

Task 3: Depth Study

Due Date: Thursday 4th July 2024 by 3:00pm

Task Distributed: 2/04/2024

Unit: Module 1

Task Type: Assessment Task

Task Weighting: 30%

Outcomes: 11/12-1, 11/12-2, 11/12-3, 11/12-4, 11/12-5, 11/12-6, 11/12-7, 11-9

Task Description

Part A: Develop an inquiry question.

Students are to identify an inquiry question to test by performing a first-hand investigation.

What you need to do for this section:

1. Develop an inquiry question that can be tested and investigated.

Part B: Literature Review

Using the above inquiry question, students will locate secondary literature related to this subject matter. Students will summarise, analyse, and evaluate the chosen literature to help build their knowledge regarding a particular field of science. Students must research information related to their chosen investigation. This literature review will be presented as a written report.

Students will need to include descriptions of each piece of literature and explain how each contributes to their understanding of their chosen practical investigation.

What you need to do for this section:

2. Using google scholar and the other resources, find literature that relates to your inquiry question.
3. Summarise, analyse, and evaluate the chosen literature – explain how each literature contributes to the question you have developed.

Part C: Scientific Report

Utilising this gained understanding of existing research, students will then undertake their own primary investigation in relation to their inquiry question and present their findings as scientific report. This will require processing both primary and secondary data in relation to this investigation, the collection of valid and reliable data, analysing and evaluating findings.

Students will follow scientific format including an inquiry question, background research, risk assessment, methodology, results, discussion of experimental data and findings and conclusion.

What you need to do for this section:

1. Conduct an experiment for your inquiry question that you have selected from above.
2. Create a written scientific report and include the following:
 - Background research
 - Aim of your experiment
 - Risk assessment
 - Method
 - Results – primary data
 - Images of you conducting the experiment
 - Discussion – talk about your results, your experiment, the reliability, accuracy, and validity of your experiment
 - Conclusion

NESA Glossary of Key Words

Understand the verb associated with the task. The verb will provide an understanding of the detail needed to successfully answer the question.

- Analyse: Identify components and the relationship between them; draw out and relate implications.
- Discuss: Identify issues and provide points for and/or against
- Evaluate: Make a judgement based on criteria; Determine the value of
- Investigate: Plan, inquire into and draw conclusions about
- Outline: Sketch in general terms; indicate the main features of.
- Summarise: Express, concisely, the relevant details

Check the NESA Glossary of Key Words for further guidance <https://educationstandards.nsw.edu.au/wps/portal/nesa/11-12/hsc/hsc-student-guide/glossary-keywords>

Details of Submission

The following items are to be submitted:

- A type of report of your literature review (no longer than 4 pages)
- A typed scientific report, using correct scientific format (no longer than 6 pages – does not include bibliography)

Needs to be submitted online (google classroom drop-box) by 3:00pm on Thursday 4th July 2024

Teacher Feedback and Student Self-Reflection

- The task will typically be returned to students within 14 of the due date.
- At this time feedback including information on how to improve will be provided through google classroom Dropbox.
- Students can clarify or seek further feedback by speaker with their teacher or the assessment marker.
- You will also receive feedback on your literacy performance based on the criteria in the school's literacy marking rubric. The marks achieved for literacy will account for between 10% – 20% of the maximum task value.

Upon return of the task, students will also be expected to complete a self-reflection.

How does this link to my learning?

- Depth studies provide the opportunity for students to pursue their interests in a field of Science and apply real world scientific processes to answer a hypothesis. This will assist the students in becoming self-regulated learners, providing them with the necessary skills to succeed as scientists in a real-world setting.

The depth study undertaken in the HSC course will allow students to identify areas of strength and weakness in scientific investigations.

Assessment Procedures

All students should be fully aware of the School Assessment Procedures for their year group. These were provided at the beginning of the school year and are available off the school website under the Learning Tab for each year group.

Literature Review

Outcome	Indicator				
<p>Analysing data and information. INS 11/12 – 4 selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media. INS11/12-5 Analyses and evaluates primary and secondary data and information.</p>	<p>Background Research How well did you use the data to come to the conclusions you made?</p>	<p>Primary and secondary data reviewed from a source. Information from source is unreliable (e.g., personal blog or Wikipedia). No limitations of data have been presented or stated</p>	<p>Primary and secondary data analysis was partially analysed with a reliable resource with an identified relationship from data. The student has stated the limitations of data presented</p>	<p>Primary and secondary data analysis was adequately analysed with a range of reliable resources with an identified relationship from data. The student has described the limitations of data presented</p>	<p>Primary and secondary data analysis was of high quality and used valid sources of information from a wide range. Relationships and/or findings discussed in data. Student discussed the limitations of the data presented and analytical processes were described.</p>
<p>Communicating INS 11/12 – 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose</p>	<p>How well do you communicate your understanding of cited literature</p>	<p>The language used is simplistic and has informalities that are not appropriate for HSC standard. Student outlines limited/incorrect information based on their review of literature</p>	<p>Scientific language is sometimes used to identify scientific processes to audiences. Student attempts to communicate by describing their main scientific findings of the review of literature</p>	<p>Scientific language is used appropriately to describe scientific processes to audiences. Student communicates by describing their main scientific findings of the review of literature</p>	<p>Descriptions display an outstanding level of scientific writing and language. Descriptions are clear and concise with all relevant terminology. Reader can gain a clear insight into the relevance of the findings from the review of literature.</p>
		1	2	3	4
		1	2	3	4

<p>Knowledge INS 11-8</p> <p>identifies that the collection of primary and secondary data initiates scientific investigations</p>	<p>Description of misconception or conspiracy theory</p>	<p>There is a limited discussion of misconception/conspiracy theory. Student makes general points/statements regarding the ability to accept/refute hypotheses</p>	<p>A range of aspects of the misconception/theory have been addressed. Acceptance or refusal of hypotheses and claims has been addressed</p>	<p>Most aspects of the misconception/theory have been addressed. Acceptance or refusal of hypotheses and claims have explicitly been addressed but not effectively linked.</p>	<p>All aspects of the misconception/theory have been addressed. Acceptance or refusal of hypotheses and claims have explicitly been addressed and effectively linked.</p>
		1	2	3	4
<p>Knowledge INS 11-9</p> <p>examines the use of inferences and generalisations in scientific investigations.</p>	<p>Descriptions of technological developments</p>	<p>There is a limited range of technologies that have been discussed. Student makes general points/statements regarding the technology's limitations</p>	<p>A range of technologies have been discussed. Some of the technological limitations have been addressed.</p>	<p>Broad range of technologies have been adequately. Most of the technological limitations have been addressed</p>	<p>There is a wide range of technologies discussed in detail. Specific examples included. Student in detail can describe the limitations of the addressed technology</p>
		1	2	3	4
<p>Knowledge INS 12-15</p> <p>Evaluates the implications of ethical, social, economic, and political influences on science.</p>	<p>Evaluation of factors influencing science</p>	<p>Identifies ethical issues and concerns regarding limited sources. Student demonstrates over generalised links scientific communities</p>	<p>Describes examples based on the social, ethical, economic, and environmental concerns regarding scientific communities. Attempts to make an evaluation based on the research conducted</p>	<p>Discusses examples based on the social, ethical, economic, and environmental concerns regarding scientific communities. Demonstrates an overall attempt to make an evaluation based on the research conducted</p>	<p>Discusses in detail examples based on social, ethical, economic, and environmental concerns. Explicitly makes an evaluation based on research conducted.</p>
	<p>Conclusion</p>	<p>There are some statements that link back to the answer to the inquiry question.</p>	<p>There is a conclusion that states an answer to the inquiry question, making little reference to information from prior sections.</p>	<p>There is a conclusion that provides a good answer to the inquiry question, making some reference to information from prior sections.</p>	<p>There is an insightful conclusion that provides a meaningful answer to the inquiry question, distilling key information from prior sections.</p>
		1	2	3	4

Scientific Report

INS 11/12-1 Develops and evaluates questions and hypotheses for scientific investigation	Research Question Develop and evaluate inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and/or secondary data	A limited attempt has been made at stating a research question.	A research question has been stated, that may not clearly identify researchable variables. And/ or The question shows surface level thinking.	A clear research question has been stated, that identifies a researchable variable. The question shows deep thinking.	A clear research question has been stated, that identifies a researchable variable. The question shows extended thinking.
		1	2	3	4
	Safety Assess risks, consider ethical issues and select appropriate materials and technologies when designing and planning an investigation	A limited attempt has been made at identifying the risks involved in a first-hand investigation.	The risks / ethical issues involved in the first-hand investigations have been identified. No evidence of risk assessment or mitigation is present.	The risks / ethical issues involved in the first-hand investigations have been identified and assessed. No evidence of risk mitigation is present.	The risks / ethical issues involved in the first-hand investigations have been identified assessed and mitigated
		1	2	3	4
	Background research Develops and evaluates knowledge and understanding of investigation.	Limited research into the concept being investigated with relevant information missing.	Research into the concept being investigated including different aspects but not detailed.	Detailed research into the concept being investigated addressing most aspects of the investigation.	Detailed and evaluated research into the concept being investigated addressing all aspects of the investigation.
		1	2	3	4
	Methodology Justify and evaluate the use of variables and experimental controls to ensure that a valid procedure	No evidence to demonstrate a valid procedure and reliable collection of data is present	Limited evidence of a valid procedure and reliable collection of data is present	Evidence of a valid procedure and reliable collection of data is present. Limited justification of the variables and experimental controls used.	Strong evidence of a valid procedure and reliable collection of data is present. Including justification of the variables and

	is developed that allows for the reliable collection of data				experimental controls used.
		1	2	3	4
	Data Presents raw data in an appropriate format	Some raw data is appropriately displayed but it is not organised or; labelled in appropriate format	Some raw data is appropriately displayed in an organised and structured manner, but data is not clearly labelled.	Most raw data is appropriately displayed in an organised and structured manner, but data is not clearly labelled.	All raw data is appropriately displayed in an organised and structured manner with data clearly labelled.
		1	2	3	4
	Data analysis Derive trends, patterns and relationships in data and information	Data/information has not been used to derive trends correctly.	Data/information has been used to derive trends or patterns that are relevant to the posed question. Small errors present OR areas for improvement identified.	Data/information has been successfully used to derive trends or patterns that are relevant to the posed question.	
		1	2	3	
	Discussion Assess error, uncertainty and limitations in data	The sources of error/uncertainty and limitations in data have not been fully identified. No assessment of the impact of these errors to the posed question is included in the discussion.	The sources of error/uncertainty and limitations in data have been identified. Poor assessment of the impact of these errors to the posed question is included in the discussion.	The sources of error/uncertainty and limitations in data have been identified and an assessment of the impact of these errors to the posed question is included in the discussion.	
		1	2	3	
	Discussion Assess the relevance, accuracy, validity, and reliability of primary and secondary data and suggest improvements to investigations	An attempt at either An assessment of the relevance, accuracy, validity, and reliability of primary and/or secondary data included in discussion. OR Suggestions	Limited assessment of the (relevance, accuracy, validity, and reliability) of primary and/or secondary data included in discussion. OR Limited suggestions improvements to investigations present.	Assessment of the relevance, accuracy, validity, and reliability of primary and/or secondary data included in discussion. Errors for improvement identified. AND Suggestions of	Detailed assessment of the relevance, accuracy, validity, and reliability of primary and/or secondary data included in discussion. AND Suggestions

		improvements to the investigation/s present.		improvements to the investigation/s present.	improvements to the investigation/s present.
		1	2	3	4
	Discussion Evaluate processes, claims and conclusions by considering the quality of available evidence, and use reasoning to construct scientific arguments. Where appropriate, mathematical models are to be applied to demonstrate the trends and relationships that occur in data.	Poor conclusion is drawn	Draws some appropriate conclusion from the first-hand data	Constructs less well-reasoned scientific arguments, without effectively using mathematical techniques to draw conclusions about the concentration of the unknown OR without determining whether the hypothesis is supported from the first-hand data	Constructs well-reasoned scientific arguments, effectively using mathematical techniques to draw conclusions about the concentration of the unknown AND determines whether the hypothesis is supported from the first-hand data
		1	2	3	4
	Conclusion Discusses the overall results of the experiment in relation to the question being investigated.	General concluding statement made	Conclusion does not relate to the research question and has contradictory/new information	A brief conclusion is included that discusses the overall results but does not relate to the research question	A conclusion that relates and answers the research question is included and discusses the overall results
		1	2	3	4
	References Select and extract information from a wide range of reliable secondary sources and acknowledge them using an accepted referencing style	Limited number and range of references.	Less than 4 references included OR Limited range of formats OR Significant errors in the formatting	Less than 5 references included, from a wide range of formats OR Minor errors in the formatting	5 or more references included, from a wide range of formats, all correctly formatted
		1	2	3	4

Presentation

Presentation and referencing (across whole report)	Depth of Reports	Report is very brief with sections missing and with incorrect information.	Report is brief AND/OR difficult to read. Sections miss key information or contain incorrect information.	Uses simplistic language overall for a specific audience. Displays good written communication but it does contain areas that are unclear or hard to understand.	Uses appropriate language overall for a specific audience. Displays good written communication and is easy to understand.	Uses appropriate language proficiently for a specific audience and displays very high-quality written communication which is clear and concise.
		0	1	2	3	4
	Presentation	Most of the report is grammatically incorrect.	Spelling, grammar, and formatting have many errors.	Spelling, grammar, and formatting of report is to good standard but contains some errors.	Spelling, grammar, and formatting of report is to a very high standard and adds to clarity of writing. There are very minor errors.	Spelling, grammar, and formatting of report is to a very high standard and adds to clarity of writing. There are no errors.
		0	1	2	3	4
	Citation	No resources	The reference list is missing or contains many mistakes and missing.	There is a reference list that contains all sources used in text. The sources are referenced with a few mistakes and inconsistencies.	There is a reference list that contains all sources used in text. The sources are consistently and correctly referenced with minor mistakes.	There is a reference list that contains all sources used in text. The sources are consistently and correctly referenced with no mistakes.
	0	1	2	3	4	
Appropriate Inquiry and Investigation INS 11-1 develops and evaluates questions and hypotheses for scientific investigation	Research question. Develop and evaluate inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and/or secondary data	A limited attempt has been made at stating a research question.	A research question has been stated, that may not clearly identify researchable variables. And/ Or The question shows surface level thinking	A clear research question has been stated, that identifies a researchable variable. The question shows deep thinking.	A clear research question has been stated, that identifies a researchable variable. The question shows extended thinking.	
		1	2	3	4	
Planning investigations INS 11-2	Safety	A limited attempt has been made at identifying	The risks / ethical issues involved in the first-hand	The risks / ethical issues involved in the first-hand	The risks / ethical issues involved in the first-hand	

designs and evaluates investigations in order to obtain primary and secondary data and information	Assess risks, consider ethical issues and select appropriate materials and technologies when designing and planning an investigation	the risks involved in a first-hand investigation.	investigations have been identified. No evidence of risk assessment or mitigation is present.	investigations have been identified and assessed. No evidence of risk mitigation is present.	investigations have been identified assessed and mitigated
		1	2	3	4
	Methodology Justify and evaluate the use of variables and experimental controls to ensure that a valid procedure is developed that allows for the reliable collection of data	No evidence to demonstrate a valid procedure and reliable collection of data is present	Limited evidence of a valid procedure and reliable collection of data is present	Evidence of a valid procedure and reliable collection of data is present. Limited justification of the variables and experimental controls used.	Strong evidence of a valid procedure and reliable collection of data is present. Including justification of the variables and experimental controls used.
	1	2	3	4	
Conducting investigations INS 11/12-3 conducts investigations to collect valid and reliable primary and secondary data and information	Tabulated raw data Presents raw data in an appropriate format	Some raw data is appropriately displayed but it is not organised or labelled in appropriate format	Some raw data is appropriately displayed in an organised and structured manner, but data is not clearly labelled.	Most raw data is appropriately displayed in an organised and structured manner, but data is not clearly labelled.	All raw data is appropriately displayed in an organised and structured manner with data clearly labelled.
		1	2	3	4
Analysing data and information INS 11/12-5 analyses and evaluates primary and secondary data and information	Data analysis and findings Derive trends, patterns and relationships in data and information	Data/information has not been successfully used to derive trends or patterns that are relevant to the posed question or has proposed trends inconsistent with collected data.	Data/information has been used to derive trends or patterns that are relevant to the posed question. Small errors present OR areas for improvement evident.	Data/information has been successfully used to derive trends or patterns that are relevant to the posed question.	
		0	1	2	