7 The speed of an object increases as it rolls down a slope.

A student suggests that the average linear speed v of a spherical object rolling down a slope depends on the height h of the slope and the diameter d of the object.

The relation between the average linear speed v, h and d may be written in the form

$$v = C\, d^{x} h^{y}$$

where C, x and y are constants.

You are provided with a number of spherical objects of different diameters. You may also use any of the other equipment usually found in a physics laboratory.

Design an experiment to determine the values of C, x and y.

You should draw a labelled diagram to show the arrangement of your apparatus. In your account you should pay particular attention to

(a) the identification and control of variables,
(b) the equipment you would use,
(c) the procedure to be followed,
(d) how the values of C, x and y are determined from your readings,
(e) any precautions that would be taken to improve the accuracy and safety of the experiment.

Diagram