Year 12 Physics

Depth Study Assessment Task 2024

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| **TOPIC**: Depth Study – Advanced Mechanics | **MARKS:** /50 |
| **SUBMISSION REQUIREMENTS:** The assessment will be submitted to CANVAS on **Wednesday March 6th 2024 by 11.59pm**.  | **WEIGHTING:**  30 %  |
| **OUTCOMES TO BE ASSESSED:**

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| **PH12-1** | Develops and **evaluates** questions and hypotheses for scientific investigation. |
| **PH12-4**  | Selects and **processes** appropriate qualitative and quantitative data and information using a range of appropriate media.  |
| **PH12-5**  | **Analyses** and evaluates primary and secondary data and information.  |
| **PH12-7**  | **Communicates** scientific understanding using suitable language and terminology for a specific audience or purpose.  |
| **PH12-12** | **Describes** and **analyses** qualitatively and quantitatively circular motion and motion in a gravitational field, in particular, the projectile motion of particles. |

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| **DIRECTIONAL VERBS:**

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| **Analyse** | Identify components and the relationship between them; draw out and relate implications |
| **Communicate** | to convey knowledge or information; can occur through different methods, such as written, oral or visual |
| **Processes** | Interoperate data or information to draw conclusions. |
| **Explain****Evaluate****Describes** | Relate cause and effect; make the relationships between things evident; provide why and/or howMake a judgement based on criteria; determine the value ofProvide characteristics and features |

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| **TASK DESCRIPTION:****Task Description**In this Depth Study, you will be working independently to investigate Theme Park Physics.*You are to analyse the physics involved with TWO rides at Luna Park, submit a scientific report and respond to HSC questions in an in-class component.*This will involve three parts:**PART A*** Choose TWO rides at Luna Park
* Write a Scientific Report Analysing the data collected from that ride to write a scientific report researching the construction of the ride from secondary sources to calculate various variables.

**PART B:*** Respond to two HSC style questions relevant to the Module 5 course material.

**Part C:*** Students engage in a mandatory excursion to Luna Park and participate in various rides.
* Students complete and submit Luna Park workbook on 7th March 2024.
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| **ASSESSMENT CRITERIA:**Students will have 5 lessons in class to research and generate their scientific report.You will be assessed on:* The modification of an inquiry question into a suitable hypothesis.
* The location of suitable secondary resources to analysee the physics principles involved in the rides of your choice.
* Analysing provided data for your chosen ride.
* Producing a methodology to test the hypothesis.
* Demonstration of understanding of the Physics involved.
* The communication of your findings which include a discussion on the validity and reliability of your investigations.
* Your ability to respond to HSC questions.

Students will be expected to complete components of this task during their own time. |

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| Year 12 Physics – Depth Study Marking Guidelines |

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| Outcomes: Investigative Processes (PHY12-1) Processing and Analysing Data (PHY12-4, PHY12-7) Communication (PHY12-7) Knowledge and Understanding (PHY12-12) |

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| **Abstract** | **Limited** | **Basic** | **Sound** | **High** | **Outstanding** |
| Summary does not reflect Depth Study | Summary reflects aspects of the Depth Study | Summary that reflects most aspects of the Depth Study | Summary of the Depth Study with reference to the inquiry question, methodology, results, and conclusion  | Clear and succinct summary of the Depth Study with reference to the inquiry question, methodology, results and conclusion |
| *0 marks* | *1 mark* | *2 marks* | *3 marks* | *4 marks* |
| **Introduction** | Develops an inquiry question but has limited understanding of the limitation of science to investigate some concepts.Formulates a hypothesis.Demonstrates a limited knowledge and understanding of mechanics | Develops an inquiry question of some relevance related to equilibrium with teacher assistance formulates a hypothesis linked to the inquiry question with teacher assistance.Demonstrates a basic knowledge and understanding of mechanics and how they relate to a chosen ride | Develops an inquiry question related to equilibrium formulates hypothesis linked to the inquiry question.Demonstrates a sound knowledge and understanding of mechanics and how they relate to the chosen rides.Demonstrates a sound knowledge of the rides examined. | Develops an appropriate inquiry question related to equilibrium that can be investigated scientifically formulates an appropriate hypothesis linked to the inquiry question. Demonstrates a thorough knowledge and understanding of mechanics and how they relate to the chosen rides.Demonstrates a thorough knowledge and understanding ofthe rides examined and related this to their experiences. | Develops an appropriate inquiry question related to equilibrium that can be investigated scientifically formulates an appropriate hypothesis that is evidence based and links to the inquiry question.Demonstrates an extensiveknowledge and understanding of mechanics and how they relate to the chosen rides.Demonstrates an extensive knowledge and understanding of the rides examined and relates this to their experiences |
| *1 mark* | *2 – 3 marks* | *4 marks* | *5 marks* | *6 marks* |
| **Materials & Method** | *Does not provide a risk assessment and requires teacher direction when using equipment.**Experimental procedure developed lacks experimental controls.**Methodology does not allow for the collection of reliable data does not select appropriate technologies to ensure accurate data collection.* | *Minimal identification of risks with some appropriate materials**Experimental procedure developed contains some experimental controls needs teacher assistance to recognise.* *methodology requires repetition to collect reliable data seeks teacher assistance to select technologies.* | *Identifies risks to select mostly appropriate materials and plan a safe investigation.**Experimental procedure developed contains most necessary experimental controls.**Develops a methodology that includes minimal repetition.**Selects basic forms of technology with minimal improved accuracy.* | *Assesses risks to select appropriate materials and plan a safe investigation.**Implements appropriate experimental controls.**Develops a methodology that includes some repetition.**Selects technology to improve the precision of data collected.* | *Thoroughly assesses risks to select appropriate materials and plan a safe investigation.**Implements appropriate experimental controls to ensure a valid procedure.**Develops a methodology that allows for the reliable collection of data.**Appropriate selection of technologies to ensure precision.* |
| *1 – 2 marks* | *3 – 4 marks* | *5 – 6 marks* | *7 – 8 marks* | *9 – 10 marks* |
| **Results** | *Unable to distinguish between relevant and non-relevant quantitative data.**Data is disorganised and not represented in appropriate formats.* | *Selects quantitative data.**Data is represented in a logical format.* | *Selects mostly relevant quantitative data.**Represents most quantitative data in a range of appropriate formats.**Applies some quantitative processes* | *Selects relevant quantitative data.**Represents quantitative data in a range of appropriate formats.**Applies quantitative process where appropriate* | *Selects relevant quantitative data.**Represents quantitative data in a range of appropriate formats using digital technologies.**Applies quantitative process where appropriate.* |
| *1 – 2 marks* | *3 – 4 marks* | *5 marks* | *6 marks* | *7 – 8 marks* |
| **Discussion** | *Presents data with limited information.**Demonstrate minimal critical thinking* | *Attempts to describe primary data;** *Identifies some trends, patterns, and relationships.*
* *Identifies some error, uncertainty, and limitations in data.*
* *Outlines the relevance, accuracy, validity, and reliability of data.*

*Suggests some improvements to**investigations**Demonstrates little critical thinking to solve problems* | *Some analysis of primary data;** *Describes most trends, patterns, and relationships.*
* *Discusses most errors, uncertainty, and limitations in data.*
* *Discusses the relevance, accuracy, validity, and reliability of data suggests improvements to investigations with some justification.*

*Demonstrates some critical thinking to solve problems.**Some attempt to link data with secondary sourced data* | *Analyses and evaluates primary data;** *Explains trends, patterns, and relationships in data.*
* *Discusses error, uncertainty, and limitations in data.*
* *Discusses the relevance, accuracy, validity, and reliability of data.*
* *Suggests and justifies most improvements to investigations.*

*Solves problems using critical thinking skills sound linkage of data with secondary sourced data* | *Thoroughly analyses and evaluates primary data;** *Derives and explains trends, patterns, and relationships in data.*
* *Assesses error, uncertainty, and limitations in data.*
* *Assesses the relevance, accuracy, validity, and reliability of data.*

*Suggests and justifies improvements to investigations.**Solves problems using critical thinking skills and scientific processes thorough linkage of data with secondary sourced data* |
| *0 – 2 marks* | *3 – 5 marks* | *6 – 8 marks* | *9 – 10 marks* | *11 – 12 marks* |
| **Conclusion** | *Conclusion does not reflect the investigation.* | *Conclusion reflects aspects of the investigation* | *Constructs a conclusion that is based on some evidence* | *Constructs an evidence-based conclusion by analysing scientific relationships* | *Constructs evidence-based**conclusions by analysing and evaluating complex scientific interrelationships.* |
| *0 marks* | *1 mark* | *2 marks* | *3 marks* | *4 marks* |
| **References & Presentation** | *Presents a report that lacks any structure.**Communicates using basic language.**Provides a reference list.**Selects secondary resources.* | *Presents a report that follows some guidelines.**Uses basic language with some limited scientific terminology and information.**Includes some scientific notations and nomenclature.**Provides a reference list attempting to use the appropriate reference style.**Selects some appropriate secondary sources* | *Presents a report that mostly follows the guidelines provides.* *Uses language that is mostly clear and relevant with some accurate scientific terminology and information.**Includes mostly appropriate scientific notations and nomenclature.**Provides an accurate reference list using the Harvard Referencing Style**Selects relevant and reliable secondary sources* | *Presents a well-organised report that follows the guidelines provided.**Communicates scientific understanding using language that is mostly clear with accurate and relevant scientific terminology and information.**Includes mostly appropriate scientific notations and nomenclature.**Provides an accurate reference list using the Harvard Referencing Style**Selects a variety of relevant, up to date and reliable secondary sources.* | *Presents a logical and cohesive report that follows the guidelines provided.**Communicates scientific understanding effectively using language that is clear and succinct including accurate relevant scientific terminology and information.**Selects appropriate scientific notations and nomenclature to**communicate scientific concepts related to equilibrium.**Provides an accurate reference list using the Harvard Referencing Style**Selects a variety of relevant, up to date and reliable secondary sources.* |
| 1 mark | *2 marks* | *3 – 4 marks* | *5 marks* | *6 marks* |
|  | *Mark* | *Percentage* | *Rank* |
| Feedback |