

Practical Investigation

The following is a summary from the study design., Unit 4 Area of Study 3:

The investigation requires the student to develop a question, formulate a hypothesis and plan a course of action to answer the question and that complies with safety and ethical guidelines.

The investigation is student-designed and must be related to waves, fields or motion studied in Unit 3 or Unit 4.

Students then undertake an experiment that involves the collection of primary quantitative data, analyse and evaluate the data, identify limitations of data and methods, link experimental results to science ideas, reach a conclusion in response to the question and suggest further investigations that may be undertaken.

All of that means you

- develop a question from the Areas of Study in Units 3 & 4
- plan a course of action that attempts to answer the question
- undertake an investigation to collect the appropriate primary qualitative and/or quantitative data
- organise and interpret the data
- reach a conclusion in response to the question.

The investigation must involving **two continuous independent** variables.

Results are communicated in a scientific poster format.

A practical logbook must be maintained by the student for recording and authentication.

This investigation is the assessment for Outcome 3 of Unit 4.

The poster contributes 35 marks of the 95 marks for Unit 4.

Working as a pair or on your own?

You can do your Practical Investigation on your own or with someone else. There are plusses and minuses to each arrangement. Working with someone else means that you have a sounding board for your ideas.

Working individually means you can work at your own pace.

If you do work in a pair, remember whilst planning and execution of the investigation is a joint and collaborative effort, you must each analyse the data and prepare **your own poster**. The only feature identical in the each poster must be the data. All writing and data analysis, including graphs, must be your own individual work.

The study design lists the following.

Outcome 3, which this investigation assesses contains the following key knowledge

- independent, dependent and controlled variables
- the physics concepts specific to the investigation and their significance, including definitions of key terms, and physics representations
- the characteristics of scientific research methodologies and techniques of primary qualitative and quantitative data collection relevant to the selected investigation, including experiments (gravity, magnetism, electricity, Newton's laws of motion, waves) and/or the construction and evaluation of a device; precision, accuracy, reliability and validity of data; and the identification of, and distinction between, uncertainty and error
- identification and application of relevant health and safety guidelines
- methods of organising, analysing and evaluating primary data to identify patterns and relationships including sources of uncertainty and error, and limitations of data and methodologies
- models and theories, and their use in organising and understanding observed phenomena and physics concepts including their limitations
- the nature of evidence that supports or refutes a hypothesis, model or theory
- the key findings of the selected investigation and their relationship to concepts associated with waves, fields and/or motion
- the conventions of scientific report writing and scientific poster presentation, including physics terminology and representations, symbols, equations and formulas, units of measurement, significant figures, standard abbreviations and acknowledgment of references.