



NSW Syllabus for the Australian Curriculum

Marine and Aquaculture Technology

Content Endorsed Course

Years 7–10 Syllabus

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Introduction

The K–10 curriculum

The NSW Education Standards Authority (NESA) syllabuses are developed with respect to some overarching views about education. These include the NESA *K–10 Curriculum Framework* and *Statement of Equity Principles* and the *Melbourne Declaration on Educational Goals for Young Australians* (December 2008).

NESA syllabuses include agreed Australian Curriculum content and content that clarifies the scope, breadth and depth of learning. The Australian Curriculum achievement standards underpin the syllabus outcomes and the Stage statements for Early Stage 1 to Stage 5.

In accordance with the *K–10 Curriculum Framework* and the *Statement of Equity Principles*, the syllabus takes into account the diverse needs of all students. It identifies essential knowledge, understanding, skills, values and attitudes. It outlines clear standards of what students are expected to know and be able to do in Years 7–10. It provides structures and processes by which teachers can provide continuity of study for all students.

The framework also provides a set of broad learning outcomes that summarise the knowledge, understanding, skills, values and attitudes essential for all students in all learning areas to succeed in and beyond their schooling.

The continued relevance of the *K–10 Curriculum Framework* is consistent with the intent of the *Melbourne Declaration on Educational Goals for Young Australians* (December 2008), which sets the direction for Australian schooling for the next ten years. There are two broad goals:

- Goal 1: Australian schooling promotes equity and excellence
- Goal 2: All young Australians become successful learners, confident and creative individuals, and active and informed citizens.

The way in which learning in the *Marine and Aquaculture Technology CEC Years 7–10 Syllabus* contributes to the curriculum, and to students' achievement of the broad learning outcomes, is outlined in the syllabus rationale.

Diversity of learners

NSW syllabuses are inclusive of the learning needs of all students. Syllabuses accommodate teaching approaches that support student diversity, including students with disability, gifted and talented students, and students learning English as an additional language or dialect (EAL/D). Students may have more than one learning need.

Students with disability

All students are entitled to participate in and progress through the curriculum. Under the *Disability Standards for Education 2005*, schools are required to provide additional support or adjustments to teaching, learning and assessment activities for some students with [disability](#). [Adjustments](#) are measures or actions taken in relation to teaching, learning and assessment that enable a student with disability to access syllabus outcomes and content and demonstrate achievement of outcomes.

Students with disability can access outcomes and content from Years 7–10 syllabuses in a range of ways. Students may engage with:

- syllabus outcomes and content from their age-appropriate Stage with adjustments to teaching, learning and/or assessment activities; or
- selected syllabus outcomes and content from their age-appropriate Stage, relevant to their learning needs; or
- syllabus outcomes from an earlier Stage, using age-appropriate content; or
- selected Years 7–10 Life Skills outcomes and content from one or more syllabuses for students in Stages 4 and 5.

Decisions regarding curriculum options, including adjustments, should be made in the context of [collaborative curriculum planning](#) with the student, parent/carer and other significant individuals to ensure that syllabus outcomes and content reflect the learning needs and priorities of individual students.

Further information can be found in support materials for:

- [Technologies](#)
- [Special Education](#)
- [Life Skills](#).

Gifted and talented students

Gifted and talented students have specific learning needs that may require adjustments to the pace, level and content of the curriculum. Differentiated educational opportunities assist in meeting the needs of gifted and talented students.

Generally, gifted and talented students demonstrate the following characteristics:

- the capacity to learn at faster rates
- the capacity to find and solve problems
- the capacity to make connections and manipulate abstract ideas.

There are different kinds and levels of giftedness and talent. Gifted and talented students may also have learning disabilities and/or English as an additional language or dialect. These needs should be addressed when planning appropriate teaching, learning and assessment activities.

Curriculum strategies for gifted and talented students may include:

- differentiation: modifying the pace, level and content of teaching, learning and assessment activities
- acceleration: promoting a student to a level of study beyond their age group
- curriculum compacting: assessing a student's current level of learning and addressing aspects of the curriculum that have not yet been mastered.

School decisions about appropriate strategies are generally collaborative and involve teachers, parents/carers and students, with reference to documents and advice available from NESA and the education sectors.

Gifted and talented students may also benefit from individual planning to determine the curriculum options, as well as teaching, learning and assessment strategies, most suited to their needs and abilities.

Students learning English as an additional language or dialect (EAL/D)

Many students in Australian schools are learning English as an additional language or dialect (EAL/D). EAL/D students are those whose first language is a language or dialect other than Standard Australian English and who require additional support to assist them to develop English language proficiency.

EAL/D students come from diverse backgrounds and may include:

- overseas and Australian-born students whose first language is a language other than English, including creoles and related varieties
- Aboriginal and Torres Strait Islander students whose first language is Aboriginal English, including Kriol and related varieties.

EAL/D students enter Australian schools at different ages and stages of schooling and at different stages of English language learning. They have diverse talents and capabilities and a range of prior learning experiences and levels of literacy in their first language and in Standard Australian English. EAL/D students represent a significant and growing percentage of learners in NSW schools. For some, school is the only place they use Standard Australian English.

EAL/D students are simultaneously learning a new language and the knowledge, understanding and skills of a syllabus through that new language. They require additional time and support, along with informed teaching that explicitly addresses their language needs, and assessments that take into account their developing language proficiency.

The *ESL Scales* and the [*English as an Additional Language or Dialect: Teacher Resource*](#) provide information about the English language development phases of EAL/D students. These materials and other resources can be used to support the specific needs of EAL/D students and to assist students to access syllabus outcomes and content.

Marine and Aquaculture Technology Key

The following codes and icons are used in the *Marine and Aquaculture Technology CEC Years 7–10 Syllabus*.

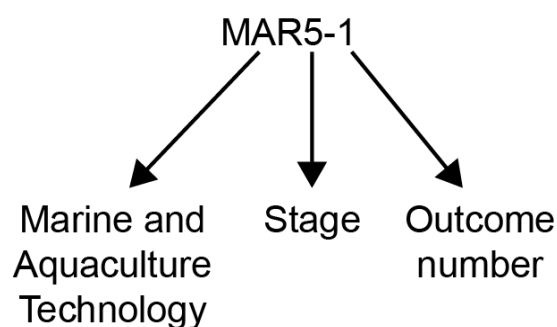
Outcome coding

Syllabus outcomes are coded in a consistent way. The code identifies the subject, Stage, outcome number and the way content is organised.

Stage 4, Stage 5 and Life Skills are represented by the following codes:

Stage	Code
Stage 4	4
Stage 5	5
Life Skills	LS

In the Marine and Aquaculture Technology syllabus, outcome codes indicate subject, Stage and outcome number. For example:

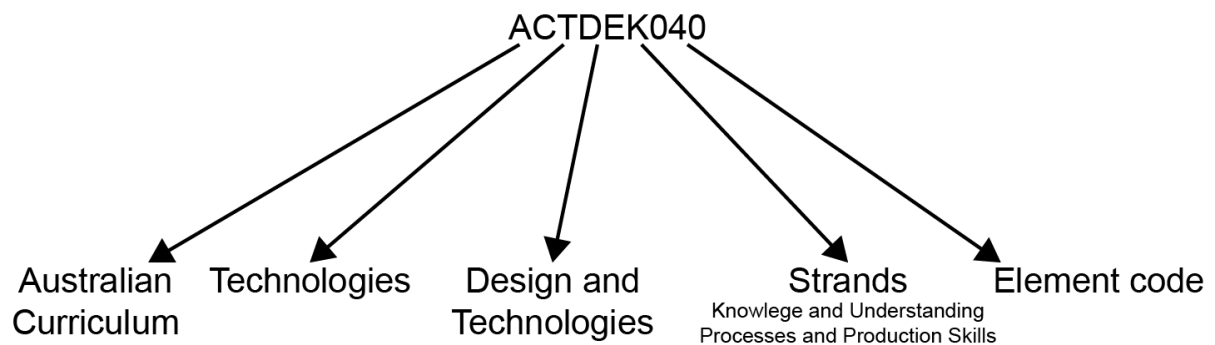


Outcome code	Interpretation
MAR5-1	Marine and Aquaculture Technology, Stage 5 – Outcome number 1
MARLS-3	Marine and Aquaculture Technology, Life Skills – Outcome number 3

Coding of Australian Curriculum content

The syllabus includes Australian Curriculum content for Design and Technologies with Australian Curriculum codes in brackets at the end of each content description, for example:

- Critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved (ACTDEK040)



Where a number of content descriptions are jointly represented, all description codes are included, eg (ACTDEK040, ACTDEK044).

For example:




- discuss the ethics of intensive and extensive aquaculture enterprises (ACTDEK040, ACTDEK044)










Learning across the curriculum icons

Learning across the curriculum content, including the cross-curriculum priorities, general capabilities and other areas identified as important learning for all students, is incorporated and identified by icons in the syllabus.




Cross-curriculum priorities

-  Aboriginal and Torres Strait Islander histories and cultures
-  Asia and Australia's engagement with Asia
-  Sustainability

General capabilities

-  Critical and creative thinking
-  Ethical understanding
-  Information and communication technology capability
-  Intercultural understanding
-  Literacy
-  Numeracy
-  Personal and social capability

Other learning across the curriculum areas

-  Civics and citizenship
-  Difference and diversity
-  Work and enterprise

Rationale

The oceans, inland waterways and other bodies of water cover more than 70 per cent of the Earth's surface and influence all forms of life on this planet. Of the 33 animal phyla, 28 are found in water; 13 of these are exclusively marine.

Internationally, the oceans are viewed either as areas rich in minerals and marine life which can supply our needs virtually without limit, or else as repositories for agricultural, industrial and domestic waste. Nationally, the United Nations declaration of the Australian Exclusive Economic Zone in 1994 effectively doubled this country's size and responsibilities. Australia now controls an area of the oceans that is 1.3 times the size of its landmass.

Marine and Aquaculture Technology in Years 7–10 fits into an emerging field of study relating to sustainability of marine and related environments. At a time of pressure on the marine environment there is a recognised need to deliver sound marine educational programs through formal structures within state and national curricula. Australians must be aware of and understand this fragile environment, and consider how to effectively manage 69 630 kilometres of coastline, 14.8 million square kilometres of continental shelf, 12 000 islands, 783 major estuaries and the life they contain.

The development of environmentally or economically sustainable methods of farming fish, molluscs, crustaceans and aquatic plants is now recognised as essential for relieving the pressure on wild fish stocks as well as on the marine and aquatic environment.

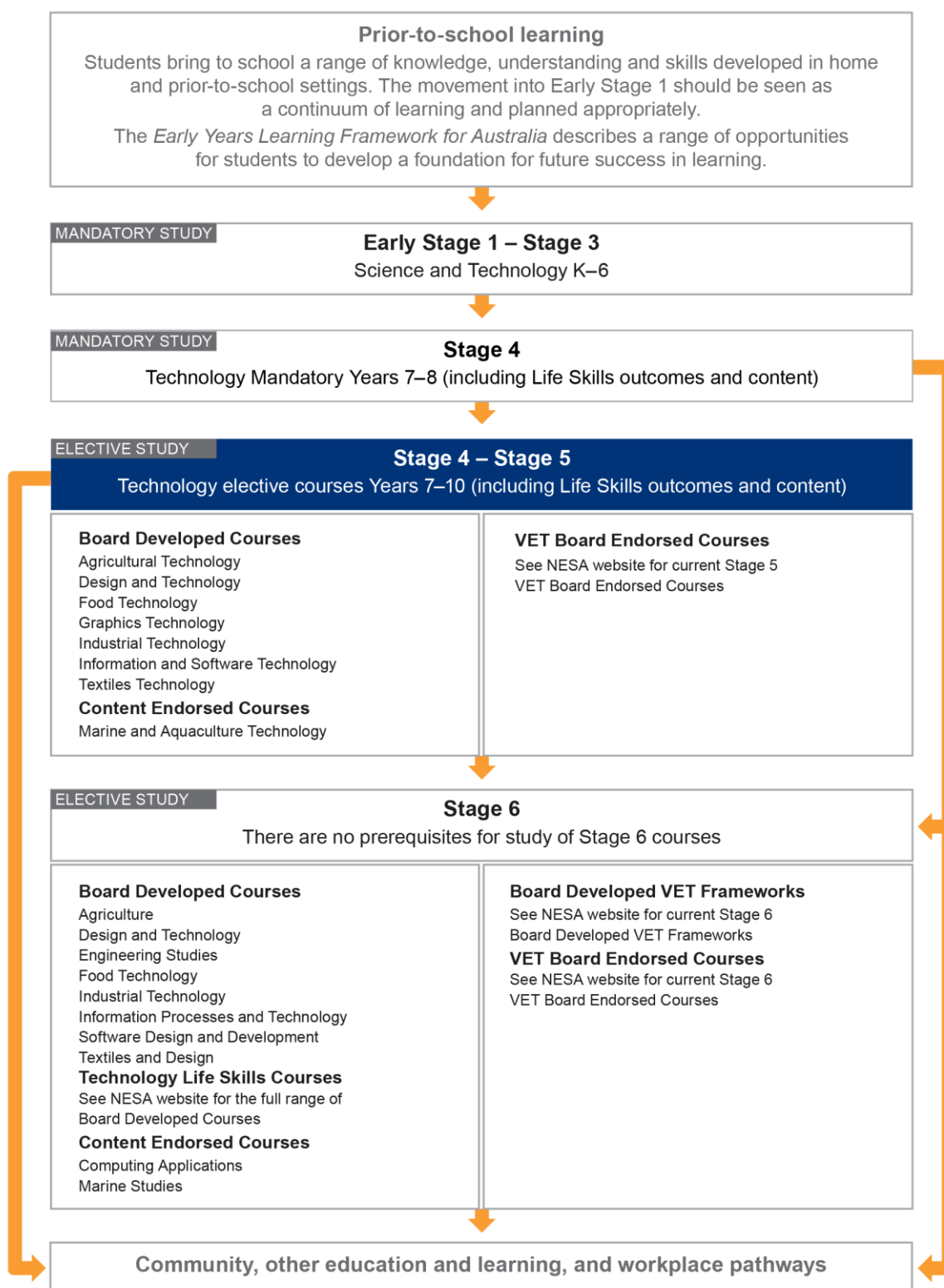
Marine and Aquaculture Technology provides an opportunity for the future custodians of this environment to study it and to appreciate its value. It gives them the opportunity to develop the necessary knowledge and skills to use and protect its unique ecosystems, and at the same time communicate their appreciation to the community. It provides an opportunity to instil in students an acceptable ethical code towards the use of the marine environment, increasingly demanded by the community and governments.

The knowledge, understanding and skills in the syllabus provide opportunities for students to make informed arguments for the maintenance of biodiversity and the sustainable use of marine ecosystems. Students are involved in project development relating to coastal areas and other water-related environments, as well as water-related enterprises and leisure activities.

Marine and Aquaculture Technology provides an educational context linked to the needs of a population based very much on Australia's coast and waterways and which fosters links to tertiary study and vocational pathways. Further, this syllabus brings a wide range of marine-based leisure experiences to students in a safe setting. Marine and Aquaculture Technology provides for both practical and theoretical learning, honing students' acquired skills to solve real-life problems.

By studying Marine and Aquaculture Technology students develop technological and scientific literacy. They increase their capacity to think critically by calling upon a wide range of knowledge, procedures and approaches to analyse issues and develop solutions. They are required to examine the impact of technology and human activity on the marine environment.

The Place of the Marine and Aquaculture Technology CEC Years 7–10 Syllabus in the K–12 Curriculum



Aim

The aim of the *Marine and Aquaculture Technology CEC Years 7–10 Syllabus* is to develop in students a capacity to design, produce, evaluate, sustain, use and manage marine and water-related environments.

Objectives

Knowledge, understanding and skills

Students develop:

- knowledge and understanding of marine and aquatic environments
- knowledge and understanding of the economic sustainability of aquaculture
- knowledge and understanding of the role of aquaculture in the preservation of wild seafood stocks and the marine environment
- knowledge, understanding and skills that promote ethical and sustainable practices in the use, management and protection of the marine environment
- knowledge, understanding and skills in the responsible selection and safe use of materials, equipment and techniques used in aquaculture and marine and maritime activities
- knowledge and understanding of the industries and organisations using, managing and regulating aquaculture and the marine environment
- knowledge and skills in researching, experimenting and communicating in marine and aquaculture contexts.

Values and attitudes

Students:

- appreciate the contribution and impact of innovation and technologies now and in the future
- appreciate the diversity of marine and aquatic environments
- appreciate the finite nature of marine and aquaculture resources and the impact of their use on the environment and society
- value the development of skills and gain satisfaction from their use to develop solutions to personal, social and global issues.

Outcomes

Table of objectives and outcomes – continuum of learning

Knowledge, understanding and skills

Objective

Students develop:

- knowledge and understanding of marine and aquatic environments

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-1 identifies the nature and scope of the marine and aquatic environment	MAR5-1 identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships
MAR4-2 identifies and describes the components of some marine ecosystems	MAR5-2 identifies, describes and evaluates the social and economic importance of marine ecosystems

Objective

Students develop:

- knowledge and understanding of the economical sustainability of aquaculture

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-3 investigates attitudes towards the marine environment as a fisheries resource	MAR5-3 identifies, describes and evaluates the effects humans have had on the marine environment
MAR4-4 investigates the effects human activity has had on native fish stocks	MAR5-4 explains why aquaculture provides an economically sustainable source of food

Objective

Students develop:

- knowledge and understanding of the role of aquaculture in the preservation of wild seafood stocks and the marine environment

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-5 identifies the nature and scope of aquaculture	MAR5-5 assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment
MAR4-6 investigates plant and animal species suitable for aquaculture	MAR5-6 evaluates the economic and environmental sustainability of aquacultural pursuits

Objective

Students develop:

- knowledge, understanding and skills that promote ethical and sustainable practices in the use, management and protection of the marine environment

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-7 identifies the need to care for and protect the marine environment	MAR5-7 identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment
MAR4-8 demonstrates sound and responsible judgement in their personal use of the marine environment	MAR5-8 identifies, describes and evaluates policies for monitoring and conserving the marine environment

Objective

Students develop:

- knowledge, understanding and skills in the responsible selection and safe use of materials, equipment and techniques used in aquaculture and marine and maritime activities

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-9 selects, organises, assembles, uses, dismantles, cleans and stores equipment appropriately	MAR5-9 selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings
MAR4-10 interprets and follows instructions with accuracy	MAR5-10 demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations

Objective

Students develop:

- knowledge and understanding of the industries and organisations using, managing and regulating aquaculture and the marine environment

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-11 identifies employment opportunities in aquaculture, marine and maritime industries	MAR5-11 identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits
MAR4-12 investigates the opportunities to join volunteer marine-based service organisations	MAR5-12 identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment

Objective

Students develop:

- knowledge and skills in researching, experimenting and communicating in marine and aquaculture contexts

Stage 4 outcomes A student:	Stage 5 outcomes A student:
MAR4-13 selects and presents the results of appropriate research from a variety of sources	MAR5-13 collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information
MAR4-14 uses appropriate language, signals, signs and conventions to communicate in marine contexts	MAR5-14 recalls aspects of the marine environment using relevant conventions, terminology and symbols

Stage 4 outcomes have been provided to assist the assessment and reporting of student achievement in those schools that choose to begin elective study before Year 9. Teachers are advised to select from the syllabus content to target the specific needs of students who commence study in Stage 4.

Stage Statements

Stage statements are summaries of the knowledge, understanding, skills, values and attitudes that have been developed by students as a result of achieving the outcomes for the relevant Stage of learning.

Stage 4 – Technology Mandatory

By the end of Stage 4, students explore problems and opportunities, considering functional, economic, environmental, social, technical and/or usability constraints. They investigate, select, justify and safely use a range of tools, materials, components, equipment and processes to develop, test and communicate design ideas using appropriate technical terms and technologies. Students plan, manage and evaluate the production of design solutions. They develop thinking skills to communicate the development of digital and non-digital solutions.

Students investigate how managed systems are used to sustainably produce food and fibre. They explain food selection and preparation, and food safety, and make informed and healthy food choices. Students collect and interpret data from a range of sources to assist in making informed judgements. They explain how data is represented in digital systems, and transmitted and secured in networks.

Students explain how force, motion and energy can be used in systems, machines and structures. They investigate characteristics and properties of a range of materials, develop skills and techniques in the use of a broad range of tools and safely apply them in the production of projects.

Students are responsible users of technology, capable of designing and producing solutions to identified needs or opportunities. They develop an appreciation of the contribution of technologies to their lives now and the impact of innovations for creating preferred futures. They develop an appreciation of the dynamic nature of design and production processes and how thinking skills are used to develop solutions to personal, social and global issues.

Stage 4 – Marine and Aquaculture Technology

By the end of Stage 4, students have the opportunity to further explore specialised technologies through the study of Marine and Aquaculture Technology.

They have opportunities to undertake practical design and technological activities that develop understanding of marine environments and the economic sustainability of aquaculture. They develop knowledge, understanding and skills in the selection and safe use of materials, equipment and techniques used in aquaculture and marine activities.

Stage 5 – Marine and Aquaculture Technology

By the end of Stage 5, the knowledge, skills and attitudes developed in the Technology Mandatory Years 7–8 are further enhanced through the study of Marine and Aquaculture Technology and implementation of associated practical activities.

Students recognise and assess the risks and WHS issues that are associated with marine activities. They apply design processes to modify, develop and produce original design solutions for a range of practical and research projects relevant to marine and related environments, enterprises and leisure activities.

Students explore the relationship between the physical and mechanical properties of a range of relevant and associated materials and marine resources and their functional applications. They identify and select appropriate resources for the participation of practical projects and activities.

Through experiences in a range of practical activities, students develop an appreciation of the value of working collaboratively with others in the achievement of common goals, gaining personal satisfaction and enjoyment. These skills form the basis that enables students to continue their learning experiences in many lifestyle and leisure activities.

Students identify and critically evaluate marine and aquaculture products and environmental solutions that have been well designed and produced, and which fulfil their intended function. They apply design criteria to the planning, development and evaluation of their projects.

Students investigate the impact of current and emerging technologies on society and the marine and related environments. They describe the effect of these technologies on the local and global environment and envisage future directions.

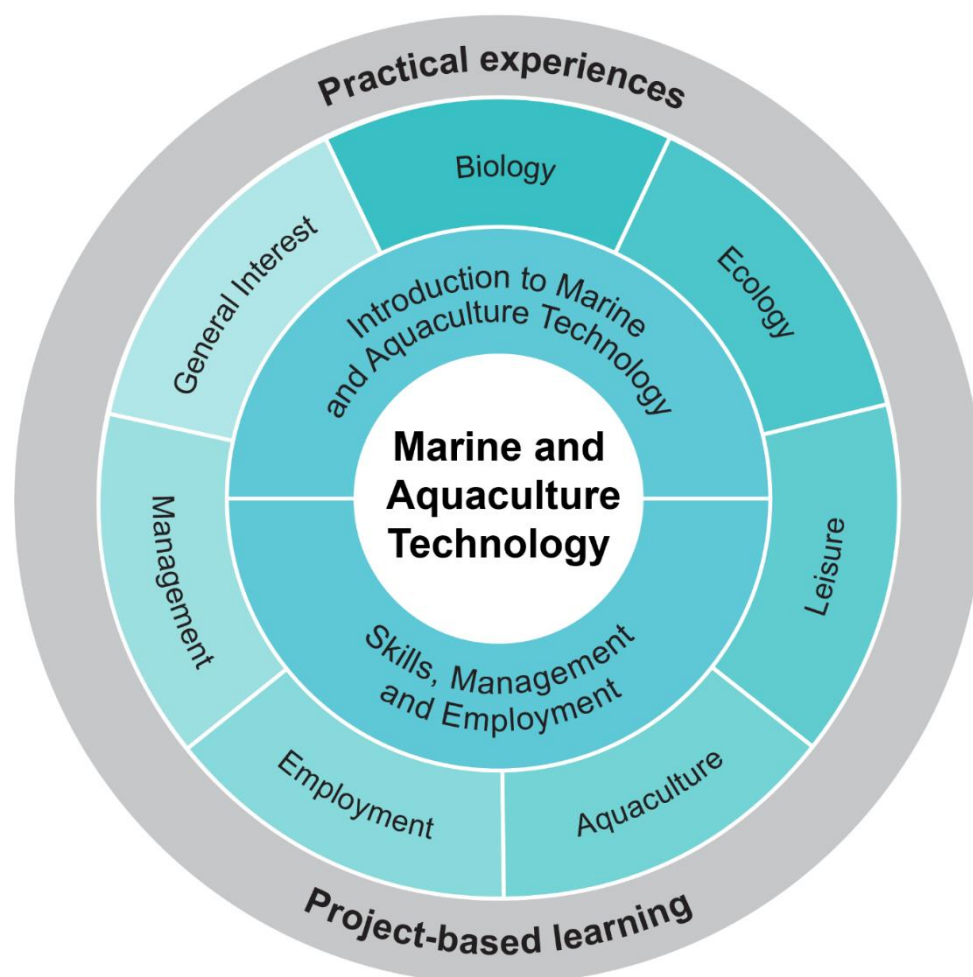
Content

For Kindergarten to Year 10, courses of study and educational programs are based on the outcomes of syllabuses. The content describes in more detail how the outcomes are to be interpreted and used, and the intended learning appropriate for the Stage. In considering the intended learning, teachers will make decisions about the sequence, the emphasis to be given to particular areas of content, and any adjustments required based on the needs, interests and abilities of their students.

The knowledge, understanding and skills described in the outcomes and content provide a sound basis for students to successfully move to the next stage of learning.

Organisation of content

The following diagram provides an illustrative representation of elements of the course and their relationship.



Course structure and requirements

The *Marine and Aquaculture Technology CEC Years 7–10 Syllabus* details the essential knowledge, understanding and skills necessary for students to achieve the syllabus outcomes and enable them to participate in further learning, training or employment, and enjoy their leisure time.

Core units are mandatory and contain essential content. Option modules contain content that is essential within that specific context.

Marine and Aquaculture Technology can be studied as a 100-hour or 200-hour course in Years 7–10. The syllabus contains mandatory Core units 1 and 2 and a sufficiently broad range of optional modules to enable students to achieve the syllabus outcomes through a course of study reflecting their interests, location and resources.

In the 100-hour course, students complete Core 1 and any five option modules.

In the 200-hour course, students complete Core 1, Core 2 and six option modules additional to those in the first 100 hours. Core 1 is to be studied at the beginning of the course and Core 2 is to be studied at the beginning of the second 100 hours of the course.

A range of student needs can be met using this model, and a variety of courses could operate within the one class or the one school. To assist course design the option modules have been grouped into focus areas.

Core

Core 1 – Introduction to Marine and Aquaculture Technology	25 indicative hours
Core 2 – Skills, Management and Employment	10 indicative hours

Option modules

Content is provided for a range of option modules in focus areas. Each module is designed for 15 hours indicative course time. Students can specialise by studying multiple modules from a focus area or can undertake a broad selection of modules from across focus areas.

Biology focus area

Module 1	Waterbirds of New South Wales
Module 2	Mangroves
Module 3	Microscopic Aquatic Organisms
Module 4	Marine and Aquatic Plants
Module 5	Marine Mammals
Module 6	Dangerous Marine Creatures

Ecology focus area

Module 7	The Oceans
Module 8	Rock Platforms
Module 9	Introducing Estuaries
Module 10	Living Together in the Sea
Module 11	Marine Pests and Threats
Module 12	Temperate Marine Ecosystems
Module 13	Antarctica's Marine Ecology
Module 14	The Abyss

Leisure focus area

Module 15	Watercraft Design, Construction and Repair
Module 16	Basic Snorkelling
Module 17	Open-Water Snorkelling
Module 18	Fish Harvesting
Module 19	Manufacturing Fishing Equipment
Module 20	Boatbuilding
Module 21	Sailing Theory and Practice

Aquaculture focus area

Module 22	Aquarium Design, Construction and Maintenance
Module 23	Underwater Farming
Module 24	Designing Systems for Aquaculture
Module 25	Economics of Aquaculture
Module 26	Growing Stockfeed for Aquaculture
Module 27	Biology of Native Crayfish
Module 28	Growing Crustaceans
Module 29	Fish Biology
Module 30	Managing Fish Production
Module 31	Managing Water Quality
Module 32	Pests and Diseases of Aquatic Organisms

Employment focus area

Module 33	Small Motorboats
Module 34	Advanced Motorboating
Module 35	Local Fishing Industries
Module 36	Food from the Sea
Module 37	Maritime Industries and Employment
Module 38	Tourism

Management focus area

Module 39	Coastal Management
Module 40	Tides and Currents
Module 41	Marine and Civil Engineering
Module 42	Saving Water Environments
Module 43	Recreational and Community Groups

General Interest focus area

Module 44	Shipwrecks and Salvage
Module 45	Basic Navigation
Module 46	Marine Disasters
Module 47	Personal Interest Project
Module 48	Local Area Study

100-hour course delivery

- Students must undertake a range of practical experiences that occupy the majority of course time.
- Core 1 is 25 indicative hours.
- Core 1 is to be taught individually at the beginning of the course.
- Five option modules must be delivered.
- Option modules may be taught individually, concurrently or integrated.
- Each option module is 15 indicative hours.

200-hour course delivery

- Students must undertake a range of practical experiences that occupy the majority of course time.
- Core 1 is 25 indicative hours.
- Core 1 is to be taught as a standalone module at the beginning of the course.
- Five option modules must be delivered in the first 100 hours.
- Core 2 is 10 indicative hours.
- Core 2 is to be taught as a standalone module at the beginning of the second 100 hours of the course.
- Six option modules must be delivered (additional to those in the first 100 hours).
- Option modules may be taught individually, concurrently or integrated.
- Each option module is 15 indicative hours.

Practical experiences

To satisfy the requirements of the syllabus, students must undertake a range of practical experiences that occupy the majority of course time. Practical experiences are used to develop knowledge and understanding of, and skills in, designing, producing and evaluating. Student capability, confidence and expertise at their current stage of development are important considerations in determining the teaching and learning sequences in the course.

Programs developed from this syllabus will have an emphasis on real-world experiences. The levels of student training, capabilities, confidence and expertise at their current stage of development are important considerations in determining the teaching sequence and choice of option modules. Programs will capitalise on the opportunities for skill development and the training of students in skills appropriate to their level of maturity and stage of physical and learning development.

Consideration of related school and systems policies, and accessing community knowledge and/or participation in the planning process, are important steps towards assuring the suitability of programs and teaching approaches. Teachers are encouraged to use Australian examples.

Students with disability may require adjustments and/or additional support in order to engage in practical experiences.

Safety

Schools have a legal obligation in relation to safety. Teachers need to ensure that they comply with relevant legislation as well as system and school requirements in relation to safety and risk management when implementing their programs. Schools should be aware of and refer to, the relevant safety guidelines of school authorities when conducting water-related activities.

This includes legislation and guidelines relating to Work Health and Safety, and the handling and storage of chemicals and dangerous goods. Teachers need to be aware of activities that may require notification, certification, permission, permits and licences.

Schools need to be aware of legal, ethical and cyber security considerations of information and communication technologies, including copyright and intellectual property, cultural considerations, accessibility, privacy issues and digital footprints.

Teachers need to be aware that students may have food or other allergies that can result in anaphylaxis, a severe and sometimes sudden allergic reaction which is potentially life-threatening and always requires an emergency response. This is an important consideration in selecting resources for plant or animal enterprises.

Animal welfare

Schools have a legal responsibility in relation to the welfare of animals. The keeping of animals and all practical activities involving animals must comply with relevant guidelines and legislation that are interpreted for schools on the [Animals in Schools](#) website.

Learning across the curriculum

Learning across the curriculum content, including the cross-curriculum priorities and general capabilities, assists students to achieve the broad learning outcomes defined in the *NESA K–10 Curriculum Framework* and *Statement of Equity Principles*, and in the *Melbourne Declaration on Educational Goals for Young Australians* (December 2008).

Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face.

The cross-curriculum priorities are:

- Aboriginal and Torres Strait Islander histories and cultures 🇺🇸
- Asia and Australia's engagement with Asia 🌏
- Sustainability 🌱

General capabilities encompass the knowledge, skills, attitudes and behaviours to assist students to live and work successfully in the 21st century.

The general capabilities are:

- Critical and creative thinking ⚙️
- Ethical understanding 🏛️
- Information and communication technology capability 💻
- Intercultural understanding 🌐
- Literacy 📖
- Numeracy 📊
- Personal and social capability 👤

NESA syllabuses include other areas identified as important learning for all students:

- Civics and citizenship 🇺🇸
- Difference and diversity 🌈
- Work and enterprise ⭐

Learning across the curriculum content is incorporated, and identified by icons, in the content of the syllabus in the following ways.

Aboriginal and Torres Strait Islander histories and cultures 🖐️

The syllabus provides students with opportunities to learn about how Aboriginal and Torres Strait Islander Peoples have developed and refined knowledge about the world through observation, making predictions, testing and responding to environmental factors within specific contexts. It emphasises the relationships people have with places and their interconnectedness with the environments in which they live. Students learn about Aboriginal and Torres Strait Islander Peoples' understanding of the environment and the ways that cultural knowledge and Western knowledge can be complementary. Students learn that there are different ways of interacting with the environment and how this can influence sustainability.

When planning and programming content relating to Aboriginal and Torres Strait Islander histories and cultures, teachers are encouraged to:

- involve local Aboriginal communities and/or appropriate knowledge holders in determining suitable resources, or to use Aboriginal or Torres Strait Islander authored or endorsed publications
- read the [Principles and Protocols](#) relating to teaching and learning about Aboriginal and Torres Strait Islander histories and cultures and the involvement of local Aboriginal communities.

Asia and Australia's engagement with Asia 🌐

Students have opportunities to explore the links that exist between Australia and Asia and appreciate how our interactions help to shape Australia's economy, areas of research and technological advancement. Students identify how the Asia region plays an important role in research and technological developments in areas such as natural resource management and natural disaster prediction and management.

Sustainability 🌱

Sustainability content is focused on renewable resources, the protection of the environment and sustainable patterns of living and requires consideration of environmental, social, cultural and economic systems and their interdependence. Students learn about the actions required to improve sustainability, helping them to take a more active role in shaping preferred futures.

Students investigate the relationships between system components, consider how systems respond to change and develop an appreciation of the impact that design solutions can have on the Earth's resources. They have opportunities to develop, sustain, use and manage marine and water-related environments.

Critical and creative thinking ⚙️

Critical thinking is at the core of most activities where students recognise or develop an argument, use evidence in support of an argument, draw reasoned conclusions, and use information to solve problems. Students are provided with opportunities to generate and apply new ideas in specific contexts, view existing situations in a new way, identify alternative explanations, and make links that generate a positive outcome. The marine and aquaculture skills and processes provide critical and creative thinking opportunities as students pose questions, make predictions, engage in firsthand investigations, design projects, solve problems and make evidence-based decisions.

Ethical understanding

Students develop capacity to behave ethically as they identify and investigate ethical concepts, values and principles, and understand how reasoning can assist ethical judgement. The syllabus provides opportunities for students to form and make ethical judgements in relation to design solutions, codes of practice, use of information and communication technologies and online collaborative environments.

Students apply ethical guidelines as they design projects, particularly when considering the implications for others and the environment. They learn about intellectual property, including Indigenous cultural and intellectual property and the protection of cultural knowledge and designs. Students are encouraged to demonstrate ethical digital citizenship, follow social and ethical protocols and understand the need to protect data and intellectual property.

Students develop knowledge and understanding of the place of ethical considerations in scientific and technological practice relating to marine and aquaculture activities.

Information and communication technology capability

This capability enables students to become effective users of information and communication technologies. Students engage with ICT when they develop ideas and solutions, solve problems, collaborate online and communicate information. Through computer simulations, ICT provides opportunities to view phenomena, test predictions and visualise designs that cannot be investigated or produced through practical experiences in the classroom, and may enhance students' understanding and engagement with technology.

Intercultural understanding

Students develop intercultural understanding and value their own culture and those of others as they engage with people from diverse cultural backgrounds in ways that recognise similarities and differences, create connections and cultivate respect. The syllabus provides opportunities for students to appreciate the contribution that diverse cultural perspectives have made to the development, breadth and diversity of technological knowledge and its applications. Students learn about and engage with issues requiring cultural sensitivity and recognise that people in technology-related professions work in culturally diverse teams. They learn about the interactions between technologies and society, and are provided with opportunities to take responsibility for securing positive outcomes for people from all cultural groups.

Literacy

The syllabus provides students with opportunities to develop skills in literacy to effectively communicate and comprehend using a variety of modes and media. Being 'literate' is more than the acquisition of technical skills – it includes the ability to identify, understand, interpret, create and communicate effectively using written, visual and/or digital forms of expression, developing the metalanguage associated with marine and aquaculture, including specific terms, concepts and processes.

Students develop an understanding that marine and aquaculture information can be presented in a variety of forms including diagrams, infographics, flow charts, models, tables and graphs.

Numeracy

Real-world numeracy connections are formed when numerical data is collected and manipulated, and numeracy concepts, such as size, proportion and measurement, are used by students. An appreciation of the fundamental importance of numeracy in everyday life is fostered as students develop an understanding of how numeracy is essential to marine and aquaculture activities. Students are provided with opportunities to learn data analysis skills, create technical drawings, use computer software, work with digital models and to appreciate the importance of accurate measurement in the production of quality products.

Numeracy skills are integral to the development of marine and aquaculture-related projects through measurement, calculation and costing of resources, foods and growth rates.

Personal and social capability

Students develop personal and social capability as they learn to understand and manage themselves, their relationships and their lives more effectively. This provides students with opportunities to establish positive relationships, work effectively both individually and collaboratively, and resolve difficult situations. The syllabus encourages students to explore, question, solve problems and develop skills in communication, display initiative, set goals and make responsible decisions.

Civics and citizenship

The syllabus provides students with opportunities to become self-reliant and active members of a society driven by change, emerging technologies and increasingly sophisticated communication and information systems. Students broaden their understanding of civics and citizenship in relation to the application of technological advances and the development of environmental and sustainable practices. Students have opportunities to develop a sense of local responsibility and global citizenship as they advance Australia through their investigations and future-focused solutions.

Difference and diversity

Difference and diversity comprises gender, ethnicity, ability and socioeconomic circumstances. The syllabus provides students with opportunities to develop their awareness, understanding and appreciation of difference and diversity within their lives and the wider community. Students have opportunities to work collaboratively and develop an appreciation of the values and ideas of all group members. This also enables them to identify individual rights, challenge stereotypes and engage with opinions different to their own.

Work and enterprise ★

Students are encouraged to develop initiative, and to become independent thinkers and confident communicators. They learn to identify and describe a range of marine and maritime vocations and volunteer organisations. Students develop an understanding of careers associated with marine and aquaculture technologies and learn skills relevant to work and leisure activities.

Students are provided with opportunities to safely manage and produce projects, and to appreciate quality of work. The application of design and production processes can provide students with work-related skills including individual and collaborative work practices.

Content for Years 7–10

Core 1: Introduction to Marine and Aquaculture Technology

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-6, MARLS-7, MARLS-8, MARLS-10, MARLS-11

Content focus

Core 1 outlines the structure of the course for students. It is a practical unit covering the nature of the marine environment and the impacts it can have on humans and equipment. It teaches the basic skills needed to work safely in this environment.

Content





Introduction to Marine and Aquaculture Technology

Students:

- identify safety procedures for laboratory and fieldwork
- identify the location of all marine equipment, including safety equipment
- describe the contribution of a range of cultures on the marine environment 🤝🌐🌿



Water safety

Students:

- investigate the common causes of drowning in New South Wales each year 
- identify safe water practices in a variety of marine activities including: 
 - young children around water
 - swimming at the beach, in pools or in bodies of water, eg lakes or rivers
 - boating, boardriding, windsurfing, jetskiing, waterskiing, canoeing, kayaking or any other relevant water activity
 - safe fishing practices, including from rocks, the beach and boats
- identify dangerous local fishing spots and list the conditions that would make them dangerous 
- identify rips at a beach
- demonstrate that they can:
 - swim 200 metres in still water
 - swim 25 metres fully clothed
 - swim 10 metres underwater
 - tread water for 3 minutes
- demonstrate a variety of skills that could assist them in maintaining their safety, for example: 
 - remove clothing while treading water
 - make a trouser-float
 - correctly fit a life jacket
 - simulate swimming out from under a capsized boat





General first aid

Students:

- outline the steps of DRSABCD during first aid treatment
- investigate and demonstrate the first aid required to treat the following conditions:  
 - bleeding, cuts and abrasions
 - soft tissue injuries, including sprains and bruises
 - foreign bodies, eg oyster shell, stingray barbs, sea urchins
 - envenomation from a variety of organisms, eg bluebottles, box jellyfish, stonefish and blue-ringed octopus
- identify the causes and treatment of breathing difficulties
- identify the causes and treatment of shock
- identify the causes and treatment of hypothermia and hyperthermia

Maintaining equipment used in water

Students:

- identify destructive forces found in the marine environment, for example: 
 - effect of salt on the oxidation of metals
 - erosion of coastal landforms by tidal and wave energy
- practise the skills required to clean, dry and store personal equipment, for example:
 - swimwear and snorkelling equipment
- investigate the effects of salt, water, sunlight and living things on common equipment 
- investigate the effects of sunscreen, outboard fuel and solvents on swimwear 
- demonstrate the procedures to maintain equipment, for example: 
 - personal swimming or snorkelling gear
 - fishing equipment
 - aluminium dinghies, outboard motors or passive craft

The marine environment

Students:

- describe the physical features of the marine environment and the effects these have on marine life
- compare and contrast the chemical and physical features of the marine and terrestrial environments including: ⚙️ 🖥️ 📖
 - variation in temperature
 - viscosity
 - concentration of gases
 - availability of light
 - pressure
 - heat loss
- perform a practical investigation to determine the salt content of seawater 🧪 📖
- describe the importance of the marine environment and outline some of the major threats to marine environments 🌊 🖥️ 📖
- outline ways in which Aboriginal Peoples use the marine environment 🙌

Core 2: Skills, Management and Employment

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment MAR5-12
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-1, MAR4-3, MAR4-7, MAR4-11, MAR4-12, MAR4-13

Related Life Skills outcomes: MARLS-1, MARLS-3, MARLS-6, MARLS-8, MARLS-9, MARLS-10

Content focus

Core 2 is a practical unit designed to re-accredit students in water safety and first aid for their water work in the second half of the 200-hour course. It also introduces students to the statutory bodies and the volunteer organisations that combine to manage the use of the marine environment in a safe and responsible manner. Core 2 is designed to provide opportunities for students to develop awareness of the roles played by each organisation and encourage them to participate in a volunteer body.

Content

Water safety re-accreditation

Students:

- recall safe water practices in a variety of marine activities including:
 - young children around water
 - swimming at the beach, in pools or in bodies of water, eg lakes or rivers
 - boating, boardriding, windsurfing, jetskiing, waterskiing, canoeing, kayaking or any other relevant water activity
 - safe fishing practices, eg from rocks, the beach and boats
- demonstrate that they can:
 - swim 200 metres in still water
 - swim 25 metres fully clothed
 - swim 10 metres underwater
 - tread water for 3 minutes
 - remove clothing while treading water

General first aid

Students:

- investigate and demonstrate first aid required for common marine-related injuries, for example: 🧑🏻🧑🏻
 - bleeding and shock
 - respiratory difficulties
 - hypothermia
 - foreign bodies, eg oyster shell, stingray barbs, sea urchins
 - envenomation from a variety of organisms including blue bottles, box jellyfish, stonefish and blue-ringed octopus
- demonstrate DRSABCD using mannequins
- demonstrate that they are able to apply first aid to common marine-related injuries 🧑🏻🧑🏻

Management and employment

Students:

- identify statutory bodies and volunteer organisations that regulate and manage aquatic habitats 📖 🧑🏻🌿
- research the roles and responsibilities of NSW government agencies, non-government agencies and volunteer groups who manage and care for the marine environment 📖
- describe how Aboriginal and Torres Strait Islander Peoples have managed the marine environment using customary and contemporary practices 🧑🏻🌿
- investigate employment opportunities and the recruitment procedures with the organisations outlined above 📖 🧑🏻🌿
- investigate further education related to Marine and Aquaculture Technology 📖 🧑🏻🌿
- investigate the daily routine of a volunteer marine operations centre 🧑🏻🌿

Focus area: Biology – Module 1 Waterbirds of New South Wales

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-6, MARLS-7, MARLS-11










Content focus

This module introduces the variety and abundance of waterbirds found along the NSW coastline. This module provides an ideal opportunity to highlight those species that migrate to the NSW coastline each year as well as native Australian species.

Content

Identifying and describing waterbirds

Students:

- identify the main species of waterbirds (both migratory and non-migratory) in New South Wales using observations and photographs
- map the migratory paths of at least three different species of waterbird   
- observe and record the behaviours of waterbirds in a feeding group 
- describe adaptations of waterbirds that make them different from land birds 
- identify and represent the characteristics of waterbirds through practical activities including models, mobiles or ICT 
- construct a database of the species present in waterbird communities based on the collection of feathers   

The importance of waterbirds

Students:

- outline the importance of waterbirds in Aboriginal and/or Torres Strait Islander cultures 🖐️
- identify, describe and evaluate the social and economic importance of waterbirds in New South Wales 🗨️
- describe the interaction between humans and waterbirds in New South Wales and the effects on waterbird numbers 🌿
- identify organisations that are working to protect waterbirds in New South Wales and the methods they are using 🌿 📺 ⭐

Focus area: Biology – Module 2 Mangroves

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-6, MARLS-7, MARLS-11





Content focus

This module investigates the scope and importance of mangrove communities in New South Wales. Students consider the vulnerability of these communities and threats to them as the population increases in coastal areas.

Content

Describing mangrove environments

Students:

- describe the physical features of a mangrove environment 
- use secondary sources to determine the distribution of mangroves in New South Wales 
- identify and describe common mangrove species found in New South Wales 
- describe the adaptations of mangrove species, including: 
 - changing salt concentrations of water
 - aeration
 - seed dispersal
- conduct a firsthand investigation to examine mangrove leaves
- identify common marine animals found in a mangrove environment
- describe the importance of mangroves to the life cycles of fish, crustaceans and molluscs
- construct a food web for a mangrove community

Protecting mangrove ecosystems

Students:

- identify and describe threats facing mangrove communities in New South Wales 🌿
- identify areas in New South Wales where mangroves have been removed 🖥️
- describe sustainable practices used to protect mangrove communities 🌿
- recall the importance of mangroves as a source of food, medicines and materials for Aboriginal and Torres Strait Islander Peoples and the sustainable practices used to protect mangrove communities 🌿🌿🖥️
- discuss how opinions may differ on the need to protect mangrove communities considering social, economic and environmental impacts (ACTDEK040) 🌿⚙️⚖️

Focus area: Biology – Module 3 Microscopic Aquatic Organisms

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-9, MAR4-10, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-7, MARLS-11

Content focus

This module introduces the variety, abundance and importance of the microscopic aquatic organisms that make up plankton. Students explore the vast numbers of these organisms that are too small to be seen with the human eye and their importance to the food chain.

Content

Students:

- compare and contrast permanent and temporary plankton 📖
- describe the differences between zooplankton and phytoplankton 📖
- examine and identify features of plankton under a light microscope
- identify that phytoplankton are a photosynthetic plant
- identify that phytoplankton are a major source of oxygen in our atmosphere
- design and construct a food pyramid featuring both phytoplankton and zooplankton and use this information to evaluate the importance of plankton in marine ecosystems ✂ ⚙
- conduct a firsthand investigation to examine the effect of oil on plankton or hay infusion microbes
- design, produce and evaluate a plankton net (ACTDEP051) ⚙

Focus area: Biology – Module 4 Marine and Aquatic Plants

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-9, MAR4-10, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-7, MARLS-11

Content focus

This module introduces the variety and importance of plants found in water. Many marine and aquatic plants are very different from terrestrial plants – all are important as producers in aquatic food webs.

Content

Students:

- outline the role of plants as producers in an ecosystem
- identify the main types of plants found in the sea and oceans
- describe the difference between cyanobacteria, diatoms and dinoflagellates 🦠
- describe the characteristics of algae 🌊
- describe the different types of seagrasses and outline their importance as a marine ecosystem 🌊
- compare and contrast dune plants and aquatic plants
- conduct a firsthand investigation on an aquatic plant, for example:
 - growing seagrass from rhizomes
 - trawling for phytoplankton
 - extracting agar from seaweed
- identify the features of marine plants from local aquatic environments, for example:
 - make a dried algal display from seaweeds found on local beaches
- investigate foods found in local supermarkets that contain ingredients made from marine algae
- create life cycle diagrams for *Ulva* or *Zostera*

Focus area: Biology – Module 5 Marine Mammals

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems
MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment
MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment
MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment
MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings
MAR5-9
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols
MAR5-14

Related Stage 4 outcomes: MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-14

Related Life Skills outcomes: MARLS-2, MARLS-3, MARLS-6, MARLS-7, MARLS-11



Content focus

This module introduces the biology of marine mammals. Students explore the anatomical and physiological features of a range of marine mammals and have the opportunity to complete a 'case study' of a mammal of interest to them.

Content







Physical features of marine mammals

Students:

- identify the general characteristics of marine mammals
- identify the anatomy of a marine mammal from a range of sources, for example: 
 - skeleton
 - model
 - animation
- describe the basic anatomical parts of a variety of marine mammals
- describe the basic physiology of a variety of marine mammals
- compare and contrast the physiology of marine mammals and humans 

The importance of marine mammals

Students:

- investigate the importance of marine mammals across different cultures, including Aboriginal and/or Torres Strait Islander cultures  
- investigate the use of marine mammals for food across different cultures, including Aboriginal and/or Torres Strait Islander cultures  
- identify and describe threats facing marine mammals across the world 
- outline the practices currently being used to protect marine mammals 

- research a selected marine mammal and prepare a presentation outlining its basic anatomy and physiology, life cycle and diet, adaptations, distribution and economic importance 🖥️ 📺

Focus area: Biology – Module 6 Dangerous Marine Creatures

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-3, MAR4-7, MAR4-9, MAR4-10, MAR4-14

Related Life Skills outcomes: MARLS-3, MARLS-6, MARLS-7, MARLS-11



Content focus

This module explores the characteristics and behaviour of a range of dangerous marine creatures to assist students to avoid contact with them. Students investigate historical and societal perspectives of dangerous marine creatures and the impact this has on human activity in marine environments.

Content





Identifying and describing dangerous marine creatures

Students:

- classify dangerous marine creatures as either active or passive by their actions
- identify dangerous marine creatures as active or passive from photographs or preserved specimens
- identify the warning signs of aggression in sharks
- describe the territorial nature of saltwater crocodiles and relate this to attacks on humans
- investigate the contemporary treatment of injuries caused by dangerous marine creatures, for example:  
 - stingray slash
 - jellyfish sting
 - bullrout or stonefish sting
 - sea snake bite
 - blue-ringed octopus bite

Society's perceptions of dangerous marine creatures

Students:

- investigate the psychology behind people's fear of dangerous marine creatures, including the role of films and journalism in creating myths and phobias  
- debate the statement – 'What we don't understand we fear and what we fear we fight'  

Focus area: Ecology – Module 7 The Oceans

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-7, MAR4-9, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-6, MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces students to the formation, size and nature of the world's oceans.

Content

Identifying and describing oceans



Students:

- describe the difference between an ocean and a sea and define other relevant terms including bay, gulf and strait 🌊
- identify the major oceans and seas of the world
- label major oceans and seas on a world map
- describe the significance of Aboriginal and/or Torres Strait Islander ocean-based creation narratives 🗑️
- describe the difference between the continental shelf, continental slope and abyssal plain
- draw and label a scaled diagram of an ocean profile 📐
- use graphs to compare ocean depths to mountain heights 📐

Ocean ecosystems

Students:

- describe the personal, historical, cultural and/or economic importance of oceans to individuals and societies 🌐
- describe the difference and significance of Freshwater and Saltwater Country/Place for Aboriginal or Torres Strait Islander Peoples 🗑️
- outline the water cycle and investigate the importance of oceans as part of this cycle 🖥️
- describe the effect of climate on oceans 🌿

- investigate the physical conditions of marine environments at various ocean depths, for example: 
 - light penetration
 - light wavelength absorption
 - temperature variation
 - salinity
- identify animals and plants that inhabit the deepest parts of the oceans and describe the adaptations that allow them to survive 

Focus area: Ecology – Module 8 Rock Platforms

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-7, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-6, MARLS-10, MARLS-11

Content focus

This module introduces rock platforms and the animals and plants that commonly live there. Students investigate the harshness of the rock platform habitat and the adaptations that organisms living on it need for survival.

Content

Rock platform ecosystems

Students:

- create a cross-section of a rock platform
- describe the physical features affecting organisms on a rock platform, including temperature, light, wave action, wind speed, and direction and salinity of the water in rock pools 🌊
- identify and describe plants and animals commonly found on rock platforms
- classify animals on rock platforms as either browsers, carnivores, scavengers, detritus feeders or filter feeders
- construct food chains and food webs for rock platform ecosystems
- describe adaptations of organisms found on rock platforms that allow them to survive in this environment

Human and natural impacts on rock platform ecosystems

Students:

- investigate the importance of rock platforms as a: 🏠
 - nursery for juvenile fish and crustaceans
 - food source for marine animals and birds
 - place to live and shelter
- describe the importance of rock platforms for Aboriginal and/or Torres Strait Islander Peoples and the sustainable practices protecting these ecosystems 🤝🌱
- describe human and natural factors that can disrupt a rock platform ecosystem 🏠
- outline steps that can be taken to reduce the impact of human activity on rock platforms 🌱

Focus area: Ecology – Module 9 Introducing Estuaries

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-7, MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-6, MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces the complexities and fragility of estuarine ecosystems. Students explore the importance of and relationships between estuaries and larger marine ecosystems. Students have opportunities to monitor estuaries and consider the need to conserve them.

Content

Physical features of estuaries

Students:

- define the term 'estuary' 🗨️
- identify the physical features of an estuary
- describe different types of estuaries 🗨️
- locate and label natural and introduced features on a map of a local estuary, for example: 🗨️ 🗺️
 - mangroves and seagrass beds
 - sandbars, channels and islands
 - middens and fish traps
 - bridges, wharves and other artificial structures
- outline the importance of seagrasses to estuarine food webs
- conduct a firsthand investigation to examine seagrass specimens
- investigate the importance of estuaries as the interface between land and sea as well as sources of shelter and food for marine organisms

Human interactions with estuaries

Students:

- describe human uses of estuaries, including commercial and non-commercial uses ★
- describe the importance of estuaries for Aboriginal and/or Torres Strait Islander Peoples and the sustainable practices for protecting them, for example: 🤝🌐
 - sea rights determination, eg Blue Mud Bay decision
- evaluate the importance of estuaries in the life cycles of many marine species ⚙️
- communicate information and present ideas that outline the importance of protective environmental measures for estuaries, for example: 🌱⚙️💻
 - design and produce posters advertising the need to protect estuaries

Focus area: Ecology – Module 10 Living Together in the Sea

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-11



Content focus

This module investigates the relationships between organisms living together in the sea. It provides an ideal context in which to examine a range of relationships, both beneficial and harmful, between marine creatures.

Content


Describing environments in the sea

Students:

- define the terms 'habitat' and 'ecosystem' 
- identify and describe different habitats and ecosystems in the sea
- investigate modern techniques and technologies used to study the sea 

The interactions of organisms in the sea

Students:

- identify and compare structural, physiological and behavioural adaptations of marine organisms
- describe the territorial behaviour of fish, either in an aquarium or video 
- classify organisms as producers, consumers and decomposers
- classify organisms as herbivores, carnivores, omnivores or detritivores
- construct food chains and food webs for different regions of the ocean
- outline the different relationships between organisms in the sea, including predation, competition, mutualism, commensalism and parasitism
- identify detrital feeders and outline their importance in marine environments

Focus area: Ecology – Module 11 Marine Pests and Threats

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-7, MAR4-8, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-6, MARLS-10, MARLS-11





Content focus

This module introduces an awareness of the pests and threats that can affect the NSW marine environment, and the measures that can minimise their impact on the environment and economy.

Content

Marine pests

Students:

- identify common marine pests
- describe the different effects marine pests may have, for example:
 - competition for food
 - competition for space
 - production of toxins
 - predation
- map the major outbreaks of an identified marine pest, for example:
 - Crown-of-thorns starfish
- investigate the effects of one introduced pest species on a marine ecosystem 
- investigate strategies that are currently being used to manage marine pests and evaluate the impact of these strategies   

Marine threats

Students:

- identify the difference between a 'pest' and a 'threat' 🖨️
- identify a variety of threats facing marine environments locally and/or globally
- investigate ballast water and describe why this is a 'marine threat' 🖨️
- describe the methods being used to reduce the risk of introducing pest species in ballast water and evaluate their effectiveness
- investigate historical ballast dumps in NSW waterways 🖨️
- discuss the transport of fouling organisms
- investigate the role played by government authorities in protecting the marine environment from marine pests and threats 🖨️ 🖨️

Focus area: Ecology – Module 12 Temperate Marine Ecosystems

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-7, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-6, MARLS-10, MARLS-11


Content focus

This module explores the features of temperate marine ecosystems. Students investigate the relationships between plants, animals and human activity within temperate marine ecosystems.

Content




The features of temperate marine ecosystems

Students:

- identify the physical characteristics of temperate marine ecosystems
- compare and contrast the features of temperate and tropical sea water
- compare and contrast the features of temperate and tropical marine ecosystems
- describe the impact of climate on temperate marine ecosystems 

Organisms and their relationships in temperate marine ecosystems

Students:

- investigate marine animal and plant life found in temperate marine ecosystems 
- describe the effect of human activity on temperate marine ecosystems
- investigate the types of thermal protection needed in temperate and cold water 
- construct temperate water food chains and food webs
- use ICT to track water movements around Australia 

Focus area: Ecology – Module 13 Antarctica's Marine Ecology

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-10, MARLS-11



Content focus

This module introduces the marine ecosystems around the continent of Antarctica. Students investigate the effects of the Antarctic Convergence or high oxygen levels on marine life in the region.

Content


Features of Antarctica

Students:

- identify and describe the features of the Antarctic continent, for example:
 - label significant features or locations on a map of Antarctica
- describe the climate and weather conditions that impact the marine environment in Antarctica
- investigate the work of early Antarctic explorers, including Sir Douglas Mawson 
- investigate the use of ICT to monitor and assess environmental conditions in Antarctica, for example: 
 - access websites to view remote sensors and webcams located in Antarctica

Antarctic ecosystems

Students:

- outline the Antarctic Convergence and how it affects the richness of Antarctic waters
- identify and describe marine life found in Antarctica, for example:
 - krill
 - phytoplankton
 - birds
 - mammals
 - fish
- examine krill specimens, photographs or videos from Antarctica and outline their importance as part of the Antarctic ecosystem 
- construct food chains and food webs for Antarctic ecosystems
- describe the social, environmental, ecological and scientific importance of Antarctica and the impact of human exploration in this area ✨

Focus area: Ecology – Module 14 The Abyss

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-10, MARLS-11





Content focus

This module explores the conditions and life forms found in the ocean depths and highlights the emerging knowledge of the deep oceans.

Content



Describing the abyss

Students:

- identify areas of the world's oceans that are abyssal
- describe the physical features of the abyssal zone, for example:
 - light
 - temperature
 - dissolved oxygen
 - pressure
- investigate methods and technologies used by scientists to examine the abyssal zones   
- investigate the latest findings and discoveries of the Australian abyssal zones 

Organisms of the abyss

Students:

- identify and describe features of life forms that inhabit abyssal zones
- describe the adaptations of life forms for survival in an abyss, for example: 
 - bioluminescence
- compare and contrast life forms on the continental shelf with those in the abyss 

Focus area: Leisure – Module 15 Watercraft Design, Construction and Repair

Outcomes

A student:

- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-7, MARLS-8, MARLS-10, MARLS-11

Content focus

This module provides opportunities for students to investigate the materials and processes used in the construction and maintenance of watercraft. Students explore elementary design and materials used in construction that dictate the performance of craft.

Content

Design features and construction of watercraft

Students:

- identify and describe the specific roles of a surfboard manufacturer ★
- outline design features relating to the performance of a surfboard, including size, rocker, plan shape, fins, fin placement, bottom shape, rail shape, thickness (ACTDEK043)
- describe materials and construction techniques used in the manufacture of surfboards
- develop a fabrication sequence for a conventional surfboard ⚙️
- investigate technologies used in surfboard, waterski or kayak construction, eg epoxy, carbon fibre, wood laminates, vacuum bagging 📺
- investigate employment opportunities related to watercraft industries ★

Repairing watercraft

Students:

- describe the stages in the repair of fibreglass craft
- demonstrate skills needed for the repair a fibreglass watercraft, for example: (ACTDEP050) ⚙️
 - a simple shatter
 - a rail or penetration ding
 - fin cracks or fin replacement
 - stress marks
 - application of textured deck to strengthen a depressed board
 - wear appropriate PPE
- demonstrate skills needed for the repair of an inflatable watercraft, for example: ⚙️
 - inspect and test for damage
 - apply a patch

Focus area: Leisure – Module 16 Basic Snorkelling

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-3, MAR4-9, MAR4-10, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-3, MARLS-7, MARLS-8, MARLS-11

Content focus

This module introduces students to the theory and practice of snorkelling. It aims to encourage lifelong skills that enable students to safely enjoy viewing marine life in shallow water.

Content

Understanding snorkelling

Students:

- investigate methods used by people throughout history to swim underwater 🏊
- identify and describe reasons for snorkelling, for example: ⭐
 - recreational pastime
 - tourism and economic importance
- identify and describe the features of snorkelling equipment
- identify features that should be considered when purchasing basic snorkelling equipment
- investigate the effects of exposure to water and water pressure on the human body and outline methods used to reduce their impact 🧑🏻🧑🏻🧑🏻

Snorkelling skills and safety

Students:

- justify safety rules for snorkelling, for example: 🧑🏻🧑🏻
 - the importance of the buddy system
 - need for a 'diver below' flag
 - understanding how shallow water blackout occurs
- demonstrate standard hand signals used when snorkelling, for example: 🧑🏻🧑🏻
 - ok (from close up)
 - ok (from a distance)
 - need help
 - go up and go down

- demonstrate skills needed for snorkelling, for example: 🧑🏊
 - scull 50 metres
 - duck dive to 2 metres depth
 - defog a mask
 - fit a mask and fins correctly
 - fin 400 metres
 - clear mask underwater
 - recover a coin in 2 metres of water
 - swim 50 metres with snorkel but no mask
 - treat a leg cramp in a buddy
 - use a tired snorkeller tow for 50 metres
 - support an unconscious buddy for 5 minutes in deep water
 - snorkel in enclosed waters

Focus area: Leisure – Module 17 Open-Water Snorkelling

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-3, MAR4-9, MAR4-10, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-3, MARLS-7, MARLS-8, MARLS-11

Content focus

This module provides opportunities for students to develop skills and confidence in snorkelling in open water. Emphasis is on the practical application of snorkelling skills in a range of environments.

Content

Open-water safety and snorkelling skills

Students:

- justify safety rules for snorkelling
- identify the equipment needed for open-water snorkelling
- outline safety procedures for open-water snorkelling, for example: 🧑🏿
 - the importance of the buddy system
 - need for a 'diver below' flag
- identify the relevant authorities and persons to be notified prior to a dive 🧑🏿
- predict possible dangers at dive sites and suggest ways to reduce risks ⚙️ 🧑🏿
- identify and select equipment required for a first aid kit
- inspect and assess equipment used on a snorkelling trip
- assess the fitness of self and buddy to undertake a dive 🧑🏿
- construct a 'diver below' flag
- complete a dive log sheet 📄
- investigate employment opportunities associated with snorkelling 🖥️ ⭐
- investigate the operation of commercial diving organisations ⭐

Focus area: Leisure – Module 18 Fish Harvesting

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-3, MARLS-6, MARLS-7, MARLS-8, MARLS-11

Content focus

This module introduces the methods used to catch fish. Students investigate the relationship between different fishing methods and the behaviour and physiology of the fish being caught.

Content

Fishing techniques

Students:

- investigate various methods used to catch fish, including practices used by Aboriginal and/or Torres Strait Islander Peoples 🖐️💻🌐
- describe the relationship between the method of capture and the physiology of the fish
- describe the different lines used to catch fish, for example: 🎣
 - hand and pole lines
 - rod and reel lines
 - long lines and drop lines
 - set lines
- describe the differences between and uses of trawl nets, gill nets and seine nets
- investigate other methods of catching fish, for example: 🌐
 - making a simple fish trap
 - describing spears and their fish-catching functions
- identify, describe and record a range of fish species found in the local area 📄

Fishing skills and regulations

Students:

- demonstrate practical skills needed for fish harvesting, for example:
 - tying different strength knots in fishing lines
 - selecting the correct hook and bait for the type of fish being sought
 - rigging a handline or rod and reel
 - casting accurately and safely
- identify the procedures required to obtain an amateur fishing licence ★
- outline rules regarding bag and size limits, and discuss why these rules have been put in place ✨
- outline the differences between an amateur and a professional fishing licence ★
- investigate employment opportunities associated with amateur and professional fishing 📺 ★

Focus area: Leisure – Module 19 Manufacturing Fishing Equipment

Outcomes

A student:

- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11

Related Stage 4 outcomes: MAR4-9, MAR4-10, MAR4-11

Related Life Skills outcomes: MARLS-7, MARLS-8

Content focus

This module introduces assembly techniques for basic fishing tackle made from readily available components.

Content

Design and manufacture of fishing equipment

Students:

- describe the process used to manufacture sinkers 🛠️
- describe the process used to manufacture spinners 🛠️
- investigate and demonstrate the techniques used to prepare and set up hand spools
- investigate employment opportunities in fishing equipment manufacturing industries 📺 ⚙️

Constructing fishing equipment

Students:

- construct a fishing rod using rod components and a rod blank ⚙️
- describe and demonstrate rigging techniques for estuary and beach fishing
- construct spinners and lures from common materials, for example balsa wood and spoons ⚙️
- design and produce either a fish trap or a crab trap (ACTDEP049) ⚙️

Focus area: Leisure – Module 20 Boatbuilding

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10

Related Stage 4 outcomes: MAR4-3, MAR4-7, MAR4-9, MAR4-10

Related Life Skills outcomes: MARLS-3, MARLS-6, MARLS-7

Content focus

This module introduces the features of small boat hulls through the construction of models.

Content

Hull design

Students:

- identify and describe the parts of a hull 🚤
- investigate the development of hulls from the coracle to the modern aluminium dinghy 🚤
- outline common features of hull design

Hull construction

Students:

- investigate and describe early boatbuilding techniques, including those used by Aboriginal and/or Torres Strait Islander Peoples 🖐️
- design and construct model hulls and/or boats (ACTDEK046) ⚙️
- discuss techniques used to test hull efficiency
- investigate boatbuilding materials and enter anticipated costs for a project into a spreadsheet (ACTDEK046) 📊
- investigate employment opportunities in boatbuilding industries ⚙️
- test model hulls in a drag tank

Focus area: Leisure – Module 21 Sailing Theory and Practice

Outcomes

A student:

- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-8, MAR4-9, MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-6, MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces the theory and practice of sailing small craft.

Content

Sailing knowledge

Students:

- investigate early sail design and the sailing techniques used by a range of mariners, including Torres Strait Islander Peoples 🖐️🗺️📺
- identify and describe the parts of a small sailboat, windsurfer or sailboard, for example:
 - sail
 - hull
 - rudder
 - mast
 - boom
- describe the function of the parts of a sailboat needed for propelling and controlling the craft 🚣
- describe the effect of wind on sailing craft
- identify the points of sail
- investigate employment opportunities associated with sailing 📺 ⭐

Sailing skills

Students:

- demonstrate skills required for sailing, for example: 🧑🏻
 - rigging and launching a sailing craft
 - tack and gybe
 - recover a capsized craft

Focus area: Aquaculture – Module 22 Aquarium Design, Construction and Maintenance

Outcomes

A student:

- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-7, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-6, MARLS-7, MARLS-8, MARLS-10, MARLS-11

Content focus

This module introduces students to the principles involved in the construction and maintenance of an aquarium. It provides students with an opportunity to appreciate the different requirements of marine and terrestrial animals and some of the specific needs of fish when kept as pets.

Content

Understanding aquariums

Students:

- identify common features of aquarium design
- compare and contrast an aquarium to the natural environment it simulates
- explore the recreational and educational activity associated with aquarium-keeping
- investigate the relationship between aquarium-keeping and aquaculture practices ★
- classify aquariums as either freshwater, marine, tropical or temperate environments

Setting up aquariums

Students:

- identify the equipment needed to make a viable aquarium
- describe and demonstrate the skills needed to maintain aquatic organisms in an aquarium
- demonstrate skills needed in the construction and maintenance of a working aquarium, for example:
 - filtration of solids and removal of wastes
 - control of algae
 - dissolved oxygen supply
 - balanced community relationships
- identify and rectify problems that may arise in maintaining an aquarium ✨

Focus area: Aquaculture – Module 23 Underwater Farming

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment MAR5-5
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11

Related Stage 4 outcomes: MAR4-2, MAR4-4, MAR4-5, MAR4-6, MAR4-7, MAR4-11

Related Life Skills outcomes: MARLS-2, MARLS-3, MARLS-4, MARLS-5, MARLS-6, MARLS-8





Content focus

This module introduces the concepts of and basic practices involved in aquaculture. The module encourages students to consider the finite nature of marine resources and the pressure placed on marine species used for human food. It explores aquaculture as a feasible supplementation and alternative to large-scale wild capture.

Content









Aquaculture skills

Students:

- explore the historical, cultural and economic significance of aquaculture  
- identify a variety of ocean resources used by individuals and societies
- describe different types of underwater farms 
- outline the role of hatcheries in aquaculture
- demonstrate skills required to raise aquatic organisms from eggs or juveniles
- outline the effects of diet on growth rates in aquatic organisms
- define harvest rates and outline the need to take into account growth/replenishment rates 
- describe methods used to grow seaweed
- investigate methods used to farm various invertebrates (ACTDEK044)

Aquaculture in practice

Students:

- describe the operational procedures on an aquaculture farm 
- outline major problems facing aquaculturalists (ACTDEK044)  
- evaluate the effects of improved fishing technology and newly exploited resources, eg krill, kelp, on the quality and quantity of harvested seafoods (ACTDEK041)
- investigate employment opportunities in aquaculture  
- assess the potential of aquaculture to sustain wild fish stocks and the aquatic environment  
- measure the growth rates of fish 

Focus area: Aquaculture – Module 24 Designing Systems for Aquaculture

Outcomes

A student:

- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11

Related Stage 4 outcomes: MAR4-4, MAR4-6, MAR4-7, MAR4-9, MAR4-11

Related Life Skills outcomes: MARLS-3, MARLS-5, MARLS-6, MARLS-7, MARLS-8

Content focus

This module introduces systems used in intensive and extensive aquaculture. Students are provided with opportunities to analyse and evaluate the systems currently used in both systems.

Content

Aquaculture systems

Students:

- outline the differences between intensive and extensive aquaculture
- investigate low-cost traditional intensive aquaculture in other countries, for example: 🌐
 - carp
 - prawns
 - tilapia
- investigate the economic and environmental costs of flow-through and recirculating aquaculture systems 🌱 ⚙️
- compare the advantages and disadvantages of sea cages 🏠

Designing aquaculture systems

Students:

- investigate the impact of aquaculture on Aboriginal and/or Torres Strait Islander communities and Country/Place, for example: 🤝
 - freshwater and saltwater fish traps and eel traps
- compare and contrast modern intensive and extensive aquaculture farm designs (ACTDEK044)
- design an intensive aquaculture system on a sloping site (ACTDEP049) ⚙️
- investigate artificial wetlands and biofilter designs in aquaculture 🏠
- construct a biofilter using food grade plastic bottle tops ⚙️
- design a crayfish pond (ACTDEP049) ⚙️

Focus area: Aquaculture – Module 25 Economics of Aquaculture

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment MAR5-5
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11

Related Stage 4 outcomes: MAR4-2, MAR4-4, MAR4-5, MAR4-6, MAR4-7, MAR4-11
















Related Life Skills outcomes: MARLS-2, MARLS-4, MARLS-6, MARLS-8

Content focus

This module provides the opportunity for students to complete a case study of an existing or hypothetical aquaculture facility to determine its economic viability and profitability.

Content

Students:

- determine the fixed costs associated with a selected intensive or extensive aquaculture enterprise   
- calculate the total operating costs of a selected intensive or extensive aquaculture enterprise using firsthand or secondary sources   
- calculate the gross income of a selected intensive or extensive aquaculture enterprise using firsthand or secondary sources   
- calculate the level of profit of a selected intensive or extensive aquaculture enterprise using firsthand or secondary sources   
- discuss the ethics of intensive and extensive aquaculture enterprises (ACTDEK040, ACTDEK044)   

Focus area: Aquaculture – Module 26 Growing Stockfeed for Aquaculture

Outcomes

A student:

- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment MAR5-5
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-4, MAR4-5, MAR4-6, MAR4-9, MAR4-10, MAR4-11, MAR4-13

Related Life Skills outcomes: MARLS-3, MARLS-4, MARLS-7, MARLS-8, MARLS-10

Content focus

This module introduces methods of growing food for animals used in aquaculture, concentrating on feeding the early stages of stock adjustment.

Content

The nature of aquaculture stockfeed

Students:

- describe problems associated with feeding newly hatched animal species used in aquaculture 📺
- describe the relationship of mouth size and gut structure to food type
- outline the importance of phytoplankton and zooplankton in aquaculture
- calculate the costs of manufactured and imported foods 📊 📄
- examine the microscopic features of microalgae and rotifers

Growing aquaculture stockfeed

Students:

- investigate methods used to grow aquaculture food in commercial operations (ACTDEK044) 📺 ⭐
- hatch artemia from cysts
- cultivate and grow artemia
- grow a variety of microalgal species and rotifers
- cultivate and grow daphnia
- establish and maintain stock cultures of algae

Focus area: Aquaculture – Module 27 Biology of Native Crayfish

Outcomes

A student:

- › assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment MAR5-5
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-5, MAR4-7, MAR4-8, MAR4-10, MAR4-13

Related Life Skills outcomes: MARLS-4, MARLS-6, MARLS-7, MARLS-10

Content focus

This module introduces students to the basic anatomy and physiology of native crayfish and their reproduction.

Content

Students:

- identify and compare the types of crayfish native to NSW waters
- identify crayfish from live or preserved specimens and/or photographs
- describe the general characteristics of crayfish 🐼
- label the external features of crayfish 🐼
- outline the anatomy of crayfish and investigate the function of specific organs 🖥
- determine the sex of crayfish from live or preserved specimens and/or photographs
- construct a flowchart showing the life cycle of a native crayfish 🖥 🐼
- raise crayfish in an aquarium or aquaculture facility (ACTDEK044)

Focus area: Aquaculture – Module 28 Growing Crustaceans

Outcomes

A student:

- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-4, MAR4-6, MAR4-7, MAR4-9, MAR4-10, MAR4-11, MAR4-13

Related Life Skills outcomes: MARLS-3, MARLS-5, MARLS-6, MARLS-7, MARLS-8, MARLS-10





Content focus

This module introduces students to the basic anatomy, physiology and behaviour of crustaceans. It also explores the growing of crustaceans for human food.

Content




Crustacean structure and function

Students:

- classify the different types of crustaceans  
- describe the basic anatomy and physiology of crustaceans
- construct flow charts showing the life cycles of a common crustacean, for example:  
 - prawns
 - freshwater crayfish
 - crabs
 - lobsters

Farming crustaceans

Students:

- outline difficulties in farming some crustaceans because of the varied stages in their life cycle
- describe the environmental requirements of a common crustacean 
- identify the nutritional requirements of a common crustacean during its life cycle
- hatch and raise brine shrimp
- investigate employment opportunities in aquaculture  

Focus area: Aquaculture – Module 29 Fish Biology

Outcomes

A student:

- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-9, MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces the anatomy and physiology of fish.

Content


Classifying fish

Students:

- identify the general characteristics of fish
- describe and classify the three categories of fish: cartilaginous, bony and jawless

Understanding fish biology

Students:

- identify and label the internal organs of bony fish, for example:
 - dissect a bony fish
- describe the basic physiology of bony fish
- examine and record the external features of a bony fish
- research and present information related to the features of a selected marine fish, for example: 
 - general description
 - basic anatomy and physiology
 - life cycle and diet
 - adaptations
 - distribution and economic importance

Focus area: Aquaculture – Module 30 Managing Fish Production

Outcomes

A student:

- › explains why aquaculture provides an economically sustainable source of food MAR5-4
- › assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment MAR5-5
- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-4, MAR4-5, MAR4-9, MAR4-10, MAR4-11, MAR4-13

Related Life Skills outcomes: MARLS-3, MARLS-4, MARLS-7, MARLS-8, MARLS-10



Content focus

This module introduces the general principles of animal husbandry, specifically those required by fish farmers.

Content




Fish production requirements

Students:

- outline the environmental requirements for fish production
- identify the limiting factors for fish growth
- describe the types of equipment needed to grow fish
- identify common fish diseases and describe their impact on fish production  

Growing fish

Students:

- construct simple structures to hold fish for prolonged periods (ACTDEK046) 
- evaluate suitable species of fish to grow out
- investigate food to optimise growth
- grow out fish from the fingerling stage
- assess the importance of management, genetics, nutrition, disease and environmental factors in determining fish growth rates (ACTDEK044)  

Focus area: Aquaculture – Module 31 Managing Water Quality

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-2, MAR4-9, MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-2, MARLS-7, MARLS-10, MARLS-11




Content focus

This module provides opportunities for students to develop an awareness of the importance of water quality, the factors affecting it and the methods used to monitor water quality. Students investigate the effects of poor water quality on aquatic and marine plants and animals.

Content




The importance of water quality

Students:

- describe the differences between sea water, brackish water and freshwater 
- identify the causes of change in temperature, pH, total dissolved solids, ammonia, phosphorus, nitrates and nitrites in water
- outline how changes in water quality affect aquatic animals and plants
- compare and contrast the water quality requirements of various organisms, for example: 
 - marine and freshwater organisms
 - animals and plants
- identify the local catchment/storage area for domestic water supply 

Testing water quality

Students:

- locate suitable water sample sites for the collection of water for analysis in your local area
- conduct local water sample tests, for example: 
 - temperature and pH
 - total dissolved solids
 - ammonia
 - total phosphorus, nitrates and nitrites
- construct a Secchi Disc and conduct a turbidity study  

Focus area: Aquaculture – Module 32 Pests and Diseases of Aquatic Organisms

Outcomes

A student:

- › evaluates the economic and environmental sustainability of aquacultural pursuits MAR5-6
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-6, MAR4-7, MAR4-8, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-5, MARLS-6, MARLS-8, MARLS-11

Content focus

This module introduces the common pests and diseases which may limit aquaculture production.

Content

Identifying pests and diseases

Students:

- describe the difference between a pest and a disease
- identify and describe common pests found in aquaculture enterprises, for example:
 - pond-cultured fish or crayfish
 - shellfish production
 - fish in sea cages
- identify and describe common diseases in aquaculture production
- identify shell disease and whitetail disease in crayfish
- identify white spot and skin fungus disease in fish

Managing pests and diseases

Students:

- describe the measures needed to protect species from disease 📖
- investigate procedures to prevent and isolate disease in aquaculture 📖 ⭐
- investigate procedures used to control some pests in specific aquaculture production 📖 ⭐
- identify and describe policies governing water quality in aquaculture that must be adhered to

Focus area: Employment – Module 33 Small Motorboats

Outcomes

A student:

- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-8, MAR4-9, MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-6, MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces the theory and skills involved in the care and handling of small motorboats. This module provides students with the opportunity to gain a NSW Roads and Maritime Services boat driving licence.

Content

Rules and regulations

Students:

- identify and label the parts of a small boat 🚤
- outline the licence requirements for a NSW General Boat Driving Licence 📄 ⭐
- identify navigation rules applicable and internationally recognised boating signals
- describe boating laws and regulations, including buoys, beacons and lights, and their meaning
- outline the importance of boating safety and identify the required safety equipment
- investigate the impact of boats on the marine environment 🌊

Boating skills

Students:

- demonstrate the skills required to use a boat, including: 🛶
 - safely board a small boat
 - distribute a load to maximise stability in a small boat
 - handle a small boat, eg rowing, steering, navigation, mooring
 - start, operate, trim and maintain an outboard motor
 - approach a mooring buoy in a current and in wind
 - anchor on a sandy bottom
 - secure the boat to a wharf and a beach
 - clean and store a boat that has been in salt water

Focus area: Employment – Module 34 Advanced Motorboating

Outcomes

A student:

- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-6, MARLS-7, MARLS-8, MARLS-11

Content focus

This module provides students with the opportunity to become familiar with the requirements for advanced boating qualifications, and gain practice in advanced small boat handling. The emphasis of this module is on the practical application of boating skills designed to build confidence and skills in handling small motorboats.

Content

Rules and regulations

Students:

- outline the boating rules for NSW waters 🚤
- investigate the theory and practical course requirements for a coxswain certificate 🚤
- discuss the impact of large motorboats on the marine environment 🌊
- investigate employment opportunities provided by the boating and support industries 📺 ⚡

Boating skills

Students:

- plan and conduct an activity in a small motorboat
- demonstrate skills needed to clean and maintain a small motorboat, for example: 🚤
 - clean and adjust or change the spark plug in an outboard motor
 - clean the water ports in an outboard motor
 - repair a crack in thin aluminium

- demonstrate skills needed to operate and navigate a small motorboat, for example: 🚤
 - bring a boat up on plane
 - approach different shores correctly
 - moor to a jetty, buoy and rocky shore
 - cross a wash
 - complete a figure of eight
 - recover an object from the water
 - complete a man-overboard drill
 - tow a disabled boat
 - refloat a swamped boat

Focus area: Employment – Module 35 Local Fishing Industries

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13

Related Stage 4 outcomes: MAR4-2, MAR4-7, MAR4-8, MAR4-11, MAR4-13

Related Life Skills outcomes: MARLS-2, MARLS-6, MARLS-8, MARLS-10

Content focus

This module provides the opportunity to study local fisheries and their importance to the local economy. Students investigate the difference between wild capture and aquaculture, with examples of cultured marine animals (eg oysters) that are important sources of human food.

Content

The nature and importance of fishing industries

Students:

- define the term 'fishery' 📖
- evaluate the interactions between Aboriginal and/or Torres Strait Islander communities and fishing industries 🤝
- analyse the importance of Australia's national fisheries ⚙️
- identify and describe important local fisheries ⭐
- evaluate the importance of these fisheries to the local economy ⚙️ 📊 📈
- outline the legal requirements for establishing a fishery ⭐

The operation of fishing industries

Students:

- investigate Aboriginal and/or Torres Strait Islander cultural fishing rights 🤝
- describe the methods used to catch seafood in New South Wales
- investigate the sale and distribution of local fisheries produce ⭐
- evaluate the operation of a local Fishermen's Cooperative 📊 ⭐
- inspect and identify trawl 'rubbish' from a sorting tray
- investigate methods used for growing oysters from spat 📊

Focus area: Employment – Module 36 Food from the Sea

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-9
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-2, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-2, MARLS-7, MARLS-8, MARLS-10, MARLS-11

Content focus

This module introduces the range of edible seafood and the cultural differences associated with its preparation and consumption. Students explore the nutritional value of seafood, particularly its value as a source of protein and omega-3 fatty acids.

Content

Handling and preparing seafood

Students:

- investigate seafood preparation methods and eating habits in a range of cultures 🇬🇧 🇦🇺 🇯🇵 🇰🇷
- outline methods used to prevent seafood from deteriorating
- describe the steps involved in preparing selected seafood for consumption
- demonstrate skills needed for preparing seafood, for example:
 - scaling, gutting, filleting and cooking fish
 - peeling and deveining prawns
 - preparing and cooking crabs
- identify seafood that can be safely eaten raw
- investigate employment opportunities in seafood handling and catering 📺 ⭐

Cooking and consuming seafood

Students:

- investigate cultural relationships between seafood and its consumption, including the importance of seafood as a source of protein 🇬🇧 🇦🇺 🇯🇵 🇰🇷
- compare the different cooking methods used for a variety of seafood

- demonstrate skills needed for the cooking of seafood, for example:
 - cooking fish using a variety of methods
 - cooking prawns peeled and prawns still in a shell
 - cooking crabs
- evaluate different utensils required for the preparation and consumption of seafood, for example:
 - seafood cracker
 - oyster knife
 - steamer

Focus area: Employment – Module 37 Maritime Industries and Employment

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment MAR5-12

Related Stage 4 outcomes: MAR4-2, MAR4-7, MAR4-8, MAR4-11, MAR4-12

Related Life Skills outcomes: MARLS-2, MARLS-6, MARLS-8, MARLS-9

Content focus

This module introduces a variety of marine careers. The nature and range of maritime and associated industries are explored in this module as a potential source of employment for students. The employment opportunities provided by the increasing marine leisure and tourism industries are highlighted.

Content

Students:

- outline major maritime industries in Australia ★
- identify a variety of roles in marine industries, including land-based and sea-based ★
- investigate further education and employment requirements for marine industries 📖 ★
- compare careers in a range of maritime industries ★
- discuss the growing importance of marine tourism ★
- research a specific marine career, for example: 📖 🗨️ ★
 - what the role involves
 - prerequisite school and sea-based credentials
 - rates of pay and working conditions

Focus area: Employment – Module 38 Tourism

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems
MAR5-2
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment
MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits
MAR5-11
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols
MAR5-14

Related Stage 4 outcomes: MAR4-2, MAR4-7, MAR4-8, MAR4-11, MAR4-14

Related Life Skills outcomes: MARLS-2, MARLS-6, MARLS-8, MARLS-11

Content focus

This module introduces tourism as an economic and culturally important activity. It examines tourism from the perspectives of value to the community as well as negative impacts, and the role of ecotourism in the future.

Content

Marine-based tourism

Students:

- explore the personal, historical, and cultural significance of tourism in marine environments 🌐
- identify and compare the features of popular marine tourist destinations 🗺️
- identify and describe local marine tourist facilities, for example: 🤝
 - Aboriginal and/or Torres Strait Islander enterprises
 - whale watching
- describe ecotourism and its importance in the maintenance of marine area integrity 🌿 ⭐

Impacts of marine tourism

Students:

- identify the impacts of tourism, including environmental, social and economic effects 🌿 ⭐
- describe the economic benefits of increased tourism in marine areas
- investigate marketing methods used to promote tourist destinations 🖥️
- determine the value of tourism to the local economy
- investigate marine tourism as a diverse employment field 🖥️ ⭐
- discuss why zoning is necessary in popular tourist areas 🌿

Focus area: Management – Module 39 Coastal Management

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-11, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-6, MARLS-8, MARLS-10, MARLS-11

Content focus

This module provides opportunities for students to investigate methods for effective management of coastal areas. Students explore the relationship between ecological problems in coastal regions and poor planning and management.

Content

The need for coastal management

Students:

- identify renewable and non-renewable resources that are found along our coast ✨
- discuss the impact of Australia's growing population and its concentration along the coastline 📊
- describe the impact of environmental and human activity on the coast, for example: ✨
 - pollution
 - sedimentation
 - over-exploitation of resources
 - introduced species
- describe the significance of engaging with Aboriginal and/or Torres Strait Islander Peoples in coastal management processes, for example ✨
 - joint management agreements
- identify industries that rely either directly or indirectly on the coastal environments 🌟

- describe waste disposal methods used both locally and globally 🌐 🏠
- investigate a canal development to check water quality and circulation

Methods of coastal management

Students:

- identify laws and regulations for river and ocean use that balance care for the environment with human needs 🌐 🏠
- map a sand dune formation and identify areas prone to blow-outs 🖨️ 📄
- collect and germinate seeds of dune-stabilising plants
- collect data to monitor a specific local problem, for example: 🖨️ 📄
 - the growth of Bitou bush
- research the impact of siltation on NSW river systems 🖨️
- discuss the ethical considerations of the access to and the use of both renewable and non-renewable resources 🌐
- investigate a sewage treatment works to study processing methods

Focus area: Management – Module 40 Tides and Currents

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-10, MARLS-11



Content focus

This module introduces the major forces that move water on earth. Students explore the various types of water movement and the effects these have on climate, marine organisms and humans.

Content









Nature of tides and currents

Students:

- describe the major forces that move water in the oceans
- identify the main types of current, including ocean, coastal and tidal currents 
- discuss how high and low tides form
- identify factors that may affect the height and time of tides 
- describe water movement around a local coastline
- identify currents as tidal and rip currents

Effects of tides and currents

Students:

- describe spring and neap tides and their effects
- plot El Niño current on a world map and state how it affects the Australian climate  
- plot the four major coastal currents on a map of Australia, including:  
 - the Antarctic Circumpolar
 - the Leeuwin Current
 - the Indonesian Throughflow
 - the East Australian Current
- use secondary sources to trace ocean currents 
- investigate marine species whose life cycle is linked to Australian currents 
- measure the rise and fall of tides 
- measure tidal flow rate in a river 

Focus area: Management – Module 41 Marine and Civil Engineering

Outcomes

A student:

- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-3, MAR4-7, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-3, MARLS-6, MARLS-10, MARLS-11

Content focus

This module identifies engineering structures found along the coastline. It explores their purpose and the impact they have on waterways and the aquatic environment.

Content

Marine structures

Students:

- identify built structures used to modify the marine environment, for example:
 - training walls
 - groynes
 - wharfs
 - boat ramps
 - boat harbours
 - dams and weirs
 - sand by-passes
- discuss the purpose and function for built structures in marine environments (ACTDEK043) 🖱 ⚙
- identify engineered structures on the lower reaches of a large NSW estuary 🖱
- research the methods used to construct early rock walls 🖱

Impacts of engineered structures

Students:

- discuss the beneficial impacts of engineered structures (ACTDEK043)
- discuss current problems caused by some structures not foreseen at the time of construction ⚙
- evaluate possible alternatives to marinas
- model the action of a groyne using a ripple tank 🖱

Focus area: Management – Module 42 Saving Water Environments

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment MAR5-12
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-12, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-2, MARLS-3, MARLS-6, MARLS-9, MARLS-10, MARLS-11

Content focus

This module explores the impact of human activity and pollution on marine environments. Students explore the legislation and procedures that can be used to minimise damage and rehabilitate those areas that have been degraded.

Content

Threats to water environments

Students:

- define pollution as the adding of contaminants or practices that cause adverse change 🗑️
- describe major causes of marine pollution 🗑️
- describe point and non-point pollution sources 🗑️
- describe the impact of technology on waste production 🗑️
- discuss human attitudes to waste disposal 🗑️ 🗑️
- identify and investigate the effects of salinity on the environment 🌊
- describe the effects of high atmospheric carbon dioxide levels on the world's oceans
- investigate specific causes and effects of pollution, for example: 🌊 🗑️
 - Minamata Disease
 - microplastics in the food chain

Combating pollution

Students:

- discuss the role of education in the fight against pollution 🌱
- explore philosophies that can be used in a community to combat pollution, for example: ✨ ⚖️ 🌍
 - ‘think globally, act locally’
- research the efforts to minimise pollution in local waterways ✨ 📺
- investigate the action plan for a major oil spill off the NSW coast or the Great Barrier Reef ✨ 📺
- evaluate measures taken to address pollution issues, for example: ⚙️ ⚖️
 - marine debris
 - radioactive residue from nuclear testing in the Pacific
 - oil spills
 - acid sulfate soils
- investigate strategies for overcoming salinity around inland waterways ✨
- investigate reconstitution of the riparian zone as a means of combating agricultural pollution ✨
- conduct an analysis of beach rubbish 🗑️

Focus area: Management – Module 43 Recreational and Community Groups

Outcomes

A student:

- › identifies, describes and evaluates the social and economic importance of marine ecosystems MAR5-2
- › identifies, describes and evaluates the effects humans have had on the marine environment MAR5-3
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › identifies, describes and evaluates policies for monitoring and conserving the marine environment MAR5-8
- › identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits MAR5-11
- › identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment MAR5-12

Related Stage 4 outcomes: MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-11, MAR4-12

Related Life Skills outcomes: MARLS-2, MARLS-3, MARLS-6, MARLS-8, MARLS-9

Content focus

This module explores water-based clubs involved in recreational activities in the aquatic environment. Students examine these groups, their interrelationships and the spin-off volunteer groups that enhance community development.

Content

Students:

- outline the objectives and purposes of different community groups and describe how these objectives and purposes are achieved 🏆
- identify the significance of cultural protocols within Aboriginal and/or Torres Strait Islander communities, including Indigenous cultural and intellectual property 🙌
- investigate how to become a member of recreational or community groups 📖 🎁 🌿
- evaluate a recreational or community group with local or personal significance 🎁
- discuss the benefits of being actively involved in recreational and community groups 🎁 🌿
- identify meritorious and community awards 📖 🌿
- investigate surf life saving activities and their role in the community 📖 ⭐
- complete contact and non-contact rescues using a variety of resources 🎁

Focus area: General Interest – Module 44 Shipwrecks and Salvage

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-10, MARLS-11






Content focus

This module provides students with opportunities to investigate the hardships faced by early mariners, their skill and the often fatal results of miscalculations, poor instrumentation and the forces of nature.

Content



Shipwrecks

Students:

- identify the dangers facing early mariners
- describe the limitations of equipment used by early mariners
- plot on a global map the major trade routes of the Indian and Pacific oceans  
- discuss modern instruments, charts and navigation aids used to prevent shipwrecks 
- investigate a famous shipwreck 
- investigate Australian shipwreck treasures that remain undiscovered 

Recovery and salvage

Students:

- identify problems facing deep-sea salvage operators
- research a major salvage operation carried out in NSW waters 
- evaluate salvage techniques, including: 
 - repairs
 - towing
 - re-righting
 - refloating

Focus area: General Interest – Module 45 Basic Navigation

Outcomes

A student:

- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-10, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-7, MARLS-10, MARLS-11

Content focus

This module introduces the basics of pilotage and navigation. Students develop an awareness of dangers associated with passage in congested shipping lanes and the need for international conventions to avoid collisions and shipwrecks.

Content

Navigation theory

Students:

- investigate traditional equipment and techniques used by Aboriginal and/or Torres Strait Islander Peoples to navigate water 🗺️
- investigate techniques used by ancient navigators to travel to distant places and return home, for example: 🌐
 - Polynesians
 - Vikings
 - Persians
- investigate the role of the compass as an important navigational instrument
- identify the features of a maritime chart 🗺️
- discuss the need for rules and international conventions to avoid collisions at sea and obstacles close to land 🗺️
- identify markers used in pilotage 🗺️

Navigation skills

Students:

- demonstrate the skills needed for navigation, for example: 🗺️
 - read and use a compass
 - record a bearing
 - interpret a navigational chart
 - plot a course on a chart
 - pilot a small craft, or model, through a series of markers

Focus area: General Interest – Module 46 Marine Disasters

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations MAR5-10
- › identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment MAR5-12
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-7, MAR4-10, MAR4-12, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-6, MARLS-7, MARLS-9, MARLS-11

Content focus

This module introduces the types and effects of natural and human-influenced disasters on the marine environment.

Content

Types of marine disasters

Students:

- identify and describe a range of natural disasters affecting the marine environment 📺
- identify and describe human-influenced disasters affecting the marine environment 📺
- identify different weather events and their effects on the sea

Planning for and preventing disasters

Students:

- investigate methods for the prediction and prevention of marine disasters 📺
- identify state and national disaster response planning organisations ⚡
- identify and describe safety procedures to be followed during marine disasters
- evaluate the role of an organisation responsible for the preparation for and response to marine disasters 📺 ⚡
- evaluate an action plan for a potential disaster 📺

Focus area: General Interest – Module 47 Personal Interest Project

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-7, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-6, MARLS-7, MARLS-11

Content focus

This module provides students with the opportunity to undertake an in-depth study of a marine-related topic of interest to them. Students may revisit a topic for further investigation, undertake projects that combine aspects of a number of focus areas or pursue an area of study with local or personal significance. The student is required to negotiate the area(s) of study with the teacher.

Content

Students:

- identify and describe the personal, social, historical and/or cultural significance of the project (ACTDEK040) 🌐 🏠
- use a variety of methods to collect information relating to the personal interest project 🖥️ 📱
- develop a range of techniques to communicate and present information relating to the personal interest project, for example: 🖥️
 - use ICT to create a portfolio

Focus area: General Interest – Module 48 Local Area Study

Outcomes

A student:

- › identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships MAR5-1
- › identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-7
- › collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information MAR5-13
- › recalls aspects of the marine environment using relevant conventions, terminology and symbols MAR5-14

Related Stage 4 outcomes: MAR4-1, MAR4-7, MAR4-13, MAR4-14

Related Life Skills outcomes: MARLS-1, MARLS-6, MARLS-10, MARLS-11

Content focus

This module provides opportunities for students to investigate marine and aquatic ecosystems in their local area and the effects of human activity.

Content

Students:

- locate their local area on a map of New South Wales 🗺
- identify the traditional owners of the selected Country 🖐
- identify a local river catchment and drainage system
- describe the types of marine ecosystems found in the local area
- map major aquatic and terrestrial ecosystems in this area 🗺 📄
- discuss the social, economic and environmental importance of local ecosystems 🌱 🌐
- discuss the impact of change upon local Aboriginal Peoples 🖐
- identify human impacts on, and modifications to, local ecosystems
- identify the major sources and ethical considerations of human impacts on these ecosystems, for example: 🌱 🏠
 - field trip to a marine ecosystem in the local area
- discuss at least one major modification that humans have made to one of these ecosystems and assess its impact on the system 🌱

Years 7–10 Life Skills Outcomes and Content

The Years 7–10 Life Skills outcomes and content are developed from the objectives of the *Marine and Aquaculture Technology CEC Years 7–10 Syllabus*.

Before deciding that a student should undertake a course based on Life Skills outcomes and content, consideration should be given to other ways of assisting the student to engage with the regular course outcomes. This assistance may include a range of adjustments to teaching, learning and assessment activities.

If the adjustments do not provide a student with sufficient access to some or all of the Stage 4 and Stage 5 outcomes, a decision can be explored for the student to undertake Life Skills outcomes and content. This decision should be made through the collaborative curriculum planning process involving the student and parent/carer and other significant individuals. School principals are responsible for the management of the [collaborative curriculum planning process](#).

The following points need to be taken into consideration:

- students are required to demonstrate achievement of one or more Life Skills outcomes
- specific Life Skills outcomes should be selected based on the needs, strengths, goals, interests and prior learning of each student
- achievement of an outcome may be demonstrated through selected Life Skills content
- outcomes may be demonstrated independently or with support.

Further information in relation to planning, implementing and assessing Life Skills outcomes and content can be found in support materials for:

- [Technologies](#)
- [Special Education](#)
- [Life Skills](#).

Years 7–10 Life Skills Outcomes

Table of objectives and outcomes

Knowledge, understanding and skills

Objective

Students develop:

- knowledge and understanding of marine and aquatic environments

Life Skills outcomes A student:
MARLS-1 recognises features of marine and aquatic environments and life
MARLS-2 explores factors that affect marine and aquaculture environments

Objective

Students develop:

- knowledge and understanding of the economic sustainability of aquaculture

Life Skills outcome A student:
MARLS-3 explores the effects of people's activities on marine and aquaculture environments

Objective

Students develop:

- knowledge and understanding of the role of aquaculture in the preservation of wild seafood stocks and the marine environment

Life Skills outcomes A student:
MARLS-4 recognises a range of marine and aquaculture plants and animals that can be grown to provide food
MARLS-5 investigates ways in which marine and aquaculture environments affect our daily lives

Objective

Students develop:

- knowledge, understanding and skills that promote ethical and sustainable practices in the use, management and protection of the marine environment

Life Skills outcome

A student:

MARLS-6

ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments

Objective

Students develop:

- knowledge, understanding and skills in the responsible selection and safe use of materials, equipment and techniques used in aquaculture and marine and maritime activities

Life Skills outcome

A student:

MARLS-7

demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety

Objective

Students develop:

- knowledge and understanding of the industries and organisations using, managing and regulating aquaculture and the marine environment

Life Skills outcomes

A student:

MARLS-8

recognises the need for marine and aquaculture environments to be managed and cared for

MARLS-9

explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment

Objective

Students develop:

- knowledge and skills in researching, experimenting and communicating in marine and aquaculture contexts

Life Skills outcomes

A student:

MARLS-10

uses a variety of strategies to locate and select information

MARLS-11

uses a variety of strategies to organise and communicate information

Values and attitudes

Students:

- appreciate the contribution and impact of innovation and technologies now and in the future
- appreciate the diversity of marine and aquatic environments
- appreciate the finite nature of marine and aquaculture resources and the impact of their use on the environment and society
- value the development of skills and gain satisfaction from their use to develop solutions to personal, social and global issues.

Years 7–10 Life Skills and Related Syllabus Outcomes

Knowledge, understanding and skills

Objective

Students develop:

- knowledge and understanding of marine and aquatic environments

Life Skills outcomes A student:	Related Stage 4 and 5 outcomes A student:
MARLS-1 recognises features of marine and aquatic environments and life	MAR4-1 identifies the nature and scope of the marine and aquatic environment MAR5-1 identifies and describes a range of marine and aquatic ecosystems and investigates their complex interrelationships
MARLS-2 explores factors that affect marine and aquaculture environments	MAR4-2 identifies and describes the components of some marine ecosystems MAR5-2 identifies, describes and evaluates the social and economic importance of marine ecosystems

Objective

Students develop:

- knowledge and understanding of the economic sustainability of aquaculture

Life Skills outcome A student:	Related Stage 4 and 5 outcomes A student:
MARLS-3 explores the effects of people's activities on marine and aquaculture environments	MAR4-3 investigates attitudes towards the marine environment as a fisheries resource MAR4-4 investigates the effects human activity has had on native fish stocks MAR5-3 identifies, describes and evaluates the effects humans have had on the marine environment MAR5-4 explains why aquaculture provides an economically sustainable source of food

Objective

Students develop:

- knowledge and understanding of the role of aquaculture in the preservation of wild seafood stocks and the marine environment

Life Skills outcomes A student:	Related Stage 4 and 5 outcomes A student:
MARLS-4 recognises a range of marine and aquaculture plants and animals that can be grown to provide food	MAR4-5 identifies the nature and scope of aquaculture MAR5-5 assesses the potential of aquaculture to sustain wild fish stocks and the aquatic environment
MARLS-5 investigates ways in which marine and aquaculture environments affect our daily lives	MAR4-6 investigates plant and animal species suitable for aquaculture MAR5-6 evaluates the economic and environmental sustainability of aquacultural pursuits

Objective

Students develop:

- knowledge, understanding and skills that promote ethical and sustainable practices in the use, management and protection of the marine environment

Life Skills outcome A student:	Related Stage 4 and 5 outcomes A student:
MARLS-6 ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments	MAR4-7 identify the need to care for and protect the marine environment MAR4-8 demonstrates sound and responsible judgement in their personal use of the marine environment MAR5-7 identifies, describes and evaluates the ethical, social and sustainability issues related to the marine environment MAR5-8 identifies, describes and evaluates policies for monitoring and conserving the marine environment

Objective

Students develop:

- knowledge, understanding and skills in the responsible selection and safe use of materials, equipment and techniques used in aquaculture and marine and maritime activities

Life Skills outcome A student:	Related Stage 4 and 5 outcomes A student:
MARLS-7 demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety	MAR4-9 selects, organises, assembles, uses, dismantles, cleans and stores equipment appropriately MAR4-10 interprets and follows instructions with accuracy MAR5-9 selects and uses a broad range of contemporary materials, equipment and techniques with confidence in aquaculture and marine settings MAR5-10 demonstrates safe and responsible use of a range of materials, equipment and techniques in different aquaculture, marine and maritime situations

Objective

Students develop:

- knowledge and understanding of the industries and organisations using, managing and regulating aquaculture and the marine environment

Life Skills outcomes A student:	Related Stage 4 and 5 outcomes A student:
MARLS-8 recognises the need for marine and aquaculture environments to be managed and cared for	MAR4-11 identifies employment opportunities in aquaculture, marine and maritime industries MAR5-11 identifies and describes a range of aquaculture, marine and maritime vocations and leisure pursuits
MARLS-9 explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment	MAR4-12 investigates the opportunities to join volunteer marine-based service organisations MAR5-12 identifies and describes the role of volunteer organisations that assist in the protection and management of the marine environment

Objective

Students develop:

- knowledge and skills in researching, experimenting and communicating in marine and aquaculture contexts

Life Skills outcomes A student:	Related Stage 4 and 5 outcomes A student:
MARLS-10 uses a variety of strategies to locate and select information	MAR4-13 selects and presents the results of appropriate research from a variety of sources MAR5-13 collects and organises data by experimenting and accurately reading instruments, signals and charts and communicates this information
MARLS-11 uses a variety of strategies to organise and communicate information	MAR4-14 uses appropriate language, signals, signs and conventions to communicate in marine contexts MAR5-14 recalls aspects of the marine environment using relevant conventions, terminology and symbols

Years 7–10 Life Skills Content

The Years 7–10 Life Skills content is suggested.

Content describes the intended learning for students as they work towards achieving one or more of the Life Skills outcomes. It provides the foundations for students to progress to the next stage of schooling or post-school opportunities.

Teachers make decisions about the choice of outcomes and selection of content regarding the sequence, emphasis and any adjustments required based on the needs, strengths, goals, interests and prior learning of students. Examples provided in the content are suggestions only. Teachers may use the examples provided or use other examples to meet the particular needs of individual students.

The Years 7-10 Life Skills content has been organised around the areas of:

- Introduction to Marine and Aquaculture Technology
- Skills, Management and Employment
- Biology
- Ecology
- Leisure
- Aquaculture
- Employment
- Management
- General Interest

These areas provide possible frameworks for addressing the Life Skills outcomes and content, and are suggestions only. Teachers have the flexibility to develop topics that will meet the needs, strengths, goals and interests and prior learning of their students.

Practical experiences

Where appropriate, students should have the opportunity to develop their knowledge, understanding and skills of Marine and Aquaculture content by engaging in a range of practical experiences including water-related activities.

Schools should be aware of and refer to, the relevant safety guidelines of school authorities when conducting water-related activities.

Students with disability may require adjustments and/or additional support in order to engage in practical experiences. Student capability, confidence and expertise at their current stage of development are important considerations in determining teaching and learning activities and sequences in this course.

Further information can be found in [Course Structure and Requirements](#).

Introduction to Marine and Aquaculture Technology

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › explores factors that affect marine and aquaculture environments MARLS-2
- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14, MAR5-1, MAR5-2, MAR5-3, MAR5-7, MAR5-9, MAR5-10, MAR5-11, MAR5-13, MAR5-14

Content focus

Students are introduced to the features and characteristics of the marine environment and have opportunities to develop practical skills for the safe participation in water-related activities. Introduction to Marine and Aquaculture Technology has an emphasis on the practical application of water safety and first aid skills.

Content

The marine environment

Students:

- identify differences between marine and land environments
- identify physical features of a range of marine environments
- identify the importance and/or purposes of marine environments, for example: 🌿 🌊
 - agricultural enterprises
 - tourism
 - cultural significance for Aboriginal and/or Torres Strait Islander Country/Place
 - World Heritage preservation
- investigate the effect of human activity on marine environments, for example: 🌊
 - overfishing
 - maritime transport

Water safety

Students:

- identify risks associated with participation in water-related activities
- identify safe practices for participation in water-related activities, for example: 🧑🏠
 - swimming under the supervision of lifeguards
 - identify rips at the beach
- select materials, tools or equipment required for personal safety when participating in water-related activities, for example: 🧑🏠
 - a personal flotation device (PFD)
 - sun protective clothing

General first aid

Students:

- identify the need for sun protection and identify how to apply sunscreen correctly 🧑🏠
- identify basic first aid procedures
- select and apply first aid procedures to treat common illness or injury, for example: 🧑🏠
 - bleeding
 - sprains and bruises
 - asthma attack
 - shock

Maintaining equipment used in water

Students:

- identify the effects of salt, water, sunlight and living things on marine equipment
- identify steps required to clean, dry and store personal equipment, for example:
 - swimwear
 - snorkelling equipment
 - fishing equipment
 - watercraft, eg surfboards, canoes, kayaks
- follow the procedures for maintaining personal equipment used in water

Skills, Management and Employment

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment MARLS-9
- › uses a variety of strategies to locate and select information MARLS-10

Related Stage 4/5 outcomes: MAR4-1, MAR4-3, MAR4-7, MAR4-11, MAR4-12, MAR4-13, MAR5-1, MAR5-3, MAR5-7, MAR5-11, MAR5-12, MAR5-13

Content focus

The Skills, Management and Employment module provides opportunities for students to extend their understanding, skills and confidence to participate in water-related activities. Students also explore the roles that both government and volunteer organisations have in the management of aquatic habitats. This module places extended emphasis on the practical application of water safety and first aid skills.

Content

Water safety

Students:

- identify, select and apply water safety skills relating to an in-water rescue, for example: 🚑
 - seeking assistance
 - directing to a safer location
 - offering assistance by using available materials, eg, rope, stick, towel, lifejacket or kickboard
- identify and participate in the demonstration of water safety skills, for example: 🏊
 - swimming in different conditions
 - swimming in different clothing
 - swimming above and/or underwater
 - treading water
 - making a trouser-float
 - correctly fitting a lifejacket
 - moving in water while wearing a lifejacket
- identify potential hazards when participating in water activities and suggest ways to reduce risk, for example: 🚰 ⚠️
 - identify dangerous local fishing spots and the conditions that would make them dangerous
 - identify rips at a beach
 - supervising young children near water
 - wearing a personal flotation device (PFD) near open water

General first aid

Students:

- identify ways to seek assistance during water-related activities, for example: 🚑
 - raising hand to signal to lifeguards
 - calling for emergency services
 - identifying the function and purpose of distress beacons or flares
- explore the steps of DRSABCD during first aid treatment
- explore potential indicators and symptoms of common marine-related injuries, for example:
 - pain and flesh wounds from contact with venomous marine organisms
 - bleeding and injury from foreign bodies, eg oyster shells or sea urchin spines
 - breathing difficulties from asthma attacks
 - shock or confusion from overexposure to the elements, eg hypothermia and hyperthermia
- explore common habitats for venomous marine organisms and suggest ways to reduce risk of injury, for example: 🐙
 - wearing protective clothing
 - responding to warning signs
 - avoid handling venomous organisms

Management and employment

Students:

- explore the function and purpose of a range of statutory bodies and volunteer organisations that regulate or manage aquatic areas 🌊
- explore potential vocations and employment opportunities related to the regulation of marine and aquaculture industries ⭐
- investigate the impact of a local environmental organisation on ethical, social or sustainability issues related to marine environments, for example: 🌿🌳🌊
 - preservation of marine habitats
 - reduction of waste pollution
 - conservation of endangered or threatened species

Biology

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › explores factors that affect marine and aquaculture environments MARLS-2
- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-14, MAR5-1, MAR5-2, MAR5-3, MAR5-7, MAR5-8, MAR5-9, MAR5-10, MAR5-14





Content focus





Students investigate the biological scope of marine plants, animals and organisms. Students have opportunities to explore the characteristics of living organisms, plant and animal life that can be found in a variety of marine environments. Suggested content may be selected to address one or more of the following biology modules:

- Waterbirds of New South Wales
- Mangroves
- Microscopic Aquatic Organisms
- Marine and Aquatic Plants
- Marine Mammals
- Dangerous Marine Creatures

Content

Students:

- identify the features and adaptations of a range of marine organisms, for example: 
 - waterbirds
 - marine mammals
 - marine and aquatic plants
 - estuarine organisms
 - dangerous marine creatures
- investigate the role of plankton in marine environments, for example: 
 - the features of plankton
 - plankton as a food source for mammals
 - the impact of pollution on plankton
- identify the role of plankton in a range of food chains and food webs in marine environments
- explore environmental factors that affect marine mammal environments, for example: 
 - temperature
 - water levels
- investigate the impact of human activity on marine plants, animals and organisms, for example: 
 - overfishing
 - pollution
 - marine transport

- identify a range of dangerous marine creatures and their features 
- explore potential injuries caused by dangerous marine creatures, for example:
 - stingray slash
 - jellyfish sting
 - sea snake bite
- investigate ways humans attempt to reduce the risk of injury from dangerous marine creatures, for example: 
 - protective clothing and equipment
 - shark netting at beaches
 - warning signs and alerts
- select information from a range of sources to communicate ideas about a dangerous marine creature, for example:  
 - features
 - habitat
 - signs of aggression
- explore the physical features of a mangrove environment
- investigate the importance of mangroves to the life cycles of fish, crustaceans and molluscs

Ecology

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › explores factors that affect marine and aquaculture environments MARLS-2
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-1, MAR4-2, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-13, MAR4-14, MAR5-1, MAR5-2, MAR5-7, MAR5-8, MAR5-9, MAR5-10, MAR5-13, MAR5-14

Content focus




Students explore the characteristics, populations and interactions among organisms within marine habitats. Students have opportunities to investigate the abiotic and biotic factors that affect different marine environments and consider the need to monitor and preserve marine ecosystems. Suggested content may be selected to address one or more of the following ecology modules:

- The Oceans
- Rock Platforms
- Introducing Estuaries
- Living Together in the Sea
- Marine Pests and Threats
- Temperate Marine Ecosystems
- Antarctica's Marine Ecology
- The Abyss

Content

Students:

- explore examples of abiotic features in marine ecosystems, for example:
 - light
 - temperature
 - oxygen levels
- explore examples of biotic features in marine ecosystems, for example:
 - plants
 - animals
 - organisms
- investigate the role of oceans as part of the water cycle
- investigate the importance of oceans to the daily lives of humans, for example:
 - food sources
 - raw materials
 - energy
 - tourism
 - transport

- identify the characteristics, features and organisms found in different marine habitats, for example: 
 - rock platforms
 - estuaries
 - coral reefs
 - abysses
- investigate the adaptations of marine animals and organisms in different ecosystems
- explore the relationships between plants, animals and organisms in ecosystems, for example:
 - producers, predators and consumers
 - food chains and food webs
 - marine pests and threats
- explore the unique environmental conditions and features of Antarctica's marine ecosystems, for example: 
 - krill
 - phytoplankton
 - birds
 - mammals
 - fish
- explore human and environmental factors that affect marine ecosystems, for example: ✨ 
 - pollution
 - changes in climate conditions
- explore the role of conservation in order to protect living organisms and ensure ecosystems are balanced ✨

Leisure

Outcomes

A student:

- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-3, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14, MAR5-3, MAR5-7, MAR5-8, MAR5-9, MAR5-10, MAR5-11, MAR5-13, MAR5-14

Content focus

Students explore ways in which people enjoy and engage with a variety of marine leisure activities. Students have opportunities to develop practical skills and knowledge in order to participate in these activities safely. Suggested content may be selected to address one or more of the following leisure modules:

- Watercraft Design, Construction and Repair
- Basic Snorkelling
- Open-Water Snorkelling
- Fish Harvesting
- Manufacturing Fishing Equipment
- Boatbuilding
- Sailing Theory and Practice

Content

Students:

- explore a range of local, national and international marine leisure activities and events, for example:
 - ★
 - swimming
 - surfing
 - kayaking
 - diving
 - fishing
 - sailing
- identify potential hazards when participating in marine leisure activities and suggest ways to reduce risks, for example: 🚫
 - wearing protective clothing and equipment
 - fishing in approved areas
 - responding to warning signs
 - handling and storing fishing equipment safely

- explore the relationship between design and function for a range of watercraft, for example:
 - shape of a surfboard for riding waves
 - size of a boat to carry passengers
 - weight of a kayak for transportation
 - materials used in the creation of a waterski
- investigate early boatbuilding techniques including those used by Aboriginal and/or Torres Strait Islander Peoples 🖐️
- identify the parts of a small boat, windsurfer or sailboard and explore the functions of these parts in propelling and controlling the craft
- identify the parts of a hull and explore the importance of hull design in boatbuilding
- explore the history and cultural significance of swimming in different communities 🖐️🌐
- identify the function and purpose of basic snorkelling equipment, for example:
 - flippers to propel through water
 - snorkel for breathing
- identify, select and apply safe practices when snorkelling, for example: 🧑🏻🧑🏻
 - snorkelling in groups
 - seeking assistance through hand signals
 - checking equipment
 - avoid handling marine life
- identify and participate in the demonstration of snorkelling skills, for example: 🧑🏻🧑🏻
 - sculling
 - diving
 - defogging a mask
 - fitting equipment correctly
 - treating a leg cramp
- explore various methods used to catch fish, including practices used by Aboriginal and/or Torres Strait Islander Peoples 🖐️
- investigate different lines used to catch fish, for example:
 - hand and pole lines
 - rod and reel lines
 - long lines and drop lines
 - set lines
- explore the range of fish species found in the local area 🐟
- identify and participate in the demonstration of practical skills for fish harvesting, for example:
 - selecting different knots for fishing lines
 - selecting different hooks and/or bait for the type of fish being sought
 - rigging a handline or rod and reel
- explore statutory regulations related to fish harvesting, for example: 📜🧑🏻🧑🏻
 - fishing licences
 - bag and size limits
 - protected species
- explore employment opportunities related to fishing and watercraft industries ⭐

Aquaculture

Outcomes

A student:

- › explores factors that affect marine and aquaculture environments MARLS-2
- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › recognises a range of marine and aquaculture plants and animals that can be grown to provide food MARLS-4
- › investigates ways in which marine and aquaculture environments affect our daily lives MARLS-5
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-2, MAR4-4, MAR4-5, MAR4-6, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-11, MAR4-13, MAR4-14, MAR5-2, MAR5-4, MAR5-5, MAR5-6, MAR5-7, MAR5-8, MAR5-9, MAR5-10, MAR5-11, MAR5-13, MAR5-14

Content focus

Students are introduced to the concepts and practices of aquaculture as they investigate the different requirements of marine animals. They explore the finite nature of marine resources and the pressure placed on marine species used for human food. Suggested content may be selected to address one or more of the following aquaculture modules:

- Aquarium Design, Construction and Repair
- Underwater Farming
- Designing Systems for Aquaculture
- Economics of Aquaculture
- Growing Stockfeed for Aquaculture
- Biology of Native Crayfish
- Growing Crustaceans
- Fish Biology
- Managing Fish Production
- Managing Water Quality
- Pests and Diseases of Aquatic Organisms

Content

Students:

- explore factors that affect fish growth, for example:
 - nutrition
 - disease
- explore the role of water quality on the health of aquatic animals and plants, for example:
 - temperature
 - pH levels
 - ammonia
 - phosphorus
 - nitrates and nitrites
- identify the function of equipment required to maintain a freshwater, marine or tropical aquarium, for example:
 - enclosure
 - thermometer
 - filters and pumps
 - gravel
 - lighting
- participate in the construction and maintenance of a working aquarium, for example: ⚙️ ⚙️
 - monitoring water levels
 - removal of waste products
 - cleaning equipment
- respond to problems that arise when maintaining an aquarium, for example: ⚙️
 - discoloured water
 - distressed and/or lethargic fish
 - oxygen and/or pH levels
- identify a range of aquaculture enterprises, for example: ⭐
 - salmon
 - mussels
 - oysters
 - prawns
 - seaweed
- explore different methods used in aquaculture enterprises, for example: ⭐
 - the role of hatcheries in aquaculture
 - methods used to grow and harvest seaweed
 - methods used in invertebrate fisheries
- investigate the features, life cycles and environmental requirements of different organisms in aquaculture enterprises, for example:
 - shellfish
 - marine fish
 - crustaceans
- explore sources of food for animals used in aquaculture
- identify common pests and diseases in aquaculture
- explore methods used to control pests and diseases in aquaculture
- select information from a range of sources to communicate ideas about an aquaculture enterprise, for example: 📖 🗣️
 - identify the location and methods used to raise, grow or farm the chosen organism
 - explore the potential threats facing the enterprise
 - investigate the impact of the enterprise on the environment
- explore the range of employment opportunities associated with aquaculture industries ⭐

Employment

Outcomes

A student:

- › explores factors that affect marine and aquaculture environments MARLS-2
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment MARLS-9
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-2, MAR4-7, MAR4-8, MAR4-9, MAR4-10, MAR4-11, MAR4-12, MAR4-13, MAR4-14, MAR5-2, MAR5-7, MAR5-8, MAR5-9, MAR5-10, MAR5-11, MAR5-12, MAR5-13, MAR5-14




Content focus

Students explore the range of vocations associated with marine industries. They have opportunities to engage with practical experiences in boating and consider the importance of fishing and tourism to the economy. Suggested content may be selected to address one or more of the following employment modules:

- Small Motorboats
- Advanced Motorboating
- Local Fishing Industries
- Food from the Sea
- Maritime Industries Employment
- Tourism

Content

Students:

- explore a range of vocations associated with maritime industries, for example:  
 - engineering
 - transport
 - leisure
 - tourism
 - conservation
- explore statutory regulations relating to motorboating, for example: 
 - boating licences
 - buoys
 - beacons and lights
 - speed limits
 - restriction zones

- identify and select equipment required for safe boating practices, for example: 🛶
 - personal flotation devices (PFD) for all passengers
 - fire extinguisher
 - anchor
 - flares or smoke signals
 - marine radio
 - emergency position indicating radio beacon (EPIRB)
- participate in the demonstration of safe boating skills, for example: 🛶 ⭐
 - safely boarding a small boat
 - rowing, steering, navigation and mooring of a boat
 - anchoring and securing a boat in different conditions
 - cleaning and storing a boat that has been in salt water
- investigate the impact of increased boating use on the marine environment 🌊 🖥️
- identify products sourced from Australia's national fisheries, for example: 🐟
 - shellfish
 - crayfish
 - fish
- identify the difference between wild stock and those from aquaculture enterprises
- explore seafood preparation and presentation from different cultures 🍴 🌐 🌍
- identify methods to safely handle, prepare and store seafood
- participate in the preparation of different seafood cooking methods, for example:
 - scaling, gutting, filleting and cooking fish
 - peeling prawns
 - preparing and cooking crabs
- investigate a variety of methods to cook seafood, for example:
 - cooking fish in an oven, pan or BBQ
 - cooking peeled and unpeeled prawns
 - boiling and steaming crabs
- explore a range of marine tourism activities and destinations, for example: 🏖️ ⭐
 - scuba diving
 - whale watching
 - sailing
 - deep sea fishing
- explore the range of vocations associated with marine tourism, for example: 🏖️ ⭐
 - land-based roles, eg sales and administration
 - sea-based roles, eg tour guides
- select information from a range of sources to communicate ideas about a marine vocation, for example: 🖥️ 📱 ⭐
 - the type of job and tasks involved
 - prerequisite school and sea-based credentials
 - the training involved
 - working conditions
 - advantages and disadvantages

Management

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › explores factors that affect marine and aquaculture environments MARLS-2
- › explores the effects of people's activities on marine and aquaculture environments MARLS-3
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › recognises the need for marine and aquaculture environments to be managed and cared for MARLS-8
- › explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment MARLS-9
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-1, MAR4-2, MAR4-3, MAR4-7, MAR4-8, MAR4-11, MAR4-12, MAR4-13, MAR4-14, MAR5-1, MAR5-2, MAR5-3, MAR5-7, MAR5-8, MAR5-11, MAR5-12, MAR5-13, MAR5-14







Content focus

Students investigate the impact of environmental factors and human activity on marine environments. They explore strategies used to manage and conserve the marine environment and the role of community organisations. Suggested content may be selected to address one or more of the following management modules:

- Coastal Management
- Tides and Currents
- Marine and Civil Engineering
- Saving Water Environments
- Recreational and Community Groups

Content

Students:

- explore the major forces that move water in the oceans, for example: 
 - wind
 - temperature
 - gravity
- explore the impact of tides on marine organisms and human activity, for example:
 - tide-pool creatures
 - marine transportation
- investigate ways to measure the rise and fall of tides  
- explore the customary ways Aboriginal Peoples use coastal environments in Australia 
- identify areas of increased population and concentration along the coastline of Australia  

- investigate the impact of increased population and human activity on marine environments, for example:
 - pollution
 - over-exploitation of marine resources
 - oil spills
 - human development and loss of habitat
- identify the purpose and impact of built structures used to modify the marine environment, for example:
 - wharfs
 - boat ramps
 - boat harbours
 - dams and weirs
- explore major causes of pollution in marine environments, for example: ✨
 - industrial and household waste
 - oil spills
 - sewage
 - microplastics
- select information from a range of sources to communicate ideas about a strategy being used to treat a marine threat, for example: ✨ 🖥️
 - overfishing
 - introduced species
 - pollution
 - bycatch
- explore a range of local and national recreational or community groups related to marine environments and water activities 🌊 ⭐
- investigate the ways in which recreational or community groups promote safe and responsible use of marine environments 🖥️ 🗣️
- use ICT to investigate a local recreational or community group related to marine environments 🖥️

General Interest

Outcomes

A student:

- › recognises features of marine and aquatic environments and life MARLS-1
- › ensures safe treatment of and care for plants and animals in their personal use of marine and aquatic environments MARLS-6
- › demonstrates safe practices in the care and use of materials, tools and equipment and in relation to personal safety MARLS-7
- › explores the opportunities provided within marine and aquaculture environments for leisure, community work and employment MARLS-9
- › uses a variety of strategies to locate and select information MARLS-10
- › uses a variety of strategies to organise and communicate information MARLS-11

Related Stage 4/5 outcomes: MAR4-1, MAR4-7, MAR4-10, MAR4-12, MAR4-13, MAR4-14, MAR5-1, MAR5-7, MAR5-10, MAR5-12, MAR5-13, MAR5-14





Content focus











Students have the opportunity to explore an option of interest for further investigation or undertake an area for study with local or personal significance. Students may also choose to investigate social, cultural and historical topics associated with marine and aquaculture not previously covered. Suggested content may be selected to address one or more of the following general interest modules:

- Shipwrecks and Salvage
- Basic Navigation
- Marine Disasters
- Personal Interest Project
- Local Area Study

Content

Students:

- explore techniques and technologies used by historical societies and cultures to navigate marine environments, for example:  
 - Vikings
 - European explorers
 - Ancient Egyptians
 - Polynesians
- explore customary and contemporary techniques and technologies used by Aboriginal and/or Torres Strait Islander Peoples to navigate marine environments 
- investigate the role of the compass as an important navigational instrument
- identify the dangers facing early mariners, for example
 - weather conditions
 - distance
 - instrument accuracy
- compare ancient and modern navigational instruments, charts and maps
- use information and communication technologies to investigate a famous shipwreck 

- explore past and present salvage techniques, for example:
 - repairs
 - towing
 - re-righting
 - refloating
- select information from a range of sources to communicate ideas about a major salvage operation, for example:  
 - location and time period of the shipwreck and salvage operation
 - methods used during the salvage operation
 - methods used for the stabilisation or restoration of the ship
 - significance of the salvage operation
- explore international regulations used to avoid collisions and obstacles at sea 
- explore the impact of natural disasters on marine environments, for example:
 - flood
 - cyclone
 - earthquake
 - tsunami
 - landslide
- explore the impact of human-influenced disasters on the marine environment, for example: 
 - oil spills
 - nuclear radiation
- investigate methods and organisations related to predicting, preparing and responding to marine disasters, for example: 
 - tsunami warning systems
 - meteorological warnings and alerts
 - disaster relief organisations
- identify marine ecosystems in their local area
- select information from a range of sources to communicate ideas about a marine ecosystem in their local area, for example:  
 - location
 - features
 - social, cultural or economic significance
 - impact of human activity
- select information from a range of sources to communicate ideas about a personal interest project, for example:   
 - selecting a marine-related topic of interest
 - collecting information relating to the topic
 - presenting information using ICT

Assessment

Standards

The NSW Education Standards Authority (NESA) *K–10 Curriculum Framework* is a standards-referenced framework that describes, through syllabuses and other documents, the expected learning outcomes for students.

Standards in the framework consist of three interrelated elements:

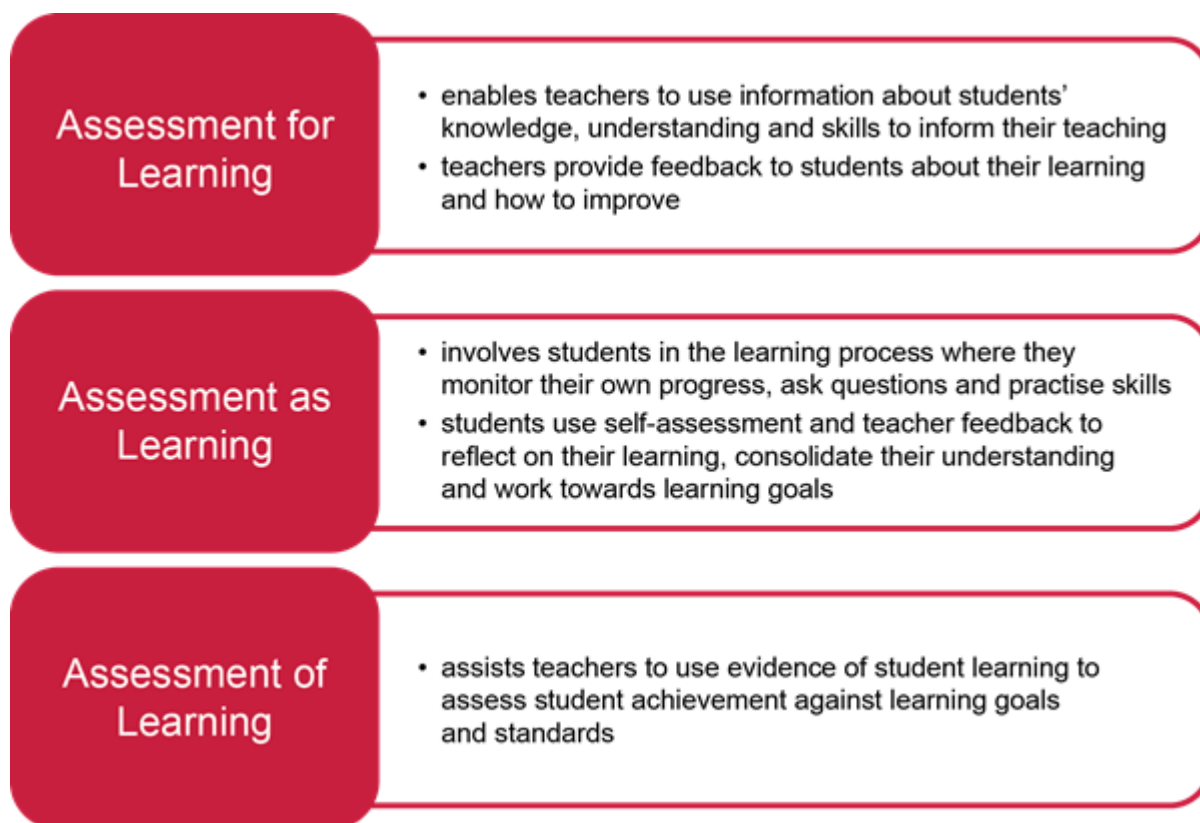
- outcomes and content in syllabuses showing what is to be learned
- Stage statements that summarise student achievement
- samples of work on the NESA website that provide examples of levels of achievement within a Stage.

Syllabus outcomes in Marine and Aquaculture Technology contribute to a developmental sequence in which students are challenged to acquire new knowledge, understanding and skills.

Assessment

Assessment is an integral part of teaching and learning. Well-designed assessment is central to engaging students and should be closely aligned to the outcomes within a Stage. Effective assessment increases student engagement in their learning and leads to enhanced student outcomes.

Assessment for Learning, *Assessment as Learning* and *Assessment of Learning* are three approaches to assessment that play an important role in teaching and learning. The NESA Years 7–10 syllabuses particularly promote *Assessment for Learning* as an essential component of good teaching.



Further advice on programming and appropriate assessment practice is provided on the NESA website. This support material provides general advice on assessment as well as strategies to assist teachers in planning education programs.

Assessment for students with disability

Some students with disability will require adjustments to assessment practices in order to demonstrate what they know and can do in relation to syllabus outcomes and content. The type of adjustments and support will vary according to the particular needs of the student and the requirements of the activity. These may be:

- adjustments to the assessment process, for example scaffolded instructions, additional guidance provided, highlighted keywords or phrases, the use of specific technology, extra time in an examination
- adjustments to assessment activities, for example rephrasing questions, using simplified language, fewer questions or alternative formats for questions
- alternative formats for responses, for example written point form instead of essays, scaffolded structured responses, short objective questions or multimedia presentations.

It is a requirement under the *Disability Standards for Education 2005* for schools to ensure that assessment tasks are accessible to students with disability. Schools are responsible for any decisions made at school level to offer adjustments to coursework, assessment activities and tasks, including in-school tests. Decisions regarding adjustments should be made in the context of [collaborative curriculum planning](#).

Further examples of adjustments to assessment for students with disability and information on assessment of students undertaking Life Skills outcomes and content can be found in support materials for:

- [Technologies](#)
- [Special Education](#)
- [Life Skills](#).

Reporting

Reporting is the process of providing feedback to students, parents/carers and other teachers about student progress.

Teachers use assessment evidence to extend the process of Assessment for Learning into their Assessment of Learning. In a standards-referenced framework, teachers make professional judgements about student achievement at key points in the learning cycle. These points may be at the end of a Year or Stage, when schools may wish to report differentially on the levels of knowledge, understanding and skills demonstrated by students.

Descriptions of student achievement provide schools with a useful tool to report consistent information about student achievement to students and parents/carers, and to the next teacher to help plan the future steps in the learning process.

The A–E grade scale or equivalent provides a common language for reporting by describing observable and measurable features of student achievement at the end of a Stage, within the indicative hours of study. Teachers use the descriptions of the standards to make a professional, on-balance judgement, based on available assessment information, to match each student's achievement to a description. Teachers use the Common Grade Scale (A–E) or equivalent to report student levels of achievement from Stage 1 to Stage 5.

For students with disability, teachers may need to consider, in consultation with their school and sector, the most appropriate method of reporting student achievement. It may be deemed more appropriate for students with disability to be reported against outcomes or goals identified through the collaborative curriculum planning process. There is no requirement for schools to use the Common Grade Scale (A–E) or equivalent to report achievement of students undertaking Life Skills outcomes and content.

Glossary

Glossary term	Definition
Aboriginal and Torres Strait Islander Peoples	<p>Aboriginal Peoples are the first peoples of Australia and are represented by over 250 language groups, each associated with a particular Country or territory. Torres Strait Islander Peoples are represented by five major island groups, and are associated with island territories to the north of Australia's Cape York which were annexed by Queensland in 1879.</p> <p>An Aboriginal and/or Torres Strait Islander person is someone who:</p> <ul style="list-style-type: none"> • is of Aboriginal and/or Torres Strait Islander descent • identifies as an Aboriginal person and/or Torres Strait Islander person, and • is accepted as such by the Aboriginal and/or Torres Strait Islander community(ies) in which they live.
accessibility	The extent to which a system, environment or object may be used irrespective of a user's capabilities or abilities. For example, the use of assistive technologies to allow people with disability to use computer systems, or the use of icons in place of words to allow young children to use a system.
aquaculture	The farming of aquatic animals and plants, especially fish, shellfish and seaweed, in natural or controlled marine or freshwater environments.
copyright	The protection provided to the creators of original works that offers a legal framework for the control and reproduction or transmission of their creations. Copyright protects written works, computer programs and artistic works such as: architecture, broadcasts, computer programs, drawings, films, music, paintings, photographs, sound recordings and videos.
Country	Country is used by Aboriginal People to describe their territories and ecosystems – a sum total of spiritual beliefs, including Dreamings, all living things including totems, and all physical factors such as sacred sites, water, air and geographical features.
designing	The development of a solution to an identified need or opportunity. Designing involves research and investigation with consideration of human, technical and environmental factors, available resources and timeframes. Designs should be tested and evaluated against predetermined criteria.
disability	<p>An umbrella term for any or all of the following components:</p> <ul style="list-style-type: none"> • impairments: challenges in body function or structure • activity limitations: difficulties in executing activities • participation restrictions: challenges an individual may experience in involvement in life situations.
diversity	Differences that exist within a group, eg age, sex, gender, gender expression, sexuality, ethnicity, ability/disability, body shape and composition, culture, religion, learning differences, socioeconomic background, values and experience.

Glossary term	Definition
emergency position indicating radio beacon (EPIRB)	An emergency position indicating radio beacon or EPIRB is used to alert search-and-rescue services in the event of an emergency.
emerging technologies	New technologies that are still immature or will be developed over the next five to ten years, which may deliver significant value and substantially alter the business and social environment.
enclosed waters (NSW)	Navigable waters within the landmass of New South Wales such as inland and coastal rivers, inland and coastal lakes and similar waters, and enclosed coastal bays and harbours.
enterprise	An individual production unit on a farm that produces a product. This could be an animal or plant production unit.
environment	The surroundings or conditions in which a person, animal or plant lives or operates. An environment may also be natural, managed or constructed.
Indigenous	Internationally recognised term for the first people of a land. In New South Wales the term 'Aboriginal person/Peoples' is preferred.
Indigenous cultural and intellectual property	Includes objects, sites, cultural knowledge, cultural expression and the arts, that have been transmitted or continue to be transmitted through generations as belonging to a particular Indigenous group or Indigenous people as a whole or their territory.
marine	Relating to or found in the sea.
maritime	Connected with the sea in relation to navigation, shipping, seaborne trade or naval matters.
open waters	Navigable waters which are not enclosed waters.
personal flotation device (PFD)	A personal flotation device is a piece of equipment designed to assist a wearer to keep afloat in water.
personal protective equipment (PPE)	Equipment used or worn by a person to minimise risk to the person's health or safety, for example apron, earmuffs, face shield, gloves, goggles, hard hat.
Place	A space mapped out by physical or intangible boundaries that individuals or groups of Torres Strait Islander Peoples occupy and regard as their own. Places are spaces that have varying degrees of spirituality.
properties	Distinctive characteristics of a material that can be identified, tested and used to help people select the one most suitable for a particular use.
resources	Materials, data, systems, components, tools and equipment used to create solutions for identified needs and opportunities, and the knowledge, understanding and skills used by people involved in the selection and use of these. Resources can also include energy, finance and time.
seafood	Any fish or shellfish used as food.
shellfish	A shelled mollusc (such as an oyster, pipi) or crustacean (such as a prawn, crab or lobster).

Glossary term	Definition
sustainable	Supporting the needs of the present without compromising the ability of future generations to meet their needs.
Work Health and Safety (WHS)	The identification of risks and the management of those risks in a workplace. WHS is concerned with the health, safety and welfare of people in the workplace. The <i>Work Health and Safety Act 2011</i> (the WHS Act) provides a framework to protect the health, safety and welfare of all workers at work.