

- The internal assessment criteria
- Guidance for the use of the internal assessment criteria

Assessed student work

- Overview
- Investigation 1: The real and the apparent positions of the stars in Orion (Database and spreadsheet)
- Investigation 2: Investigating the lift force of a toy helicopter (Hands-on)
- Investigation 3: Obtaining Wien's displacement law of electromagnetic radiation (Simulation)
- Investigation 4: Investigating the force on an electric charge moving through a magnetic field (Simulation)
- Investigation 5: Determining solar characteristics using planetary data (Database)
- Investigation 6: Physical and mathematical models of the greenhouse effect (Hands-on and mathematical models)
- Investigation 7: Exploring the relationship between the pressure of the ball and coefficient of restitution (Hands-on)
- Investigation 8: The exponential nature of a bouncing ping-pong ball (Hands-on and modelling)
- **Investigation 9: Investigation water depth pressure (Hands-on)**
- Investigation 10: How temperature affects the vibration rate of a tuning fork (Hands-on)

Appendix

- Changes in the syllabus content

## Investigation 9: Investigation water depth pressure (Hands-on)

To view the various elements of this example, please use the icons at the side of the screen.

**Note:** The comments in the annotated examples match the labelling on teacher forms.

### Examiner comments

Personal engagement	Exploration	Analysis	Evaluation	Communication	Total
x/2	x/6	x/6	x/6	x/4	x/24
1	5	5	3	3	17

### Personal engagement

This criterion assesses the extent to which the student engages with the exploration and makes it their own. Personal engagement may be recognized in different attributes and skills. These could include addressing personal interests or showing evidence of independent thinking, creativity or initiative in the designing, implementation or presentation of the investigation.

**Mark**

**Descriptor**

1	The evidence of personal engagement with the exploration is limited with little independent thinking, initiative or creativity.
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- The justification given for choosing the research question and/or the topic under investigation does not demonstrate **personal significance, interest or curiosity**.
- There is little evidence of **personal input and initiative** in the designing, implementation or presentation of the investigation.

Moderator's  
award

Moderator's comment

1

The student's involvement with scuba diving clearly directs him or her to this study, but one reference is all we get here. There is no personal engagement with the design, implementation or presentation of the investigation.

## Exploration

This criterion assesses the extent to which the student establishes the scientific context for the work, states a clear and focused research question and uses concepts and techniques appropriate to Diploma Programme level. Where appropriate, this criterion also assesses awareness of safety, environmental, and ethical considerations.

### Mark

### Descriptor

3-4

- The methodology of the investigation is mainly appropriate to address the research question but has limitations since it takes into consideration only some of the significant factors that may influence the relevance, reliability and sufficiency of the collected data.

5-6

- The topic of the investigation is identified and a relevant and fully focused research question is clearly described.
- The background information provided for the investigation is entirely appropriate and relevant and enhances the understanding of the context of the investigation.

Moderator's comment

Moderator's  
award

5

The topic is nicely identified and explained, and the real-world context is illustrated. The method is appropriate; indeed, it is the Vernier pressure sensor data sheet method. This is not a problem for high school lab work. Students are not expected to devise original or insightful methods. A basic safety issue is recognized, but the environmental concern comment is better forgotten. The descriptors of the exploration criterion are all addressed. There is some weak use of language and the student often needs to get to the point more directly.

## Analysis

This criterion assesses the extent to which the student's report provides evidence that the student has selected, recorded, processed and **interpreted** the data in ways that are relevant to the research



question and can support a conclusion.

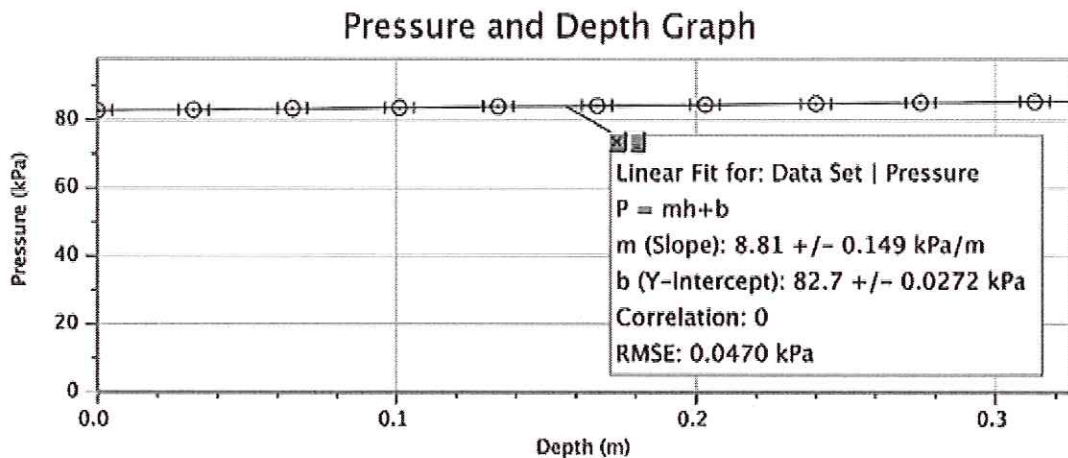
Mark	Descriptor
3-4	<ul style="list-style-type: none"> <li>Appropriate and sufficient data processing is carried out that could lead to a broadly valid conclusion but there are significant inaccuracies and inconsistencies in the processing.</li> <li>The report shows evidence of some consideration of the impact of measurement uncertainty on the analysis.</li> </ul>
5-6	<ul style="list-style-type: none"> <li>The report includes sufficient relevant quantitative and qualitative raw data that could support a detailed and valid conclusion to the research question.</li> <li>The processed data is correctly interpreted so that a completely valid and detailed conclusion to the research question can be deduced.</li> </ul>

Moderator's comment

There is no doubt that the student has selected, recorded, processed and presented the data appropriately for the confirmation of the given pressure equation. We can say the amount of data is sufficient, but repeated measurements would have been useful. Uncertainty, although not so much accuracy, has been considered. The quality of the data is sufficient to reach appropriate conclusions. However, the student does not see the obvious with his or her graph. Here is the student's data re-graphed with a proper zero-zero origin. The gradient seems (but is not) nearly flat. The student never appreciates this subtlety.

Moderator's award

5



There is definitely room for improvement under analysis, but it was felt that awarding a mark of 4 was too low.

Evaluation

This criterion assesses the extent to which the student's report provides evidence of evaluation of the investigation and the results with regard to the research question and the accepted scientific context.

Mark	Descriptor
1–2	<ul style="list-style-type: none"> <li>Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are <b>outlined</b> but are restricted to an <b>account of the practical or procedural issues</b> faced.</li> <li>The student has <b>outlined</b> very few realistic and relevant suggestions for the improvement and extension of the investigation.</li> </ul>
3–4	<ul style="list-style-type: none"> <li>A conclusion is <b>described</b> which is relevant to the research question and supported by the data presented.</li> <li>A conclusion is described which makes some relevant comparison to the accepted scientific context.</li> </ul>

#### Moderator's comment

Moderator's award	The student does have evidence to support his or her research question, but the correct question is not to prove the theory but to illustrate it. The quality of the gradient is given a 10% confidence level, which may sound reasonable but in fact it turns out that the biggest error is in the depth measurement, accounting for most of the 10%. The water level is not at the end of the rubber tube, hence the evaluation is null in terms of good physics. The student struggles with data analysis and meaning. A justification is missing, and the methodological issue is never addressed.
3	

### Communication

This criterion assesses whether the investigation is presented and reported in a way that supports effective communication of the focus, process and outcomes.

Mark	Descriptor
1–2	<p><b>The presentation of the investigation is unclear, making it difficult to understand the focus, process and outcomes.</b></p> <ul style="list-style-type: none"> <li>The understanding of the focus, process and outcomes of the investigation is obscured by the presence of inappropriate or irrelevant information.</li> </ul>
3–4	<p><b>The presentation of the investigation is clear. Any errors do not hamper understanding of the focus, process and outcomes.</b></p> <ul style="list-style-type: none"> <li>The report is well structured and clear: the necessary information on focus, process and outcomes is present and presented in a coherent way.</li> <li>The use of subject specific terminology and conventions is appropriate and correct. Any errors do not hamper understanding.</li> </ul>

## Moderator's comment

Moderator's  
award

3

The investigation is presented and reported in a way that makes sense and flows. Much of the writing is not as focused as it should or could be, but the logical flow makes sense. There are a few incorrect or vague expressions relating to appropriate scientific language and the graph is not explained properly, but the point of the project is communicated satisfactorily.



• [Student work \(PDF\)](#)



• [Annotated student work \(PDF\)](#)



• [Examiner comments](#)

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