Chapter 5-1



Work

• Work = force xdisplacement Work is not done unless the object moves. The application of force alone does not make work.

- Work is done only when components of a force are parallel to the movement.
- If you are pushing down on a box and the box is moving sideways (not down), then you are not doing work.
- Work = force (displacement) $\cos\theta$
- If $\theta = 0$, then the cos 0 = 1 and W=fd.
- However, if θ=90, then cos 90 = 0 and
 W = 0.

 If more than one force is acting on the object, you must find the net force. If friction is involved; • Force $- F_f = F_{net}$ • $F_f = \mu F_n$

Units Work is force x length • Force – newtons Length – meters • Work = Nm or Joules (J)

- Work is scalar and can be positive or negative
- Work is positive when the component of force is in the same direction of the movement.
- Work is negative when the force is in the opposite direction of movement.

 If the net work is positive, then the object speeds up and the net force does work on the object.

 If the net work is negative, then the object slows down and work is done by the object. (Friction is greater then force done)

Practice 5A

- #1. A boat pulls with a force of 5000 N. How much work is done if it moves 3 km?
- Knowns?
- Unknown?
- Equation?