

B8 Work, Energy and Power

- B8.1 A box of mass 5.0 kg is dropped from a height of 3.2 m.
- How much gravitational potential energy (GPE) was stored by the box before it was released?
 - The box lands on a table that is 70 cm above the ground. How much work did gravity do on the box on its way down to the table?
- B8.2 A ball of mass 3.5 kg rolls all the way down a slope inclined at 40° to the horizontal, with a base length of 4.8 m.
- How much GPE does the ball lose?
 - If the average frictional force is 4.0 N, work out how much work the ball does against friction.
- B8.3 50 J of work is done in stretching a spring to an extension of 3.5 cm. Work out the average force applied.
- B8.4 A boy whirls a 30 g conker around his head in a circle at a speed of 2.2 m s^{-1} , using a taut inextensible string. How much work is done on the conker by the tension in the string?
- B8.5 A weight lifter pulls a 2000 kg car forwards at an average speed of 1.5 m s^{-1} against a force of 1250 N.
- What is his power output?
 - How long will it take the weight lifter to do 10 000 J of work?
- B8.6 A 1300 kg car travels at a steady speed, covering 75 m in 5 seconds. Frictional forces are constant and are 450 N in total. Work out the power output of the engine, assuming 100% efficiency.
- B8.7 A child of 40 kg rides a 35 kg bike at 9.0 m s^{-1} . The brakes are then applied and the bike is slowed to 3.8 m s^{-1} . How much work is done by frictional forces?
- B8.8 A 55 kW motor is used to lift a 4800 kg mass vertically up a mine shaft. What is the maximum possible speed that the mass could move upwards?
- B8.9 A 4.0 kg ball is thrown vertically up into the air with an initial velocity of 8.5 m s^{-1} . By the time it is height h metres above the starting point, it has a velocity of 3.0 m s^{-1} and has done 4.0 J of work against air resistance. Find h .