

WJEC England Physics A Level

SP C1 02 : Kinematics

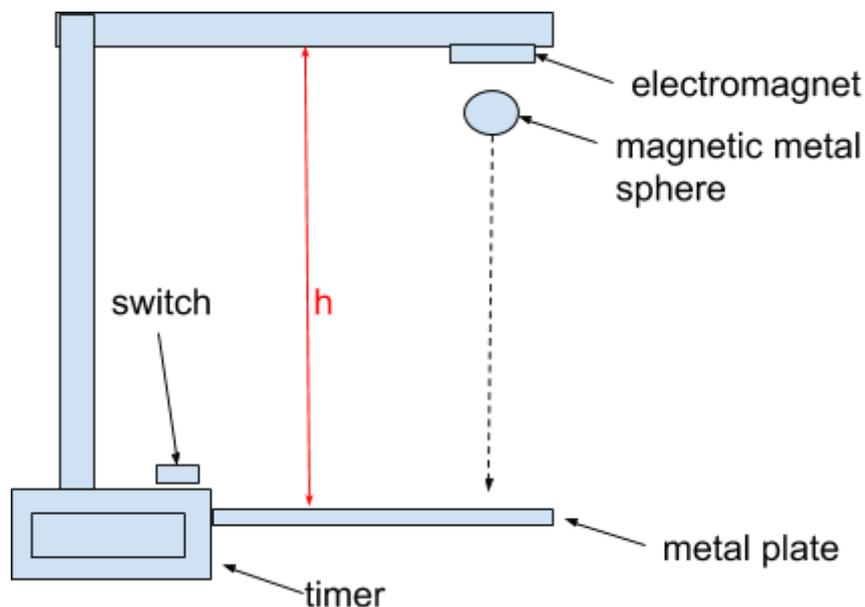
Practical notes



1. Measurement of g by Freefall

Equipment:

- An electronic timer, as below:



Method:

1. Press the switch to disconnect the electromagnet.
2. The metal sphere will fall.
3. When the sphere hits the plate, it will disconnect the circuit, stopping the timer.
4. Use the time taken to calculate the acceleration due to gravity.
5. Repeat for a range of heights.
6. Plot a graph of time squared (t^2) against height.
7. Calculate the gradient.
8. Calculate g, from $g = 2 \times \text{gradient}$.

The calculations are derived from SUVAT:

$$s = ut + \frac{1}{2} at^2$$

Where $s = h$, as this is the distance fallen, and $t =$ measured time.

Rearrange to...

$$a = \frac{2(s - ut)}{t^2}$$

U is 0 because it falls from rest, so...

$$a = \frac{2s}{t^2}$$

Where s / t^2 is equal to the gradient, so a can be obtained by multiplying the gradient by 2.

