

## Overview

There are two Reef subsidies available for students to visit the Great Barrier Reef, including:

- ✿ For students across Australia - with eligible trips including an overnight stay - the Kids for the Reef School Excursion Rebate Program subsidises excursions to the Reef, making it easier for students to experience the Reef first-hand and understand its ecological significance. To apply, check eligibility and for more information please click [here](#).
- ✿ For students in Queensland, the Great Barrier Reef Experience Program supports primary, secondary and home educators to undertake excursions to the Great Barrier Reef with a High Standard Tourism Operator. Schools can apply for subsidies of up to \$150 per student/learner. To apply, check eligibility and for more information please click [here](#).

Schools can get involved through accessing curriculum-aligned Reef Guardian School resources such [Rapid Monitoring](#) that delivers age-appropriate activities that meet ACARA achievement standards across P-10 year levels and across four learning areas. This document has mapped curriculum links and designed for teachers to simply scroll down until they find the target year level and associated ACARA V9.0 curriculum codes. Please note, only QCAA senior (yr 11 and 12) syllabus links have been included. Senior teachers, please check your relevant interstate senior syllabus documents for mapping and alignment.

Rapid Monitoring is not only a subsidy endorsed reef activity, but it also is a citizen science activity that enables anyone who visits the Reef to collect citizen [data](#). This collated data on reef health indicators, protected and iconic species, and emerging reef health issues actively contribute to lifelong skill, monitoring, trend and Marine Park management needs over time. Students / guest can complete the survey independently, in pairs or as a guided group.

A Rapid Monitoring [Flip book](#) and [power point](#) are the latest product designed for educators. It is one of many educational tools that support the teaching and learning of Rapid Monitoring. All learning resources can be found in Table 1 on page 2. We also offer professional development sessions, [Reef Guardian School Portal](#) and [Virtual Learning Experiences](#) to support facilitation of Rapid Monitoring.

High Standard tourism operators have increased their capacity to deliver Rapid Monitoring as an activity to complete for students at the Reef. When planning your excursion and risk assessment documentation you will find that High Standard Tourism Operators are adequately equipped to meet the safety requirements relevant to your local state or territory. To ensure students have the best possible reef experience, we strongly recommend that students be given opportunity to practice snorkeling in a pool and at the very least their swimming/ snorkeling ability be determined and discussed with the tour guide prior to entering the open water.

Should you have any further questions, please feel free to contact us at [reefguardians@gbrmpa.gov.au](mailto:reefguardians@gbrmpa.gov.au).

**Table 1: Overview of Rapid Monitoring Modules**

| Section                                                          | Age/ Grade            | Information                                                                             | Links                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------------------------------|-----------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pre-Learning</b><br>(online or at school).                    | Age-Open              | Rapid Monitoring methodology, surveys and information.<br>Snorkel practice (pool).      | <a href="#">Rapid Monitoring training course</a> (16 years + or teacher facilitated)<br><a href="#">Rapid Monitoring Flip Book</a> or <a href="#">Rapid Monitoring Power Point</a><br><a href="#">Marine Park Zoning Maps</a><br>Prep-Grade 3 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a><br>Grade 4 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a> - Grade 5 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a> - Grade 6 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a><br>Grade 7 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a> - Grade 8 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a> - Grade 9 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a> - Grade 10 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> , <a href="#">assessment</a><br>Grade 11 & 12 <a href="#">Power point</a> , <a href="#">activity book</a> , <a href="#">answers</a> <a href="#">assessment 1</a> , <a href="#">assessment 2</a> , <a href="#">assessment 3</a> . |
| <b>RAPID 1- Site and survey</b><br>(boat).                       | Age-9+<br>Grade 4+    | Site and observer details, environmental conditions.                                    | <a href="#">Rapid Monitoring Flip Book</a> or <a href="#">Rapid Monitoring Power Point</a><br><a href="#">Rapid Module 1</a> and <a href="#">Quiz RM1</a><br>Primary <a href="#">Pre</a> and <a href="#">Post</a> Snorkel Brief<br>Middle <a href="#">Pre</a> and <a href="#">Post</a> Snorkel Brief<br>Senior <a href="#">Pre</a> and <a href="#">Post</a> Snorkel Brief                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>RAPID 2- Timed swim</b><br>(snorkel or glass bottom boat)     | Age-9+<br>Grade 4+    | Identify and count 11 key reef indicator species within 10 minutes.                     | Foundation- Grade 4+, ages 5-10 <a href="#">BAMBFAD Single Slate</a> .<br>Grade 4- 9, ages 10-15 - <a href="#">BAMBFAD 11 Indicator Slate</a> .<br>Grade 10+, ages 15+ <a href="#">Rapid Monitoring Slate</a> .<br><a href="#">Rapid Monitoring Flip Book</a> or <a href="#">Rapid Monitoring Power Point</a><br><a href="#">Rapid Module 2</a> and <a href="#">Quiz RM2</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>RAPID 3- Benthic 360°</b><br>(snorkel)                        | Age-15+<br>Grade 10+  | Estimating % cover of the benthos (substrate types) of a representative reef site area. | <a href="#">Rapid Monitoring Flip Book</a> or <a href="#">Rapid Monitoring Power Point</a><br><a href="#">Rapid Module 3</a> and <a href="#">Quiz RM3</a><br>Senior <a href="#">Pre</a> and <a href="#">Post</a> Benthic Snorkel Brief.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>RAPID 4- Coral impact</b><br>(snorkel)                        | Age- 16+<br>Grade 11+ | Includes; bleaching, predation, disease, competition, damage and rubbish.               | <a href="#">Coral impact Flip Book</a><br><a href="#">Rapid Monitoring Flip Book</a> or <a href="#">Rapid Monitoring Power Point</a><br><a href="#">Rapid Module 4</a> and <a href="#">QuizRM4</a><br>RM <a href="#">Final Exam Answer Sheet</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Data entry</b><br>(Tourism operator facilitated or classroom) | Age-9+<br>Grade 4+    | Collating and <a href="#">submitting data into Eye on the Reef</a> .                    | <a href="#">Rapid Monitoring data entry</a><br><a href="#">Eye on the Reef Registration and data entry guide</a> .<br>Prep to Grade 3 <a href="#">Power point</a><br>Grade 4 <a href="#">Power point</a> - Grade 5 <a href="#">Power point</a> - Grade 6 <a href="#">Power point</a><br>Grade 7 <a href="#">Power point</a> - Grade 8 <a href="#">Power point</a> - Grade 9 <a href="#">Power point</a> - Grade 10 <a href="#">Power point</a><br>Grade 11 & 12 <a href="#">Power point</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Post survey</b><br>(Tourism operator or classroom).           | Age- Open             | Discussion, reflecting on findings, Reef health, survey methods, and observations       | <a href="#">Reef Health Evaluation</a> .<br><a href="#">Rapid Monitoring Certificate</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

## Curriculum Links – ACARA v9.

The tables below justify how the Australian Curriculum (ACARA v9) aligns with Rapid Monitoring and how it can be mapped across all year levels: Foundation to Year 10- Science, Humanities and Social Sciences (HASS) /Geography, Mathematics, English and Senior Marine Science & Aquatic Practices.

### Kindergarten (Be A Marine Biologist For A Day- BAMBFAD)

| Subject | ACARA code                                      | ACARA Standard                                                                                                                                                                                                                       | Activities to achieve the standard.                                                                                                                                                |
|---------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">SU</a><br><a href="#">AC9SFU01</a>  | Observe external features of plants and animals and describe ways they can be grouped based on these features.                                                                                                                       | Focus on indicator species and discuss their external features and how they can be grouped.                                                                                        |
| Science | <a href="#">SHE</a><br><a href="#">AC9SFH01</a> | Explore the ways people make and use observations and questions to learn about the natural world.                                                                                                                                    | How can counting and observing indicator species be used to learn about reefs?                                                                                                     |
| Science | <a href="#">SI</a><br><a href="#">AC9SFI04</a>  | Compare observations with predictions with guidance.                                                                                                                                                                                 | Ask students to predict the numbers of indicator species they will see and compare with actual results.                                                                            |
| HASS    | <a href="#">AC9HSFK03</a>                       | The features of familiar places they belong to, why some places are special and how places can be looked after.                                                                                                                      | Discuss with students their direct or indirect association with the Reef.                                                                                                          |
| Math    | <a href="#">AC9MFN02</a>                        | Recognise and name the number of objects within a collection up to 5 using subitising.                                                                                                                                               | Make cards with numbers 1-5 displayed using subitised spp.                                                                                                                         |
| Math    | <a href="#">AC9MFN03</a>                        | Quantify and compare collections to at least 20 using counting and explain or demonstrate reasoning.                                                                                                                                 | Count and compare butterfly fish with grazing herbivores.                                                                                                                          |
| Math    | <a href="#">AC9MFN05</a>                        | Represent practical situations involving addition, subtraction and quantification with physical and virtual materials and use counting or subitising strategies.                                                                     | Select one indicator species and count how many are seen in a reef scape image or video transect.                                                                                  |
| Math    | <a href="#">AC9MFST01</a>                       | Collect, sort and compare data represented by objects and images in response to given investigative questions that relate to familiar situations.                                                                                    | Have various examples of indicator species and ask students to put them into categories e.g. sea cucumbers, butterfly fish, grazing herbivores, cods and groupers and coral trout. |
| English | <a href="#">AC9EFLA05</a>                       | Recognise that sentences are key units for expressing ideas.                                                                                                                                                                         | Make a summary statement where students can add in their <a href="#">data</a> .                                                                                                    |
| English | <a href="#">AC9EFLA07</a>                       | Explore the contribution of images and words to meaning in stories and informative texts.                                                                                                                                            | Discuss a labelled diagram and how it helps to assist in identification.                                                                                                           |
| English | <a href="#">AC9EFLA09</a>                       | Identify punctuation as a feature of written text different from letters; recognise that capital letters are used for names, and that capital letters also signal the beginning of sentences while punctuation marks signal the end. | Practice use of capital letters of chosen indicator spp.                                                                                                                           |

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| English | <a href="#">AC9EFLE01</a> | Share ideas about stories, poems and images in literature, reflecting on experiences that are similar or different to their own by engaging with texts by First Nations Australian, and wide-ranging Australian and world authors and illustrators. | Compare the images of First Nation representation of indicator species. Eg turtle.                    |
| English | <a href="#">AC9EFLY06</a> | Create and participate in shared editing of short written texts to record and report ideas and events using some learnt vocabulary, basic sentence boundary punctuation and spelling some consonant–vowel–consonant words correctly.                | Create a sentence and cut it up for students to glue and create a sentence or fill in a missing word. |

### Grade 1 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                              | Activities to achieve the standard.                                                   |
|---------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S1U01</a>  | Identify the basic needs of plants and animals, including air, water, food or shelter, and describe how the places they live meet those needs.              | Discuss reef creatures' needs of water, sunlight and currents.                        |
| Science | <a href="#">AC9S1H01</a>  | Describe how people use science in their daily lives, including using patterns to make scientific predictions.                                              | Discuss how counting reef species can be used to make predictions.                    |
| Science | <a href="#">AC9S1I05</a>  | Compare observations with predictions and others' observations, consider if investigations are fair and identify further questions with guidance.           | Discuss why each person may have a different result.                                  |
| Science | <a href="#">AC9S1I06</a>  | Write and create texts to communicate observations, findings and ideas, using everyday scientific vocabulary.                                               | Use a glossary to help create texts or explore scientific names of indicator species. |
| HASS    | <a href="#">AC9HS1K04</a> | How places change and how they can be cared for by different groups including First Nations Australians.                                                    | Discuss how the Reef changed over time and how we can look after it.                  |
| Math    | <a href="#">AC9M1ST01</a> | Acquire and record data for categorical variables in various ways including using digital tools, objects, images, drawings, lists, tally marks and symbols. | Use the slate to tally images or visual footage.                                      |
| English | <a href="#">AC9E1LA09</a> | Recognise the vocabulary of learning area topics.                                                                                                           | Glossary                                                                              |

### Grade 2 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                    | Activities to achieve the standard.                                                                                      |
|---------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S2I04</a>  | Sort and order data and information and represent patterns, including with provided tables and visual or physical models.                         | Rapid monitoring data can be represented in different forms- could use photos of indicator species to make column graph. |
| Science | <a href="#">AC9S2I05</a>  | Compare observations with predictions and others' observations, consider if investigations are fair and identify further questions with guidance. | Compare and discuss why Rapid results vary.                                                                              |
| HASS    | <a href="#">AC9HS2K01</a> | A local individual, group, place or building and the reasons for their importance, including social, cultural or spiritual significance.          | Discuss the importance of reefs and world heritage values.                                                               |

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| HASS    | <a href="#">AC9HS2K03</a> | How places can be spatially represented in geographical divisions from local to regional to state/territory, and how people and places are interconnected across those scales.       | Draw ways each biome across Australia is connected to the reef.                         |
| HASS    | <a href="#">AC9HS2S01</a> | Develop questions about objects, people, places and events in the past and present.                                                                                                  | Students develop a question they would like to answer about the Reef.                   |
| HASS    | <a href="#">AC9HS2S05</a> | Draw conclusions and make proposals.                                                                                                                                                 | Draw conclusions on the Rapid monitoring results. Propose how we can all help the Reef. |
| HASS    | <a href="#">AC9HS2S06</a> | Develop narratives and share observations, using sources, and subject-specific terms.                                                                                                | Write a story about a chosen indicator species.                                         |
| Math    | <a href="#">AC9M2ST01</a> | Acquire data for categorical variables through surveys, observation, experiment and using digital tools; sort data into relevant categories and display data using lists and tables. | Conduct a component of Rapid monitoring and slates (online or in water).                |
| English | <a href="#">AC9E2LA08</a> | Understand that images add to or multiply the meanings of a text.                                                                                                                    | Labeled diagrams of an indicator species.                                               |

### Grade 3 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                                        | Activities to achieve the standard.                                                                                 |
|---------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S3H01</a>  | Examine how people use data to develop scientific explanations.                                                                                                                                       | Discuss the data results.                                                                                           |
| Science | <a href="#">AC9S3H02</a>  | Consider how people use scientific explanations to meet a need or solve a problem.                                                                                                                    | Rapid <a href="#">data</a> can be used to monitor the GBR that is 2300km long.                                      |
| Science | <a href="#">AC9S3I01</a>  | Pose questions to explore observed patterns and relationships and make predictions based on observations.                                                                                             | Design a question based on information given about indicator species e.g. are butterfly fish always found in pairs? |
| Science | <a href="#">AC9S3I04</a>  | Construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns.           | Organise data using Rapid monitoring slate.                                                                         |
| Science | <a href="#">AC9S3I05</a>  | Compare findings with those of others, consider if investigations were fair, identify questions for further investigation and draw conclusions.                                                       | Discuss Rapid monitoring method findings and discuss why results may be different or impacted.                      |
| HASS    | <a href="#">AC9HS3S04</a> | Analyse information and data and identify perspectives.                                                                                                                                               | Analyse food chain perspectives- what if the indicator species was gone altogether?                                 |
| Math    | <a href="#">AC9M3ST03</a> | Conduct guided statistical investigations involving the collection, representation and interpretation of data for categorical and discrete numerical variables with respect to questions of interest. | Rapid monitoring slate.                                                                                             |

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| English | <a href="#">AC9E3LY02</a> | Use interaction skills to contribute to conversations and discussions to share information and ideas.                                                                                                                                                                                 | Group discussion and presentations of findings.                                              |
| English | <a href="#">AC9E3LY07</a> | Plan, create, rehearse and deliver short oral and/or multimodal presentations to inform, express opinions or tell stories, using a clear structure, details to elaborate ideas, topic-specific and precise vocabulary, visual features, and appropriate tone, pace, pitch and volume. | Retell the Rapid task. Or tell a story about new knowledge about a chosen indicator species. |

#### Grade 4 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                              | Activities to achieve the standard.                                                                                |
|---------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S4U01</a>  | Explain the roles and interactions of consumers, producers and decomposers within a habitat and how food chains represent feeding relationships.                                            | Using indicator species to represent feeding relationships.                                                        |
| Science | <a href="#">AC9S4U02</a>  | Identify sources of water and describe key processes in the water cycle, including movement of water through the sky, landscape and ocean; precipitation; evaporation; and condensation.    | Discuss the water cycle and how it is linked to the reef.                                                          |
| Science | <a href="#">AC9S4H01</a>  | Examine how people use data to develop scientific explanations.                                                                                                                             | Discuss how this data can be used to help management of Marine Park.                                               |
| Science | <a href="#">AC9S4H02</a>  | Consider how people use scientific explanations to meet a need or solve a problem.                                                                                                          | Discuss how data regarding <a href="#">Crown of thorns starfish (COTS)</a> can mitigate the impacts of a breakout. |
| Science | <a href="#">AC9S4I01</a>  | Pose questions to explore observed patterns and relationships and make predictions based on observations.                                                                                   | Pose questions about a chosen indicator species.                                                                   |
| Science | <a href="#">AC9S4I04</a>  | Construct and use representations, including tables, simple column graphs and visual or physical models, to organise data and information, show simple relationships and identify patterns. | Rapid monitoring <a href="#">data</a> slates. Data can also be turned into graphs at school.                       |
| Math    | <a href="#">AC9M4M02</a>  | Recognise ways of measuring and approximating the perimeter and area of shapes and enclosed spaces, using appropriate formal and informal units.                                            | Recognise that a 10-minute timed swim can cover a different area dependent on speed and current direction.         |
| Math    | <a href="#">AC9M4ST03</a> | Conduct statistical investigations, collect data through survey responses and other methods; record and display data using digital tools; interpret the data and communicate the results.   | <a href="#">Rapid monitoring data entry.</a>                                                                       |
| HASS    | <a href="#">AC9HS4K05</a> | The importance of environments, including natural vegetation and water sources, to people and animals in Australia and on another continent.                                                | Discuss the importance of the Great Barrier Reef.                                                                  |
| English | <a href="#">AC9E4LA02</a> | Identify the subjective language of opinion and feeling, and the objective language of factual reporting.                                                                                   | Write a fact report on the data and compare it to a written summary of your opinion on the reef.                   |

## Grade 5 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                                                                                                                                                                                       | Activities to achieve the standard.                                                                                         |
|---------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S5U01</a>  | Examine how particular structural features and behaviours of living things enable their survival in specific habitats.                                                                                                                                                                                                                               | Chosen an indicator species to examine how structural and behavioral features enhance survival.                             |
| Science | <a href="#">AC9S5H02</a>  | Investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions.                                                                                                                                                                                                             | Describe how Rapid data is used for <a href="#">Marine Park management</a> .                                                |
| Science | <a href="#">AC9S5I05</a>  | Compare methods and findings with those of others, recognise possible sources of error, pose questions for further investigation and select evidence to draw reasoned conclusions.                                                                                                                                                                   | Discuss the variation in survey results. Discuss possible sources of error and ways to improve next time.                   |
| Science | <a href="#">AC9S5I06</a>  | Write and create texts to communicate ideas and findings for specific purposes and audiences, including selection of language features, using digital tools as appropriate.                                                                                                                                                                          | Present or recap information learnt on an indicator species.                                                                |
| HASS    | <a href="#">AC9HS5S02</a> | Locate, collect and organise information and data from primary and secondary sources in a range of formats.                                                                                                                                                                                                                                          | Rapid monitoring slates or combining BAMBFAD <a href="#">data</a> .                                                         |
| HASS    | <a href="#">AC9HS5S03</a> | Evaluate information and data in a range of formats to identify and describe patterns and trends, or to infer relationships.                                                                                                                                                                                                                         | Use abundance to describe pattern and trends to infer ecological relationships of indicator species.                        |
| HASS    | <a href="#">AC9HS5S04</a> | Evaluate primary and secondary sources to determine origin, purpose and perspectives.                                                                                                                                                                                                                                                                | Evaluate <a href="#">data</a> compared to previous year or in a different Marnie Park <a href="#">zone</a> or type of reef. |
| HASS    | <a href="#">AC9HS5S05</a> | Develop evidence-based conclusions.                                                                                                                                                                                                                                                                                                                  | Use data to describe evidence based on ecological health of the Reef.                                                       |
| HASS    | <a href="#">AC9HS5S06</a> | Propose actions or responses to an issue or challenge that consider possible effects of actions.                                                                                                                                                                                                                                                     | Talk about green <a href="#">zones</a> and possible effects to the reef.                                                    |
| HASS    | <a href="#">AC9HS5S07</a> | Present descriptions and explanations, drawing ideas, findings and viewpoints from sources, and using relevant terms and conventions.                                                                                                                                                                                                                | After engaging with tourism operators, present a description of the health of the reef surveyed.                            |
| HASS    | <a href="#">AC9HS5K05</a> | The management of Australian environments, including managing severe weather events such as bushfires, floods, droughts or cyclones, and their consequences.                                                                                                                                                                                         | Explore extreme weather events and Reef impacts.                                                                            |
| Math    | <a href="#">AC9M5ST03</a> | Plan and conduct statistical investigations by posing questions or identifying a problem and collecting relevant data; choose appropriate displays and interpret the data; communicate findings within the context of the investigation.                                                                                                             | Could compare the number of indicator species at two different reefs and communicate findings. <a href="#">Data entry</a> . |
| English | <a href="#">AC9E5LY06</a> | Plan, create, edit and publish written and multimodal texts whose purposes may be imaginative, informative and persuasive, developing ideas using visual features, text structure appropriate to the topic and purpose, text connectives, expanded noun groups, specialist and technical vocabulary, and punctuation including dialogue punctuation. | Using the glossary write a summary text on findings from completing Rapid or BAMBFAD data.                                  |

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| English | <a href="#">AC9E5LY07</a> | Plan, create, rehearse and deliver spoken and multimodal presentations that include relevant, elaborated ideas, sequencing ideas and using complex sentences, specialist and technical vocabulary, pitch, tone, pace, volume, and visual and digital features. | Choose an indicator species and make a power point of all the relevant information required for next year's class to complete BAMBFAD or Rapid monitoring. |
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### Grade 6 (BAMBFAD)

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                     | Activities to achieve the standard.                                                                                                                        |
|---------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S6U01</a>  | Investigate the physical conditions of a habitat and analyse how the growth and survival of living things is affected by changing physical conditions.                             | Analyse how salinity, rainfall, sunlight and/or temperature affect coral growth and survival.                                                              |
| Science | <a href="#">AC9S6H02</a>  | Investigate how scientific knowledge is used by individuals and communities to identify problems, consider responses and make decisions.                                           | Investigate how people use knowledge about the reef to take action to protect it.                                                                          |
| Science | <a href="#">AC9S6I05</a>  | Compare methods and findings with those of others, recognise possible sources of error, pose questions for further investigation and select evidence to draw reasoned conclusions. | Compare <a href="#">data</a> collated between students, discuss errors and how to improve data collation next time.                                        |
| Science | <a href="#">AC9S6I06</a>  | Write and create texts to communicate ideas and findings for specific purposes and audiences, including selection of language features, using digital tools as appropriate.        | Write a summary report on the Rapid monitoring process, why, what, who, when, where and how.                                                               |
| HASS    | <a href="#">AC9HS6S02</a> | Locate, collect and organise information and data from primary and secondary sources in a range of formats.                                                                        | Rapid monitoring primary and online <a href="#">data</a> collation.                                                                                        |
| HASS    | <a href="#">AC9HS6S03</a> | Evaluate information and data in a range of formats to identify and describe patterns and trends, or to infer relationships.                                                       | Infer relationship between the number of herbivorous fish and algae coverage.                                                                              |
| HASS    | <a href="#">AC9HS6S04</a> | Evaluate primary and secondary sources to determine origin, purpose and perspectives.                                                                                              | Compare photo or video footage to primary in-water results.                                                                                                |
| HASS    | <a href="#">AC9HS6S05</a> | Develop evidence-based conclusions.                                                                                                                                                | Use the data to make inferences on the health of a reef.                                                                                                   |
| HASS    | <a href="#">AC9HS6S06</a> | Propose actions or responses to an issue or challenge that consider possible effects.                                                                                              | Propose actions that can be taken to help protect the indicator species.                                                                                   |
| HASS    | <a href="#">AC9HS6S07</a> | Present descriptions and explanations, drawing ideas, findings and viewpoints from sources, and using relevant terms and conventions.                                              | Describe why a chosen species should or should not be classed as an indicator species.                                                                     |
| English | <a href="#">AC9E6LA07</a> | Identify and explain how images, figures, tables, diagrams, maps and graphs contribute to meaning.                                                                                 | Explain how images and diagrams assist with identification training. Explain how <a href="#">zoning</a> maps assist in explaining a reef and its location. |

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| English | <a href="#">AC9E6LY05</a> | Use comprehension strategies such as visualising, predicting, connecting, summarising, monitoring and questioning to build literal and inferred meaning, and to connect and compare content from a variety of sources. | From the flip book and various resources learn how to identify reef indicator species in books, photos and in real life. |
| English | <a href="#">AC9E6LY09</a> | Use knowledge of known words, word origins including some Latin and Greek roots, base words, prefixes, suffixes, letter patterns and spelling generalisations to spell new words including technical words.            | Find scientific names of reef indicator species and understand how to spell and write them.                              |

## Grade 7

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                                                                                                                                                    | Activities to achieve the standard.                                                                                                                                        |
|---------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S7U01</a>  | Investigate the role of classification in ordering and organising the diversity of life on Earth and use and develop classification tools including dichotomous keys.                                                                                                                                             | Investigate how each of the indicator species are classified.                                                                                                              |
| Science | <a href="#">AC9S7U02</a>  | Use models, including food webs, to represent matter and energy flow in ecosystems and predict the impact of changing abiotic and biotic factors on populations.                                                                                                                                                  | Create food webs of the reef and indicator species and predict the impact of changing biotic and abiotic factors.                                                          |
| Science | <a href="#">AC9S7U03</a>  | Model cyclic changes in the relative positions of the Earth, sun and moon and explain how these cycles cause eclipses and influence predictable phenomena on Earth, including seasons and tides.                                                                                                                  | Explain how the movement of the tide and moon affects coral reefs and spawning events.                                                                                     |
| Science | <a href="#">AC9S7H03</a>  | Examine how proposed scientific responses to contemporary issues may impact on society and explore ethical, environmental, social and economic considerations.                                                                                                                                                    | Investigate, if green <a href="#">zones</a> are better for maintaining ecosystem function might interact with competing viewpoints, values and interests for marine areas. |
| Science | <a href="#">AC9S7I02</a>  | Plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place. | Plan and conduct Rapid monitoring to test if data can be used for management. Identify variables, risks, and the <a href="#">Marine Park</a> .                             |
| Science | <a href="#">AC9S7I04</a>  | Select and construct appropriate representations, including tables, graphs, models and mathematical relationships, to organise and process data and information.                                                                                                                                                  | Can turn the tallied results into bar graphs.                                                                                                                              |
| Science | <a href="#">AC9S7I06</a>  | Analyse, methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.                                                                                                                                                                               | After Rapid Monitoring, analyse the method, conclusion, assumptions and possible sources of error.                                                                         |
| Science | <a href="#">AC9S7I08</a>  | Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital tools as appropriate.                                                                                                       | Write a report of the Rapid monitoring data collation.                                                                                                                     |
| HASS    | <a href="#">AC9HG7S01</a> | Develop questions for a geographical inquiry related to a phenomenon or challenge.                                                                                                                                                                                                                                | How to monitor and manage the Reef that is as big as Italy.                                                                                                                |

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| HASS    | <a href="#">AC9HG7S02</a> | Collect, organise and represent data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriate.                                                                                                                      | <a href="#">Rapid Monitoring data.</a>                                                              |
| Math    | <a href="#">AC9M7ST01</a> | acquire data sets for discrete and continuous numerical variables and calculate the range, median, mean and mode; make and justify decisions about which measures of central tendency provide useful insights into the nature of the distribution of data                                                                      | Combine all Rapid results across the class and calculate the range, mean and mode of each category. |
| English | <a href="#">AC9E7LA05</a> | Understand how complex and compound-complex sentences can be used to elaborate, extend and explain ideas.                                                                                                                                                                                                                      | Explain the results and how they can infer the health of the reef.                                  |
| English | <a href="#">AC9E7LY07</a> | Plan, create, rehearse and deliver presentations for purposes and audiences in ways that may be imaginative, reflective, informative, persuasive and/or analytical, by selecting text structures, language features, literary devices and visual features, and using features of voice including volume, tone, pitch and pace. | Present facts and ideas about how to identify an indicator species.                                 |

## Grade 8

| Subject | ACARA code                | ACARA Standard                                                                                                                                                                                                                                                                                                   | Activities to achieve the standard.                                                                                 |
|---------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S8H04</a>  | Explore the role of science communication in informing individual viewpoints and community policies and regulations.                                                                                                                                                                                             | Explore science communication used within the GBRMP.                                                                |
| Science | <a href="#">AC9S8I02</a>  | Plan and conduct reproducible investigations to answer questions and test hypotheses, including identifying variables and assumptions and, as appropriate, recognising and managing risks, considering ethical issues and recognising key considerations regarding heritage sites and artefacts on Country/Place | Plan Rapid monitoring investigation.                                                                                |
| Science | <a href="#">AC9S8I06</a>  | Analyse methods, conclusions and claims for assumptions, possible sources of error, conflicting evidence and unanswered questions.                                                                                                                                                                               | Rapid monitoring analyses of method, errors and conclusions.                                                        |
| Science | <a href="#">AC9S8I08</a>  | Write and create texts to communicate ideas, findings and arguments for specific purposes and audiences, including selection of appropriate language and text features, using digital tools as appropriate.                                                                                                      | Complete a report after Rapid monitoring.                                                                           |
| HASS    | <a href="#">AC9HG8K02</a> | The location and distribution of Australia's distinctive landscapes and significant landforms.                                                                                                                                                                                                                   | Explore the location of the Great Barrier Reef.                                                                     |
| HASS    | <a href="#">AC9HG8S01</a> | Develop questions for a geographical inquiry related to a phenomenon or challenge.                                                                                                                                                                                                                               | Develop questions of how the Reef can be monitored and managed.                                                     |
| HASS    | <a href="#">AC9HG8S02</a> | Collect, organise and represent data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriate.                                                                                                        | <a href="#">Rapid monitoring data.</a>                                                                              |
| HASS    | <a href="#">AC9HG8S03</a> | Interpret and analyse geographical data and information to identify similarities and differences, explain patterns and trends and infer relationships.                                                                                                                                                           | Identify similarities and differences in Rapid monitoring data and infer ecological function or health of the reef. |

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| HASS    | <a href="#">AC9HG8S04</a> | Draw conclusions based on the analysis of the data and information.                                                                                                                                                                                                                                    | Draw conclusions on the health of the reef based on Rapid monitoring data.                                                                                 |
| HASS    | <a href="#">AC9HG8S05</a> | Identify a strategy for action in relation to environmental, economic, social or other factors, and explain potential impacts.                                                                                                                                                                         | From Rapid monitoring identify a strategy for action that would increase the environmental or economic factors and explain any impacts.                    |
| Math    | <a href="#">AC9M8ST02</a> | Analyse and report on the distribution of data from primary and secondary sources using random and non-random sampling techniques to select and study samples.                                                                                                                                         | Use random sampling of Rapid timed swim compared to transect lines in particular areas.                                                                    |
| Math    | <a href="#">AC9M8ST04</a> | Plan and conduct statistical investigations involving samples of a population; use ethical and fair methods to make inferences about the population and report findings, acknowledging uncertainty.                                                                                                    | Collate <a href="#">data</a> of indicator species populations using Rapid monitoring. Make inferences on about the population and acknowledge uncertainty. |
| English | <a href="#">AC9E8LY06</a> | Plan, create, edit and publish written and multimodal texts, organising and expanding ideas, and selecting text structures, language features, literary devices and visual features for purposes and audiences in ways that may be imaginative, reflective, informative, persuasive and/or analytical. | Explain Rapid monitoring and results.                                                                                                                      |

## Grade 9

| Subject | ACARA code               | ACARA Standard                                                                                                                                                                                                                                                                                                                                          | Activities to achieve the standard.                                                             |
|---------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Science | <a href="#">AC9S9U03</a> | Represent the carbon cycle and examine how key processes including combustion, photosynthesis and respiration rely on interactions between Earth's spheres (the geosphere, biosphere, hydrosphere and atmosphere).                                                                                                                                      | Represent the Carbon cycle that includes marine and aquatic biomes e.g. reef, mangroves, ocean. |
| Science | <a href="#">AC9S9I02</a> | Plan and conduct valid, reproducible investigations to answer questions and test hypotheses, including identifying and controlling for possible sources of error and, as appropriate, developing and following risk assessments, considering ethical issues, and addressing key considerations regarding heritage sites and artefacts on Country/Place. | Plan and conduct Rapid monitoring.                                                              |
| Science | <a href="#">AC9S9I04</a> | Select and construct appropriate representations, including tables, graphs, models and mathematical relationships, to organise and process data and information.                                                                                                                                                                                        | Organise and process <a href="#">data</a> and information gained from Rapid monitoring.         |
| Science | <a href="#">AC9S9I07</a> | Construct arguments based on analysis of a variety of evidence to support conclusions or evaluate claims and consider any ethical issues and cultural protocols associated with accessing, using or citing secondary data or information.                                                                                                               | Construct an argument about reef health using a variety of secondary data or information.       |
| Science | <a href="#">AC9S9I08</a> | Write and create texts to communicate ideas, findings and arguments effectively for identified purposes and audiences, including selection of appropriate content, language and text features, using digital tools as appropriate.                                                                                                                      | Communicate findings of Rapid monitoring.                                                       |

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| HASS    | <a href="#">AC9HG9K01</a> | The distribution and characteristics of biomes as regions with distinctive climates, soils, vegetation and productivity.                                                                                                                                                                                                                                | Look at the distribution of reefs and mangroves worldwide.                                                                      |
| HASS    | <a href="#">AC9HG9K06</a> | The effects on places of people's travel, recreational, cultural or leisure choices, and the strategies for managing the impacts on these places.                                                                                                                                                                                                       | Investigate the effects of travel, recreational, cultural or leisure activities and strategies for managing impact on the Reef. |
| HASS    | <a href="#">AC9HG9S01</a> | Develop a range of questions for a geographical inquiry related to a phenomenon or challenge.                                                                                                                                                                                                                                                           | Develop questions regarding climate change, <a href="#">COTS</a> or coral spawning.                                             |
| HASS    | <a href="#">AC9HG9S02</a> | Collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriate.                                                                                                                                                | <a href="#">Rapid monitoring data.</a>                                                                                          |
| HASS    | <a href="#">AC9HG9S03</a> | Evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationships.                                                                                                                                                                                                                | <a href="#">Rapid monitoring data.</a>                                                                                          |
| HASS    | <a href="#">AC9HG9S06</a> | Create descriptions, explanations and responses, using geographical knowledge and geographical tools as appropriate, and concepts and terms that incorporate and acknowledge research findings.                                                                                                                                                         | Describe Rapid monitoring site that acknowledges research findings.                                                             |
| Math    | <a href="#">AC9M9ST02</a> | Analyse how different sampling methods can affect the results of surveys and how choice of representation can be used to support a particular point of view.                                                                                                                                                                                            | Compare the timed swim to the 360 benthic survey to transects and quadrants.                                                    |
| Math    | <a href="#">AC9M9ST05</a> | Plan and conduct statistical investigations involving the collection and analysis of different kinds of data; report findings and discuss the strength of evidence to support any conclusions.                                                                                                                                                          | <a href="#">Rapid monitoring data.</a>                                                                                          |
| English | <a href="#">AC9E9LY04</a> | Analyse the organisation of ideas in paragraphs and extended texts and evaluate its impact on meaning.                                                                                                                                                                                                                                                  | Can look at the <a href="#">Outlook report</a> or <a href="#">MMP snapshots</a>                                                 |
| English | <a href="#">AC9E9LY06</a> | Plan, create, edit and publish written and multimodal texts, organising, expanding and developing ideas, and selecting text structures, language features, literary devices and multimodal features for purposes and audiences in ways that may be imaginative, reflective, informative, persuasive, analytical and/or critical.                        | Informative written text on indicator species and Rapid monitoring.                                                             |
| English | <a href="#">AC9E9LY07</a> | Plan, create, rehearse and deliver spoken and multimodal presentations for purpose and audience, using language features, literary devices and features of voice such as volume, tone, pitch and pace, and organising, expanding and developing ideas in ways that may be imaginative, reflective, informative, persuasive, analytical and/or critical. | Informative presentation on indicator species and Rapid monitoring.                                                             |

## Grade 10

| Subject | ACARA code                | ACARA Standard                                                                                                                                    | Activities to achieve the standard.                                 |
|---------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Science | <a href="#">AC9S10U02</a> | Use the theory of evolution by natural selection to explain past and present diversity and analyse the scientific evidence supporting the theory. | Use theory of evolution to explain past and present reef diversity. |

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| Science | <a href="#">AC9S10U04</a>  | Use models of energy flow between the geosphere, biosphere, hydrosphere and atmosphere to explain patterns of global climate change.                                                                                                                                                                                                                  | Explain climate change and biosphere and hydrosphere.                                                                                 |
| Science | <a href="#">AC9S10I06</a>  | Assess the validity and reproducibility of methods and evaluate the validity of conclusions and claims, including by identifying assumptions, conflicting evidence and areas of uncertainty.                                                                                                                                                          | Assess the validity of Rapid monitoring and Benthic 360 survey.                                                                       |
| Science | <a href="#">AC9S10I08</a>  | Write and create texts to communicate ideas, findings and arguments effectively for identified purposes and audiences, including selection of appropriate content, language and text features, using digital tools as appropriate.                                                                                                                    | Create texts to communicate findings of Rapid and Benthic surveys.                                                                    |
| HASS    | <a href="#">AC9HG10K01</a> | The human-induced changes that challenge the sustainability of places and environments.                                                                                                                                                                                                                                                               | Explore human induced changes that challenge the sustainability of the reef.                                                          |
| HASS    | <a href="#">AC9HG10K03</a> | First Nations Australians' approaches to custodial responsibility and environmental management in different regions of Australia.                                                                                                                                                                                                                     | Explore how <a href="#">TUMRA</a> groups use Rapid monitoring.                                                                        |
| HASS    | <a href="#">AC9HG10K04</a> | Causes and effects of a change in an identified environment at a local, national or global scale, and strategies to manage sustainability.                                                                                                                                                                                                            | Climate change and impact on reef.                                                                                                    |
| HASS    | <a href="#">AC9HG10S02</a> | Collect, represent and compare data and information from primary research methods, including fieldwork and secondary research materials, using geospatial technologies and digital tools as appropriate.                                                                                                                                              | <a href="#">Rapid monitoring data.</a>                                                                                                |
| HASS    | <a href="#">AC9HG10S03</a> | Evaluate geographical data and information to make generalisations and predictions, explain patterns and trends and infer relationships.                                                                                                                                                                                                              | Explain patterns and trends between Indicator and Benthic survey results and what it may infer regarding reef health.                 |
| HASS    | <a href="#">AC9HG10S04</a> | Evaluate Data and Information to justify conclusions.                                                                                                                                                                                                                                                                                                 | Evaluate Indicator and Benthic data to justify conclusions.                                                                           |
| Math    | <a href="#">AC9M10M04</a>  | Identify the impact of measurement errors on the accuracy of results in practical contexts.                                                                                                                                                                                                                                                           | Identify the impact of measurement errors on the accuracy of results in Rapid and Benthic monitoring.                                 |
| English | <a href="#">AC9E10LY06</a> | Plan, create, edit and publish written and multimodal texts, organising, expanding and developing ideas through experimenting with text structures, language features, literary devices and multimodal features for specific purposes and audiences in ways that may be imaginative, reflective, informative, persuasive, analytical and/or critical. | Plan, create, edit and publish written and multimodal texts reporting on the method and findings of Indicator and Benthic monitoring. |

### Year 11 and 12 Aquatic Practices

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|-----|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| AQP | <a href="#">AQP Syllabus</a> | Students explore the rich biodiversity that exists in aquatic ecosystems, including the biotic and abiotic components that create this diversity. | Discuss biotic and abiotic factors of the reef/ site.                           |
| AQP | <a href="#">AQP Syllabus</a> | They explain the processes that form, degrade and restore ecosystems and the wide variety of ecological relationships they each contain.          | Coral impact section- damage                                                    |
| AQP | <a href="#">AQP Syllabus</a> | Students build skills in identifying species, measuring water quality, conducting risk assessments and identifying threats to ecosystems.         | Identification of reef indicator species, benthic categories and coral impacts- |

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|     |                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | could conduct <a href="#">water quality</a> or turbidity tests. Discuss algae and flood plumes.                                                                                                                                         |
| AQP | <a href="#">AQP Syllabus</a> | They gain an appreciation and awareness of the cultural significance of waterways to Aboriginal peoples, Torres Strait Islander peoples and Australian communities.                                                                                                                                                                                                                                                                                                                      | Discuss the cultural significance of mangroves and reef to Aboriginal, Torres Strait Islanders and Australian communities.                                                                                                              |
| AQP | <a href="#">AQP Syllabus</a> | Students develop their understanding of conservation and management techniques for aquatic ecosystems.                                                                                                                                                                                                                                                                                                                                                                                   | Discuss the management and conservation of the <a href="#">Marine Park</a> ( <a href="#">zoning</a> , programs)                                                                                                                         |
| AQP | <a href="#">AQP Syllabus</a> | They evaluate the effectiveness of current management of aquatic ecosystems and consider ways this could be improved.                                                                                                                                                                                                                                                                                                                                                                    | Evaluate the effectiveness of current <a href="#">Marine Park</a> management and improvement.                                                                                                                                           |
| AQP | <a href="#">AQP Syllabus</a> | investigate a question that – is related to aquatic ecosystems – has scope to be refined further. Document the investigation process and conclusion, including – selecting a methodology or sources – collecting information – analysing information – drawing a conclusion based on the analysis of information – making recommendations for future investigations.                                                                                                                     | Complete Rapid and benthic survey (coral impact section if relevant) enter <a href="#">Rapid monitoring data</a> . Write report.<br>Question “Is the Reef in good health?”<br>“Does reef health differ between <a href="#">zones</a> ”? |
| AQP | <a href="#">AQP Syllabus</a> | complete a project – that is related to a scenario about aquatic ecosystems – with an outcome of either a physical product or the performance of a skill. Document the process used to complete the project, including – analysing and interpreting the given scenario – describing the relevant concepts and procedures – selecting a procedure to follow – executing skills and processes to deliver an outcome – evaluating the outcome – making recommendations for future projects. | Complete snorkeling performance and enter <a href="#">Rapid monitoring data</a> .                                                                                                                                                       |

### Marine Science Unit 2 is Year 11 and Unit 3 is Year12

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|----|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Describe the three main types of diversity, i.e. genetics, species and ecosystem.                                                                                                                                          | Could discuss coral genetic and species diversity and inner and outer reef ecosystem diversity.                                                                                |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Explain the three unique characteristics of marine biodiversity, i.e. wide dispersal at sea, the need for structural complexity, critical nursery habitats.                                                                | Could discuss life cycle of many marine organisms spending various parts of their life out at sea, in mangroves, on reefs. Connectivity and importance to conserve each biome. |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Identify the variety of ecosystems (e.g. estuaries, coastal lakes, saltmarshes, mangroves, seagrass, rocky shores, temperate reefs, coral reefs, lagoons, shelf and deep water) that constitute Australia’s marine biomes. | Discuss how many biomes a student has encountered travelling from home to the outer reef. Discuss importance of connectivity and conservation of each biome.                   |

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| SU | <a href="#">MS Syllabus UNIT 2</a> | Describe the implications of connectivity to marine ecosystems, e.g. estuaries, mangroves, seagrass beds.                                                                                                                   | Implications for life cycles, food, shelter, habitat, adaptation, threats and pollution.                                                                                                                                                                                                                                    |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Identify factors that lead to a loss of diversity, e.g. natural hazard, loss/fragmentation of habitat, pollution, exploitation, introduction of new species, disease.                                                       | Identify reef threats- cyclones, plumes, <a href="#">COTS</a> , overfishing, algae, <a href="#">water quality</a> , marine debris, climate change.                                                                                                                                                                          |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Calculate the biodiversity of a marine ecosystem using Simpson's diversity index (SDI), $SDI = 1 - ( \sum n(n-1) / N(N-1) )$ where N = total number of organisms of all species and n = number of organisms of one species. | SDI could be conducted after Rapid monitoring. Or a different count study on butterfly fish or grazing herbivores.                                                                                                                                                                                                          |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Describe the concepts of ecosystem resilience, disturbance and recovery.                                                                                                                                                    | Could focus on coral resilience after floods or bleaching and recovery. Resilience and recovery can be influenced by human daily actions and long-term projects.                                                                                                                                                            |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Identify biotic components of marine ecosystems, i.e. trophic levels, food chains, food webs, interactions and population dynamics.                                                                                         | Identify the various trophic levels, food chains/ webs and interactions of the indicator species and benthic categories of Rapid monitoring. Population dynamics can be discussed in terms of number of grazing herbivores and macroalgae.                                                                                  |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Classify biotic interactions based on the following terms - symbiosis (i.e. parasitism, mutualism, commensalism and amensalism) - competition (i.e. intraspecific and interspecific) - predation.                           | Unpack the Anemone fish mutualism, groupers, cod and sharks, <a href="#">COTS</a> and <i>Drupella</i> as predation, sea cucumbers and pearlfish commensalism, chemical warfare amensalism, growth of coral and algae competition, parasites to corals such as flatworms and sea spiders. Zooxanthellae and coral symbiosis. |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Identify and describe marine species, using field guides and identification keys.                                                                                                                                           | Rapid indicator species and macro algae.                                                                                                                                                                                                                                                                                    |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Identify organisms in trophic levels in a food web based on the following terms - producers - primary consumers - secondary consumers - tertiary consumers - decomposers.                                                   | Indicator species and benthic categories can be identified in trophic levels regarding the role and ecological function to reef.                                                                                                                                                                                            |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Describe the concept of population dynamics using the terms population size, density, abundance, distribution (i.e. clumped, uniform, random), carrying capacity, niche, K-strategists and r-strategists, keystone species. | These terms can be used when explaining the data collated from Rapid and Benthic monitoring.                                                                                                                                                                                                                                |
| SU | <a href="#">MS Syllabus UNIT 2</a> | Describe abiotic components of marine ecosystems: light availability, depth, stratification, temperature, currents (water and wind), tides, sediment type and nutrient availability.                                        | In the first section of Rapid monitoring method it asks participants to take these factors into consideration and record. Discuss the importance of these factors when summarizing data results.                                                                                                                            |

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| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Explain how marine ecosystems are influenced and limited by abiotic factors differently than terrestrial ecosystems due to the different physical and chemical properties of water, e.g. light availability, buoyancy, pressure, temperature, viscosity, sound, salinity and sediment loading.                                                                                                                                                                                                                                                                                                                                                                 | Could compare and contrast the Reef to the rainforest and also reef to dry tropics.                                                                                          |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Explain the concepts of limiting factors and tolerance limits and their importance in population distributions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Discuss the limiting factors and tolerance limits of the benthic categories.                                                                                                 |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Interpret field data from a local ecosystem.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Enter in <a href="#">Rapid Monitoring data</a> and interpret findings from the Rapid monitoring survey conducted.                                                            |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Classify different groups of animals using structural characteristics.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Grazing herbivores and butterfly fish can be classified based on structural adaptations.                                                                                     |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Classify adaptations as anatomical (structural), physiological (functional) or behavioural.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Classify the adaptations of reef indicator species as structural, physiological or behavioural.                                                                              |
| SU | <a href="#">MS Syllabus</a><br>UNIT 2 | Describe the role of adaptation in enhancing an organism's survival in a specific marine environment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | How has adaptation enhanced the survival of grazing herbivores (or any chosen indicator species) on the reef.                                                                |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Investigate a local ecosystem to determine factors of population dynamics (e.g. density or distribution) and assess abiotic components, including - estimating populations, e.g. survey count, quadrats, species density, percentage coverage, indirect or direct observation, catch and release - using field guides to identify to a genus level - using a range of field equipment to measure biotic factors related to marine environments - conducting in-field mapping of food webs via gut analysis to determine food sources - identifying physical structures of a specific marine organism (this could be virtual, practical or as a demonstration). | Rapid and Benthic monitoring- Rapid monitoring survey.                                                                                                                       |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Assess the limitations of a chosen field technique, e.g. quadrat, transect.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Assess, compare and contrast the limitations of the timed swim survey method to the 360 benthic method.                                                                      |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Apply the terms ecosystem resilience, disturbance and recovery as indicators of 'health' of marine environments to a chosen case study.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Apply the listed terms to the findings from the Rapid monitoring method.                                                                                                     |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Classify the arguments for preserving species and habitats as ecological, economic, social, aesthetic or ethical.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | GBR World heritage values classify preserving biodiversity into these categories as well as Marine Park <a href="#">zoning</a> -multiuse science for management information. |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Describe the direct and indirect values of marine ecosystems of Australia.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <a href="#">GBR World heritage values</a>                                                                                                                                    |
| SI | <a href="#">MS Syllabus</a><br>UNIT 2 | Describe the role of stakeholders in the use and management of marine ecosystems.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Management of GBR- <a href="#">TUMRA</a> - Field Management- <a href="#">zoning</a> , compliance,                                                                            |

|     |                                    |                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                   |
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|     |                                    |                                                                                                                                                                                                                                                                                              | <a href="#">permits</a> , <a href="#">COTS</a> , <a href="#">Eye on the Reef App</a> , reporting and monitoring programs.                                                         |
| SI  | <a href="#">MS Syllabus UNIT 2</a> | Discuss the specific value systems that identified stakeholders use, i.e. ecocentric, technocentric and anthropogenic.                                                                                                                                                                       | List stakeholders use and identify the value system for each.                                                                                                                     |
| SI  | <a href="#">MS Syllabus UNIT 2</a> | Identify issues affecting selected marine ecosystem, including erosion, eutrophication, overharvesting, runoff, sedimentation, urbanisation.                                                                                                                                                 | Identify the issues on the Reef from overharvesting, overfishing, flood and algae plumes and urbanisation.                                                                        |
| SI  | <a href="#">MS Syllabus UNIT 2</a> | Describe criteria used to inform decisions regarding the design of Marine Protected Areas.                                                                                                                                                                                                   | Discuss Marine Park <a href="#">zoning</a> and investigate how it was completed.                                                                                                  |
| SI  | <a href="#">MS Syllabus UNIT 2</a> | Compare the strategies and techniques used for marine environmental planning and management with reference to a specific case study.                                                                                                                                                         | Could case study Rapid monitoring method or <a href="#">COTS</a> program.                                                                                                         |
| SI  | <a href="#">MS Syllabus UNIT 2</a> | Interpret data related to the marine environmental planning and management process.                                                                                                                                                                                                          | <a href="#">Rapid monitoring data</a> and <a href="#">Outlook report</a> .                                                                                                        |
| SHE | <a href="#">MS Syllabus UNIT 2</a> | Evaluate the success of a regional zoning plan or plan management, based on the social, economic and cultural context on which it was considered.                                                                                                                                            | Consider the success of green <a href="#">zones</a> based on social, economic and cultural context on which it was considered to protect and preserve biodiversity and abundance. |
| SHE | <a href="#">MS Syllabus UNIT 2</a> | Appreciate that effective marine ecosystem management is informed by the development of complex models requiring a broad range of scientific knowledge in gathering data, identifying indicators and ensuring measurement is valid and reliable.                                             | Appreciate that citizen science Rapid monitoring data adds value to the management of the reef.                                                                                   |
| SHE | <a href="#">MS Syllabus UNIT 2</a> | Recognise that in areas where marine management decisions reflect scientific, social, cultural and ethical considerations, Aboriginal knowledge and practices and Torres Strait Islander knowledge and practices related to sea country are often used to complement conservation practices. | <a href="#">TUMRA</a> Indigenous ranger-use of Rapid monitoring.                                                                                                                  |
| SU  | <a href="#">MS Syllabus UNIT 3</a> | Describe the different types of reef structure, e.g. fringing, platform, ribbon, atolls, coral cays.                                                                                                                                                                                         | Rapid monitoring site section.                                                                                                                                                    |
| SU  | <a href="#">MS Syllabus UNIT 3</a> | Describe the zonation within a reef cross-section, e.g. reef slope, reef crest/rim, lagoon/back reef.                                                                                                                                                                                        | Rapid monitoring.                                                                                                                                                                 |
| SU  | <a href="#">MS Syllabus UNIT 3</a> | Explain that the habitat complexity (including species diversity, rugosity and percentage coral cover) established by corals influences the diversity of other species.                                                                                                                      | Could investigate species diversity of butterflyfish with coral diversity. Or investigate macroalgae coverage and grazing herbivore diversity.                                    |
| SU  | <a href="#">MS Syllabus UNIT 3</a> | Describe how fish, particularly herbivore populations, benefit from coral reefs.                                                                                                                                                                                                             | Discuss how grazing herbivores reduce macroalgae to promote future coral settlement and growth.                                                                                   |
| SU  | <a href="#">MS Syllabus UNIT 3</a> | Identify the relationship between water quality and some of the factors that affect coral cover, e.g. crown-of-thorns                                                                                                                                                                        | <a href="#">Water quality</a> of flood plumes and nutrients can smother and kill corals and potential increase survival conditions for macroalgae and <a href="#">COTS</a> .      |

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|----|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Assess the diversity of a reef system, e.g. using line intercept transects, quadrats, fish counts using underwater video survey techniques, benthic surveys, invertebrate counts and rugosity measurements. | Choose a Rapid monitoring indicator species e.g. Butterfly fish or Grazing herbivore, investigate the diversity and complete a species diversity count.                                                                                                                                            |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Explain the concept of coral bleaching in terms of Shelford's law of tolerance.                                                                                                                             | Coral impact section of Rapid monitoring can be elaborated linking to <a href="#">Shelford's law of tolerance</a> .                                                                                                                                                                                |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Discuss the ecological effects of a bleaching event on other reef organisms, e.g. fish.                                                                                                                     | Food and shelter loss. Anemones can bleach and fish can lose its home.                                                                                                                                                                                                                             |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Describe the conditions necessary for recovery from bleaching events.                                                                                                                                       | Sea surface temperature returns to below threshold due to cloud cover, seasons, upwelling, currents, reduction of carbon outputs.                                                                                                                                                                  |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Compare the responses to bleaching events between two regions, recognising that coral cover increases on resilient reefs once pressures are reduced or removed.                                             | Could compare the northern versus the southern Reef using <a href="#">Outlook report</a> or <a href="#">Snapshots</a> .<br>Could compare <a href="#">Rapid monitoring data</a> over consecutive years, before and after temperature increases. Collaborate with another school to compare regions. |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Discuss how resilience of coral reefs is improved by minimising other impacts including coastal run-off (nitrogen inputs), and habitat destruction and fishing.                                             | Coastal run off can be investigated via <a href="#">MMP</a> , <a href="#">Summer Snapshot reports</a> .<br>Rapid Monitoring- grazing herbivores increased numbers in green <a href="#">zones</a> and associated reduction of macroalgae promoting coral health and growth.                         |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Examine how decisions made on reef management and conservation are based on scientific knowledge, which relies on clear communication of findings, peer review and reproducibility.                         | <a href="#">Outlook report</a>                                                                                                                                                                                                                                                                     |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Explain the criteria (i.e. site selection, networking and connectivity, replication, spacing, size and coverage) used to design protected marine areas.                                                     | <a href="#">Marine Park Zoning</a> .                                                                                                                                                                                                                                                               |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Identify management strategies used to support marine ecosystem health, e.g. managing threats, zoning, permits, plans, longitudinal monitoring.                                                             | Reef Authority <a href="#">Zoning</a><br>Reef Authority <a href="#">Permits</a><br>Reef Authority <a href="#">COTS</a> program<br><a href="#">Marine Park management</a><br>Reef Authority <a href="#">Restoration</a>                                                                             |
| SU | <a href="#">MS Syllabus</a><br>UNIT 3 | Interpret data to determine the success of a protected marine area.                                                                                                                                         | Scientific journals, <a href="#">Green Zone Infographic</a> and <a href="#">Outlook report</a> .                                                                                                                                                                                                   |