

$$W = F \times d$$

$$\begin{array}{c} \text{work} \\ | \\ \text{J} \end{array} = \begin{array}{c} \text{force} \\ | \\ \text{N} \end{array} \times \begin{array}{c} \text{dist} \\ | \\ \text{m} \end{array}$$

Work - examples

1. A box is dragged 40cm across a table by a person with a force of 8.5N.

a) how much work is done?

$$W = F \times d = 8.5 \text{ N} \times 0.4 \text{ m} \\ = 3.4 \text{ J}$$

b) identify the energy transfer(s)

c) how could I decrease the amount of work done moving the box?

decrease the force (e.g. by reducing friction)

decrease the distance

A pencil case weighing 3.15N is lifted 1.5m at a constant speed.

a) Draw a diagram showing the forces on the pencil case

b) Calculate the work done

c) Identify the energy transfer(s)

chemical \rightarrow GPE

A shopping trolley with a mass of 62kg is not moving.

A child pushes the trolley 5m with a force of 80N, and it accelerates.

a) How much work is done? 400 J

b) Identify the energy transfers

chemical \rightarrow kinetic + heat

c) Calculate the maximum possible speed of the trolley

$$400\text{ J} = \frac{1}{2} m v^2$$

$$400 \times 2 = 62 \times v^2$$

$$v^2 = \frac{800}{62}$$

$$v = \sqrt{\frac{800}{62}} = 3.6\text{ m/s}$$