# Pendulum Investigation

Name:

## Task:

**Design and conduct an experiment to investigate the relationship between
the length, amplitude and mass of a pendulum and the period (T) of its swing.**

## Background

A **pendulum** is a mass suspended from a fixed point by a string that can swing freely under the influence of gravity. The mass is known as the pendulum **bob**. When energy losses due to friction are ignored, the swing has a regular frequency and period.

## Important considerations

To conduct a successful experiment, you will need to think carefully about how to control your variables to minimise friction. Here are some important questions to discuss in your group:

1. What are the independent and dependent variables?
2. What lab equipment will we use to construct and swing a pendulum?
3. What material would be ideal for a “massless string” that won’t break?
4. How can we keep friction (at the pivot and also through the air) as low as possible?
5. What shape of pendulum bob will work best?
6. What effect could the amplitude of the swing have on our measurements? Is it better to have a large swing, or small?
7. Length of string and period both need to be measured. What equipment and techniques will we use in order to make the most accurate measurements possible?
8. What lengths of ‘string’ will keep measuring errors as low as possible?
9. How will we record our data? (Will we need to average anything?)

**Group members:**

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**Aim:**

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**Prediction:**

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**Hypothesis:**

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**Variables:**

* Independent:

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* Dependent:

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* Controlled:

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**Materials:**

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**Method:** (Use detailed numbered steps/instructions)

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**Diagram:**

**Results:** (Draw the table that you will use to collect your results here)

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**Graph:** (Draw the graph that you will represent your results)



Key Words for Investigations

**Title:** A title is a name that helps you introduce your report

**Aim:** What you are trying to find out. This is the question you will answer during the investigation.

**Hypothesis:** What you think is going to happen? This is a general statement that you can test through this investigation.A good hypothesis says what variable you are changing and what the effect will be. It should be written as an “If…then…” statement. E.g.; if fertilizer is added to plants the growth will increase

**Independent Variable:** What is the one part of your investigation that you are going to change deliberately? E.g.; if you are investigating how fertiliser affects plant growth then you are going to be changing the amount of fertilizer between at least two plants.

**Dependent Variable:** What will be measured as you do the investigation? E.g.; if you change the amount of fertilizer then what you would be measuring is the plant growth in millimetres or just by observations.

**Controlled Variables:** The parts of an investigation that are kept the same; to make the investigation fair.

**Apparatus and Materials:** What equipment you will need? Make a list.

**Method or Procedure:** A series of numbered steps explaining in specific detail how to complete your experiment.

**Results Table:** In this area you draw up the table to record all the results. If possible there should also be a column to calculate any averages.

**Analysis of Results/Discussion:**

What do your results tell you?

Are there any patterns or trends in your results? Try to use some Science ideas to help explain what happened.

**Conclusion:**

What did you find out about the outcome being investigated?

Was your outcome different to your hypothesis? How is it different?

**Evaluation:**

Did you experience any difficulties doing this investigation? What were they?

Explain how you could improve this investigation, e.g. fairness and accuracy

Are there any further investigations that could come from this investigation?