

Work Done

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

A 25 N force pushes a box 4 m. How much work is done?

Step 1 · Formula

Work done (J) = force (N) × distance moved in the direction of the force (m).

Step 2 · Calculate

$25 \times 4 = 100 \text{ J.}$

Answer: 100 J

Check: 1 joule = 1 newton moved through 1 metre.

2. Now try one with the steps

You lift a 30 N bag 2 m onto a shelf. How much work do you do, and where does the energy go?

Step 1 · Work

Step 2 · Energy

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the unit of work done? [1]

2. Write the equation linking work done, force and distance. [1]

3. A 10 N force moves an object 3 m. How much work is done, in joules? [1]

4. A 50 N push moves a trolley 20 m. How much work is done, in joules? [1]

5. A 40 N bag is lifted 1.5 m. How much work is done, in joules? [1]

6. Write 2500 J in kilojoules. [1]

7. 600 J of work is done pushing a sledge 30 m. What force was used, in newtons? [2]

8. Anil pushes hard against a wall for a minute but it does not move. How much work does he do on the wall, in joules? [1]

9. A 5 kg box is lifted 2 m. Using 10 N per kg, how much work is done, in joules? [2]

10. A box is pushed at a steady speed across a carpet. Where does the energy from the work done go? [2]

11. A 600 N load is raised 1 m using a 3 m ramp. Ignoring friction, what force is needed along the ramp, in newtons? [3]

12. In real life the force needed for the last question is 250 N. Explain why it is more than you calculated. [2]

13. An ideal lever: an effort of 40 N moves 0.5 m and the load moves 0.1 m. What is the load, in newtons? [3]

14. When you stretch a spring, work is done. Where is the energy stored?

[1]

4. Before you hand it in

Using mass (kg) instead of force (N).

Convert mass to weight first: $\text{weight (N)} = \text{mass (kg)} \times 10 \text{ N/kg}$.

"A ramp saves energy."

A ramp or lever lets you use a smaller force over a longer distance.

Counting work when nothing moves.

Holding or pushing something that does not move does no work on it (though your muscles still get tired).