Work and Kinetic Energy

Applying a force on an object through a certain displacement increases its **energy.** In this case, we say that **work** was performed on the object.

(Work = Force x Displacement)

Any moving object has some energy associated with its movement. We call this the **Kinetic Energy**.

"Change in kinetic energy is equal to the mechanical work done by all forces"

$$\Delta K = W$$

$K = \frac{m\,v^2}{2}$ ---> Kinetic Energy

$W = F\,\Delta x$ ---> Work

In order to do work, a force must be along the displacement of the object

Homework

Problem 1.

A cyclist is moving at a constant speed of 10 m/s on a flat road. There is an air resistance force acting on him which is F=100 Newtons, directed backwards (called air drag).

a) What is the total work done by the air drag force in 1 minute?

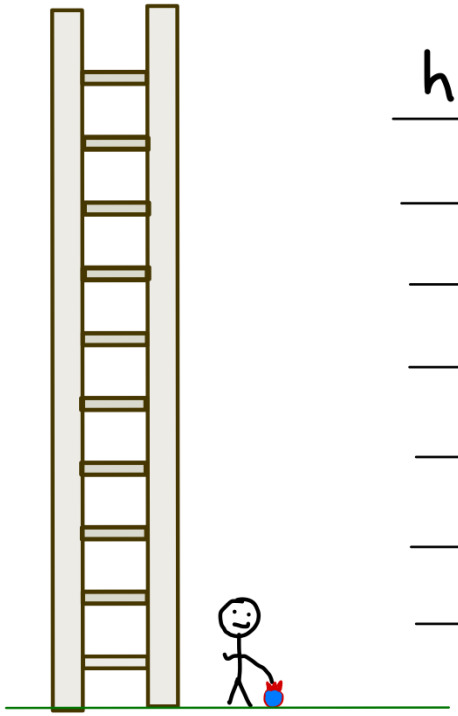
b) What is the work done by the bicyclist over the same time (assuming there are no other losses except of the air drag)?

Problem 2.

We want to find out the work done by Bob on a 2kg balloon by bringing it up a ladder.

a) For each height in the table below, find the work that Bob would need to do on the balloon to bring it up to this height.

b) Now, we want to understand how the potential energy changes with the height. Use the table that you filled in part (a) to make a graph in which you plot the potential energy of the balloon (vertical axis) versus the height of the balloon (horizontal axis). Hint: Remember that in this case, the work done by Bob on the balloon is energy transferred to the balloon in the form of potential energy



h (m)	PE (J)
1	
2	
3	
4	
5	
6