

# NEATH PORT TALBOT COLLEGE COLEG CASTELL NEDD PORT TALBOT

## School of Maths & Science Science Practical

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### To Determine the Acceleration due to Gravity.

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#### ◆ Aim

To determine the acceleration due to gravity by free fall.

#### ◆ Introduction

You will calculate the acceleration due to gravity by timing a ball bearing falling through the air.

#### ◆ Safety

##### Control Measures

- You are reminded of the need of good laboratory practice in order to maintain a safe working environment.

##### Hazards



##### General Hazard.

Make sure that the retort stand is suitably supported.



##### Electrical Hazard.

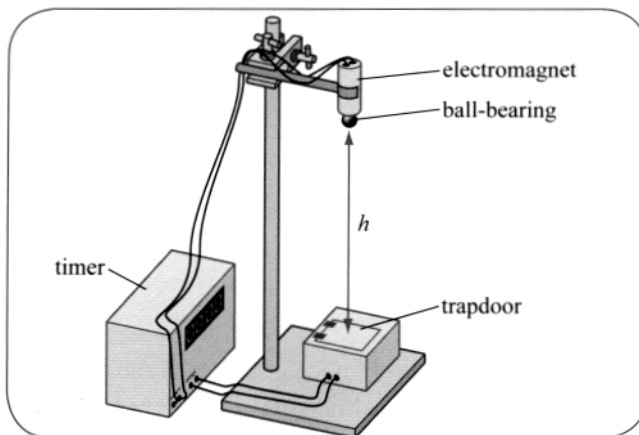
The timer operates off **main** electricity.  
Take care!

◆ **Apparatus Required**

g by free fall apparatus, electronic timer, metre rule, retort stand and clamp, ball bearing, connecting leads, low voltage transformer.

◆ **Procedure**

1. Set up the apparatus as shown in the diagram below.



The timer records the time for the ball to fall through the distance  $h$ .

2. Switch on the timer and power supply. Ensure that the junction switch unit is on.
3. Adjust the power supply until the ball bearing just hangs onto the electromagnet.
4. Ensure the gate is closed.
5. Switch the junction switch unit to off. The ball bearing falls and the timer starts. The ball bearing opens the gate and the timer stops.
6. Take a reading on the timer.
7. Switch the junction unit to on.
8. Close the gate.
9. Hang the ball bearing on the electromagnet.
10. Press reset to clear the result.
11. Take more readings to confirm the result.
12. Adjust the apparatus to obtain different heights of the ball bearing above the gate plate. Go back to 4 and repeat taking readings.


13. Plot a graph of height (m) against time squared ( $s^2$ )

14. Use your graph to determine the acceleration due to gravity. Justify the number of significant figures used in your answer.

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15. Determine the percentage uncertainty in the acceleration due to gravity.

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16. Determine the percentage difference between the experimental value of the acceleration due to gravity and the standard value of  $9.8\text{ms}^{-2}$ .

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17. Using the graphs and your answers to the two sections above comment on the accuracy and reliability of the experiment.

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