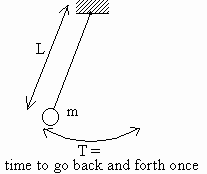


Applecross SHS

Year 11 Physics

Movement Investigation

Using a Pendulum to measure Acceleration due to Gravity



You can measure 'g' using a pendulum. This investigation goes all the way back to the genius Galileo, who made a pendulum so frictionless that he could detect the Earth's rotation.

There is a pendulum like Galileo's at the Gravity Discovery Centre near Gingin.

Plan, then investigate, **how** the **time for one oscillation** [the pendulum period] **depends upon** the **pendulum length**.

You should research how this can be done using STAWA page 148 and the internet.

For this investigation, identify and write down your experimental hypothesis, the dependent variable and the independent variable, and which variables (if any) you intend to control.

Discuss with your lab partners what you will measure, and how you will obtain at least six pairs of measurements for each trial that you carry out.

**Prepare a procedure** outlining how you intend to do this investigation.

**Prepare a table** suitable for recording your measurements.

You will spend one period doing the experimental work in class and collect your data in your group.

The next class period you will process the data, write up the investigation and answer some questions.



Applecross SHS

Physics 11

Pendulum Investigation

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**Hypothesis : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Independent Variable :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1 mark)

**Dependent Variable : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (1 mark)

**Controlled Variables : \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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**Equipment :** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Diagram :**  (1 mark)

**Method :**

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**Observations :**

(2 marks)

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**Additional Observations :**

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**Pendulum Investigation Part 2**

**Year 11 Physics**

**Name : ­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Graph the period vs the length**.

(2 marks)

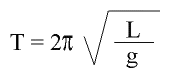
**Graph**

If you do not obtain a straight line plot, try graphing other functions, such as;

* (inverse of period) vs length,
* (period squared) vs length
* and so on, until you get a straight line plot. (2 marks)

When you have found a straight line graph involving the period and the length, draw a line of best fit through your points and calculate the gradient. (2 marks)

This gradient can be used to work out 'g', the acceleration due to gravity.



where T = period of oscillation

L = length of the string

g = acceleration due to gravity

Rearrange this formula to get an expression for ‘g’. (hint : square both sides).

Then use the value you calculated for the gradient on the previous page to calculate ‘g’.

(3 marks)

**Analysing Data :** Compare your experimental value calculated above, with the accepted value.

(1 mark)

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Comment on the accuracy (or otherwise) of your experimental data and explain the main sources of error. (2 marks)

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**Conclusion :** (1 mark)

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**Evaluating Data :** How could this investigation be improved? (2 marks)

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