

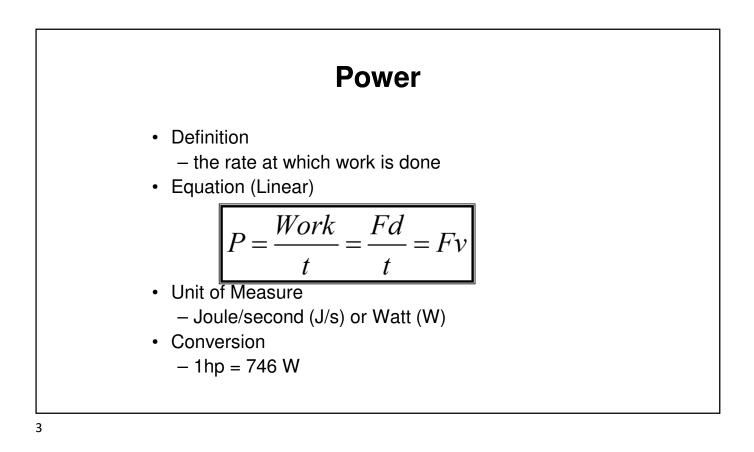
## **Net Force and Work**

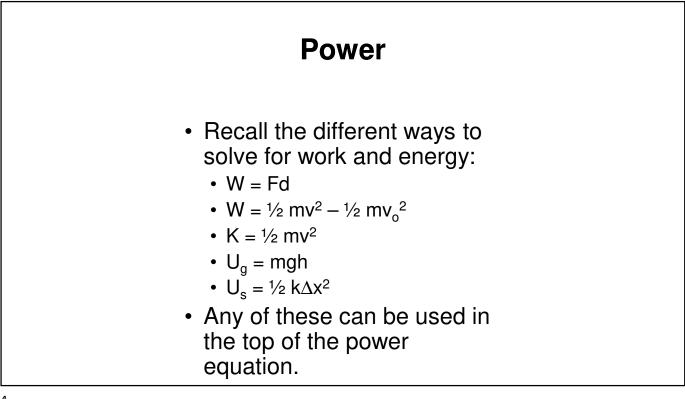
Situation 1: A car idles on a level surface at a constant velocity. It is observed moving a distance of 32 m. How much work is done on the car?

Constant velocity means no change in kinetic energy. No change in kinetic energy means no work is done. Or, constant velocity means no acceleration. No acceleration means no net force. No force, means no work is done.

Situation 2: You lift a 20 kg crate from the ground to a shelf 5 m high with a force of 215 N force. What is the velocity of the crate when it reaches the shelf?

Net force = 215-196=19 N. Work = 19 x 5 = 95 J = Change in K V= 3.1 m/s





Power Sample  
Problem 1• Adrienne lifts a 23 kg box on to a shelf that is 1.8 m above the  
floor. If it takes 1.4 s for her to move the box, how much  
power is generated?
$$U_g = mgh$$
  
 $U_g = (23)(9.8)(1.8)$   
 $U_g = 406 J$  $P = \frac{W}{t}$   
 $P = \frac{Ug}{t}$   
 $P = \frac{406}{1.4} = 290W$ 

## Power Sample Problem 2

 An electric motor lifts an elevator 9.00 m in 15.0s by exerting an upward force of 1.20 x 10<sup>4</sup> N. What is the power of the motor?

$$W = Fd P = \frac{W}{t} P = \frac{108,000}{15.0} P = 7,200 W$$