

Hobart Zoo and Aquarium



Marine Biology Mass Coral Bleaching and Optimal Reef Conditions

Assessment

This template will guide you through creating your assessment on the 2024 Mass Coral Bleaching Event. You will explain bleaching, apply Shelford's Law of Tolerance, include graphs, and integrate photos from our excursion. You will also reflect on how marine biologists and aquarists design and maintain aquarium systems to mimic Great Barrier Reef conditions.

Student Checklist

- Define what a coral reef is.
- Discuss how the Government measure the health of the reef.
- Explain mass coral bleaching on the Great Barrier Reef clearly.
- Apply Shelford's Law of Tolerance and include an example from your excursion at Hobart Zoo and Aquarium.
- Include at least two graphs with labels.
- Include your infographic.
- Insert at least 8 photos with captions from your excursion and reputable websites.
- A list of chemicals that are measured in tropical aquatic ecosystems and what optimal levels should be in aquariums to replicate wild conditions.
- Explain how marine biologists and aquarists maintain optimal tank conditions.
- Describe daily/weekly monitoring routines observed and scientific tools used.
- Ensure layout is clear, readable, and visually engaging.
- Include a 200–300 word personal reflection about your learnings throughout the unit and the excursion to Hobart Zoo and Aquarium.
- Include a reference list of all sources used.

The report should include information on the following topics. Use these questions to guide your synthesis of information from lessons, your excursion and any additional research you require.

Section A: Mass Coral Bleaching Explanation

What is a coral reef?



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Where are coral reefs located in Australia?

What is coral bleaching? Explain what happens to a coral when it bleaches and why this is a sign of stress.

How does the Australian Government measure the health of the Great Barrier Reef.

Why did the 2024 bleaching event happen? Describe why the Great Barrier Reef experienced a major bleaching event in 2024.

Section B: What Happened on the Reef in 2024?

Which parts of the Reef were most affected? Describe what happened in one region.

Why do you think some reefs had high bleaching while others nearby had only low or moderate bleaching?

Section C: Shelford's Law of Tolerance

Explain how Shelford's Law of Tolerance helps us understand bleaching patterns in the 2024 event.

Section D: Local Connection – Hobart Zoo & Aquarium

Describe two ways the Hobart Zoo and Aquarium helps support coral reef conservation and community understanding.

Explain how aquariums that mimic real ecosystems help people learn about tolerance limits, stress, and coral health. Include how they apply the principles of Shelford's Law of Tolerance to ensure that conditions are within the optimal range.



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What tools do they use for this and what do they assess? Include a list of the chemicals that are measured in tropical aquatic ecosystems and what optimal levels should be in aquariums to replicate wild conditions.

What is the nitrate cycle?

What are the optimal chemical conditions of a tropical reef aquarium?

Explain how Shelford's Law of Tolerance helps them choose species to cohabit in these recreated ecosystems.

Section E: Possibly Strategies

Write one idea for a management or protection strategy that could support coral recovery or help corals stay within their tolerance limits.

Section F: Personal Reflection

Write a personal reflection to synthesise your new learnings from this unit and your opinion, based on evidence, of the importance of modern aquariums like Hobart Zoo and Aquarium in contributing to humans making changes to support the regeneration of the Great Barrier Reef.

What can you do in your local community to raise awareness?



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TAC-Aligned Teacher Marking Guide - Mass Coral Bleaching Assessment

Criterion 1: apply personal skills to plan, organise and complete activities

The learner:

Rating A	Rating B	Rating C
selects and uses techniques and equipment safely, competently and methodically, applying them to unfamiliar contexts	selects and uses techniques and equipment safely, competently and methodically	uses familiar techniques and equipment safely and competently
follows instructions accurately and methodically, adapting to new circumstances	follows instructions accurately and methodically to complete activities	follows instructions accurately to complete activities
monitors and critically evaluates progress towards meeting goals and timelines, and plans realistic future actions	monitors and evaluates progress towards meeting goals and timelines, and plans/negotiates realistic future actions	monitors progress towards meeting goals and timelines and plans/negotiates future actions
meets planned timelines and addresses all aspects of the activity with a high degree of accuracy	meets planned timelines and addresses all aspects of the activity	meets planned timelines and addresses most aspects of the activity
performs and monitors own contribution, and guides others in their contribution to successful completion of group activities.	performs tasks and monitors own contribution to successful completion of group activities.	performs tasks to contribute to successful completion of group activities.

Criterion 2: develop, interpret and evaluate biological experiments

This criterion is both internally and externally assessed.

The learner:

Rating A	Rating B	Rating C
expresses a hypothesis to explain observations, as a precise and testable statement that can be supported or refuted by an experiment	expresses a hypothesis to explain observations, as a precise and testable statement	expresses a hypothesis to explain observations, meeting most of the criteria of a testable hypothesis
designs a controlled, safe and ethical experiment, identifying all variables and including all accepted elements of experimental design, to efficiently collect valid, reliable data	designs a controlled, safe and ethical experiment, identifying the main variables, to collect valid, reliable data	designs a controlled experiment, identifying the main variables and considering safety and ethics, to collect valid data
critically analyses, interprets and explains data to draw a valid conclusion that relates to a hypothesis	analyses, interprets and explains data to draw a valid conclusion that relates to a hypothesis	based on data, provides some explanation and draws a conclusion that relates to a hypothesis that has some validity
discusses significant limitations and sources of error in experimental design, with reference to evidence	identifies significant limitations and sources of error in experimental design	identifies some limitations and sources of error in experimental design
critically analyses an experimental design and provides an evidence-based critique and discussion on valid improvements and alternatives.	evaluates an experimental design and describes a number of possible valid improvements.	identifies a valid improvement in an experimental design.

Criterion 3: collect, record, process and communicate information

The learner:

Rating A	Rating B	Rating C
uses a variety of relevant sources to collect information and critically evaluates their reliability	uses a variety of relevant sources to collect information and evaluates their reliability	uses differing relevant sources to collect information
collects a wide range of relevant and accurate qualitative and quantitative experimental data, and records it methodically in a format that allows analysis	collects relevant and accurate qualitative and quantitative experimental data and records it in a format that allows analysis	collects and records relevant qualitative and quantitative experimental data, with some degree of accuracy
accurately follows accepted complex conventions and terminology in written responses	accurately follows accepted conventions and terminology in written responses	follows accepted conventions and terminology to achieve clarity in written responses
clearly identifies the information, images, ideas and words of others used in the learner's work	clearly identifies the information, images, ideas and words of others used in the learner's work	differentiates the information, images, ideas and words of others from the learner's own
clearly identifies sources of the information, images, ideas and words that are not the learner's own. Referencing conventions and methodologies are followed with a high degree of accuracy.	clearly identifies sources of the information, images, ideas and words that are not the learner's own. Referencing conventions and methodologies are followed correctly.	identifies the sources of information, images, ideas and words that are not the learner's own. Referencing conventions and methodologies are generally followed correctly.
creates appropriate, well-structured reference lists/bibliographies	creates appropriate, structured reference lists/bibliographies	creates appropriate reference lists/bibliographies
selects and uses appropriate scientific formats for effective and accurate communication of information for specific audiences and purposes.	uses an appropriate scientific format for clear and accurate communication of information for specific audiences and purposes.	uses an appropriate scientific format for communication of information.



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Criterion 8: describe and apply concepts and processes related to continuity of organisms and survival of changes

This criterion is both internally and externally assessed.

Related to the study of continuity of organisms and survival of changes, the learner:

Rating A	Rating B	Rating C
correctly explains concepts and processes	correctly describes concepts and processes	correctly identifies fundamental concepts and processes
applies concepts and processes to explain, continuity of organisms and survival of changes, analyses and interpret complex problems, and makes reasoned, plausible predictions in familiar and unfamiliar contexts	applies concepts and processes to explain, continuity of organisms and survival of changes, analyses and interprets problems, and makes plausible predictions in familiar and some unfamiliar contexts	applies fundamental concepts and processes to describe continuity of organisms and survival of changes, interprets problems, and makes plausible predictions in familiar contexts
justifies the selection of data as evidence, critically analyses and interprets evidence with reference to concepts, and draws evidence-based conclusions that identify any limitations.	selects appropriate data as evidence, analyses and interprets evidence with reference to concepts, and draws valid conclusions based on data.	uses data to demonstrate links to fundamental concepts, and presents simple valid conclusions based on data.

Criterion 4: discuss the application and impact of biology in society

The learner:

Rating A	Rating B	Rating C
explains relevance of identified science background to an issue	describes relevant science background to an issue	identifies relevant science background to an issue
evaluates aspects and explains significant components of an issue to present a detailed and balanced discussion with reference to evidence	evaluates aspects and describes components of an issue to present a balanced discussion	identifies key components of an issue and presents a discussion
critically evaluates the tensions and connections between all significant relevant influences (ethical, political, cultural, social, economic, scientific) in a range of contexts	discusses the connections between an issue and most of the relevant influences (ethical, political, cultural, social, economic, scientific) in a range of contexts	outlines connections between an issue and some of the relevant influences (ethical, political, cultural, social, economic, scientific) in more than one context
analyses and evaluates to present a complex argument related to benefits of the use of scientific knowledge, and any harmful or unintended consequences	discusses benefits of the use of scientific knowledge, and any harmful or unintended consequences	describes benefits of the use of scientific knowledge, and any harmful or unintended consequences
argues a reasoned conclusion, linking it to relevant evidence, and assesses the relative impact of influences on their decision making.	argues a reasoned conclusion, linking it to relevant evidence.	presents a reasoned conclusion, using some relevant evidence.



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