

Grade 8 Natural Science Worksheet

Force and Work

Work is done when a force acts on an object and the object moves in the direction of the force.

The SI unit for work is the joule (J).

The formula used to calculate work is:

$$W = F \times s$$

↖ ↖ ← distance the object moved (m)
work (J) force (N)

The amount of work done is also equal to the energy transferred.

Energy is also measured in joules.

Answer the following questions:

A boy would like to move a box of mass 12 kg from his bedroom to the kitchen. The distance that the box needs to be moved is 5 m.

1. The boy decides to slide the box. The force he needs to apply to overcome the friction is 20N. Calculate how much work he will do. [4]
2. The boy decides that this is too much work and decides to lift the box onto his desk, which is 2 m high. Calculate the work he does in lifting the box. [6]
3. Does the boy use more energy in sliding the box or in lifting the box? [2]
4. What kind of energy conversion takes place in the boy's body when he lifts the box? [2]

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5. What kind of energy does the box have when it is placed on the table? [2]

[16marks]

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Suggested Solutions

Question number	Possible marks	Solution
1	4	$W = F \times s$ ✓ $W = 20 \times 5$ ✓✓ $W = 100 \text{ J}$ ✓
2	6	$F_G = m \times g$ ✓ $F_G = 12 \times 10$ ✓ $F_G = 120 \text{ N}$ $W = F \times s$ ✓ $W = 120 \times 1.2$ ✓✓ $W = 144 \text{ J}$ ✓
3	2	The boy actually uses less✓✓ energy to slide the box than he would to lift the box.
4	2	Chemical potential✓ → kinetic ✓
5	2	Gravitational potential energy ✓✓