

w/s - Work Done

When a force moves an object, energy is transferred and work is done. For example picking up a cup and moving it from one side of a desk to another takes a small amount of work. The person lifting the cup has to do work to move it along the desk.

Think of some simple situations where work is done. Write down five of your ideas, for each idea say what is doing the work. E.g. A car moves along the road as the engine does some work.

The amount of work done (energy transferred) can be calculated if the distance the object is moved and the force used to move the object are known. This gives us the formula shown below.



$$\begin{array}{ccccc} \text{work done} & = & \text{force applied} & \times & \text{distance moved in direction of force} \\ \text{(J)} & & \text{(N)} & & \text{(m)} \end{array}$$

Using the formula, it is possible to work out how much work is done in many different situations. E.g. Calculate how much work is done when a toy car is pushed 2m with a force of 4N.

$$\text{work done} = \text{force} \times \text{distance moved in applied direction of force}$$

$$\text{work done} = 4\text{N} \times 2\text{m}$$

$$\text{work done} = 8\text{J}$$

Work done is a measure of how much energy is transferred and so is measured in Joules (J).

Section A (show all workings)

Calculate how much work is done when :

1. A box is moved 1m by a force of 3N.
2. A force of 12N moves a block 3m.
3. A test tube is pushed 2m along a desk with a force of 7N.
4. A car is moved 20 m by a force of 320N.
5. A brush is pushed 2.5m by a force of 30N.

Section B

Calculate the work done when :

1. A box is moved 1m by a force of 3.4N.
2. A force of 12N moves a block 3.25m.
3. A test tube is pushed 2.2m along a desk with a force of 7N.
4. A car is moved 23 m by a force of 320N.
5. A brush is pushed 2.5m by a force of 32N.

Section C

Calculate the force used when :

1. 12J of work was used to move a box 3m.
2. A block was moved 15m using 45J of energy
3. 18J of work was done to move a test tube 2m along a desk.
4. 490J of work was needed to move a car 7m.
5. 50J of work was used to push a brush 20m.

Section D

Calculate the distance the object moved when :

1. 2N of force did 26J of work to move a box.
2. 12N of force did 36J of work to move a block.
3. Only 9J of work was used to move a test tube along a desk, by a force of 3N
4. 150J of work was done on a car by a force of 60N.
5. 4N of force did 14.8N of work to push a brush.