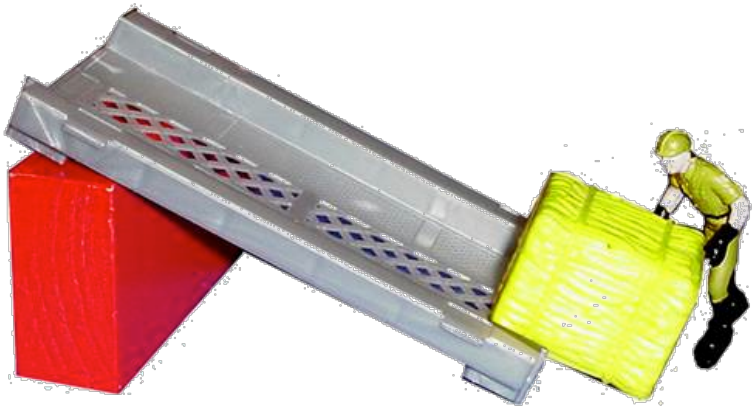
Inclined Plane

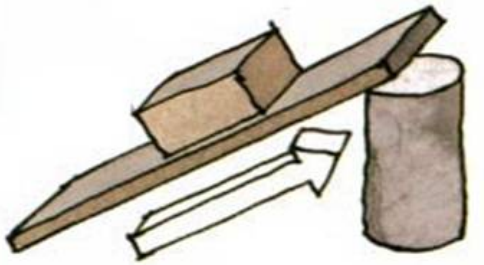
Flat surface set at an angle or incline

Most common inclined plane is a ramp

Able to lift objects by pushing or pulling the load

Examples of Inclined Planes

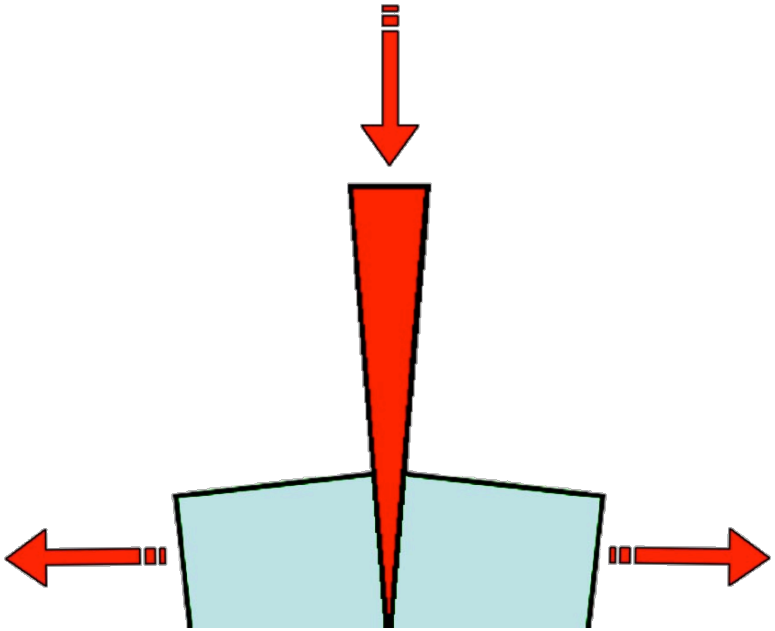




Wedge

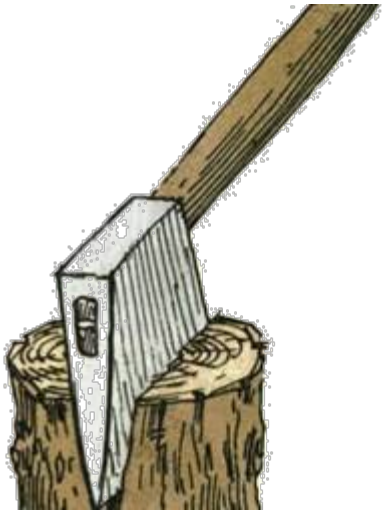
Functions as a ***moving*** inclined plane

Tapers to a thin edge and is used for splitting or for tightening by being driven into something

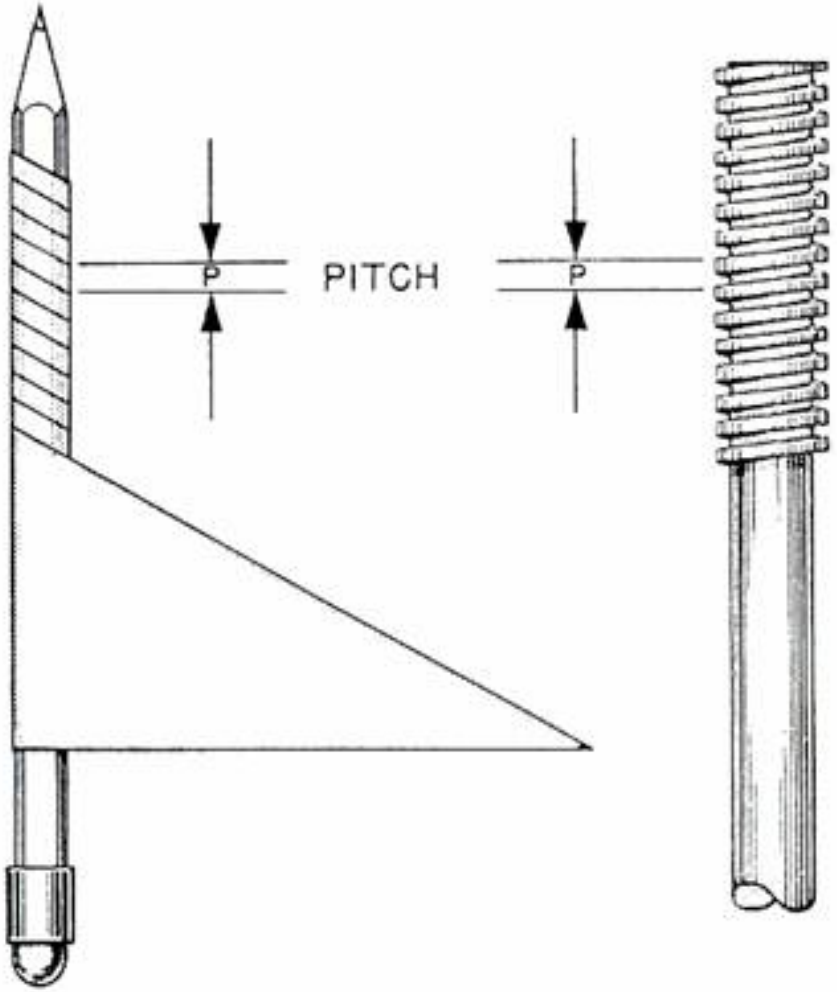


Examples of Wedges

Almost all cutting tools make use of the wedge.



Screw

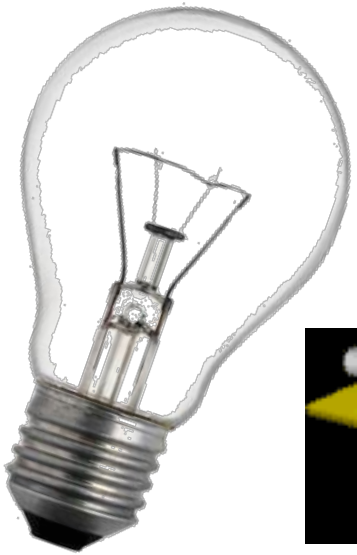


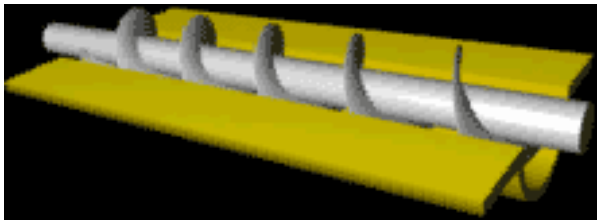
An inclined plane wrapped around a cylinder, forming the path and pitch

Pitch is the distance between two threads

A screw is used as a threaded fastener. It changes rotary motion to linear force.

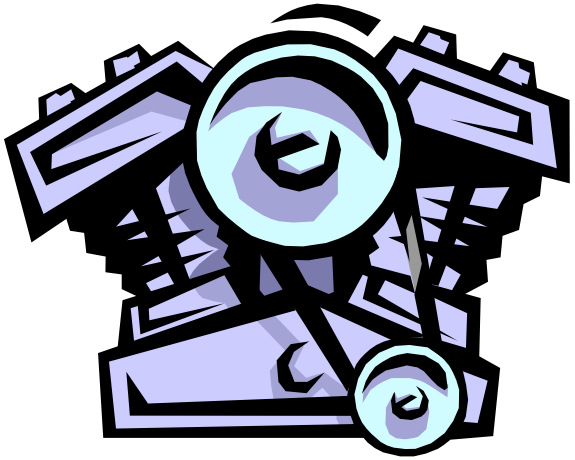
Examples of Screws





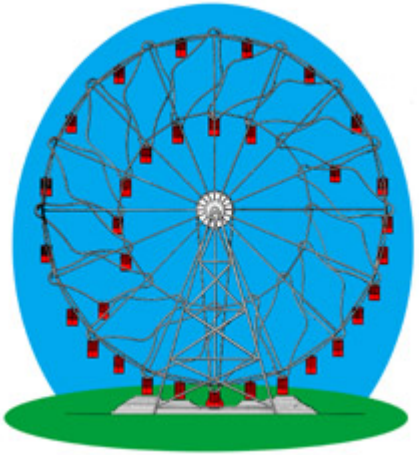
What Kind of Simple Machine Is This?

Pulley



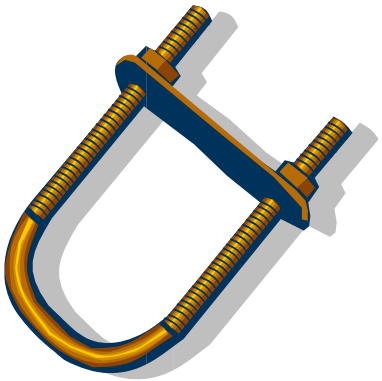
Wedge

Wheel and Axle

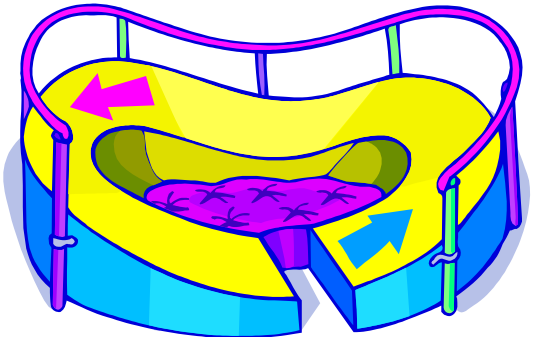


Lever

Screw



Inclined Plane



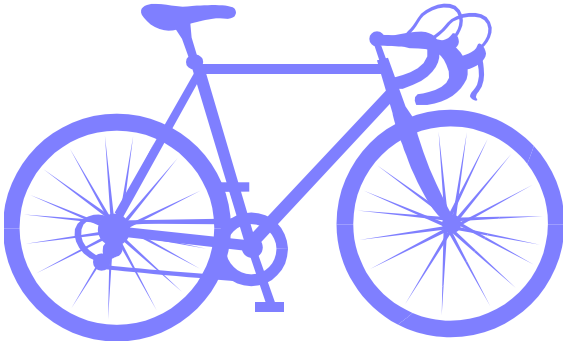
Compound Machines

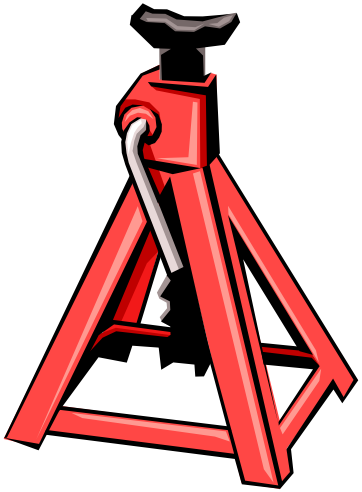
- Compound machines consist of two or more simple machines put together.
- Most devices are compound machines.
- They can do more difficult jobs because their mechanical advantage is greater.

What two simple machines are in scissors?

First Class Lever and Wedge

Name the Simple Machines Present in Each Compound Machine





Another Compound Machine

The Pancake Eye

The Pancake Eye is a complex machine. Mr. Glentzer and I built it last weekend. It includes 3 levers, 2 screws, and an inclined plane, . It shoots flour or any other object at a poor, unsuspecting person. Here is how it works. First one lever is pulled down and another lever secures. The inclined plane bowls are then filled with the desired ammo. Finally, a the string is attached to the 3rd lever. When the string is pulled, one lever releases the other and smack! A face full of powder! One thing I learned from doing this project is that I wish I could tweak a little of the components so that it didn't hit quit so hard. I also should think about the placement so that it doesn't hit right in someone's eye next time. Mrs. Whitehair, could I make some changes and then we try it again?? The best part of doing this project was creating a machine that really worked and allowed us to get sweet revenge!!