

## Astronomy Sample 4 - Habitable Zones

Personal Engagement x/2	Exploration x/6	Analysis x/6	Evaluation x/6	Communication x/4	Total x/24
2	1	1	2	2	8

### 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 2</b>	<p><b>Moderator's Comment</b></p> <p>Personal engagement is a holistic evaluation and should never appear as a section in the student report. 95% of the student's words in their PE section add nothing to the assessment of PE. Nonetheless, the topic and purpose of this IA and how the student went about it does demonstrate a degree of personal engagement. The student clearly took the initiative, despite lacking strong academic skills.</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
1-2	<ul style="list-style-type: none"> <li>The topic of the investigation is identified and a research question of some relevance is <b>stated but it is not focused.</b></li> <li>The background information provided for the investigation is <b>superficial</b> or of limited relevance and does not aid the understanding of the context of the investigation.</li> <li>The methodology of the investigation is only appropriate to address the research question to a very limited extent since it takes into consideration few of the significant factors that may influence the relevance, reliability and sufficiency of the collected data.</li> <li>The report shows evidence of limited 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 1</b>	<p><b>Moderator's Comment</b></p> <p>Although we know what the student is addressing, the expression of the research question is awkward and lacks a well-defined statement. Indeed, some of what the student is asking might be more suited for biology than physics. The 'procedure' never explains the procedure or method. Superficial and irrelevant describes most of the student's plan. Although the text is interesting in places, it appears to be a general essay and not a scientific investigation.</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
1-2	<ul style="list-style-type: none"> <li>The report includes <b>insufficient relevant</b> raw data to support a valid conclusion to the research question.</li> <li>Some <b>basic</b> data processing is carried out but is either too <b>inaccurate or too insufficient to lead to a valid</b> conclusion.</li> <li>The report shows evidence of little consideration of the impact of measurement uncertainty on the analysis.</li> <li>The processed data is incorrectly or insufficiently interpreted so that the conclusion is invalid or very incomplete.</li> </ul>
<b>Moderator's Award</b> 1	<p><b>Moderator's Comment</b></p> <p>There is no data as such used for analysis, although the essay describes a number of relevant factors. There is no analysis to answer an ill-defined research question. Uncertainties are not relevant in such an essay, and there is hardly an interpretation of what the student thinks is data other than explain the meaning of the various terms. But even here there are problems. The student writes "<math>P = nkT</math>" when they mean <math>pV = nRT</math> (and 'n' is the number of moles, not the density of particles as the student thinks). At best, analysis earns a low 1.</p>

## 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>A conclusion is <b>outlined</b> which is not relevant to the research question or is not supported by the data presented.</li> <li>The conclusion makes superficial 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>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>
<b>Moderator's Award</b> 2	<p><b>Moderator's Comment</b></p> <p>Amazingly, the student writes an evaluation without a recognized conclusion. The style here is more like a general essay, something written by copying information from an encyclopaedia. One gets the impression that the student hardly knows what they are talking about. The lack of a focused research question and the lack of any real method, does not allow for an appropriate evaluation or conclusion. The evaluation achievement level is clearly in the 1-2 markband, and because the student recognizes many relevant issues the evaluation criterion earns a weak 2.</p>

## 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 report is not well structured and is unclear: The necessary information on focus, process and outcomes is missing or is presented in an incoherent or disorganized way.</li> <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 use of subject specific terminology and conventions is appropriate and correct. Any errors do not hamper understanding.</li> </ul>
<p><b>Moderator's Award</b> <b>2</b></p>	<p><b>Moderator's Comment</b></p> <p>The text lacks focus, and often a topic is presented without a reason or purpose. The student seems lost, and just able to copy material from texts or the internet. The student made use of many resources and yet there are no proper citations. The teacher should have never submitted this work as it stands. Academic honesty has been ignored, and yet the moderator does not think the student is plagiarising material, but they are making a good use of copy and paste. There are some serious mistakes in mathematics and terminology. Luminosity is quoted in erg per second as well as in joules per second. The expression <math>(0.39)^2</math> means 0.39 squared. These are minor issues but reflect the overall lack of purposeful communication. There is too much information copied from the NASA Kepler website and not enough scientific study going on to earn anything more than a 2 here.</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.