Aquatic Practices 2019 v1.0

Applied Senior Syllabus

This syllabus is for implementation with Year 11 students in 2019.

Queensland Government | Queensland Curriculum & Assessment Authority

For all Queensland schools

170228

Contents

1 Course overview

1.1 Introduction

1.1.1 Rationale

The subject Aquatic Practices investigates how Australians interact with their coastal waters, freshwater rivers, lakes and wetlands. Australia's seas and inland waterways have always played a critical role in supporting human habitation and culture, from pre-colonisation to the present day. Through a study of Aquatic Practices, students will gain insight into the management of aquatic regions and their ecological and environmental systems, helping them to position themselves within a long and sustainable tradition of custodianship.

Aquatic Practices provides opportunities for students to explore, experience and learn practical skills and knowledge valued in aquatic workplaces and other settings. The subject promotes an appreciation of the role coastal waters and inland waterways play in tourism, recreation, transport and food production, and of the legal and safety issues and codes of practice associated with waterways. Through these learning experiences, students build their understanding of the conditions and expectations for work in aquatic settings and develop an understanding of career pathways, jobs and other opportunities available for participating in and contributing to aquatic and related fields and activities.

This Applied syllabus describes learning in Aquatic Practices in four areas of study: 'Environmental', 'Recreational', 'Commercial' and 'Cultural'. Knowledge, understanding and skills related to 'Safety and management practices' are embedded in all four areas of study. Students will gain knowledge and understanding of the principles underpinning safety and management in the aquatic environment, and of the commercial, environmental, recreational and cultural considerations and opportunities around aquatic practices.

The skills valued in aquatic workplaces are also described in 'Safety and management practices'. These practices include skills needed to work effectively as an individual and as part of a team, to build relationships with peers, colleagues and wider networks, to collaborate and communicate appropriately with others, and to plan, organise and complete tasks on time. These skills are valued in all settings where people work together, and therefore position students for successful transition to work, training and other collaborative environments.

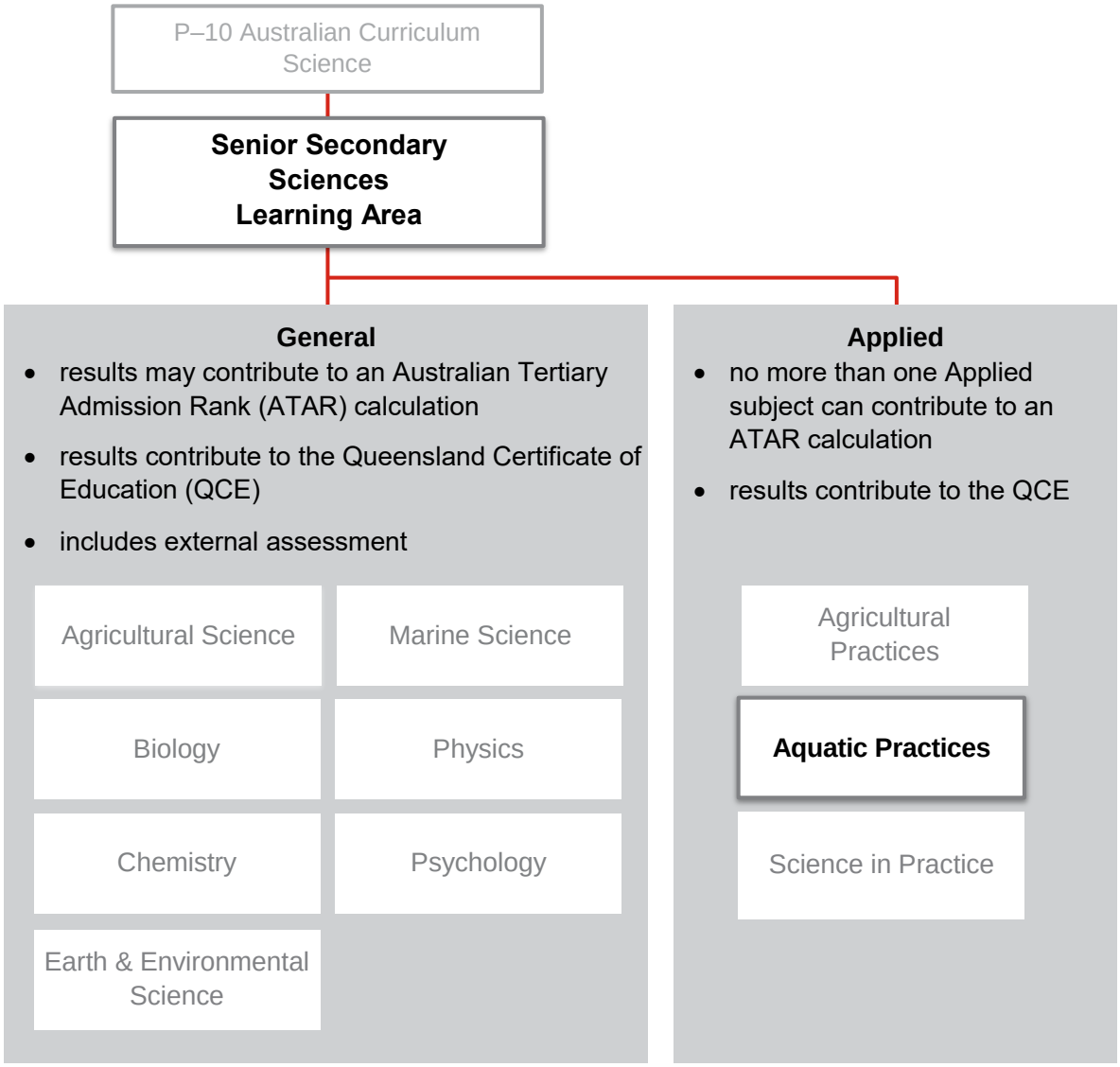
Teaching and learning in Aquatic Practices focuses on aquatic concepts and ideas, and practical application of knowledge, understanding and skills in real-world or lifelike aquatic contexts. Through this approach, students have opportunities to learn in, through and about aquatic workplaces, events and other related activities. Additional learning in this subject links to an understanding of the employment, study and recreational opportunities associated with communities who visit, live or work on and around our waterways.

Pathways

A course of study in Aquatic Practices can establish a basis for further education and employment in the fields of recreation, tourism, fishing and aquaculture. The subject also provides a basis for participating in and contributing to community associations, events and activities, such as yacht and sailing club races and competitions and boating shows.

1.1.2 Learning area structure

Figure 1: Summary of subjects offered in the Science learning area



1.2 Teaching and learning

1.2.1 Dimensions and objectives

The dimensions are the salient properties or characteristics of distinctive learning for this subject. The objectives describe what students should know and be able to do by the end of the course of study.

Progress in a particular dimension may depend on the knowledge, understanding and skills developed in other dimensions. Learning through each of the dimensions increases in complexity to allow for greater independence for learners over a four-unit course of study.

The standards have a direct relationship with the objectives, and are described in the same dimensions as the objectives. Schools assess how well students have achieved all of the objectives using the standards.

The dimensions for a course of study in this subject are:

- Dimension 1: Knowing and understanding
- Dimension 2: Analysing and applying
- Dimension 3: Planning and evaluating.

Dimension 1: Knowing and understanding

Knowing and understanding refers to students comprehending what is meant by the concepts and ideas, knowledge, understanding and skills used in aquatic contexts. They achieve this knowledge and understanding through retrieving relevant knowledge from memory, constructing meaning from instructional messages, and recognising, interpreting, explaining and demonstrating.

Objectives

By the conclusion of the course of study, students should:

- describe concepts and ideas in aquatic contexts
- explain concepts and ideas in aquatic contexts
- demonstrate skills in aquatic contexts.

When students describe concepts and ideas, they give an account of their characteristics or features. An aquatic context is any setting or situation where aquatic activities take place.

When students explain concepts and ideas, they present meaning with clarity, precision, completeness, and with due regard to the order of statements in the explanation.

When students demonstrate skills, they give a practical exhibition of learnt skills within an aquatic context. This practical exhibition may be given in the classroom, real-world or lifelike situations.

Dimension 2: Analysing and applying

Analysing and applying refers to students analysing concepts and ideas within activities in aquatic contexts by breaking information into its constituent parts and determining how the parts relate to each other and to an overall structure or purpose. This may involve students in differentiating, organising and/or attributing. When students apply, they carry out or use a procedure in a given situation.

When students apply and analyse, they draw on their learning in Knowing and understanding.

Objectives

By the conclusion of the course of study, students should:

- analyse information, situations and relationships in aquatic contexts
- apply knowledge, understanding and skills in aquatic contexts
- use language conventions and features appropriate to aquatic contexts to communicate ideas and information, according to purpose.

When students analyse information, situations and relationships in aquatic contexts, they ascertain and examine constituent parts and/or their relationships. It may include establishing the importance of particular relationships and will inform the application of knowledge, understanding and skills.

When students apply knowledge, understanding and skills, they select particular knowledge, understanding and skills in preference to others and use them in particular aquatic activities, situations and contexts.

When students use language conventions and features, they use correct grammar, spelling, punctuation, vocabulary, text types and structures in written, oral and visual communication modes.

Dimension 3: Planning and evaluating

Planning and evaluating refers to students devising procedures for accomplishing tasks and/or generating plans for solving problems and then reflecting on solutions and outcomes to consider ways to improve future responses. This may include checking and critiquing.

When students plan and evaluate, they draw on their learning in Knowing and understanding and Analysing and applying.

Objectives

By the conclusion of the course of study, students should:

- generate plans and procedures for activities in aquatic contexts
- evaluate the safety and effectiveness of activities in aquatic contexts
- make recommendations for activities in aquatic contexts.

When students generate plans and procedures, they collect information to design and create a detailed proposal of procedures that will allow them to complete activities in aquatic contexts.

When students evaluate the safety and effectiveness of aquatic activities, they assign merit to processes according to criteria. Criteria could be developed by the teacher or students. Examples of criteria include safety, effectiveness, cost, time-efficiency and environmental impact.

When students make recommendations, they consider improvements and/or alternatives to improve or extend the results achieved in future activities in aquatic contexts.

1.2.2 Underpinning factors

There are five factors that underpin and are essential for defining the distinctive nature of Applied syllabuses:

- applied learning
- community connections
- core skills for work
- literacy
- numeracy.

These factors, build on the general capabilities found in the P–10 Australian Curriculum. They overlap and interact, are derived from current education, industry and community expectations, and inform and shape Aquatic Practices.

All Applied syllabuses cover all of the underpinning factors in some way, though coverage may vary from syllabus to syllabus. Students should be provided with a variety of opportunities to learn through and about the five underpinning factors across the four-unit course of study.

Applied learning and community connections emphasise the importance of applying learning in workplace and community situations. Applied learning is an approach to contextualised learning; community connections provide contexts for learning, acquiring and applying knowledge, understanding and skills. Core Skills for Work, literacy and numeracy, however, contain identifiable knowledge and skills which can be directly assessed. The relevant knowledge and skills for these three factors are contained in the course dimensions and objectives for Aquatic Practices.

Applied learning

Applied learning is the acquisition and application of knowledge, understanding and skills in real-world or lifelike contexts. Contexts should be authentic and may encompass work place, industry and community situations.

Applied learning values knowledge — including subject knowledge, skills, techniques and procedures — and emphasises learning through doing. It includes both theory and the application of theory, connecting subject knowledge and understanding with the development of practical skills.

Applied learning:

- links theory and practice
- integrates knowledge and skills in real-world and/or lifelike contexts
- encourages students to work individually and in teams to complete tasks and solve problems
- enables students to develop new learnings and transfer their knowledge, understanding and skills to a range of contexts
- uses assessment that is authentic and reflects the content and contexts.

Community connections

Community connections build students' awareness and understanding of life beyond school through authentic, real-world interactions. This understanding supports transition from school to participation in, and contribution to, community, industry, work and not-for-profit organisations (NFPOs). 'Community' includes the school community and the wider community beyond the school, including virtual communities.

Valuing a sense of community encourages responsible citizenship. Connecting with community seeks to deepen students' knowledge and understanding of the world around them and provide

them with the knowledge, understanding, skills and dispositions relevant to community, industry and workplace contexts. It is through these interactions that students develop as active and informed citizens.

Schools plan connections with community as part of their teaching and learning programs to connect classroom experience with the world outside the classroom. It is a mutual or reciprocal arrangement encompassing access to relevant experience and expertise. The learning can be based in community settings, including workplaces, and/or in the school setting, including the classroom.

Community connections can occur through formal arrangements or more informal interactions. Opportunities for community connections include:

- visiting a business or community organisation or agency
- organising an event for the school or local community
- working with community groups in a range of activities
- providing a service for the local community
- attending industry expos and career 'taster' days
- participating in mentoring programs and work shadowing
- gaining work experience in industry
- participating in community service projects or engaging in service learning
- interacting with visitors to the school, such as community representatives, industry experts, employers, employees and the self-employed
- internet, phone or video conferencing with other school communities.

Core skills for work

In August 2013, the Australian Government released the *Core Skills for Work Developmental Framework (CSfW)*[1]. The *CSfW* describes a set of knowledge, understanding and non-technical skills that underpin successful participation in work[2]. These skills are often referred to as generic or employability skills. They contribute to work performance in combination with technical skills, discipline-specific skills, and core language, literacy and numeracy skills.

The *CSfW* describes performance in ten skill areas grouped under three skill clusters, shown in the table below. These skills can be embedded, taught and assessed across Aquatic Practices. Relevant aspects of core skills for work are assessed, as described in the standards.

Table 1: Core skills for work skill clusters and skill areas

	Skill cluster 1: Navigate the world of work	Skill cluster 2: Interacting with others	Skill cluster 3: Getting the work done
Skill areas	• Manage career and work life • Work with roles, rights and protocols	• Communicate for work • Connect and work with others • Recognise and utilise diverse perspectives	• Plan and organise • Make decisions • Identify and solve problems • Create and innovate • Work in a digital world

[1] More information about the Core Skills for Work Developmental Framework is available at: https://docs.education.gov.au/node/37095.

[2] The term 'work' is used in the broadest sense: activity that is directed at a specific purpose, which may or may not be for remuneration or gain.

Literacy in Aquatic Practices

The information and ideas that make up the Aquatic Practices are communicated in language and texts. Literacy is the set of knowledge and skills about language and texts that is essential for understanding and conveying this content.

Each Applied syllabus has its own specific content and ways to convey and present this content. Ongoing systematic teaching and learning focused on the literacy knowledge and skills specific to Aquatic Practices is essential for student achievement.

Students need to learn and use knowledge and skills of reading, viewing and listening to understand and learn the content of Aquatic Practices. Students need to learn and use the knowledge and skills of writing, composing and speaking to convey the Aquatic Practices content they have learnt.

In teaching and learning in Aquatic Practices, students learn a variety of strategies to understand, use, analyse and evaluate ideas and information conveyed in language and texts.

To understand and use Aquatic Practices content, teaching and learning strategies include:

- breaking the language code to make meaning of Aquatic Practices language and texts
- comprehending language and texts to make literal and inferred meanings about Aquatic Practices content
- using Aquatic Practices ideas and information in classroom, real-world and/or lifelike contexts to progress their own learning.

To analyse and evaluate Aquatic Practices content, teaching and learning strategies include:

- making conclusions about the purpose and audience of Aquatic Practices language and texts
- analysing the ways language is used to convey ideas and information in Aquatic Practices texts
- transforming language and texts to convey Aquatic Practices ideas and information in particular ways to suit audience and purpose.

Relevant aspects of literacy knowledge and skills are assessed, as described in the standards.

Numeracy in Aquatic Practices

Numeracy is about using mathematics to make sense of the world and applying mathematics in a context for a social purpose.

Numeracy encompasses the knowledge, skills, behaviours and dispositions that students need to use mathematics in a wide range of situations. Numeracy involves students recognising and understanding the role of mathematics in the world and having the dispositions and capacities to use mathematical knowledge and skills purposefully.[3]

Although much of the explicit teaching of numeracy skills occurs in Mathematics, being numerate involves using mathematical skills across the curriculum. Therefore, a commitment to numeracy development is an essential component of teaching and learning across the curriculum and a responsibility for all teachers.

To understand and use Aquatic Practices content, teaching and learning strategies include:

- identifying the specific mathematical information in their learning area

[3] ACARA, General Capabilities, Numeracy, www.australiancurriculum.edu.au/GeneralCapabilities/Numeracy/Introduction/Introduction

- providing learning experiences and opportunities that support the application of students' general mathematical knowledge and problem-solving processes
- communicating and representing the language of numeracy in teaching, as appropriate.

Relevant aspects of numeracy knowledge and skills are assessed, as described in the standards.

1.2.3 Planning a course of study

Aquatic Practices is a four-unit course of study.

Units 1 and 2 of the course are designed to allow students to begin their engagement with the course content, i.e. the knowledge, understanding and skills of the subject. Course content, learning experiences and assessment increase in complexity across the four units as students develop greater independence as learners.

Units 3 and 4 consolidate student learning.

The minimum number of hours of timetabled school time, including assessment, for a course of study developed from this Applied syllabus is 55 hours per unit. A course of study will usually be completed over four units (220 hours).

A course of study for Aquatic Practices includes:

- the four areas of study: 'Environmental', 'Recreational', 'Commercial' and 'Cultural'
- core topics for 'Safety and management practices' embedded in each of the four areas of study in both by midway through the course (end of Unit 2) and again by the end of the course (end of Unit 4)
- each core topic and its associated concepts and ideas addressed at least once across the four-unit course
- a minimum of four and a maximum of eight modules of work.

'Safety and management practices' include four core topics with associated concepts and ideas, and knowledge, understanding and skills.

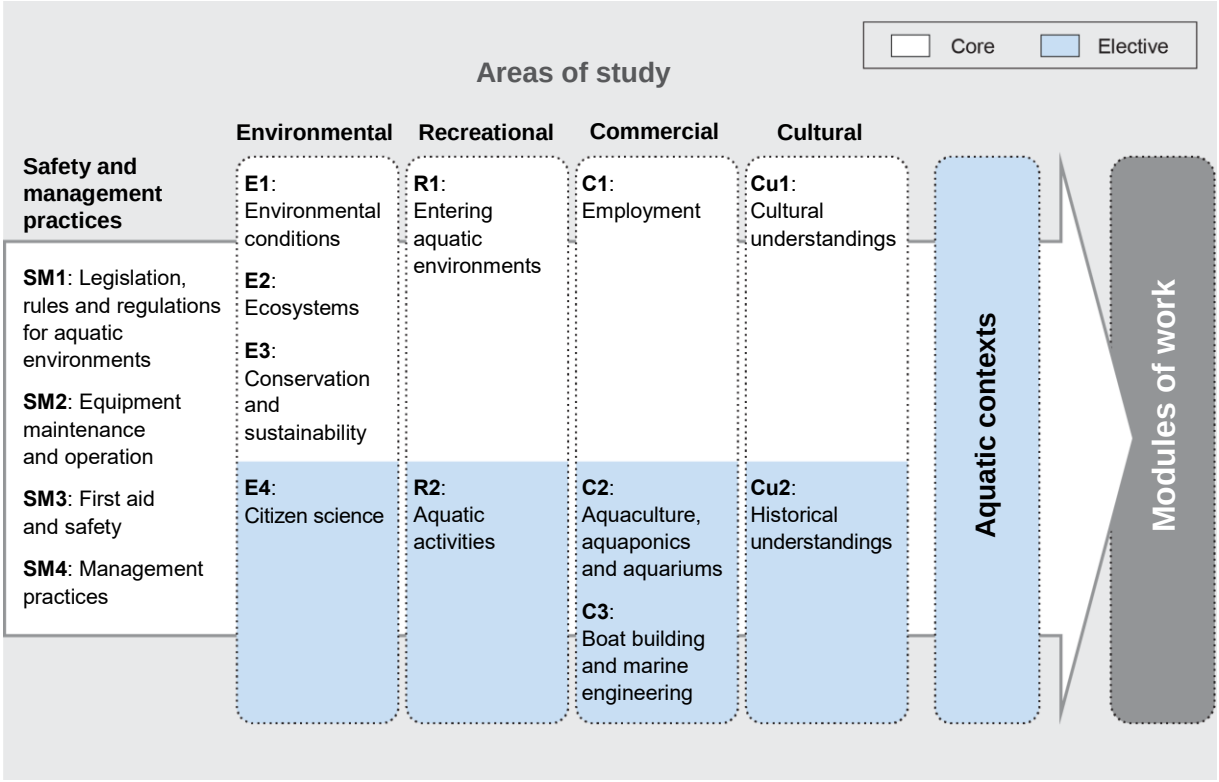
Each of the four areas of study for aquatic activity includes core topics and elective topics with associated concepts and ideas, and knowledge, understanding and skills.

Areas of study and their associated concepts and ideas may be taught discretely or in an integrated way to best suit student interests and needs and the resources available to the school.

An aquatic context is any setting or situation where aquatic activities take place.

The relationship between the core, electives and areas of study is shown in the figure below. Topics are coded to support schools in the development of their study plans.

Figure 2: A course of study — the relationship between core, electives and modules of work



1.2.4 Developing a module of work

Schools develop modules of work to deliver teaching, learning and assessment in Aquatic Practices. The four-unit course of study must be organised to include a minimum of four and a maximum of eight modules of work. For each module of work, teachers select a real-world or lifelike aquatic context for teaching, learning and assessment.

Core topics and, any selected elective topics are delivered through the aquatic context for the unit. These are described in Areas of study. Requirements for 'Safety management practices', core learning and elective learning are described in Safety and management practices.

Defining *inquiry* in science education

This syllabus provides guidance to support schools in aligning a chosen pedagogical framework with the curriculum and assessment expectations outlined in this syllabus. This guidance clarifies the use of the term *inquiry* and articulates a framework to describe the process of inquiry. The purpose of this guidance is to prevent misunderstandings and problematic conflations and their subsequent negative impact on student learning. As Abrams, Southerland and Silva (2008, p. xv) stated in their book, *Inquiry in the Classroom: Realities and opportunities*:

> Inquiry in the classroom can be conceived as a complex set of ideas, beliefs, skills, and/or pedagogies. It is evident that attempting to select a singular definition of inquiry may be an insurmountable and fruitless task. Any single definition of inquiry in the classroom would necessarily reflect the thinking of a particular school of thought, at a particular moment in time, or a particular goal, and such a singular definition may serve to limit legitimate and necessary components of science learning. **However, operating without a firm understanding of the various forms of inquiry leaves science educators often 'talking past' one another, and often results in very muddled attempts in the classroom.**

Uses of the term *inquiry*

Common phrases involving the term *inquiry* have been listed below:

- science inquiry
- science inquiry skills
- the inquiry process
- inquiry-based learning.

This syllabus refers to the first three uses listed above. The first, *science inquiry*, defines the practical work of a scientist (Harlen 2013). The second, *science inquiry skills*, refers to the skills required to do the work of a scientist (Harlen 2013). The third, *the inquiry process*, is a framework that can be used to describe the process of asking a question and then answering it.

The final phrase, *inquiry-based learning*, refers to a variety of teaching and learning strategies an educator may choose to use within their school's pedagogical framework. Although a school may choose to adopt an inquiry-based pedagogy, this syllabus is *not* intended to endorse or recommend an inquiry-based learning approach.

Science inquiry and science inquiry skills

Science inquiry involves identifying and posing questions and working to answer them. It is concerned with evaluating claims, investigating ideas, solving problems, reasoning, drawing valid conclusions and developing evidence-based arguments. It can easily be summarised as the 'work of a scientist' (Hackling 2005).

Within this syllabus, it is expected that students will engage in *aspects* of the work of a scientist by engaging in science inquiry (Tytler 2007).

Science inquiry skills are the skills required to do the work of a scientist. They include writing research questions, planning, conducting, recording information and reflecting on investigations; processing, analysing and interpreting evidence; evaluating conclusions, processes and claims; and communicating findings (ACARA 2015c).

It is expected that students are taught science inquiry skills (Krajcik et al 2000). The syllabus outlines a number of these skills in the subject matter.

Teachers decide how the science inquiry skills are to be developed. For example, teachers will determine opportunities to:

- develop, rehearse and refine science inquiry skills
- engage students in scaffolded or open-ended science inquiry tasks
- formatively assess science inquiry skills.

Framework to describe the inquiry process

In order to support student engagement in activities involving inquiry, it is useful to establish a common language or framework to distinguish between stages of the process.

The stages involved in any inquiry are:

- forming and describing the inquiry activity
- finding valid and reliable evidence for the inquiry activity
- analysing and interpreting the evidence selected
- evaluating the conclusions, processes or claims.

This framework uses reflection as the connection between, and driver of, all the stages. The progression through the inquiry process requires reflection on the decisions made and any new information that has emerged during the process to inform the next stage. Each stage of the inquiry process is worthy of reflection, the result of which may be the revision of previous stages (Marzano & Kendall 2007).

Figure 3: Stages of inquiry process

Scientific literacy

Aquatic Practices continues the development of scientifically literate individuals who are able to:

- connect scientific knowledge to everyday life and the world around them
- respond critically and analytically to new technologies and associated issues
- understand uncertainty and risk, how scientists work, and the impact of science on people's lives
- understand the evolving and interdisciplinary nature of science, the links with technology, and the complexity of systems with many interconnected effects (such as balancing economic, social, energy and environmental factors)
- identify scientific questions, and investigate and draw evidence-based conclusions
- be sceptical and questioning of claims made by others
- think critically about significant contemporary issues, using an understanding of science
- apply their knowledge in a broad range of relevant practical situations, including field work
- use community and industry resources; and use technology
- collaborate and work safely and effectively in teams
- participate as informed and responsible citizens in decision-making processes, making informed decisions about the environment and their own health and wellbeing.[4]

[4] Adapted from Rennie, L 2006, *The community's contribution to science learning: Making it count*, Proceedings of the Australian Council for Educational Research, Melbourne, p. 6. and Tytler, R 2007, 'Re-imagining Science Education: Engaging students in science for Australia's future', *Australian Education Review*, http://research.acer.edu.au/aer/3, pp. 26–27.

1.2.5 Aboriginal perspectives and Torres Strait Islander perspectives

The Queensland Government has a vision that Aboriginal and Torres Strait Islander Queenslanders have their cultures affirmed, heritage sustained and the same prospects for health, prosperity and quality of life as other Queenslanders. The QCAA is committed to helping achieve this vision, and encourages teachers to include Aboriginal perspectives and Torres Strait Islander perspectives in the curriculum.

The QCAA recognises Aboriginal peoples and Torres Strait Islander peoples, their traditions, histories and experiences from before European settlement and colonisation through to the present time. Opportunities exist in Aquatic Practices to encourage engagement with Aboriginal peoples and Torres Strait Islander peoples, strengthening students' appreciation and understanding of:

- frameworks of knowledge and ways of learning
- contexts in which Aboriginal peoples and Torres Strait Islander peoples live
- contributions to Australian society and cultures.

Aboriginal peoples and Torres Strait Islander peoples have successfully managed their waterways for thousands of years. These waterways provide primary sources of food, required for a healthy sustainable life. Cultural practices of Aboriginal peoples and Torres Strait Islander peoples include the use of resources — including water and all that lives in it — in such a way that they are renewed and not exhausted.

Aboriginal peoples and Torres Strait Islander peoples rely on specific knowledge of the local area, including the complex diversity of plants and animals found there and the physical environment and ecology in which they live. There is a deep understanding of season changes and how they affect ways of life, including food availability, mobility and ceremonial practices.

Aboriginal peoples and Torres Strait Islander peoples have diverse relationships with, connections to and understanding of the Australian environment. Aboriginal peoples refer to 'Country' while Torres Strait Islander peoples refer to 'Place' — the significant place they have a symbiotic connection to and relationship with, including the people, flora, fauna, waterways, sky, spirituality (ancestors) and weather cycles.

Guidelines about Aboriginal perspectives and Torres Strait Islander perspectives and resources for teaching are available at: www.qcaa.qld.edu.au/k-12-policies/aboriginal-torres-strait-islander-perspectives.

In particular, see the following resource, found on the Support materials tab under Resources at: www.qcaa.qld.edu.au/3035.html:

- *Aboriginal and Torres Strait Islander Studies Handbook 2010,* a helpful guide for schools when embedding Aboriginal perspectives and Torres Strait Islander perspectives across the curriculum
- *Relationships to country: Aboriginal people and Torres Strait Islander people*, which describes the diverse relationships that Aboriginal people and Torres Strait Islander people have with the Australian environment.

2 Subject matter

2.1 Core

The core describes the concepts and ideas, and knowledge, understanding and skills for a course of study in Aquatic Practices. Core learning for Aquatic Practices comprises of the core topics for the four areas of study: 'Environmental', 'Recreational', 'Commercial' and 'Cultural', described in 'Areas of study', and all 'Safety and management practices' topics, described in 'Safety and management practices'.

All core topics are listed in the table below. Topics are coded to support schools in the development of their study plans (see Topic coding).

Area	Core topics
Environmental	E1: Environmental conditions E2: Ecosystems E3: Conservation and sustainability
Recreational	R1: Entering the aquatic environment
Commercial	C1: Employment
Cultural	Cu1: Cultural understandings
Safety and management practices	SM1: Legislation, rules and regulations for aquatic environments SM2: Equipment maintenance and operations SM3: First aid and safety SM4: Management practices

2.2 Electives

There are five electives spread over the four areas of study in Aquatic Practices, as listed in the table below. The elective topics are described in Areas of study.

Schools consider their own resources and needs as well as the interests and abilities of their students and the local community when determining whether to include electives in a course of study.

All elective topics are listed in the table below. Topics are coded to support schools in the development of their study plans (see Topic coding).

Area	Elective topics
Environmental	E4: Citizen science (elective)
Recreational	R2: Aquatic activities (elective)
Commercial	C2: Aquaculture, aquaponics and aquariums (elective) C3: Boat building and marine engineering (elective)
Cultural	Cu2: Historical understandings (elective)

2.3 Areas of study

There are four areas of study in Aquatic Practices:

- Areas of study: Environmental
- Areas of study: Recreational
- Area of study: Cultural.

The core and elective topics for each of the four areas of study and 'Safety and management practices' are described through concepts and ideas, and associated knowledge, understanding and skills in tables on the following pages. Topics, concepts and ideas are coded to support schools in the development of their study plans.

Topic coding

To support schools in the development of their study plans, codes have been provided to identify each topic, as follows:

- **E**nvironmental — **E1** to **E4**
- **R**ecreational — **R1** and **R2**
- **C**ommercial — **C1** to **C3**
- **Cu**ltural — **Cu1** and **Cu2**
- **S**afety and **m**anagement practices — **SM1** to **SM4**.

The concepts and ideas within each topic are also numbered, so **E1.1** is the first concept and idea in 'Environmental' topic 1, **E1.2** is the second.

Elective topic tables are shaded blue.

2.3.1 Area of study: Environmental

The 'Environmental' area of study includes three core topics and one elective topic and associated concepts and ideas, knowledge, understanding and skills related to activities in aquatic contexts. These topics are embedded in and delivered through modules of work.

An understanding of the environment is critical to the success of marine and aquatic activities. Marine and aquatic ecology provides information about interrelationships between animals and plants. Oceanography, meteorology and geography provide insight into aspects of the aquatic environment including weather patterns, tides, currents, and wave and swell characteristics and motions. Use of sustainable practices ensures that the aquatic environment can be used both now and into the future.

The 'Environmental' core and elective topics are:

- E1: Environmental conditions
- E2: Ecosystems
- E3: Conservation and sustainability
- E4: Citizen science (elective).

Topics, concepts and ideas are coded to support schools in the development of their study plans.

E1: Environmental conditions

Concepts and ideas	Knowledge, understanding and skills
E1.1 Understanding weather and tides is essential for activities in and on the water.	• interpretation of weather and tide data, e.g. Bureau of Meteorology website • calculation of tide heights and charting datum points • prediction of tide heights and weather conditions
E1.2 Oceanography and riparian processes shape aquatic environments.	• coastal processes, e.g. longshore drift, chemical and physical erosion, reef formation • wave formation and types of waves • ocean currents — localised, national and international • river processes

E2: Ecosystems

Concepts and ideas	Knowledge, understanding and skills
E2.1 Aquatic ecosystems include biotic and abiotic components.	• biotic components — organisms, communities and populations • abiotic components, e.g. temperature, light, pH, dissolved oxygen, salinity • relationships between biotic and abiotic components • interdependent relationships between organisms • different aquatic ecosystems, e.g. coastal, estuarine and riparian
E2.2 Aquatic habitats are the places where organisms live.	• ecosystems and habitats • habitats of local aquatic organisms
E2.3 Particular organisms are suited to aquatic ecosystems and habitats.	• classification of aquatic organisms • aquatic organisms have behavioural, structural and functional adaptations suited to their habitat • identification of common local aquatic organisms

Concepts and ideas	Knowledge, understanding and skills
E2.4 The condition of aquatic ecosystems varies as a result of the biotic and abiotic components.	• condition of biotic and abiotic components, e.g. testing for pollutants and taking measurements • factors that impact on ecosystem condition • impacts of component condition on their relationship/s, e.g. algal bloom

E3: Conservation and sustainability

Concepts and ideas	Knowledge, understanding and skills
E3.1 Marine and freshwater pests and threats, including pollution, impact on aquatic environments.	• marine pests and associated threats, including crown of thorns starfish, toxic algae, European carp and salvinia • ways aquatic industries impact on their environment, e.g. overfishing, agricultural runoff and human erosion activities • sources of aquatic pollution and associated threats, including: – ballast water – oil pollution – fouling organisms • quarantine breaches
E3.2 Actions conserve, sustain and bioremediate aquatic environment	• definitions of conservation, sustainability and bioremediation • legislation rules and regulations exist to conserve and sustain aquatic environments, e.g. Marine Park Zones and Government Departmental Authorities fishing rules and regulations • Aboriginal communities and Torres Strait Islander communities have knowledges and practices that support ecosystem condition, e.g. ceremonial purposes, sustainable living

E4: Citizen science (elective)

Concepts and ideas	Knowledge, understanding and skills
E4.1 The scientific method involves asking questions about the natural world and collecting data systematically to address the question.	• dependent and independent variables • importance of controlling variables in scientific investigations
E4.2 Citizen science programs engage volunteers and the public in scientific research programs.	• participation in a citizen science project, e.g. CoralWatch, Reef Guardians, Eye on the Reef, Seagrass-Watch, Healthy Waterways • public benefits of citizen science programs, e.g. heightened public awareness of environmental issues, tourism
E4.3 Citizen science allows scientists to gather data over time, across large geographic areas to answer significant research questions.	• areas of ongoing research, e.g. impact of global warming on coral reefs, migration/mating habits of whales and sharks

2.3.2 Area of study: Recreational

The 'Recreational' area includes one core topic and one elective topic and associated concepts and ideas, knowledge, understanding and skills related to activities in aquatic contexts. These topics are embedded in and delivered through modules of work.

The sea and other bodies of water provide major recreation for many Australians. Water sports such as swimming, snorkelling, surfing, boating, sailing, kite surfing, fishing and canoeing, as well as activities such as walking on the shore and reef, provide relaxation and enjoyment. Development of skills in these activities, knowledge of recreation as an industry and understanding and awareness of personal safety in the water and its environs are important and help students broaden their appreciation and enjoyment of water-related activities.

The 'Recreational' core and elective topics are:

- R1: Entering the aquatic environment
- R2: Aquatic activities (elective).

Topics, concepts and ideas are coded to support schools in the development of their study plans.

R1: Entering the aquatic environment

Concepts and ideas	Knowledge, understanding and skills
R1.1 People engage with the aquatic environment in different ways.	• range of aquatic activities, e.g. boating, fishing, snorkelling, sailboarding, canoeing, surfing, aquariums and fishkeeping • specialised equipment and materials • factors determining available activities, e.g. weather, water visibility, swell, tides
R1.2 Scientific principles explain how objects behave in the water.	• application of Archimedes' principle, Boyle's Law and the principles of buoyancy

R2: Aquatic activities (elective)

Concepts and ideas	Knowledge, understanding and skills
R2.1 Navigation knowledge and skills are essential for activities on the water.	• equipment requirements for boats, including navigation lights • characteristics and interpretation of charts • bearing and position • steering of a compass course • planning a passage and plotting a course
R2.2 Specialised skills are required to safely participate in aquatic activities.	• skills required to operate water craft, e.g. following collision regulations, IALA (International Association of Marine Aids to Navigation and Lighthouse Authorities) buoys and buoyage • skills required to safely snorkel, e.g. equalising, finning techniques, clearing mask and snorkel techniques

2.3.3 Area of study: Commercial

The ‘Commercial’ area includes one core topic and two elective topics and associated concepts and ideas, knowledge, understanding and skills related to activities in aquatic contexts. These topics are embedded in and delivered through modules of work.

The commercial use of the sea and inland waters presents many employment opportunities for young people in shipping and water transport, fishing, boat building, aquaculture, tourism and ecotourism, as well as in the manufacture, maintenance and retailing of surf and boat equipment supplies and watersports gear. The development of skills in such areas of employment provides a wide range of job opportunities.

The ‘Commercial’ core and elective topics are:

- C1: Employment
- C2: Aquaculture, aquaponics and aquariums (elective)
- C3: Boat building and marine engineering (elective).

Topics, concepts and ideas are coded to support schools in the development of their study plans.

C1: Employment

Concepts and ideas	Knowledge, understanding and skills
C1.1 Core skills for work are valued by employers.	• work roles and workplace rights and expectations and incorporation of established guidelines in industry policies and procedures relevant to activities in aquatic contexts • recognition, appreciation and responsiveness to differing values, beliefs, perspectives and behaviours • anticipation or identification of problems in aquatic contexts, decisions about courses of action to solve problems and reflection on the outcomes of decisions • strategies for working effectively with technology applied in activities in aquatic contexts to connect to other people and contexts for aquatic work-related purposes • identification of how digital technology and digitally based systems can extend, enhance or make possible specific aspects of an aquatic role or task, and create new opportunities
C1.2 There are different career opportunities and pathways in aquatic industry and businesses.	• roles in aquatic industry and businesses, e.g. marine engineer, eco-tour guide, boat-builder, dive instructor, commercial fisher, aquaculturist • pathways into aquatic employment, e.g. apprenticeships and traineeships • knowledge, skills and qualifications relevant to positions, roles and/or pathways, e.g. Coxswain’s licence, deckhand certificate
C1.3 Employers expect employees to build and update their knowledge and skills.	• industry guidelines and standards change over time, e.g. licencing requirements • marine and aquatic industry associations, e.g. Boating Industries Alliance Australia, Maritime Safety Queensland • training and education providers and courses, e.g. local providers for boat and jet-ski licences • recording and updating training and other learning, e.g. certificates, registrations and licences

C2: Aquaculture, aquaponics and aquariums (elective)

Concepts and ideas	Knowledge, understanding and skills
C2.1 Different methods are suited to particular stock/plants, locations, climates, types of water and purposes.	• different methods, e.g. cage/pond farming, open/closed systems • organisms suited to purpose, e.g. redclaw for aquaculture, perch for aquaponics • equipment, resources and materials needed, e.g. netting for mariculture • sources for quality organisms, feed and other resources
C2.2 Water quality is essential for animal/plant production.	• water quality parameters, e.g. pH, dissolved oxygen, nitrates • testing and adjusting water quality, e.g. temperature
C2.3 Quantity and quality of nutrition is essential for organism production.	• types of feed/nutrition • constituents of feed/nutrition, e.g. protein, carbohydrate and fats • dietary needs of different stock/plants • feed/nutrition contamination and its effects on organisms and systems • feed/nutrition preparation and storage
C2.4 Healthy organisms are essential for animal/plant production.	• recognition and recording of changes in organisms, e.g. growth rates, appearance, signs of illness, changes in population • causes of ill health and disease, e.g. biofouling, parasites, deficiency diseases • strategies to prevent and treat disease, e.g. cleaning tanks, altering pH, administering supplements

C3: Boat building and marine engineering (elective)

Concepts and ideas	Knowledge, understanding and skills
C3.1 Different vessel designs are suited to different situations.	• major hull types — displacement and planning • different hull shapes for different purposes, e.g. punt for sheltered estuary waters, deep-v hulls for open water • materials for vessel construction are dependent on purpose, e.g. rubber, alloy, wood, fibreglass, steel
C3.2 Boats are designed and constructed using a variety of materials and techniques.	• vessel or model construction to scale plans • application of tools and materials to fabricate vessel or model • design testing and modification
C3.3 There are different propulsion systems and types of marine engine installations for vessels.	• uses of different marine installations, e.g. inboard, outboard, stern-drive and jet • principles of mechanical and non-mechanical boat propulsion, e.g. powered and non-powered craft, such as traditional sailing vessels • factors influencing selection and use of particular propulsion systems
C3.4 Marine engines are internal combustion engines.	• operation of different forms of internal combustion engine, e.g. two-stroke (two-cycle), four-stroke (four-cycle), diesel, turbine and steam • operating principles of engine support systems, e.g. fuel, ignition, cooling, lubrication and charging systems • safe practices for fuelling engines and maintaining and storing batteries

2.3.4 Area of study: Cultural

The ‘Cultural’ area includes one core topic and one elective topic and associated concepts and ideas, knowledge, understanding and skills related to activities in aquatic contexts. These topics are embedded in and delivered through modules of work.

The cultural significance of the aquatic environment and of maritime activity for Queensland and Australia is evident in contemporary society and the history of the state and the nation. Aboriginal peoples and Torres Strait Islander peoples have maintained spiritual, social, economic and cultural links with the seas and inland waterways across Australia for centuries. Students can learn about Australia’s maritime history by studying Australian maritime culture. A study into the marine and aquatic practices of Aboriginal, Torres Strait Islander, Asian, South Sea Islander and European communities provides a rich and diverse range of learning experiences and perspectives for students.

The ‘Cultural’ core and elective topics are:

- Cu1: Cultural understandings
- Cu2: Historical understandings (elective).

Topics, concepts and ideas are coded to support schools in the development of their study plans.

Cu1: Cultural understandings

Concepts and ideas	Knowledge, understanding and skills
Cu1.1 People source a range of resources from waterways.	• aquatic organisms are used for a variety of purposes in different cultures, e.g. food, fertiliser, compost and mulch, and bioremediation • aquatic resources, e.g. food preparation technologies and techniques in different cultures, shell art, driftwood carving
Cu1.2 Indigenous peoples have spiritual, social, economic and cultural links with waterways and places.	• Indigenous peoples, including Aboriginal peoples, and Torres Strait Islander peoples, relationships with, connections to and understanding of country and place • protocols for working with Aboriginal and Torres Strait Islander communities and Indigenous knowledge
Cu1.3 There are different social and cultural attitudes to industries and activities associated with and impacting on aquatic environments.	• social and political responses to impacts of industries and activities on aquatic environments, e.g. attitudes towards whaling, accidents such as the Exxon Valdez oil spill, Fukushima nuclear accident, organisations such as Greenpeace • unlawful activities in aquatic environments, e.g. illegal fishing and trawling, piracy

Cu2: Historical understandings (elective)

Concepts and ideas	Knowledge, understanding and skills
Cu2.1 Aquatic industries and activities were, and continue to be economically, socially and culturally significant.	• aquatic industries and activities, e.g. trading goods, immigration, fishing and trawling • waterways of importance to aquatic industries and activities, including those: – in the school's local area – in Queensland, e.g. fishing and trade routes in Cape York and the Torres Strait Islands – in Australia, e.g. Brisbane River – internationally, e.g. Suez Canal, Panama Canal, Great Lakes • representations of Aboriginal peoples and Torres Strait Islander peoples spiritual and cultural relationships with, connections to and understanding of waterways, e.g. fish traps and shell middens • economic, social and cultural impacts of maritime industries and activities, e.g. whaling stations, pearl divers
Cu2.2 The history of aquatic places, events and activities continues to be of interest and importance.	• shipwrecks, e.g. the Australian Hospital Ship Centaur, HMAS Sydney • museums, e.g. the Queensland Maritime Museum • trade routes, vessel and cargos from the past • immigration routes and vessels from the past • aquatic industries and activities from the past, e.g. whaling in Australia and New Zealand
Cu2.3 Aquatic technologies and culture are interdependent.	• designs of water craft from different cultures • development of aquatic technologies over time, e.g. boat building, navigation and propulsion technologies, fishing techniques • scientific and cultural impacts of major ocean voyages, e.g. Columbus, Cook, Darwin

2.4 Safety and management practices

The study of ‘Safety and management practices’ is compulsory.

‘Safety and management practices’ are used to plan, manage and safely complete aquatic activities. There are four core topics, which are embedded in each area of study and delivered through modules of work throughout the course of study. Each core topic must be taught in both by midway through the course (end of Unit 2) and again by the end of the course (end of Unit 4).

The ‘Safety and management practices’ core topics are:

- SM1: Legislation, rules and regulations for aquatic environments
- SM2: Equipment maintenance and operations
- SM3: First aid and safety
- SM4: Management practices.

The topics are described in detail through concepts and ideas, and knowledge, understanding and skills in the tables below. Topics, concepts and ideas are coded to support schools in the development of their study plans.

SM1: Legislation, rules and regulations for aquatic environments

Concepts and ideas	Knowledge, understanding and skills
SM1.1 Commonwealth and state legislation, rules and regulations control activities in aquatic environments.	• legislation, rules and regulations relevant to aquatic activities, e.g. native title, marine parks, licences and permits for provision of products and services • resources to support understanding and implementation of legislation, rules and regulations, e.g. *Queensland Fisheries and Boating Handbook*, materials from Wet Paper Publications — Marine Studies curriculum material for Australian Secondary Schools • implementing legislation, rules and regulations, e.g. operating a vessel according to International Association of Lighthouse Authorities (IALA) buoyage system
SM1.2 Commonwealth and state legislation, rules and regulations are administered by government departments and authorities.	• functions of relevant authorities, e.g. Department of Agriculture, Fisheries and Forestry — recreational fishing rules and regulations for Queensland • information and advice from relevant officers in government departments and authorities, e.g. Queensland Transport — boating licences
SM1.3 Observation of workplace health and safety practices is essential when participating in aquatic activities.	• understand and implement duty of care • difference between risks and hazards • conduct risk assessments • manage risks and hazards • implement risk management plans, e.g. take preventative action

SM2: Equipment maintenance and operations

Concepts and ideas	Knowledge, understanding and skills
SM2.1 The natural environment impacts on reliable and safe operation of equipment.	• components of the aquatic environment that impact on equipment, e.g. salts, water, air, sunlight and living things • selection of processes and products to protect equipment against the natural environment • implementation of processes and using products to protect equipment against effects of the natural environment, e.g. cleaning and storing equipment
SM2.2 Regular maintenance is essential for reliable and safe operation of equipment.	• use of operation manuals for service instructions and information, e.g. following maintenance schedules, everyday servicing and maintenance of equipment • identification of faults and taking appropriate action
SM2.3 It is essential to follow equipment operating instructions at all times.	• operation manuals • online support materials • training and courses

SM3: First aid and safety

Concepts and ideas	Knowledge, understanding and skills
SM3.1 The aquatic environment poses particular threats.	• identification of aquatic threats, injuries and emergencies, e.g. hypothermia, hyperthermia, marine stings, drowning
SM3.2 First aid skills are applied in response to illness, injuries and emergencies.	• responses to illness, injuries and emergencies, e.g. hyperthermia, allergic reactions, unconsciousness, bleeding, burns and scalds, fractures, cardiopulmonary resuscitation (CPR), pressure immobilisation technique
SM3.3 Aquatic environment requires specialised safety skills.	• application of specialised aquatic safety skills, e.g. survival techniques including HELP/HUDDLE, swimming, treading water, rescue tow

SM4: Management practices

Concepts and ideas	Knowledge, understanding and skills
SM4.1 Working with others is essential when working in aquatic environments.	• instructions from teachers and trainers • strategies for working and collaborating effectively in teams • effective communication strategies
SM4.2 Completion of aquatic activities requires a range of management skills.	• goal setting to complete aquatic activities • plan and organise aquatic activities • management of time and resources to complete aquatic activities • demonstration of initiative

3 Assessment

3.1 Assessment — general information

Assessment is an integral part of the teaching and learning process. It is the purposeful, systematic and ongoing collection of information about student learning outlined in the syllabus.

The major purposes of assessment are to:

- promote, assist and improve learning
- inform programs of teaching and learning
- advise students about their own progress to help them achieve as well as they are able
- give information to parents, carers and teachers about the progress and achievements of individual students to help them achieve as well as they are able
- provide comparable exit results in each Applied syllabus which may contribute credit towards a Queensland Certificate of Education (QCE); and may contribute towards Australian Tertiary Admission Rank (ATAR) calculations
- provide information about how well groups of students are achieving for school authorities and the State Minister responsible for Education.

Student responses to assessment opportunities provide a collection of evidence on which judgments about the quality of student learning are made. The quality of student responses is judged against the standards described in the syllabus.

In Applied syllabuses, assessment is standards-based. The standards are described for each objective in each of the three dimensions. The standards describe the quality and characteristics of student work across five levels from A to E.

3.1.1 Planning an assessment program

When planning an assessment program over a developmental four-unit course, schools should:

- administer assessment instruments at suitable intervals throughout the course
- provide students with opportunities in Units 1 and 2 to become familiar with the assessment techniques that will be used in Units 3 and 4
- assess all of the dimensions in each unit
- assess each objective at least twice by midway through the course (end of Unit 2) and again by the end of the course (end of Unit 4)
- assess only what the students have had the opportunity to learn, as prescribed in the syllabus and outlined in the study plan.

For a student who studies four units, only assessment evidence from Units 3 and 4 contributes towards decisions at exit.

Further guidance can be found in the QCE and QCIA policy and procedures handbook.

3.1.2 Authentication of student work

Schools and teachers must have strategies in place for ensuring that work submitted for summative assessment is the student's own.

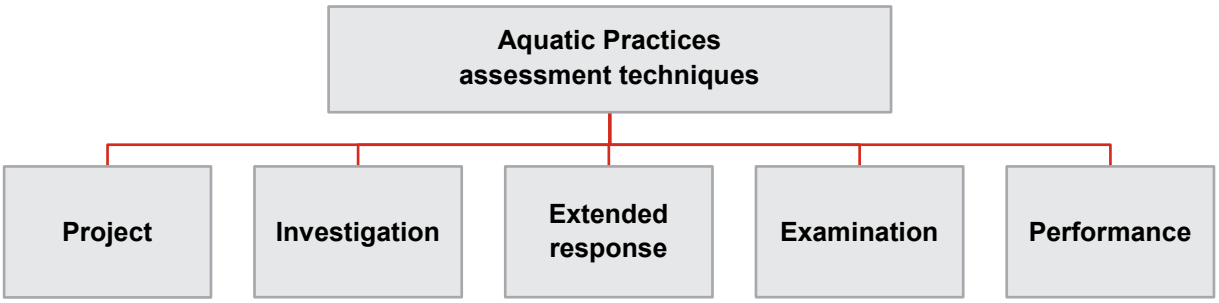
Judgments about student achievement are based on evidence of the demonstration of student knowledge, understanding and skills. Schools ensure responses are validly each student's own work.

Guidance about authentication strategies which includes guidance for drafting, scaffolding and teacher feedback can be found in the QCE and QCIA policy and procedures handbook.

3.2 Assessment techniques

The diagram below identifies the assessment techniques relevant to this syllabus. The subsequent sections describe each assessment technique in detail.

Figure 4: Aquatic Practices assessment techniques



Schools design assessment instruments from the assessment techniques relevant to this syllabus. The assessment instruments students respond to in Units 1 and 2 should support those techniques included in Units 3 and 4.

For each assessment instrument, schools develop an instrument-specific standards matrix by selecting the syllabus standards descriptors relevant to the task and the dimension/s being assessed (see Standards matrix).

The matrix is used as a tool for making judgments about the quality of students' responses to the instrument and is developed using the syllabus standards descriptors. Assessment is designed to allow students to demonstrate the range of standards (see Determining an exit result). Teachers give students an instrument-specific standards matrix for each assessment instrument.

Where students undertake assessment in a group or team, instruments must be designed so that teachers can validly assess the work of individual students and not apply a judgment of the group product and processes to all individuals.

Evidence

Evidence includes the student's responses to assessment instruments and the teacher's annotated instrument-specific standards matrixes. Evidence may be direct (e.g. student responses to assessment instruments) or indirect (e.g. supporting documentation). Within a student folio, indirect evidence should be balanced with direct evidence.

Further guidance can be found in the QCE and QCIA policy and procedures handbook.

Conditions of assessment

Over a four-unit course of study, students are required to complete assessment under a range of conditions (see Planning an assessment program).

Conditions may vary according to assessment. They should be stated clearly on assessment instruments, for example:

- supervised or unsupervised
- individual, group or team
- time allowed (with perusal time as needed)
- length required
- seen or unseen questions
- using sources and/or notes (open book).

Where support materials or particular equipment, tools or technologies are used under supervised conditions, schools must ensure that the purpose of supervised conditions (i.e. to authenticate student work) is maintained.

Assessment of group work

When students undertake assessment in a group or team, instruments must be designed so that teachers can validly assess the work of individual students and not apply a judgment of the group product and processes to all individuals.

3.2.1 Project

Purpose

This technique assesses a response to a single task, situation and/or scenario in a module of work that provides students with authentic and/or real-world opportunities to demonstrate their learning. The student response will consist of a collection of **at least two** different assessable components, demonstrated in different circumstances, places and times, and may be presented to different audiences, and through differing modes.

Dimensions to be assessed

This assessment technique is to be used to determine student achievement in objectives from all of the following dimensions:

- Knowing and understanding
- Analysing and applying
- Planning and evaluating.

Not every objective from each dimension needs to be assessed.

Types of projects

A project occurs over a set period of time. Students may use class time and their own time to develop a response.

A project consists of **at least two different assessable components** from the following:

- written, e.g. a set of data
- spoken, e.g. an explanation of a procedure
- multimodal, e.g. a presentation of a set of data and its purpose and meaning
- performance, e.g. demonstration of snorkelling
- product, e.g. model of a boat.

The selected assessable components must contribute significantly to the task and to the overall result for the project. A variety of technologies may be used in the creation or presentation of the response.

Note: Spoken delivery of a written component; or a transcript of a spoken component (whether written, electronic, or digital) constitutes one component, not two.

Examples of projects in Aquatic Practices include:

- rod building and testing
- planning a tour itinerary
- boat hull design and evaluation
- lure design and building
- aquaculture project.

Written component

This component requires students to use written language to communicate ideas and information to readers for a particular purpose. A written component may be supported by references or, where appropriate, data, tables, flow charts or diagrams.

- reports, which will normally be presented with section headings, and may include tables, graphs and/or diagrams, and analysis of data supported by references
- articles for magazines or journals
- letters to the editor
- essays, e.g. informative, analytical, argumentative.

Examples of written components in Aquatic Practices include:

- a data table
- action plan
- itinerary
- scientific report.

Spoken component

This component requires students to use spoken language to communicate ideas and information to a live or virtual audience (that is, through the use of technology) for a particular purpose.

Examples include:

- oral presentations
- debates
- interviews
- podcasts
- seminars.

Examples of spoken components in Aquatic Practices include:

- an explanation of a procedure
- reflections on a performance
- sales or marketing pitch.

Multimodal component

This component requires students to use a combination of at least two modes **delivered at the same time** to communicate ideas and information to a live or virtual audience for a particular purpose. The selected modes are integrated to allow both modes to contribute significantly to the multimodal component. Modes include:

- written
- spoken/signed
- nonverbal, e.g. physical, visual, auditory.

Examples include:

- digital presentations
- vodcasts
- seminars
- webinars.

A variety of technologies may be used in the creation or presentation of the component. Replication of a written document into an electronic or digital format does not constitute a multimodal component.

Examples of multimodal components in Aquatic Practices include:

- data and graphs
- advertising campaign
- report to stakeholders.

Performance component

This component refers to physical demonstrations as outcomes of applying a range of cognitive, technical and physical skills.

Performance components involve student application of identified skill/s when responding to a task that involves solving a problem, providing a solution, or conveying meaning or intent. Examples of performances in Aquatic Practices include nautical knot tying and snorkelling.

Product component

This component refers to the production of aquatic models and equipment and will be the outcome of applying a range of cognitive, technical and physical skills.

Product components involve student application of identified skill/s in the building of models, rods, boats and other aquatic equipment.

Assessment conditions	Units 1–2	Units 3–4
Written component	400–700 words	500–900 words
Spoken component	1½ – 3½ minutes	2½ – 3½ minutes
Multimodal component	2–4 minutes	3–6 minutes
Performance component	Schools provide students with some continuous class time to develop and demonstrate the performance component/s of their project.	
Product component	Schools provide students with some continuous class time to develop the product component/s of their project.	

Further guidance

When implementing assessment instruments for the project technique, teachers:

- define for students or work with students to define the task, situation or scenario, and purpose for the project; all components of the project must clearly relate to this single task, situation or scenario
- establish the required length of student responses within the assessment conditions (see above); the required length of student responses should be considered in the context of the tasks — longer is not necessarily better; words lengths and time limits are given as guides
- clearly indicate the dimensions and objectives that will be assessed and explain to students the requirements of the task, including instrument-specific standards
- teach the objectives, knowledge, understanding and skills students need to complete all components of the project
- teach the requirements for each component of the project, e.g. diagrams, report on the condition of an animal/plant, demonstration of mixing fertiliser
- allow some continuous class time for students to work towards completing each component of the project; independent student time may also be required to complete the response
- implement strategies to promote authentication of student work, e.g. note-taking, journals, logs, drafting, research checklists, referencing, teacher observation sheets
- consult, negotiate and provide feedback while students are developing their response to the project, e.g. to provide guidance about ethical matters and to monitor the progress of student work.

3.2.2 Investigation

Purpose
This technique assesses investigative practices and the outcomes of applying these practices. Investigation includes locating and using information beyond students' own knowledge and the data they have been given. In Aquatic Practices, investigations involve research and follow an inquiry approach. Investigations provide opportunity for assessment to be authentic and set in lifelike contexts.
Dimensions to be assessed
This assessment technique is to be used to determine student achievement in objectives from at least two of the following dimensions: • Knowing and understanding • Analysing and applying • Planning and evaluating. Not every objective from each dimension needs to be assessed.
Types of investigations and responses
An investigation occurs over a set period of time. Students may use class time and their own time to develop a response. In this assessment technique, students investigate or research a specific question or hypothesis through collection, analysis and synthesis of primary and/or secondary data obtained through research. Examples of investigations in Aquatic Practices include: • investigation of water quality • research into historically significant shipwrecks • investigation of Aboriginal and/or Torres Strait Islander fishing techniques.
Written response
This response requires students to use written language to communicate ideas and information to readers for a particular purpose. A written response may be supported by references or, where appropriate, data, tables, flow charts or diagrams. Examples include: • field reports, which will normally be presented with section headings, and may include tables, graphs and/or diagrams, and analysis of data supported by references • write-ups of scientific investigations or experiments • fisheries notes • articles for magazines or journals • letters to the editor • essays, e.g. analytical, persuasive/argumentative, informative.
Spoken response
This response requires students to use spoken language to communicate ideas and information to a live or virtual audience (that is, through the use of technology) for a particular purpose. Examples include: • oral presentations • debates • interviews • podcasts • seminars.

Multimodal response

This response requires students to use a combination of at least two modes **delivered at the same time** to communicate ideas and information to a live or virtual audience for a particular purpose. The selected modes are integrated to allow both modes to contribute significantly to the multimodal response. Modes include:

- written
- spoken/signed
- nonverbal, e.g. physical, visual, auditory.

Examples include:

- digital presentations
- vodcasts
- seminars
- webinars.

A variety of technologies may be used in the creation or presentation of the response. Replication of a written document into an electronic or digital format does not constitute a multimodal response.

When making judgments about multimodal responses, teachers apply the standards to the entire response, i.e. to all modes used to communicate the response.

Assessment conditions	Units 1–2	Units 3–4
Written	500–800 words	600–1000 words
Spoken	2–4 minutes	3–4 minutes
Multimodal	3–5 minutes	4–7 minutes

Further guidance

When implementing assessment instruments for the investigation technique, teachers:

- establish a focus for the investigation or work with the student to develop a focus
- establish the required length of student responses within the assessment conditions (see above); the required length of student responses should be considered in the context of the tasks — longer is not necessarily better; words lengths and time limits are given as guides
- clearly indicate the dimensions and objectives that will be assessed and explain to students the requirements of the task, including instrument-specific standards
- teach the objectives, knowledge, understanding and skills students need to complete the investigation
- teach the written, spoken or multimodal form/s and language features required for student responses, e.g. report, presentation, seminar
- allow some continuous class time for students to work towards completing each component of the project; independent student time may also be required to complete the response
- implement strategies to promote authentication of student work, e.g. note-taking, journals, logs, drafting, research checklists, referencing, teacher observation sheets
- consult, negotiate and provide feedback while students are developing their investigation response, e.g. to provide guidance about ethical matters and to monitor the progress of student work.

3.2.3 Extended response

Purpose
This technique assesses the interpretation, analysis/examination and/or evaluation of ideas and information in provided stimulus materials. While students may undertake some research in the writing of the extended response, it is not the focus of this technique.
Dimensions to be assessed
This assessment technique is to be used to determine student achievement in objectives from at least two of the following dimensions: • Knowing and understanding • Analysing and applying • Planning and evaluating. Not every objective from each dimension needs to be assessed.
Types of extended response
An extended response occurs over a set period of time. Students may use class time and their own time to develop a response. Students respond to a question or statement about the provided stimulus materials. Stimulus material could include: • scientific texts, e.g. journal/research article • media texts, e.g. letter to the editor, documentary • data and statistics, e.g. tide chart, weather data • maps and charts, e.g. map indicating reefs and other features. An extended response occurs over a set period of time. Students may use class time and their own time to develop a response.
Written response
This response requires students to use written language to communicate ideas and information to readers for a particular purpose. A written response may be supported by references or, where appropriate, data, tables, flow charts or diagrams. Examples may include: • reports, which will usually be presented with section headings, and may include tables, graphs and/or diagrams, and analysis of data supported by references • case studies, e.g. conservation and management, coastline engineering, and surfboard design • articles for a magazine or journal • letters to the editor • essays, e.g. analytical, persuasive/argumentative, informative.
Spoken response
This response requires students to use spoken language to communicate ideas and information to a live or virtual audience (that is, through the use of technology) for a particular purpose. Examples include: • oral presentations • debates • interviews • podcasts • seminars.

Multimodal response

This response requires students to use a combination of at least two modes **delivered at the same time** to communicate ideas and information to a live or virtual audience for a particular purpose. The selected modes are integrated to allow both modes to contribute significantly to the multimodal response. Modes include:

- written
- spoken/signed
- nonverbal, e.g. physical, visual, auditory.

Examples include:

- digital presentations
- vodcasts
- seminars
- webinars.

A variety of technologies may be used in the creation or presentation of the response. Replication of a written document into an electronic or digital format does not constitute a multimodal response.

When making judgments about multimodal responses, teachers apply the standards to the entire response, i.e. to all modes used to communicate the response.

Assessment conditions	Units 1–2	Units 3–4
Written	500–800 words	600–1000 words
Spoken	2–4 minutes	3–4 minutes
Multimodal	3–5 minutes	4–7 minutes

Further guidance

When implementing assessment instruments for the extended response technique, teachers:

- provide stimulus for students and establish a focus for the extended response, or work with students to select suitable stimulus and/or develop a focus for the extended response
- establish the required length of student responses within the assessment conditions (see above); the required length of student responses should be considered in the context of the tasks — longer is not necessarily better; words lengths and time limits are given as guides
- clearly indicate the dimensions and objectives that will be assessed and explain to students the requirements of the task, including instrument-specific standards
- teach the objectives, knowledge, understanding and skills students need to complete the extended response
- teach the written, spoken or multimodal form/s required for student responses, e.g. report, presentation, seminar
- allow some continuous class time for students to work towards completing each component of the project; independent student time may also be required to complete the response
- implement strategies to promote authentication of student work, e.g. note-taking, journals, logs, drafting, research checklists, referencing, teacher observation sheets
- consult, negotiate and provide feedback while students are developing their extended response, e.g. to provide guidance about ethical matters and to monitor the progress of student work.

3.2.4 Examination

Purpose

This technique assesses the application of a range of cognition to provided questions, scenarios and/or problems. Responses are completed individually, under supervised conditions and in a set timeframe.

Dimensions to be assessed

This assessment technique is to be used to determine student achievement in objectives from at least two of the following dimensions:

- Knowing and understanding
- Analysing and applying
- Planning and evaluating.

Not every objective from each dimension needs to be assessed

Type of examination

Short response test

- Short response tests typically consist of a number of items that may include students responding to some or all of the following activities:
  - drawing, labelling or interpreting equipment, graphs, tables or diagrams
  - calculating using algorithms
  - responding to seen or unseen stimulus materials
  - interpreting ideas and information.
- Questions, scenarios and problems are typically unseen; if seen, teachers must ensure the purpose of this technique is not compromised.

Assessment conditions	Units 1–2	Units 3–4
Recommended duration	60–90 minutes	60–90 minutes
Short response test	50–150 words per item (diagrams and workings not included in word count)	50–250 words per item (diagrams and workings not included in word count)

Further guidance

When implementing assessment instruments for the examination technique, teachers:

- format the assessment to allow for ease of reading and responding
- write clear questions, considering students' language needs
- ensure questions allow the full range of standards to be demonstrated
- establish the time requirement for the examination within the assessment conditions (see above)
- ensure stimulus materials are succinct enough to allow students to engage with them in the time provided; if they are lengthy, consider giving students access to them before the assessment
- clearly indicate the dimensions and objectives that will be assessed
- explain to students the requirements of the task, including instrument-specific standards
- outline any permitted material in the instrument conditions, e.g. one page of handwritten notes
- teach the objectives, knowledge, understanding and skills needed for the items in the examination, including opportunities for students to respond to unseen tasks using appropriate communication strategies.

3.2.5 Performance

Purpose
This technique assesses physical demonstrations as outcomes of applying a range of cognitive, technical and physical skills. Performance assessments involve student application of identified skill/s when responding to a task that involves solving a problem, providing a solution, or conveying meaning or intent.
Dimensions to be assessed
This assessment technique is to be used to determine student achievement in objectives from at least two of the following dimensions: • Knowing and understanding • Analysing and applying • Planning and evaluating. Not every objective from each dimension needs to be assessed.
Types of performance
Students will demonstrate performances in a range of aquatic contexts. Contexts may include individual, and group environments. These may include: • seafood preparation — filleting techniques • snorkelling • nautical knot tying • participating in aquatic activities in recreational contexts, e.g. boating camp • organising and managing events • demonstration of health and safety mechanisms and procedures, e.g. first aid, lifesaving
Supporting evidence
Supporting evidence is required to substantiate teacher decisions made on performances for exit purposes. Evidence to support performances may include: • notes or annotations • journal entries • self and peer evaluations • teacher observations and checklists • a recording of the response (as appropriate).

Assessment conditions	Units 1–2	Units 3–4
Performances	Schools provide students with some continuous class time to develop and practise the performance.	

Further guidance
This technique requires teachers to observe a defined activity within an aquatic activity, such as performance of: • physical responses required to perform an aquatic activity in a familiar environment, e.g. swimming in a pool • relevant physical responses in an aquatic activity within a changing environment, e.g. reef snorkelling • roleplaying of group or team situations, e.g. identification of group tasks and allocation of responsibilities • applying knowledge or following industry guidelines and procedures in a workplace or workplace-related situation • operating equipment, e.g. dive equipment, boats.

3.3 Exiting a course of study

3.3.1 Folio requirements

A folio is a collection of one student's responses to the assessment instruments on which exit results are based. The folio is updated when earlier assessment responses are replaced with later evidence that is more representative of student achievement.

3.3.2 Exit folios

The exit folio is the collection of evidence of student work from Units 3 and 4 that is used to determine the student's exit result. Each folio must include:

- four assessment instruments, and the student responses
- evidence of student work from Units 3 and 4 only
- evidence of all dimensions being assessed at least twice
- at least one instrument that assesses all three dimensions
- no more than two instruments from any one technique
- a student profile completed to date.

3.3.3 Exit standards

Exit standards are used to make judgments about students' exit result from a course of study. The standards are described in the same dimensions as the objectives of the syllabus. The standards describe how well students have achieved the objectives and are stated in the standards matrix.

The following dimensions must be used:

- Dimension 1: Knowing and understanding
- Dimension 2: Analysing and applying
- Dimension 3: Planning and evaluating.

Each dimension must be assessed in each unit, and each dimension is to make an equal contribution to the determination of an exit result.

3.3.4 Determining an exit result

When students exit the course of study, the school is required to award each student an A–E exit result.

Exit results are summative judgments made when students exit the course of study. For most students this will be after four units. For these students, judgments are based on exit folios providing evidence of achievement in relation to all objectives of the syllabus and standards.

For students who exit before completing four units, judgments are made based on the evidence of achievement to that stage of the course of study.

Determining a standard

The standard awarded is an on-balance judgment about how the qualities of the student's responses match the standards descriptors in each dimension. This means that it is not necessary for the student's responses to have been matched to every descriptor for a particular standard in each dimension.

Awarding an exit result

When standards have been determined in each of the dimensions for this subject, the table below is used to award an exit result, where A represents the highest standard and E the lowest. The table indicates the minimum combination of standards across the dimensions for each result.

Awarding exit results

Exit result	Minimum combinations of standards
A	Standard A in any two dimensions and no less than a B in the remaining dimension
B	Standard B in any two dimensions and no less than a C in the remaining dimension
C	Standard C in any two dimensions and no less than a D in the remaining dimension
D	At least Standard D in any two dimensions and an E in the remaining dimension
E	Standard E in the three dimensions

Further guidance can be found in the QCE and QCIA policy and procedures handbook.

3.3.5 Standards matrix

	Standard A	Standard B	Standard C	Standard D	Standard E
Knowing and understanding	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:
	• comprehensive description of concepts and ideas in aquatic contexts	• detailed description of concepts and ideas in aquatic contexts	• description of concepts and ideas in aquatic contexts	• superficial description of concepts and ideas in aquatic contexts	• partial description of aquatic information
	• concise and coherent explanation of concepts and ideas in aquatic contexts	• coherent explanation of concepts and ideas in aquatic contexts	• explanation of concepts and ideas in aquatic contexts	• disjointed explanation of concepts and ideas in aquatic contexts	• statements of information about aquatic contexts
	• proficient demonstration of a comprehensive range of skills in aquatic contexts.	• precise demonstration of a range of skills in aquatic contexts.	• demonstration of skills in aquatic contexts.	• basic demonstration of skills in aquatic contexts.	• guided demonstration of skills in aquatic contexts.
Analysing and applying	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:
	• discerning and logical analysis of information, situations and relationships in aquatic contexts	• logical analysis of information, situations and relationships in aquatic contexts	• analysis of information, situations and relationships in aquatic contexts	• identification of situations and relationships in aquatic contexts	• identification of aspects of situations and relationships in aquatic contexts
	• discerning and proficient application of knowledge, understanding and skills in aquatic contexts	• controlled application of knowledge, understanding and skills in aquatic contexts	• application of knowledge, understanding and skills in aquatic contexts	• basic application of knowledge, understanding and skills in aquatic contexts	• partial application of knowledge and skills in aquatic contexts
	• concise and coherent use of language conventions and features appropriate to aquatic contexts to communicate ideas and information, according to purpose.	• coherent use of language conventions and features appropriate to aquatic contexts to communicate ideas and information, according to purpose.	• use of language conventions and features appropriate to aquatic contexts to communicate ideas and information, according to purpose.	• use of basic language conventions and features to communicate ideas and information.	• disjointed use of language conventions to communicate information.

Planning and evaluating	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:	The student work has the following characteristics:
	• generation of insightful plans and procedures for activities in aquatic contexts	• generation of considered plans and procedures for activities in aquatic contexts	• generation of plans and procedures for activities in aquatic contexts •	• listing of aspects of plans and procedures for activities in aquatic contexts	• collection of information related to planning in aquatic contexts
	• comprehensive and systematic evaluation of the safety and effectiveness of activities in aquatic contexts	• detailed and reasoned evaluation of the safety and effectiveness of activities in aquatic contexts	• evaluation of the safety and effectiveness of activities in aquatic contexts	• identification of the safety and effectiveness of activities in aquatic contexts	• statements about aspects of the safety and effectiveness of aquatic activities
	• justified and valid recommendations with detailed evidence for activities in aquatic contexts.	• valid recommendations with evidence for activities in aquatic contexts.	• recommendations for activities in aquatic contexts.	• statements of opinion about activities in aquatic contexts.	• statements about aspects of activities in aquatic contexts.

4 Glossary

Term	Explanation
A	
analyse; analysis	dissect to ascertain and examine constituent parts and their relationships
applied learning	the acquisition and application of knowledge, understanding and skills in real-world and/or lifelike contexts
apply; application	use in a particular situation; make use of as relevant, suitable, or pertinent
appropriate	suitable to the context or activity
aquatic activities	practical activities designed to promote learning or experience associated with aquatic environments
aquatic context	an aquatic context is any setting or situation where aquatic activities take place
aspects	components, elements
B	
basic	elementary or simple
C	
coherent	logical and internally consistent relation of parts
collection	a group of accumulated items
communicate	convey information, knowledge and/or understanding to others
community (environmental context)	all the populations of different organisms that live together in a habitat
comprehensive	detailed and thorough, including all that is relevant; inclusive of a broad coverage of facts, ideas and information
concise	brief and to the point; without repetition of information, loss of clarity or logic of argument or solution
considered	formed after careful thought and relating to multiple parts of aquatic activities
controlled	exercise direction over
culture	the social practices of a particular people or group, including shared language, beliefs, values, knowledge, customs and lifestyle
D	
demonstrate; demonstration	give a practical exhibition
describe; description	give an account of characteristics or features
detailed	executed with great attention to detail; specific

Term	Explanation
discerning	showing good judgment to make thoughtful choices
disjointed	lacking in coherent, logical or connected sequences; fragmented, lacking connection
E	
ecosystem	a community and habitat in which it lives
effectiveness	the degree to which something is successful in producing a desired result
embed	implant an idea so that it becomes ingrained within a particular context
evaluate; evaluation	assign merit according to criteria; examine and judge the merit, significance or value of something
explain	provide additional information that demonstrates understanding of reasoning and/or application
explain (to others)	presenting a meaning with clarity, precision, completeness, and with due regard to the order of statements in the explanation
G	
generate; generation	produce or create something
guided	supported or directed by a teacher or mentor
H	
habitat	the place where organisms live
I	
idea	a thought, conception, notion; a way of thinking
identify; identification	distinguish, isolate; locate and recognise
information	aquatic information is described through the areas of study, topics, concepts, ideas, knowledge, understanding and skills
insightful	perceptive, demonstrating accurate and deep understanding
J	
justified	supported by logical reasoning or evidence, based on premises regarded as true
L	
language convention	an accepted practice that has developed over time and is generally used and understood; includes the use of specific structural aspects of texts, e.g. use of sections for introduction, background, discussion and recommendations in report writing
language features	the features of language that support meaning, e.g. sentence structure, noun group/phrase, vocabulary, punctuation, figurative language, framing, camera angles; choices in language features and text structures together define a type of text and shape its meaning; these choices vary according to the purpose of a text, its subject matter, audience, and mode or medium of production

Term	Explanation
list; listing	a number of connected items or names written or printed consecutively, typically one below the other
little	less, or fewer than required
logical	rational and valid; internally consistent
M	
module of work	a module of work provides effective teaching strategies and learning experiences that facilitate students' demonstration of the dimensions and objectives as described in the syllabus A module of work: • draws from relevant aspects of the underpinning factors • identifies relevant concepts and ideas, and associated subject matter from the core topics • provides an alignment between core subject matter, learning experiences and assessment.
multimodal	an assessment mode that uses a combination of at least two modes, delivered at the same time, to communicate ideas and information to a live or virtual audience, for a particular purpose the selected modes are integrated to allow both modes to contribute significantly to the multimodal response
O	
opinion	a view or judgment formed about something, not necessarily based on fact or knowledge
outcomes	results or consequences
P	
partial	attempted, with evidence provided, but incomplete
perform; performance	carry out or accomplish
plan (n.)	devising a procedure or process for accomplishing an activity
plan (v.)	organise into a coherent and meaningful schedule of sequenced actions that aim to competently deliver a predefined result
population	all the members of a single species that live in a habitat
practical	of, or concerned with, the actual doing or use of something rather than with theory and ideas
precise	characterised by definite or exact execution
procedure	an established or official way of using knowledge, understanding and skills when undertaking aquatic activities
process	a series of actions or steps taken to achieve a particular result
proficient	skilled and adept
purpose	the reason for which something is done or created or for which something exists

Term	Explanation
R	
range	the breadth of coverage, applicable to the context under study
reasoned	logical and sound; presented with justification
recall	ability to express information or understanding from memory
recommendation	a suggestion or proposal as to the best course of action
related	belonging to the same group, or type; connected
relationships	interdependent connections between people, between creatures and their environments, and between concepts and ideas
response	a verbal or written answer
S	
safety	the condition of being protected from or unlikely to cause danger, risk, or injury
service learning	a method of teaching that combines formal instruction with a related service in the community service learning integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and encourage lifelong civic engagement students learn and develop through active participation in an organised service that is coordinated with a school and conducted in, and meets the needs of, a community
situation	a set of circumstances subject to change
skill	a particular ability
solution	a means of solving a problem
statement	a sentence or assertion
superficial	apparent and sometimes trivial
systematic	methodical, organised and logical
U	
unit	a unit is 55 hours of timetabled school time, including assessment. A course of study will usually be completed over four units (220 hours).
V	
valid; validity	in science, the extent to which tests measure what was intended; the extent to which data, inferences and actions produced from tests and other processes are accurate (ACARA 2015c)

5 References

Abrams, E, Southerland, S & Silva, P 2008, *Inquiry in the classroom: realities and opportunities*, Information Age Publishing, Inc. North Carolina.

Australian Curriculum, Assessment and Reporting Authority (ACARA) 2015c, *The Australian Curriculum: Chemistry*, Version 8.2, http://www.australiancurriculum.edu.au/seniorsecondary/science/chemistry/curriculum/seniorsecondary#page=1.

Hackling, M 2005, *Working Scientifically: Implementing and assessing open investigation work in science*, Western Australia Department of Education and Training.

Harlen, M 2013, *Assessment and Inquiry-based Science Education: Issues in policy and practice*, Global Network of Science Academies Science Education Programme, Italy.

Krajcik, J, Blumenfeld, P, Marx, R & Soloway, E 2000, 'Instructional, curricular, and technological supports for inquiry in science classrooms', *Inquiring into Inquiry Learning and Teaching in Science*, Minstrell, J & van Zee, E (eds), American Association for the Advancement of Science, www.aaas.org/programs/education/about_ehr/pubs/inquiry.shtml.

Marzano, RJ & Kendall, JS 2007, *The New Taxonomy of Educational Objectives*, 2nd edition, Corwin Press, USA.

Rennie, L 2006, *The community's contribution to science learning: Making it count*, Proceedings of the Australian Council for Educational Research, Melbourne, p. 6.

Tytler, R 2007, *Re-imagining Science Education: Engaging students in science for Australia's future,* ACER Press, Camberwell, Victoria.

ISBN: 978-1-74378-006-0

Aquatic Practices Applied Senior Syllabus 2019

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