$W_o = F_o\ d_o$ & $W_i = F_i\ di$
Sample Problems

Name: _____
Date: _____ Period: _____

Bill used a lever to help him move a large boulder that weighed 610 N. He applied a force of 210 N to move the lever 1.5 m.

What is Bill's input work (W_i)?
Don't forget to show all work.

How far did the boulder move?
Don't forget to show all work.

Bill had another boulder to move that weighed 725 N. He used the same lever, but this time he needed to apply a force of 250 N to move the lever 1.5 m to make the boulder move 0.5 m.

What is Bill's input work (W_i)?
Don't forget to show all work.

What is Bill's output work (W_o)?
Don't forget to show all work.

Levers

- Draw example for each class
- Label fulcrum (Δ), load (L), and effort (E)
- Tell advantage for each example

First Class
Second Class
Third Class

Pulleys

- Draw pulley for each example
- Label input force (F_i), output force (F_o), and pulleys (movable and/or fixed)
- Tell Mechanical Advantage

One Fixed Pulley	One Movable Pulley
Two Pulley System (pulling down)	Two Pulley System (pulling up)

How can the mechanical advantage of a pulley system be increased? _____

_____

Inclined Planes

What advantages do all inclined planes give? _____

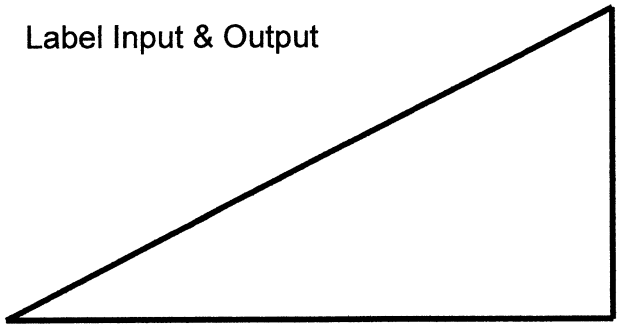
_____

_____

_____

_____

Label Input & Output



How are screws modified inclined planes? _____

_____

How do screws make work easier? _____

_____

How are wedges modified inclined planes? _____

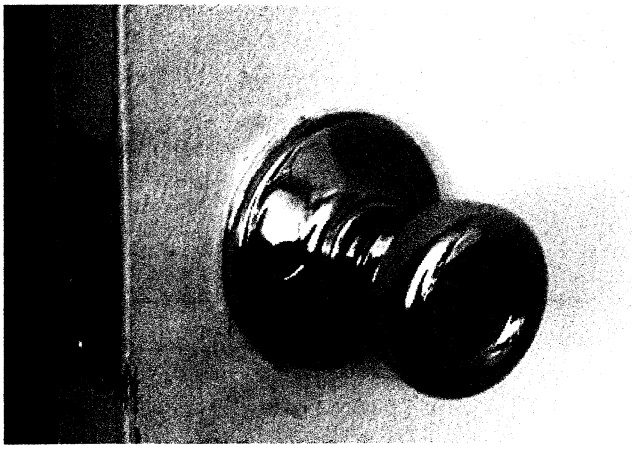
_____

How do wedges make work easier? _____

_____

Wheel & Axle

- Label wheel, label axle
- How does each make work easier?



_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

A pulley lifts a 300 Newton object to a height of 25 m. The person lifting the object pulls with a force of 65 N, and pulls the rope 135 m.

What is the output force? (F_O) _____

What is the output distance? (d_O) _____

What is the work output? (W_O)

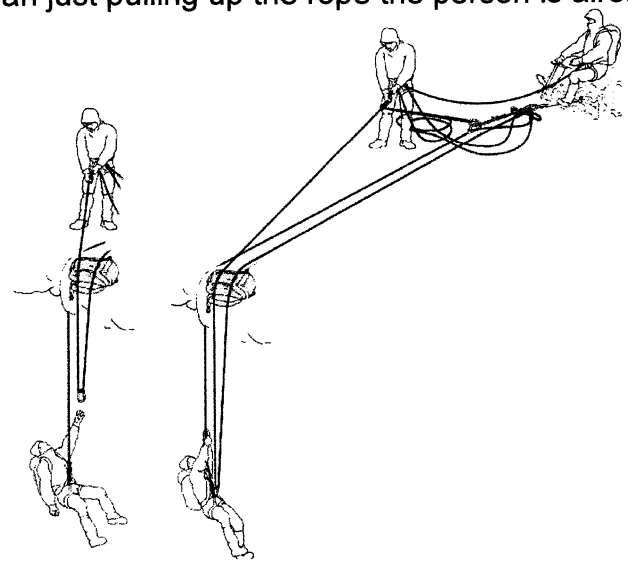
What is the input force? (F_I) _____

What is the input distance? (d_I) _____

What is the work input? (W_I)

Why isn't the work input equal to the work output?

When mountaineers travel across glaciers, they wear harnesses and use ropes so they are always connected. If a member of the climbing party falls into a crevasse (a very deep hole in the ice) then the other climbers can stop them from falling deep into the hole. However, getting the climber back to safer is difficult, as they may not be able to apply enough force to safely lift the person back onto the glacier. The two pictures below show one climber that has fallen into a crevasse and how his two climbing partners are lifting him back to safety. Explain why throwing an additional rope is easier than just pulling up the rope the person is already attached to.



Simple machines are all around us. For homework, you be searching your house for at least TWO different simple machines.

You will:

1) Draw a picture or describe what the simple machine is.
2) Explain how that simple machine makes work easier.

In you description, you should you as many of the following words as you can:

input force *input distance* *output force* *output distance*
gain force *gain distance* *change direction*