

## Dynamics and Statics

# g by freefall

(Ireland)

### Background:

The acceleration due to gravity may be calculated using a sensitive release mechanism and accurate timing.

When objects fall, they accelerate towards the ground. If released from rest, then there is zero initial velocity. Hence the acceleration can be determined by accurate measurement of the distance fallen and the time spent falling. These results may be substituted in the formula

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

### You will need:

- ✓ Acoustic stopwatch app from PhyPhox or similar
- ✓ 2 screwdrivers

- ✓ A neodymium magnet
- ✓ A screw
- ✓ A steel ball

### Follow these steps:

1. Download the “acoustic stopwatch” APP on your phone from PhyPhox. Set the initial conditions as displayed in the photograph. Prime the stopwatch to record.
2. Set up the release mechanism as shown in the photograph.
3. Hold the apparatus so that the ball is a meter above the floor.

When the lower screwdriver struck upwards against the other screw-driver, it simultaneously started the watch and released the ball to fall. When it struck the floor the noise of the impact stopped the watch and the time interval was displayed as shown. When the distance and time measurements were inserted in the formula and processed, the acceleration due to gravity was calculated

### What next?

- Repeat the process several times and find an average value.
- Repeat the process for several different heights

### So what happened?

