Stage 2 Physics

Assessment type and task clearly identified.

Assessment Type 1: investigations Folio

Deconstruction and Investigation Task - Slides

Children’s slides or slippery dips come in different shapes and sizes. Some are used in playrooms, others in back yards, children’s playgrounds, or as water slides.

A manufacturer wants to make a slide which has at least one curve in it, but knows that there are safety considerations that must be built into the design. The slide needs to be thrilling but not too scary.

Context provided for the investigation.

In this investigation, you will consider and explore the problem that the manufacture faces when designing a safe slide with a curve.

You will then design and conduct an experiment to determine the effect of *one* factor on the construction of a simple slide with a curve.

**A Deconstruct the problem**

Task is broken down into manageable sections, clearly identifying requirement and timeline of task.

* Think about a range of factors to be considered when constructing a slide with a curve.
* Identify the impact these could have on the design and the criteria you might use for judging safety and suitability.
* Consider how these could be modelled and tested and the results measured and recorded.
* **Summarise your thinking**

Then select *one* factor and develop and *justify* a method to investigate how *that* factor might influence the construction of a slide with a curve.

**B Designing your own investigation**

Students directed to the subject outline to provide support.

* Use the guidelines on Page 7 of the subject outline to help you design your practical investigation. Also, keep in mind the requirements of the practical report that are described at the end of the task.
* Annotate your design to justify the decisions you have made as your design your investigation. Examples: 5 tests at each height because………….., This material will provide …….., After trialling different X, this turned out to be ……..

Annotations may be in textboxes or in a different coloured text.

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 (minimum font size 10). This evidence must be attached to the practical report.

Part A and B will be completed individually and will be submitted for assessment on:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**C Implementing an investigation**

In defined groups, students (in consultation with the teacher) will select one method to implement and to collect data.

Collaborative work.

**D Writing an individual report**

You will use the data collected to write an individual report. This report is based on the investigation that was actually undertaken in Part C.

The practical report with the deconstruction summary and the method that you designed attached is to be submitted on:

Clear deadlines.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Your practical report must include:

* introduction with relevant physics concepts with a hypothesis, independent, dependent variables, variable to be controlled
* materials used
* method that outlines the method that was implemented

Specifications for the report from the subject outline.

* 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 data, and identifying sources of uncertainty
* conclusion, with justification.

The report should be a maximum of 1500 words if written, or a maximum of 9 minutes for an oral presentation, or the equivalent in multimodal form.

Only the following sections are included in the word count:

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

Performance Standards for Stage 2 Physics

| - | Investigation, Analysis and Evaluation | Knowledge and Application |
| --- | --- | --- |
| A | Critically deconstructs a problem and designs a logical and coherent physics investigation with detailed justification.  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 with reasonable justification.  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 with some justification.  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. |

**Notes for teachers**

There are many different web sites that can support students in the design of slides with curves.

These include: Physics on the Playground, Amusement Park Physics, and Physics on a playground slide.