

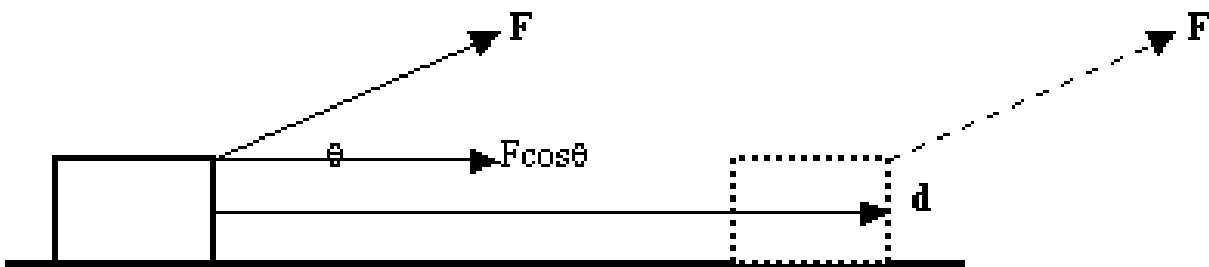
## Physics 12 Section 6-1 to 6-3

### Work done by a constant force

1. Work is defined to be the product of the magnitude of the displacement and the component of the force parallel to the displacement.

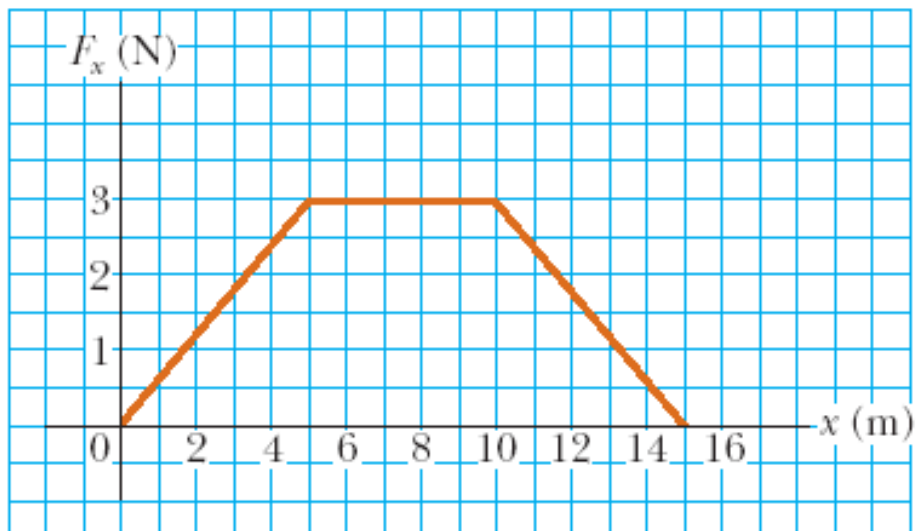
$$W = Fd$$

$$W = Fd\cos\theta$$



### Work done by a varying force

2. Work done by a varying force moving an object between two points, is equal to the area under the  $F$  vs  $d$  curve between those two points.



## Kinetic Energy and the work energy principle

1. Energy is the ability to do work. Translational kinetic energy is the energy of motion.

$$KE = \frac{1}{2} mv^2$$

The net work done on an object is equal to the change in its kinetic energy.

This is known as the work energy principle.

$$W_{\text{net}} = \Delta KE = KE_2 - KE_1$$

Example 6-5 page 152: How much work is required to accelerate a 1000kg car from 20m/s to 30m/s?

$$W_{\text{net}} = \Delta KE = KE_2 - KE_1$$

$$= \frac{1}{2} mv_2^2 - \frac{1}{2} mv_1^2$$

$$= \frac{1}{2} (1000\text{kg})(30\text{m/s})^2 - \frac{1}{2} (1000\text{kg})(20\text{m/s})^2$$

$$= 2.5 \times 10^5 \text{J}$$