**Stage 2 Physics**

**Assessment Type 1: Investigations Folio – Design Experiment**

For this task you are required to design and undertake a physics experiment. This will be completed in three stages:

**Planning**: A physics context will be deconstructed and an experiment will be designed.

**Experiment**: The experiment that was designed will be undertaken.

**Practical Report**: The data will be recorded and analysed, and any conclusions will be discussed.

You may work in groups up to a maximum of three people to implement one of the group’s investigation design, however, each member needs to be submit their own plan and experiment report.

You can design an experiment in any area of physics provided that appropriate equipment is available.

You may wish to investigate one of the following:

* Factors that affect resistance to motion
* Damped motion of oscillating springs
* Factors that affect projectile motion
* Crater formation
* Measuring the thickness of hair or other small/thin objects
* Investigating different types of pendulum
* Investigate the properties of lasers

Your will be assessed according to the performance standards on the final page of this document based on following submissions:

**Planning**

You must complete the following two sections and be given approval before undertaking your experiment.

**Context**:

* What area of physics will you investigate?
* What physics understanding is required?
* What variables are involved?
* Which of these variables can be manipulated?

**Lines inserted here for *Planning***

Each member needs to submit their own document.

Due date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Deconstruction and Design**

Consider these questions when working on your deconstruction and design.

* What outcomes are expected from manipulating different variables?
* Can you predict outcomes using your physics understanding?
* What hypothesis can you form using this context?
* What kind of experiment will test your hypothesis?
* Why will certain procedures chosen?
* How and why will variables be controlled?
* What data will be collected?
* What will the data table look like?
* How will the data be analysed?
* How will the data be used to test your hypothesis?
* How will other variables be controlled?

As you are answering these questions, you need to explain why you have arrived at your answers in order to justify your plan of action. This may be done by using textboxes to annotate your deconstruction and/or design to by using a different coloured font.

Evidence of deconstruction, the method/procedure chosen as most appropriate, and a justification of the plan of action must be a maximum of 4 sides of an A4 page.

**Report**

Each member prepares and submits an individual practical report. Your practical report should include:

* introduction with relevant physics concepts, and either a hypothesis and variables, or an investigable question
* materials/apparatus used
* method that outlines the method that was implemented
* identification and management of safety and/or ethical risks
* results including table(s) and/or graph(s)
* analysis of results, identifying trends, and linking results to concepts
* evaluation of procedures and effects on data, and identifying sources of uncertainty
* conclusion, with justification.

The report should be a maximum of 1500 words, if written, or a maximum of 10 minutes for an oral presentation, or the equivalent in multimodal form.

Only the following sections of the report are included in the word count:

* introduction
* analysis of results
* evaluation of method/procedure
* conclusion.

The evidence of the deconstruction and design component must be attached to the practical report.

Due date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Performance Standards Stage 2 Physics**

| - | Investigation, Analysis and Evaluation | Knowledge and Application |
| --- | --- | --- |
| A | Critically deconstructs a problem and designs a logical, coherent, and detailed physics investigation.  Obtains, records, and represents data, using appropriate conventions and formats accurately and highly effectively.  Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.  Critically and logically evaluates procedures and their effect on data. | Demonstrates deep and broad knowledge and understanding of a range of physics concepts.  Applies physics concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between science and society.  Communicates knowledge and understanding of physics coherently, with highly effective use of appropriate terms, conventions, and representations. |
| B | Logically deconstructs a problem and designs a well-considered and clear physics investigation.  Obtains, records, and represents data, using appropriate conventions and formats mostly accurately and effectively.  Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.  Logically evaluates procedures and their effect on data. | Demonstrates some depth and breadth of knowledge and understanding of a range of physics concepts.  Applies physics concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between science and society.  Communicates knowledge and understanding of physics mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| C | Deconstructs a problem and designs a considered and generally clear physics investigation.  Obtains, records, and represents data, using generally appropriate conventions and formats with some errors but generally accurately and effectively.  Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.  Evaluates procedures and some of their effect on data. | Demonstrates knowledge and understanding of a general range of physics concepts.  Applies physics concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of physics generally effectively, using some appropriate terms, conventions, and representations. |
| D | Prepares a basic deconstruction of a problem and an outline of a physics investigation.  Obtains, records, and represents data, using conventions and formats inconsistently, with occasional accuracy and effectiveness.  Describes data and undertakes some basic interpretation to formulate a basic conclusion.  Attempts to evaluate procedures or suggest an effect on data. | Demonstrates some basic knowledge and partial understanding of physics concepts.  Applies some physics concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic physics information, using some appropriate terms, conventions, and/or representations. |
| E | Attempts a simple deconstruction of a problem and a procedure for a physics investigation.  Attempts to record and represent some data, with limited accuracy or effectiveness.  Attempts to describe results and/or interpret data to formulate a basic conclusion.  Acknowledges that procedures affect data. | Demonstrates limited recognition and awareness of physics concepts.  Attempts to apply physics concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about physics. |