Work Done & Energy Used

1) How much work is required to lift the same 4.0 kg mass up a distance of **4.0 m**?

2) David and Karen push against a wall. David pushes with a force of 450 N for 60 s. Karen pushes with a force of 350 N for 120 s. How much work do they each do?

3) A 80. kg box is pushed 4.0 m across a horizontal surface by a 45 N applied force.
   a) How much work was done?
   b) If the box started from rest, what is final speed of the box?

4) A 60 kg cart starts from rest and reaches a speed of 2.0 m/s. How much work was done on the cart?

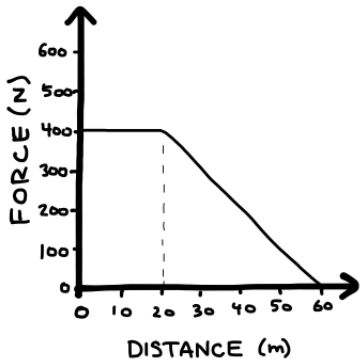
5) A spring-driven gun propels a 10.0 g dart . The spring is compressed by 5.0 cm by exerting an average force of 20. N.
   a) What is the work done in compressing the spring?
   b) How much potential energy is stored in the spring?
   c) With what speed will the dart leave the gun, assuming the spring has negligible mass?

6) A 1000 kg car experiences a constant friction force of 4000 N. How much work does friction do over 20 m?

7) A 1200 kg car is moving at 50.0 km/h. The driver applies the brakes and the car stops after 16 m.
   a) How much work is done by friction on the car?
   b) What is the force of friction on the car?

8) A cart experiences a constant force of 300 N for 30 m, then zero force.
   a) Work done
   b) Final speed of a 200 kg cart

9) The graph shows the net force on a 250 kg cart as it is pushed across a frictionless surface.
   a) What is the work done on the cart?
   b) If the car started from rest, what is the final speed of the cart?



10) A **200 kg cart** moves along a horizontal track. The **net force on the cart is described by the equation:** $F(x) = 500 - 10x$ where F is in newtons and $x$is the distance. The cart starts from rest at $x = 0$.
   a) Determine the **distance** at which the cart reaches its **maximum speed**
   b) Determine the **maximum speed** of the cart
   c) Explain **why the cart does not reach its maximum speed at the end of the motion**