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so many fake sites. this is the first one which worked! Many thanks

Answer Key

Energy, Work, and Power

Energy and work are interrelated— one can make the other.

Energy
Energy is stored work. A battery can store energy to make things work whenever you want. Energy can cause forces, which can cause motion, which can do work.

Work
Work is done when a force applied (caused) through a distance. $W = Fd$ (force times distance). Work equals force times distance.

Energy is Work
Energy is stored work. A battery can store energy to make things work whenever you want. Energy can cause forces, which can cause motion, which can do work. A generator uses work to make energy, which can be stored to do more work.

Work
Work is defined as a force applied (caused) through a distance. $W = Fd$ (force times distance). Work equals force times distance.

To do work, a force has to be in the direction of the motion.
Half of this force does work (moves it in the direction). $W = Fd \cos(\theta)$.
All of this force does work (it is all parallel to the motion). $W = Fd$.

Power
How fast you do work is called power. If you work faster, you use more power. $P = \frac{W}{t}$ (work divided by time). Putting in the work equation: $P = \frac{Fd}{t}$.

Ex: You do 120 joules of work in 2 seconds. How much power did you use?
 $W = 120 \text{ J}$
 $t = 2 \text{ sec}$
 $P = \frac{W}{t} = \frac{120 \text{ J}}{2 \text{ sec}} = 60 \text{ Watts}$
name of a light bulb.

Ex: Two guys lift one 40 kg rock up a 3 m staircase. Both stay in it for 10 seconds. How much power did they use?
 $F = 40 \text{ N}$
 $d = 3 \text{ m}$
 $W = Fd = 40 \text{ N} \times 3 \text{ m} = 120 \text{ J}$
 $t = 10 \text{ sec}$
 $P = \frac{W}{t} = \frac{120 \text{ J}}{10 \text{ sec}} = 12 \text{ W}$
They do the same amount of work (120 J), but Bob uses more power (12 W).

Ex: You push a 1000 newton car 3 meters. How much work did you do?
 $F = 1000 \text{ N}$
 $d = 3 \text{ m}$
 $W = Fd = 1000 \text{ N} \times 3 \text{ m} = 3000 \text{ Joules}$
(Over 1,000 J of energy takes 1,000 J of energy)

Ex: How much work does a kid do while sitting? The kid weighs 40 N.
No work — the kid is not moving. $d = 0$. $W = 0$.

A machine that works faster is less time to more powerful.
A more powerful light bulb gives off the same amount of light (watts), but does it faster.

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