

Efficiency

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Efficiency

- ▶ Efficiency is the percentage of useful work from a machine.
- ▶ An **ideal machine** will transfer 100 % of the input work into output work.
- ▶ No machine is ideal... we will always lose some of our work as friction (heat) or air resistance, etc.

$$\text{percent efficiency} = \frac{\text{work output}}{\text{work input}} \times 100$$

Efficiency Problems

- ▶ A pulley system (block & tackle) lifts a 400 N load 1.5 m. The person pulling the rope pulls 15 meters of rope through the pulley with a 50 N force. Calculate the efficiency of the pulley.

$$\text{percent efficiency} = \frac{\text{work output}}{\text{work input}} \times 100$$

Efficiency Problems

- ▶ A machine moves a 600N object 6m. If the amount of work put into the machine is 4500 J, what is the efficiency of the machine.

$$\text{percent efficiency} = \frac{\text{work output}}{\text{work input}} \times 100$$

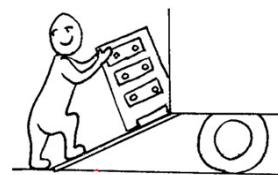
Efficiency Problems

- ▶ A machine is 80% efficient at doing work. If you put 200 J of work into the machine, how much work will the machine give you?

$$\text{percent efficiency} = \frac{\text{work output}}{\text{work input}} \times 100$$

Efficiency Calculations

- ▶ A dresser weighing 200 N is pushed up an inclined plane that is 3 m long. It takes a force of 50 N to push it into the truck (1 m high). What is the efficiency?



$$\text{percent efficiency} = \frac{\text{work output}}{\text{work input}} \times 100$$