

## Astronomy Sample 3 – Altitude and velocity of the ISS

Personal Engagement x/2	Exploration x/6	Analysis x/6	Evaluation x/6	Communication x/4	Total x/24
<b>2</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>3</b>	<b>23</b>

### Personal Engagement

This criterion assesses the extent to which the student engages with the exploration and makes it his or her 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
2	<p><b>The evidence of personal engagement with the exploration is clear with significant independent thinking, initiative or creativity.</b></p> <ul style="list-style-type: none"> <li>The justification given for choosing the research question and/or the topic under investigation demonstrates <b>personal significance, interest or curiosity.</b></li> <li>There is evidence of <b>personal input and initiative</b> in the designing, implementation or presentation of the investigation.</li> </ul>
<b>Moderator's Award</b> 2	<p><b>Moderator's Comment</b></p> <p>The student clearly demonstrates initiative and interest in this investigation. Overall, this has more a feel of an extended essay than an Individual Investigation. The student uses the term "we" often, and this brings up the issue of academic honesty. The moderator usually accepts the teachers ruling here. For sure, the student had help in a way that may not affect credibility. The student truly made this investigation their own.</p>

### 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
5-6	<ul style="list-style-type: none"> <li>The topic of the investigation is identified and a relevant and fully focused research question is clearly described.</li> <li>The background information provided for the investigation is entirely appropriate and relevant and enhances the understanding of the context of the investigation.</li> <li>The methodology of the investigation is highly appropriate to address the research question because it takes into consideration all, or nearly all, of the significant factors that may influence the relevance, reliability and sufficiency of the collected data.</li> <li>The report shows evidence of full awareness of the significant safety, ethical or environmental issues that are <b>relevant to the methodology of the investigation.*</b></li> </ul>
<b>Moderator's Award</b> 6	<p><b>Moderator's Comment</b></p> <p>The student expresses a well-reasoned and relevant research question. The methodology is entirely appropriate although the student could have looked up the data instead of measuring it, but then what would they have learned?. The various factors relating to the investigation were thoroughly considered and explained. The moderator is impressed. Even safety issues were mentioned.</p>

\* This indicator should only be applied when appropriate to the investigation.

## 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
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>Appropriate and sufficient data processing is carried out with <b>the accuracy</b> required to enable a conclusion to the research question to be drawn that is fully <b>consistent</b> with the experimental data.</li> <li>The report shows evidence of full and appropriate consideration of the impact of measurement uncertainty on the analysis.</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>
<b>Moderator's Award</b> 6	<b>Moderator's Comment</b> The student handles raw data and processed data in a most thorough manner and in a way that addresses the research question. The impact of uncertainties has been appreciated and the results interpreted correctly. Even the eccentricity of the orbit was acknowledged. Both models were analysed appropriately.

## 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
5-6	<ul style="list-style-type: none"> <li>A detailed conclusion is <b>described and justified</b> which is entirely relevant to the research question and fully supported by the data presented.</li> <li>A conclusion is correctly <b>described and justified</b> through relevant comparison to the accepted scientific context.</li> <li>Strengths and weaknesses of the investigation, such as limitations of the data and sources of error, are <b>discussed</b> and provide evidence of a clear understanding of the <b>methodological issues</b> involved in establishing the conclusion.</li> <li>The student has <b>discussed</b> realistic and relevant suggestions for the improvement and extension of the investigation.</li> </ul>
<b>Moderator's Award</b> 6	<b>Moderator's Comment</b> A properly appreciated conclusion was described, justified and is clearly relevant to the research question. The data was appropriately analysed in the conclusion, although some of the discussion lacks a conciseness of a well-defined evaluation. Comparison to accepted theory was mentioned, and both procedural and methodological issues were addressed as well as realistic and relevant improvements.

## 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
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 report is relevant and concise thereby facilitating a ready understanding of the focus, process and outcomes of the investigation.</li><li>• The use of subject specific terminology and conventions is appropriate and correct. Any errors do not hamper understanding.</li></ul>
Moderator's Award <b>3</b>	<p><b>Moderator's Comment</b></p> <p>The report is nicely organized and laid out in logical steps, but it is hard to image why the student would number pages with Roman numerals. Also, communications was slightly obscured with too much detail. The report was not as concise that one would like in order to keep the purpose focused and the process understood. The use of scientific terms and conventions was correct. The student's achievement here is in the 3-4 markband; the best fit method of assessment give this report a solid 3.</p>

\*For example, incorrect/missing labelling of graphs, tables, images; use of units, decimal places. For issues of referencing and citations refer to the "Academic honesty" section.