



**POWER**

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## OBJECTIVES

- Define Power.
- Calculate the power of a system.



# WHAT IS POWER?

- **Power** is the rate at which work is done.

$$P = \frac{W}{t} = \frac{F \cos \theta \bullet d}{t} = \frac{mgd}{t}$$

- Units are Joules/second, Watts (W)
- It is possible to do the same amount of work, but have different power outputs, if time is different.



## SAMPLE PROBLEM 1

- Myra and Cedric move a sofa 3 meters across the floor by applying a combined force of 200N horizontally. If it takes them 6 seconds to move the sofa, what amount of power did they supply?



## SAMPLE PROBLEM 2

- Cedric then pushes the same sofa 3 meters across the floor by applying a force of 200N. Cedric, however, takes 12 seconds to push the sofa. What amount of power did Cedric supply?



## ALTERNATE POWER CALCULATIONS

$$P = \frac{W}{t} = \frac{Fd}{t} = F \cdot v$$



## SAMPLE PROBLEM 3

- Motor A lifts a 5000 N steel crossbar upward at a constant 2 m/s.
- Motor B lifts a 4000 N steel support upward at a constant 3 m/s
- Which motor is supplying more power?



## SAMPLE PROBLEM 4

- A 70-kilogram cyclist develops 210 watts of power while pedaling at a constant velocity of 7 meters per second east. What average force is exerted eastward on the bicycle to maintain this constant speed?





## GET READY FOR LAB

- Lab: Get into groups of 3-4 and begin the Strongman Competition Lab!
- Convert your weight now.
- 1 pound = 4.45 Newtons

