Work, energy and power

1 Work

Work(J) = Force(N) × Distance(m)
For work done against gravity, use vertical distance.

1.1 Work done against friction

Work done against friction is:

$$WD = \mu R \times \text{Distance}$$

Where the distance is in the direction of motion

2 Energy

$\mathbf{E_K = \frac{1}{2}mv^2}$

$\mathbf{GPE = E_P = mgh}$

3 Conservation of energy

A particle's total energy is constant if it is subject only to gravity (i.e. smooth surfaces)
If there are frictional forces to consider then the loss of energy is the work done by friction.

4 Power

Power = Force × Velocity
Usually given in kW