ORANGE HIGH SCHOOL

ASSESSMENT TASK NOTIFICATION

Subject	Biology – Task 2
Year	11 (Preliminary HSC)
Weighting	30%
Teacher	Ms Huggett, Mrs Boardman, Ms Nicholson
Head Teacher	Ms Huggett
Date given	Monday 31st July, 2023 – Week 3A, Term 3
Date and school week	Friday 25th August, 2023 – Week 6B, Term 3

Assessment Outline

- To complete this task, you are required to conduct quadrat and/or transect sampling to gather data on an investigation of your choice. The investigation should address the question:
  - "How does a human influenced factor impact a biotic factor at Lake Canobolas?"
  - "How does an abiotic factor impact a biotic factor at Lake Canobolas?"
  - "How does a biotic factor impact another biotic factor at Lake Canobolas?"
- The practical investigation will be performed at Lake Canobolas Orange, in small groups. Data will be collected on the day and can then be edited when producing the formal investigation report.
- Students will then be required to analyse and interpret the data collected from the Lake Canobolas sampling and present it in the format of a formal written scientific report (see provided scaffold).
- **All students are expected to attend the field study excursion to collect their own data. If you are unable to attend, data will be provided to you to complete the assessment.**

Non-completion of Task:

If you know you are going to be away on the day that the task is due, you must make alternative arrangements with your classroom teacher. If you are away on the day of the examination, you must catch up with your classroom teacher on the first day you return to make alternate arrangements to catch up on this task.

Failure to follow the above procedures may result in a zero award.

Outcomes Assessed

BIO11 – 1 Develops and evaluates questions and hypotheses for scientific investigation

BIO11 – 2 Designs and evaluates investigations in order to obtain primary and secondary data and information

BIO11 – 3 Conducts investigations to collect valid and reliable primary and secondary data and information

BIO 11-4 Selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media

BIO11 – 5 Analyses and evaluates primary and secondary data and information

BIO11 – 6 Solves scientific problems using primary and secondary data, critical thinking skills and scientific processes

BIO11- 7 Communicates scientific understanding using suitable language and terminology for a specific audience or purpose

BIO11 –10 describes biological diversity by explaining the relationships between a range of organisms in terms of specialisation for selected habitats and evolution of species

BIO11 –11 analyses ecosystem dynamics and the interrelationships of organisms within the ecosystem

Scientific Report Writing Scaffold:

To write your formal scientific report written using third person language you must include the following:

Formal Title – A statement that is specific, and informs the reader of the investigation that was conducted.

(1 Sentence)

Abstract – An abbreviated version of your final report, usually **only one paragraph in length**. An abstract should have the following five pieces:

- **Introduction**. This is where you describe the purpose of the investigation with reference to background research surrounding the topic being investigated.
- **Problem Statement**. Identify the hypothesis that was investigated.
- **Procedures**. What was your approach for investigating the problem? Don't go into detail about materials unless they were critical to your success. Do describe the most important variables.
- **Results**. What answer did you obtain? Be specific and use numbers to describe your results. Do not use vague terms like "most" or "some."
- **Conclusions**. State what the investigation contributes to the area you worked in. Did you meet your objectives?

Aim – what was the purpose of the investigation? **(1 Sentence)**

Literature Review – A literature review is a critical account of what has been published on a topic by accredited researchers. It should provide a clear statement of the topic area (scope), a range of research on the topic, provide an indication of what further research is necessary and identify areas of controversy in the literature. Reviewing the literature requires four stages **(1-2 paragraphs)**:

1. Problem formulation - Which topic is being examined and why? What aspects will be included/excluded? Define your scope.
2. Literature search - Identifying relevant research
3. Critical analysis – Criticise the experts; identify conflicting evidence, assumptions, errors and misconceptions
4. Evaluation – which authors are most convincing and provide the most significant scientific contribution? Have I conducted a fair and objective literature review?

Hypothesis - A tentative explanation for an observed phenomenon, expressed as a precise and unambiguous statement that can be supported or refuted by investigation. A hypothesis is based on prior knowledge and clearly identifies how the independent variable will affect the dependent variable.

(1-2 Sentences)

Equipment list – a detailed list of **all equipment** used to perform the investigation.

Variables Identified – Correctly identify the variables in the experiment including; independent, dependent and controlled variables. **(1-2 Sentences per variable)**

Risk Assessment – Students are to conduct a risk assessment of the investigation. At least 3 risks should be included, and three control measures **(1 Sentence/ control measure)**. The risk assessment should be presented as a table. (see below)

Hazard:	Risk:	Minimisation Strategy:
	Risk 1	
	Risk 2	
	Risk 3	

Method – Create a method on how the investigation was conducted. You must include the method in your report. Your method will need to include any changes that were made to the way the investigation was conducted. It should be in step form, provide clear logical instructions, include how/what equipment is used to collect the data, and include repetition. This must be written using third person language and in past tense.

(Half a page)

Results (table) - First-hand data should be presented in appropriate table(s). All tables should be labelled. More detail can be found within the marking criteria. Table should contain transformed, not raw data.

(Half a page/table)

Results (graphs) Make sure that your graphs have appropriate heading, labels on the axis, even scales, and appropriate units. You may draw your graphs using a computer program (excel) or by hand.

(Half a page/graph)

Discussion - This is the section in which you analyse your results. Your discussion should have at least 4 sections of a minimum of **one paragraph in length per section**.

Section 1: This is the section in which you interpret your results. You should refer directly to the data that was gathered and analyse it using your graph. You should look for trends and discuss why they have occurred. You can link this to your background research to further indicate your understanding of why this trend has occurred.

Section 2: This is the section in which you analyse the accuracy and precision of the data you collected. It is a good idea to give a definition of each term before you start discussing how your investigation performed. You also need to make sure that you provide evidence (specific examples) of how your investigation was/wasn't accurate or precise. You should also include how you could improve the investigation to increase accuracy and precision.

Section 3: This is the section in which you analyse the reliability of the data you collected. It is a good idea to give a definition of the term before you start discussing how your investigation performed. You also need to make sure that you provide evidence (specific examples) of how your investigation was/wasn't reliable. You should also include how you could improve the investigation to increase reliability.

Section 4: This is the section in which you analyse the validity of the data you collected. It is a good idea to give a definition of the term before you start discussing how your investigation performed. You also need to make sure that you provide evidence (specific examples) of how your investigation was/wasn't valid. You should also include how you could improve the investigation to increase validity.

Conclusion – **A paragraph** summarising the main findings of the investigation. A concluding paragraph should refer to the aim of the investigation and state whether the hypothesis was supported or not supported, and the consequences/implications of this. Your conclusion may identify an area of potential future research based on your investigation. Your conclusion should always be based on evidence and refer directly to evidence from your investigation.

Reference list – This is where you include any references that you used/referred to in your investigation. You should try to use references in your background information section and in your discussion. Please see addition information on how to reference using an Author-Date referencing style (Scaffold provided).

(**Check marking criteria for minimum number of sources required)**

Appendix/appendices – An appendix is always included in a scientific investigation. An appendix is where you include any calculations (if any) that you made during your investigation, any additional data that you collected, your raw data collected in the investigation (this is where you put your messy table from when you actually conducted the investigation), any additional data manipulation that isn't required in the main results section. You can also include pictures of your investigation set up from the field study sampling.

Bibliography Scaffold:

BOOKS					
Author(s)	**Date of publication in brackets**	**Title of book in italics**	**Name of publisher**		
Example: Keay, J.	(2000).	*The Great Arc.*	Harper Collins.		
WEBSITES					
Author	**Date published if available**	**Title of Article**	**Title of website in italics**	**From URL**	**Date accessed**
	If no date available write (n.d.)				
Example: Landsberger, J.	(n.d.)	Citing Websites.	In *Study Guides and Strategies.*	http://www.studygs.net/citation.htm.	(Accessed: 28 July 2022)
MAGAZINES					
Author	**Date**	**Title of Article**	Name of Magazine	Volume, issue, pages	
Example: Tumulty, K	(2006, April).	Should they stay or should they go?	*Time*	*167*(15), 3-40.	
PERSONAL CONVERSATIONS AND EMAILS					
Person's name	**Date**	**How you know them**	**Nature of communication**		
Example: Mr B. Rock	**12/7/16**	Geologist and uncle	email		
VIDEOS, DVDS, TV SHOWS ETC					
Producer and writer / director or for youtube the person who uploaded video	**Date**	**Title and type of resource**	**Country and company producing video / or the URL**		
Example: Fothergill, A. (producer), Attenborough, D. (narrator).	(2005)	The Blue Planet – Coral Seas [DVD]	UK, BBC.		

<u>Marking Rubric:</u> Practical: Quadrat/Transect Sampling. How does a biotic/abiotic factor impact a biotic factor at Lake Canobolas?

NAME: _____

Criteria:	Outcome	Outstanding (A)	High (B)	Sound (C)	Basic (D)	Limited (E)
1. Title /1	BIO 11-1			● Title is a specific statement about the investigation **2 marks**		
2. Abstract /5	BIO 11-10	● Clear explanation of the project. ● Detailed and sophisticated explanation of the topic area of study. **5 marks**	● Clear explanation of project. ● Detailed explanation of the topic area of study. **4 marks**	● Explanation of project given. ● Explanation of topic area of study. **3 marks**	● Explanation of project. Basic explanation of the topic area. **2 marks**	● Explanation of project given. **1 mark**
3. Aim /2	BIO 11-1			● Detailed scientific aim given, includes the independent and dependent variable **2 marks**	● Aim attempted with reference to a correct variable **1 marks**	
4. Literature Review /5	BIO 11-10	● Outstanding summary of key background information and research from a wide range of scientific and credible sources. ● Multiple factors relating to the investigation are extensively researched. **5 marks**	● Summary of key background information and research from scientific and credible sources. ● Multiple factors relating to the investigation are researched. **4 marks**	● Summary of some background information and research from credible sources. ● Factors relating to the investigation are researched. **3 marks**	● Some background information and research included ● Related to investigation **2 marks**	● Some information written **1 marks**
5. Hypothesis /2	BIO 11-1	● Predict what you think will happen. ● State how the changing the independent variable will affect the dependent variable **2 marks**				● Prediction attempted **1 mark**

6. Equipment list	BIO11-2	● Sophisticated and completed list of all equipment used **3 marks**		● List of most of the equipment used **2 marks**		● Simple list of some of the equipment used **1 mark**
4. **Variable in the investigation**		● Controlled variables – correct (4 or more) ● Independent variable – correct ● Dependent variable – correct ● Scientific language used ● At an extensive level. **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at a satisfactory level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
6. **Safety**		List all safety issues (3 or more) with conducting the investigation Explain how each issue was solved or reduced At an extensive level. **5 marks**	List all safety issues (3 or more) with conducting the investigation Explain how each issue was solved or reduced At a thorough level. **4 marks**	List some safety issues (2) with conducting the investigation Explain how each issue was solved or reduced At a satisfactory level. **3 marks**	List some safety issues (2) with conducting the investigation Attempts to explain how each issue was solved or reduced At a basic level. **2 marks**	List some safety issues (1) with conducting the investigation Attempts to explain how issue was solved or reduced At an elementary level. **1 mark**
7. **Method**	/18	● Clear and logical method in third person ● Need to be in correct order, detailed and in numbered steps ● Include how the dependent variable will be measured, along with any other variables ● Include how many times the experiment will be repeated ● Scientific terms used and at an extensive level. No use of “I” or “we”. (past tense) **5 marks**	Any 4 of the previous at thorough level. No use of “I” or “we”. **4 marks**	Any 3 of the previous at a satisfactory level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**

8. **Results - Table**	BIO11-3 /5	● Presented in an appropriate table ● Has appropriate headings and correct units ● No units present on the data in the table (in heading only) ● Averages included and correct ● Neatly presented and at an extensive level (is enclosed and has been drawn with ruler). **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at a satisfactory level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
9. **Results - Graph**	BIO11-4 /5	● Presented in an appropriate graph for the data collected ● A line or curve of best fit is correctly present ● Axis' are labelled correctly ● Units included on the correct axis' ● Data plotted correctly and at an extensive level (use of x to plot data points). **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at a satisfactory level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
10. **Discussion – Section 1**	BIO11-5	● A summary of the main findings of the investigation given, including trends. ● Results are interpreted and specific examples from the data given ● Results link to background research on the topic. ● Real world applications discussed for the results? ● Scientific terms used and at an extensive level. **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at satisfactory level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
11. **Discussion – Section 2**		● A judgement about the accuracy of the investigation is given. ● Explanation of what makes an investigation (any) accurate? ● Specific examples from the investigation to support the assessment of the accuracy of the results given. ● Scientific terms used and at an extensive level. ● How could you improve the accuracy of the investigation? **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at high level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**

12. **Discussion – Section 3**		• A judgement about the reliability of the investigation is given. • Explanation of what makes an investigation (any) reliable? • Specific examples from the investigation to support the assessment of the reliability of the results given. • Scientific terms used and at an extensive level. • How would improve the reliability of the investigation? **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at high level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
13. **Discussion – Section 4** /20		• A judgement about the validity of the investigation given. Was it a fair test? • Explains if investigation is valid? What makes an investigation valid? • Explains what variables are controlled and how they were controlled • Problems with the investigation discussed and linked to its validity • Specific examples from the investigation to support the assessment of the validity of the results and scientific terms used and at an extensive level. **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at high level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
14. **Conclusion** /5	BIO11-6	• Summary statement of the main results from the investigation. • How did the independent variable affect the dependent variable? • Examples given from results. • Explains if results support or disprove the hypothesis? • Scientific terms used and at an extensive level. **5 marks**	Any 4 of the previous at thorough level. **4 marks**	Any 3 of the previous at high level. **3 marks**	Any 2 of the previous at basic level. **2 marks**	Any 1 of the previous at elementary level. **1 mark**
15. **Report –Overall Presentation** /5	BIO11-7	• Reference list present and correct (10 or more sources used) • Follows report format extensively • All sections of report are addressed at appropriate level of detail **5 marks**	Reference list present 8 or more sources. **4 marks**	Reference list present 6 or more sources. **3 marks**	Reference list present 3 sources. **2 marks**	List of URLs used **1 mark**

16. **Appendix**	11BIO-11 /3	• Appendix supplied and correct • Data in appendix shows relationships between 2 or more organisms • Impact of abiotic factors evident in appendix data **3 marks**		• Appendix supplied and correct • Data in appendix shows relationship between ecosystem organisms or an ecosystem organism and an abiotic factor **2 marks**		• Appendix supplied and correct **1 mark**

Outcome	**BIO11-1**	**BIO11-2**	**BIO11-3**	**BIO11-4**	**BIO11-5**	**BIO11-6**	**BIO11-7**	**BIO11-10**	**BIO11-11**
Mark	**/5**	**/18**	**/5**	**/5**	**/20**	**/5**	**/5**	**/10**	**/3**

Total Mark: ____/76

Teacher Feedback:

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