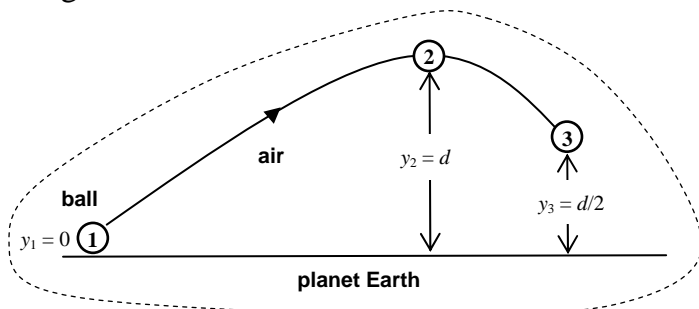


Ex 11 Energy of a soccer ball in flight

The goalkeeper kicks a soccer ball about half the length of the field.



The diagram above shows the system of the **ball**, surrounding **air** and planet **Earth** within the broken line.

This system will be considered at 3 stages:

- 1 just before the ball is kicked,
- 2 at the highest point of its flight, and
- 3 part way down.

Follow the usual conventions with the **work-energy bar charts**:

- gravitational potential energy U_g is positive if the object is above the x-axis,
- the object has kinetic energy K if it is moving,
- an elastic object has elastic potential energy U_s if it is stretched or compressed,
- internal thermal energy U_{int} is generated if objects rub against one another, and
- work W done on the system is positive and work done by the system is negative.

The work-energy bar chart for the system just before the ball is kicked is shown in Fig. 1. Complete the work-energy bar charts for Figs 2 and 3.

