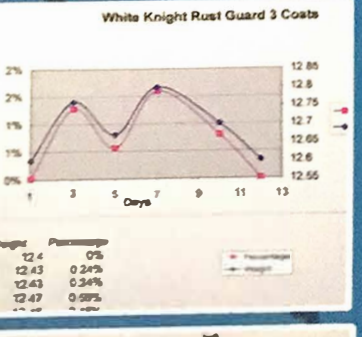
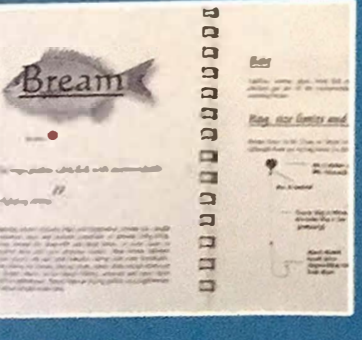
Marine Teachers Association of Queensland Inc.





Coast and Marine Education Syllabus

Level 4 -beyond Level 6

Including Workshop notes and Syllabus History

www.marineteachers.org.au

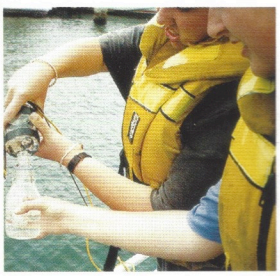
MARINE TEACHERS ASSOCIATION OF QUEENSLAND INC.

The birth of a syllabus

Coast and Marine Education Syllabus report

June 2000 - November 2004

A partnership project with Education Queensland and the Marine Education Industry Network in consultation with the Queensland Studies Authority



Teach Marine Studies!

The right courses...

Coast and Marine Education is a pathway subject written in outcomes especially for middle school students from years 7-10. Senior Marine Studies is a course written for students who want to go to University. Marine and Aquatic Practices is a practical subject for students wishing to enter the marine industry.

the right experiences...

Over 90% of all Australians work and live within an hours drive of the sea. Coast and Marine Education provides foundation skills for living on the coast and working in the marine environment.

... and the right association.

MTAQ is teachers driven association with a curriculum exchange, a QSA accredited middle school syllabus, training and in-service courses, an annual conference, marine safety days and other services to meet the daily needs of classroom teachers.

Join now

The Marine Teachers Association of Queensland Inc

Membership Office

PO Box 9278

Gold Coast Mail Centre 4217

Telephone: (07) 5532 7230

www.marineteachers.org.au

Financial acknowledgements to date

Figures are a combination of actual and estimated

1998 - 2001

- $1,200 — Hervey Bay, SHS, Mercy College and Holy Spirit Colleges for TRS days and airfares.
- $8,000 Wet Paper Publications - Coolangatta and Hervey Bay conferences
- $10,000 Grant from ANZSBEG (The Australian and New Zealand Safe Boating Group) Kids and Water Project
- $3,000 Queensland Transport, QYA and Great Barrier Reef Marine Park Authority

2002

- $5,500 Queensland Transport, QYA and Wet Paper Publications
- $1,100 members funds

2003

- $4,000 Curriculum Strategy Branch Education Queensland
- $5,500 Queensland Transport, QYA and Wet Paper Publications
- $12,000 accumulated members funds
- $2,200 individual subscriptions (Snorkelling examiners)
- Minister for Education and The Arts for giving us permission to use the Agriculture Syllabus as a template for the Junior Marine Syllabus and for permission for State School teachers to place their unit outlines and worksheets on our web site.
- $25,000 project officer wages (Donated Wet paper Publications)

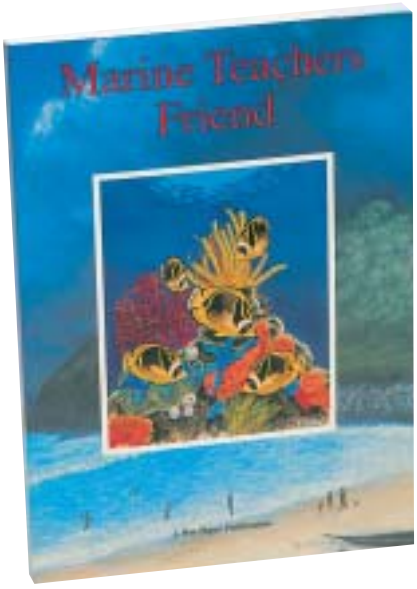
2004

- $4,000 Curriculum Strategy Branch Education Queensland
- $4,000 Australian Government Quality Teacher Program
- $16,000 from Australian Maritime College, Marine Safety Qld, Great Barrier Reef Marine Park Authority and Yachting Queensland for funds to print the syllabus and Noosa Conference
- $7,000 Principals of Kirwan, Mercy College, Sunshine Beach, Hervey Bay, Clontarf for giving us TRS days out of their school budgets.
- $10,000 Representatives and departmental heads from Qld Fisheries Service, Great Barrier Reef Marine Park Authority, Wet Paper, Marine Safety Queensland for supplying wages and other resources such as phone, fax, email, postage and photocopying to attend and process information meetings .
- $3,000 est - committee members who paid for their own fuel and wages to travel to meetings and put up with the budget meals and accommodation
- $2,000 Education Queensland for providing meeting rooms, advice and syllabus interpretation disks for planning for Workshop 1.
- $3,000 Mackay SHS for providing rent free workshop facilities and accommodation for Workshop 1.
- $25,000 Wet Paper Publications for logistical administration support and wages for a project officer
- $500 The Goodinghams for providing rent free accommodation, meals and Sunshine Beach SHS for Workshop 2.
- $500 AUFQ for providing rent free meeting rooms for Workshops 3 and 4.
- $500 Mercy College for Workshop 5 and Simone Bakers parents for providing accommodation for the workshop
- $3,000 individuals donations for travel, meals and accommodation

The gestation period

1998 - 2001

- Junior marine studies began in Queensland in 1998 with the introduction of a copyright free teachers guide - called the Marine Teachers Friend written for schools who wanted a multi-disciplinary approach to Science, Health and Physical Education, Study of Society and Environment and Technology.
- The Junior Program began with activities and programs from this copyright free publication.
- Schools introduced a 1, 2 or 3 year program, with a range of successes were Hervey Bay, Clontarf Beach, Maryborough, Marymount College, Benowa, Robina, Sunshine Beach, Robina, Pioneer, Rockhampton Grammar, Sarina, Southern Cross College, Southport, Springwood, St Mary's College, Tin Can Bay, Urangan, Victoria Point, Woodridge and Yeppoon.
- In 2000, a 2 day conference at Coolangatta funded with a $4,000 grant from Wet Paper Publications, heard of the successes and failures of the programs and made plans to run workshops where possible to network ideas to improve classroom teaching.
- In 2001, a one day workshop in Hervey Bay funded with $10,000 sponsorship from ANZSBEG (The Australian and New Zealand Safe Boating Group) examined ways to extend the program into the Primary School which lead to the now successful Kids and Water Primary School Marine Reader literacy program.
- Conference sessions were also run at our Townsville Conference. Representatives were also invited to the then Curriculum Studies Authority community meeting on syllabuses that were most likely to fit into the level 4 — beyond level 6 learning areas outside the key learning areas.



Copyright free publication to schools

Hervey Bay Junior Marine Studies students in action 1998

2002

- At our 2002 annual conference at Malanda, it was proposed to seek interest from members about the possibility of having our own Junior Marine Syllabus and a committee was formed to rally interest.
- In August 2002 a Junior Writers workshop was held at Hervey Bay with $4,000 sponsorship from Queensland Transport, QYA and Wet Paper

The aims of the Hervey Bay Workshop were:

- To develop outcomes for Junior Marine Programs from Holy Spirit Mackay, Hervey Bay State High and Clontarf Beach SHS
- To investigate a series of rich tasks from combinations of 3-4 key learning areas from Qld Science, Health and PE, Technology and SOSE syllabus
- To prepare an in-service brief for MTAQ Mackay State Conference in Marine Studies

Program leaders

- Tim Ryan Education Advisor Science Wide Bay Region
- Graham Rogers Lecturer Marine Studies B.Ed program QUT
- Phil Smith Conference Convenor MTAQ Wide Bay
- Dr David Tulip, Queensland University of Technology

Program included

- Inspection of Junior Marine Studies Facilities and program Hervey Bay SHS
- Matching school programs to Science
- Delegation of duties
- Matching school programs
- Designing units of work in aquaculture
- Project brief to writing consultant

In August 2002 a Junior Writers workshop held at Hervey Bay laid the foundation for the Coast and Marine Education Syllabus

2003

Term 1

- Early in 2003 representatives from the committee met Mark Snartt from the newly formed Queensland Studies Authority where we learnt we could submit a syllabus under new legislation. Mark outlined to use what we had to do and Curriculum strategies branch Education Queensland gave us a grant of $4000. A further $5,000 came from Wet Paper, Marine Safety Queensland and QYA.

  So armed with this the committee set about to organise workshops, the first of which was at Mackay. With budget constraints the committee agreed that we would use our money for spartan accommodation, low cost noodles and beg our principals for travel, TRS days. All committee members were then to donate their time for the good of education and the love of the subject!

- A syllabus draft topic on fishing was developed by the committee chairman as well as a procedure for writing outcomes. This was posted on our web site and formed the basis for Workshop 1 planned for Term 2. All schools who were financial members of MTAQ were invited to the Mackay conference.

Term 2

- **Workshop 1**

  Mackay State High School in June (funding from remains of Term 1 funds), where it was voted not to proceed with a competency based approach but to use existing syllabi and organise our workprograms so that we could place them on our new web site: www.marineteachers.org.au

- Ministerial permission was requested for use of the Ag Syllabus as a template and for Ed Qld Employees to put their units of work on our web site.

  This was granted later in the year and Sunshine Coast, Hervey Bay, Clontarf Beach, Mercy and Holy Spirit Colleges are now preparing materials for our first ever Marine Teachers Curriculum Exchange.

  These should be ready for launch at the end of the year and contain worksheets and unit outlines that show teachers how these schools are teaching Junior Marine Studies.

In 2003 the committee rejected the proposal for competency based syllabus and recommended that the subcommittee go back and draft up a syllabus based on outcomes from levels 4 to 6+. It also recommended that MTAQ write to the Education Minister for approvals to set up a curriculum exchange on our Web Page and use existing syllabi as a base for our syllabus

Term 3

- Workshop 2 was at Sunshine Beach SHS ($1200 - funded from members fees) in August where committee members decided to go for a Level 4 — Beyond Level 6 approach using existing syllabi as a template for design
- Ministerial permission was requested and granted for us to use the Agricultural Syllabus and other syllabus outcomes provided we seek permission to alter existing copyright materials and work closely with the syllabus manager QSA.
- Six syllabus strands were proposed and outcomes and syllabus elaborations were commenced.

Workshop 2 Sunshine Coast

Syllabus reference documents were:

SOSE

Technology

Science

Health and PE

Draft Agriculture

Draft strands were:

Safety

Skills

Ecology

Meteorology

Saving the sea

Industry

Term 4

Workshop 3 : Brisbane

- This was organised for October 22 - 23 ($1200 - funded from members fees) to coincide out of hours with the Senior Syllabus Conference for trial schools.
- Delegates from 33 schools who do senior marine studies will have the opportunity on the night of October 22 to comment on the following:
- A complete proposal was in an attached file :0562 Junior Syllab.doc
- The template syllabus in the attached file Agriculture 030709.doc (Copyright QSA)
- Meetings with our web designer and contract for $10,000 signed to develop web page and administration functions. (Funds from accumulated members fees ($8,000 and Wet Paper sponsorship $2,000)

Workshop 4: Amity Point North Stradbroke Island

- A two day workshop was organised for schools who wish to trial the new syllabus in 2004 ($4,000 - funded from members fees)
- Members also got Snorkelling Instructor qualifications to satisfy DOEM ($1,800 - 2 Examiners funded from members fees)

The syllabus gets a name —

Coast and Marine Education Subject Area Syllabus
Levels 4 to beyond level 6

Please see attached files for further information on the way we are going

Proposed strands

1. Marine safety
2. Marine skills and practices
3. Coastal ecology
4. Coast and marine sustainability
5. Oceanography
6. Coast and marine industries

Proposed organisation

Students develop their understandings of the concepts within the strands throughout the later years of compulsory schooling.
Courses of study can be planned using learning outcomes from a single strand or from a number of strands.

Workshop 4 Amity Point Syllabus Group meeting

2004 activities

Term 1

- Workshop 5 had to be limited to a committee of 1 (Funding $0. Doom and gloom ... will we ever convince anyone to back this?
- Trial however starts at Kirwan, Sunshine Coast, Mercy College, Holy Spirit College and various other ad hoc schools

Australian Government
Quality Teacher Programme

Term 2

- Workshop 6 We find Quality Teacher Program money $4,000) and with members funds ($2,500) and scrounged around from sponsors QYA we plan a final meeting in Mackay
- End of term sees us all meet thanks to the hospitality of the Goodinghams, Bakers and Mercy College canteen.. as well as $77 air fares thanks Qantas and Virgin for the price war.
- Final touches put forth and we have syllabus

Workshop 5: Discussion of trials

Workshop 6 — The 2004 Team - Trial teachers Martin Taylor, Zoe Hiddins, Sheree Bell, Simone Baker and Kelly Goodingham with outgoing syllabus chairman Bob Moffatt

2004 June Report to members

This report was written to determine the effectiveness of the Coast and Marine Education MTAQ Marine Studies Trial Syllabus 2003-2004 as teachers developed work programs and implemented the course. The MTAQ CME syllabus was developed to:

- allow marine studies teachers to show their school principals a QSA fully accredited Junior Marine Studies Course
- provide for a pathway for students into Senior Marine Studies and Marine and Aquatic Practices.
- offer an new and engaging low cost Year 8-10 program that can be adopted in ANY Queensland school with minimal teaching qualifications
- offer a syllabus that is outcomes based that can be modified into rich tasks or criterion based assessment.
- use existing equipment supplied to industrial arts, science, SOSE or Physical Education subject departments
- use existing curriculum materials involving one text for three years with a MTAQ curriculum exchange available to financial members

This report has concluded that a pathway is possible and that workprograms developed were low cost and did not require additional teaching qualifications. The syllabus does link to many topics in the senior Marine Studies and MAP syllabi.

Further evaluation should provided opportunities for teachers, administrators, parents, students, industry representatives, QSA staff and panel members, and career advisers to make suggestions for improving the syllabus in line with current teaching, learning and vocational developments.

Unfortunately due to budget constrains, this was not possible in this report.

New MTAQ CME Syllabus chairperson

Sheree Bell Sunshine Coast Rep and Vanuatu Conference trip organiser has offered to take over the final stage of the CME syllabus which involves the ominous task of accreditation with QSA. Sheree has been teaching Junior Marine Studies under a criterion based scheme for over three years now and has been able to adapt the trial syllabus that involves outcomes based assessment. However like many schools who are in the transition to outcomes, she has been able to successfully report in both formats using standards and anticipated evidence statements.

Continued funding

Thanks to our funds raised through sponsorship and members fees - see industry partners to the right, we now have the $3000 in the bank to begin the accreditation process however the time will all be voluntary. At the end of the day MTAQ own the copyright on the syllabus and will licence school systems to use it. It is hoped to second a secondary teacher from MTAQ to complete this process or we hope that Sunshine Coast will be very generous with their TRS day allocations.

Bob Moffatt

MTAQ CME Chairman

17 June 2004

Industry partners thanked

Australian Government
Great Barrier Reef Marine Park Authority

YACHTING QUEENSLAND

Wet Paper

Queensland Government

Queensland Government

AMC
AUSTRALIAN MARITIME COLLEGE

Australian Government
Quality Teacher Programme

The project officer supplied to MTAQ has cost its industry sponsor in excess $60,000 alone

We estimate MTAQ has spent over $100,000 in syllabus development so far

Term 3

- Final rush to get to QSA for accreditation. All staff very helpful but process is slow.

  Tugan bypass may be complete before we get cover sorted.
- Urgent need to raise funds for printing and CD production.

  Bob lobbies hard and gets AMC on board ($2,200) as well as continuing sponsors ($10,000).
- Date set for QSA meeting and we design a 50 slide power point presentation.

  We try to second a teacher but fail this time. We will never give up however.
- Designer appointed to typeset syllabus and marketing and covers finalised.

  One way to get money back is to sell a licence and we decide to go national.
- Ministerial launch planned - We plan also for a 3 day workshop
- QSA requests cover to be different from existing QSA syllabuses. More money for designer!!

We hand over our $3,000 cheque

Workshop 7: Snorkelling in Junior School discussion

Workshop 7: Trial school presentations

CME Syllabus Strands

Courses of study can be planned using learning outcomes from a single strand or from a number of strands.

1. The practices and skills strand focuses on the practices and skills that allow people to use marine and coastal environments as well as on marine and coastal situations that are potentially dangerous to humans. The organisers for this strand from which the outcomes are written are:
   - Safe practices involves an understanding of safe and unsafe situations, behaviours and their consequences.
   - Matching approved equipment with desired use is necessary to effect skills and practices.
   - Skills and strategies are required to participate in marine recreational activities.
2. The industry strand focuses on industries that are related to coastal and marine environments. The organisers for this strand from which the outcomes are written are:
   - Marine industries involves technology and design methods that take into account specific features of the coast and marine environments.
   - Marine industries are extremely diverse in their operations, employment requirements, marketing and income streams.
   - Industry involves the establishment and maintenance of systems and subsystems.
3. The oceanography strand focuses on the physical and chemical interactions between the ocean and the coast. The organisers for this strand from which the outcomes are written are:
   - Events on Earth and in the solar system effect natural systems on Earth
   - Advances in scientific research have contributed greatly to our knowledge of the oceans, the climate and coastal geomorphology.
4. The ecology strand focuses on the biological interactions that occur between the ocean and the coast. The organisers for this strand from which the outcomes are written are:
   - An organism needs to survive to the age of reproduction to continue its species.
   - Ecology involves the interaction between the living and non living environment..
5. The conservation strand focuses the sustainability of coastal and marine systems The organisers for this strand from which the outcomes are written are:
   - For 200 years European impact on the Australian coastal zone and marine environment has been significant.
   - Community groups have been working for many years to conserve our coast and marine zones.

"The syllabus is very flexible and can be taught by a first year teacher with equipment normally found in a Science Department store room"

Coast and Marine Studies Central content

Relationship with Senior Marine Studies

The syllabus writers have been very aware of the fact that many students will go on to do Senior Marine Studies. With this in mind the content recommended is significantly different from Senior Marine in that:

- General skills and concepts are emphasised eg Students are NOT encouraged to obtain their boat licence or SCUBA ticket
- Navigation and Marine Radio are part of boating and only briefly mentioned. There is no requirement for any skills in these areas.
- Marine conservation is aimed at the practical level and concepts of planning and marine parks are left to Senior Marine.
- There is great emphasis on longer time project work such as building an aquarium, boat hull or fishing rod. In other words, the content explores those projects which are highly engaging that teachers of Senior Marine Studies just do not have the time to do.

Student engagement with central content

The central learning outcomes are the focus for planning learning activities and assessment tasks. Students will engage with central content when they are provided with opportunities to demonstrate central learning outcomes.

Unit writers are strongly advised that:

- The organisation of content within a strand should not be considered hierarchical.
- Any of the content can be addressed at any appropriate level and not all of the content need be addressed at every level.
- Each list should not be considered exhaustive.
- Central content should be selected to suit students' needs, interests and abilities and to take account of their prior knowledge and experiences.
- In the Coast and Marine Education subject area, there is an overlap of central content across strands. For example, safety is in the central content for the Safety strand, but is also relevant to other strands.

Possible central content of each strand is identified on the following pages.

Practices and skills content

Boating

- Types of craft, boating terms, equipment, boating skills, boating, the environment and licencing and safe practices
- Knots and ropes, splicing, knot types and uses, rope types and uses
- History of navigation, rules of the road, navigation aids

Fishing

- Amateur fishing, fishing gear, commercial fishing, fishing and conservation, safe practices, ethics and etiquette, water safety

Snorkelling

- Snorkelling skills, equipment, safe practices, certificates, water safety

Sailing

- Types of craft, sailing skills, sailing equipment, safe practices, dingy sailing, yachting skills, cruising and racing
- Knots and lines, knot types and uses, rope types and uses

Canoeing

- Kyacking and rowing, types of craft, skills, equipment, safe practices

First Aid

- The DRABC action plan, Expired air resuscitation (EAR), External cardiac compression (ECC). Cardiopulmonary resuscitation (CPR)
- Burns, cuts and bleeding, marine medical emergencies, accidents with marine organisms, dangerous creatures

Surfing

- Skills, equipment, the environment, how surfboards are made, accreditation, professional surfing, water safety

Community organisations

- Yacht clubs, surf clubs, Coast Guard, DPI – Fisheries, Recreational clubs eg. diving, fishing, sailing, boating

Industry content

- Aquariums
- Equipment maintenance and repairs
- Education and training
- Tourism and retail
- Mariculture and aquaculture
- Research and manufacturing
- Salvage
- Food from the sea
- Communications
- Shipping, oat building and hull design

Oceanography content

- Weather lore, temperature, air pressure, rainfall and humidity, weather forecasting, your weather station
- Seawater, properties of sea water, gases in sea water, sea water and corrosion
- Oceans, ocean formation, depth and characteristics, the greenhouse effects, ocean shape, mining ocean resources, power from the sea, ocean management and mapping
- Wave characteristics, types, effects of waves on beaches and marine life, surfing the waves
- Currents, ocean currents, southern oscillation index, coastal currents, local currents, tidal currents
- Tide definitions, the importance of tides, causes of tides, tide height and tidal range, tidal currents, destructive tides
- Topography, coastlines, abyssal, continental shelves, reefs, ridges, sea mounts, catchments

Ecology content

- Dangerous sea creatures, aggressors, retaliators
- Plankton, temporary plankton, permanent plankton, plankton adaptations
- Energy in the sea and energy relationships
- Plants, marine plants, dune plants, mangroves, conservation
- Animals, classifying and naming living things:
- Animals without backbones, protozoans, sponges jellyfish, corals and anemones, comb jellies, worms, animals with jointed legs, spiny-skinned animals, animals with shells
- Animals with backbones: fish, reptiles, birds and mammals
- Living together, problems with living in the sea, living in habitats, adaptations for coast and marine zones, relationships between individuals
- Sea birds: Adaptations for coast and marine life, migration patterns, different types of seabird, observing birds, significance of seabirds
- Antarctica, marine life, the significance of Antarctica
- Excursions eg: Rocky shore, mangroves, reef, sand dune, estuary

Conservation content

- Pollution — who causes it? Sources of pollution, the cost of pollution, trashing the coastline, solutions, legislation. Marine pests and threats.
- Water quality. What determines seawater quality? Seawater quality tests. Macro-invertebrate sensitivity tests
- Taking actions to save the sea. Acting locally, thinking globally, repairing the sea
- Roles of Government and Non-Government Organisations - Local, State, Commonwealth, National Oceans Office
- Shipwrecks — importance and significance. Research projects.
- Maritime archaeology , preservation of materials, display, museums, national protected wrecks
- Environmental protection action plans - Seaweek, world environment day
- Education, Raising awareness, Best practices, Ecological sustainability
- GBRMPA Reef Guardians program - practical solutions to saving the sea.

Kirwan Case Study

Kirwan is a big school with over 2000 students and 150 staff. Zoe Hiddins works in the science department and has a pretty good group of year 9's who trialled the outcomes from the Industry strand in Semester 1. Zoe has a BSc and grad BEd and has been teaching for 4 years and was constrained by the fact she could not report in outcomes.

Zoe's task to year 9's

You have been contracted by Ross Haven Marine, a local shipwright company, to investigate different materials with respect to their suitability for shipbuilding. In doing so, you are required to investigate the properties and characteristics associated with the ocean and how they impact on various materials.

Conditions of Task:

- Experimentation to be completed in groups of 3 – 4 students
- Written work for submission to be completed individually
- Each student is permitted two drafts only
- Several weeks class time will be allowed for completion of this report
- Report length to be 500 – 600 words.

Outcomes Assessed:

In 4.1 Students investigate how the properties of materials influence their use.

In 5.1 Students devise tests to show that the properties of materials influence their use.

In 6.1 Students evaluate different commercial products to test if their materials meet specific standards for their use.

Aspects

- Seawater composition (salinity, gases in seawater, dissolved materials)
- Properties associated with seawater (density, temperature, buoyancy, photic zone, water pressure, viscosity, sound)
- Processes on Earth and their impact (eg the water cycle)
- Predicting Earth processes based on seawater properties

Possible Learning Experiences

- Excursion to freshwater source (eg Ross River) and saltwater source (eg breakwater) to collect data and water samples for further testing
- Guest speaker from Ross haven marine
- Bronze CREST award
- Experimental reports testing aspects of seawater

Assessment

Zoe reported in outcomes but had to use a criteria sheet (school requirement) that used the clearly demonstrated, demonstrated and working towards statement.

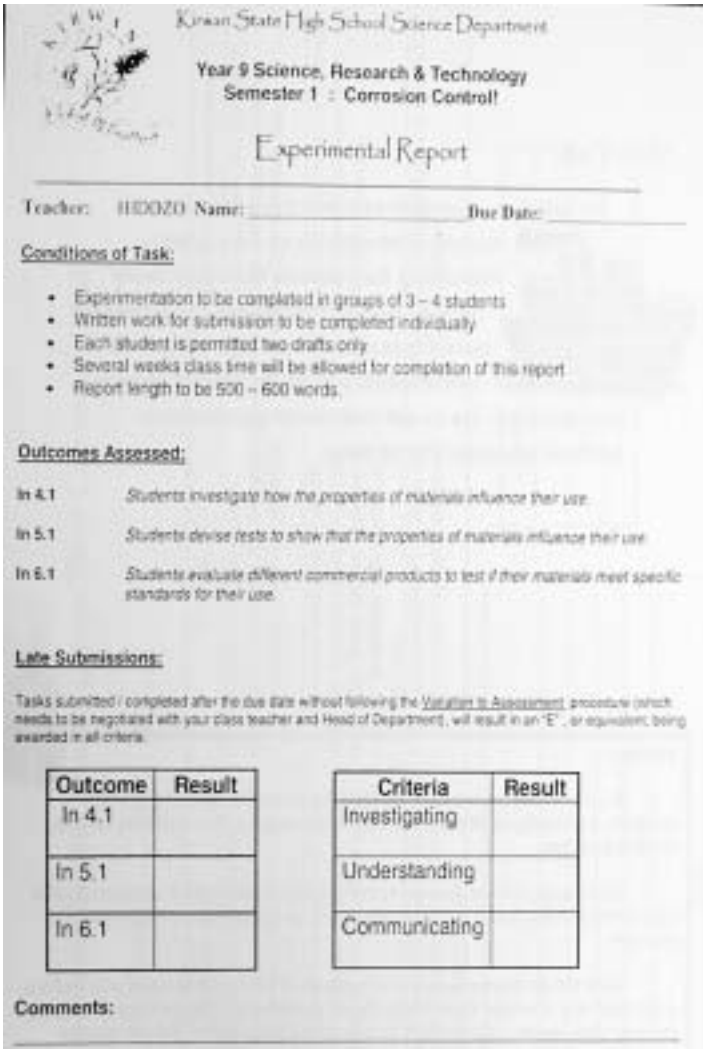
- Bronze CREST Award
- Portfolio Report (including various experimental reports)
- Stimulus Response Task

Rich tasks, new basics

Zoe's unit could easily be developed into a rich task or as part of a international trade new basics topic

- Utilising real world problems - International trade
- Using links to industry (involving shipwrights, local business etc as source of data)

Student method and results >>>>>>>>>>>



Kirwan State High School Science Department

Year 9 Science, Research & Technology
Semester 1 : Corrosion Control!

Experimental Report

Teacher: HODZO Name: _____ Due Date: _____

Conditions of Task:

- Experimentation to be completed in groups of 3 – 4 students
- Written work for submission to be completed individually
- Each student is permitted two drafts only
- Several weeks class time will be allowed for completion of this report
- Report length to be 500 – 600 words.

Outcomes Assessed:

In 4.1 Students investigate how the properties of materials influence their use.

In 5.1 Students devise tests to show that the properties of materials influence their use.

In 6.1 Students evaluate different commercial products to test if their materials meet specific standards for their use.

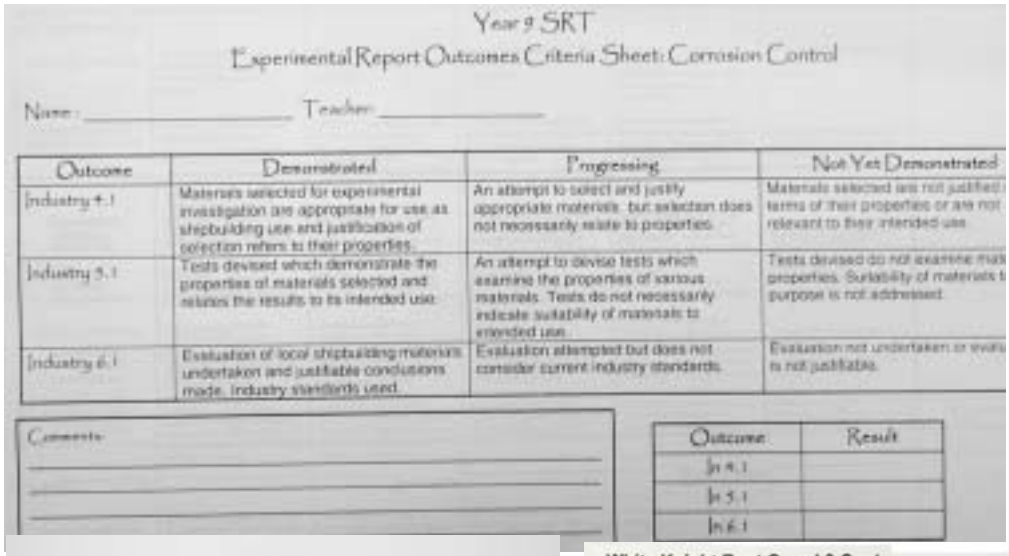
Late Submissions:

Tasks submitted / completed after the due date without following the Variation to Assessment procedure (which needs to be negotiated with your class teacher and Head of Department), will result in an 'E', or equivalent, being awarded in all criteria.

Outcome	Result
In 4.1	
In 5.1	
In 6.1	

Criteria	Result
Investigating	
Understanding	
Communicating	

Comments:



Year 9 SRT

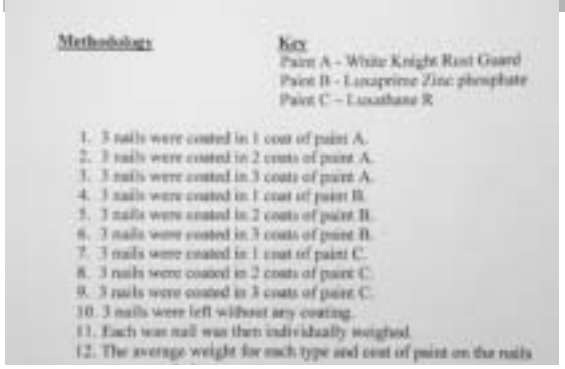
Experimental Report Outcomes Criteria Sheet: Corrosion Control

Name: _____ Teacher: _____

Outcome	Demonstrated	Progressing	Not Yet Demonstrated
Industry 4.1	Materials selected for experimental investigation are appropriate for use as shipbuilding use and justification of selection refers to their properties.	An attempt to select and justify appropriate materials, but selection does not necessarily relate to properties.	Materials selected are not justified in terms of their properties or are not relevant to their intended use.
Industry 5.1	Tests devised which demonstrate the properties of materials selected and relates the results to its intended use.	An attempt to devise tests which examine the properties of various materials. Tests do not necessarily indicate suitability of materials to intended use.	Tests devised do not examine material properties. Suitability of materials for purpose is not addressed.
Industry 6.1	Evaluation of local shipbuilding materials undertaken and justifiable conclusions made. Industry standards used.	Evaluation attempted but does not consider current industry standards.	Evaluation not undertaken or evaluation is not justifiable.

Comments:

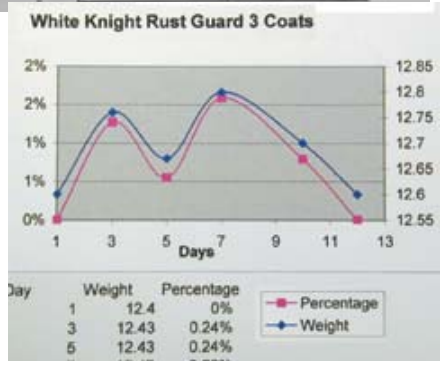
Outcome	Result
In 4.1	
In 5.1	
In 6.1	



Methodology

Key
Paint A - White Knight Rust Guard
Paint B - Lusoprime Zinc phosphate
Paint C – Luxathane R

1. 3 nails were coated in 1 coat of paint A.
2. 3 nails were coated in 2 coats of paint A.
3. 3 nails were coated in 3 coats of paint A.
4. 3 nails were coated in 1 coat of paint B.
5. 3 nails were coated in 2 coats of paint B.
6. 3 nails were coated in 3 coats of paint B.
7. 3 nails were coated in 1 coat of paint C.
8. 3 nails were coated in 2 coats of paint C.
9. 3 nails were coated in 3 coats of paint C.
10. 3 nails were left without any coating.
11. Each was nail was then individually weighed.
12. The average weight for each type and coat of paint on the nails



Sunshine Coast Case study

CME syllabus trial at Sunshine Beach SHS

Here is a sample of the outcomes based using the MTAQ trial syllabus with a standard Rocky Shore Excursion.

MTAQ Syllabus Outcomes

Ec 4.1 Students identify features of organisms that help them survive and reproduce

Ec 5.1 Students examine the internal and external features of organisms and relate these features to survival and reproduction.

Ec 6.1 Students evaluate the different strategies of organisms in terms of their relative efficiency in survival and reproduction

Ec 4.2 Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment. [Science LL 4.3]

Ec 5.2 Students evaluate the consequences of interactions between the living and non-living parts of environments.. [Science LL 5.3]

Ec 6.2 Students prepare scenarios to describe the potential long-term effects of changes in biodiversity caused by human action on ecosystems. [Science LL 6.3]

Sunshine Beach's student outcomes for Ecology 4.1, 5.1, 6.1

L4. Students identify features of organisms that help them survive and reproduce

L5. Students examine the internal and external features of organisms and relate these features to survival and reproduction

L6. Students evaluate the different strategies of organisms in terms of their relative efficiency in survival and reproduction

Sunshine Beach's student outcomes for Ecology 4.2, 5.2, 6.2

L4. Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment.

L5. Students evaluate the consequences of interactions between the living and non-living parts of environments

L6. Students prepare scenarios to describe the potential long term effects of changes in biodiversity caused by human action on ecosystems.

EC .1 Anticipated evidence — Sunshine Coast's interpretation

L4. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals

L5. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided

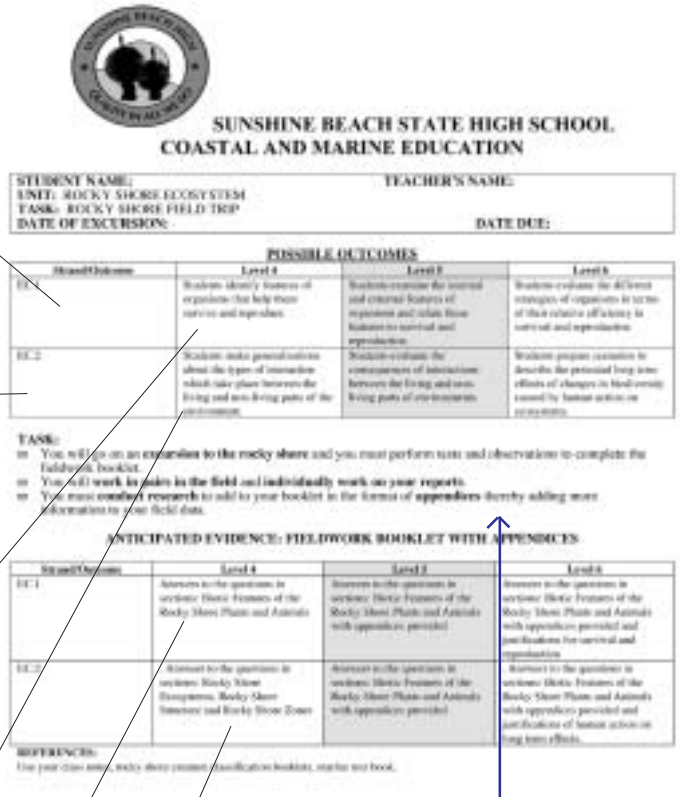
L.6 Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications for survival and reproduction

EC .2 Anticipated evidence — Sunshine Coast's interpretation

L4. Answers to the questions in sections: Rocky Shore Ecosystems, Rocky Shore Structure and Rocky Shore Zones

L5. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided

L6. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications of human action on long term effects.



SUNSHINE BEACH STATE HIGH SCHOOL
COASTAL AND MARINE EDUCATION

STUDENT NAME: TEACHER'S NAME:
UNIT: ROCKY SHORE ECOSYSTEM
TASK: ROCKY SHORE FIELD TRIP
DATE OF EXCURSION: DATE DUE:

POSSIBLE OUTCOMES

Strand/Substrand/Outcome	Level 4	Level 5	Level 6
EC 1	Students identify features of organisms that help them survive and reproduce	Students examine the internal and external features of organisms and relate these features to survival and reproduction	Students evaluate the different strategies of organisms in terms of their relative efficiency in survival and reproduction
EC 2	Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment	Students evaluate the consequences of interactions between the living and non-living parts of environments	Students prepare scenarios to describe the potential long-term effects of changes in biodiversity caused by human action on ecosystems

TASK:
- You will go on an **excursion to the rocky shore** and you must perform tests and observations to complete the fieldwork booklet.
- You will **work in pairs in the field** and **individually work on your reports**.
- You must **conduct research** to add to your booklet in the format of **appendices** thereby adding more information to your field data.

ANTICIPATED EVIDENCE: FIELDWORK BOOKLET WITH APPENDICES

Strand/Substrand/Outcome	Level 4	Level 5	Level 6
EC 1	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications for survival and reproduction
EC 2	Answers to the questions in sections: Rocky Shore Ecosystems, Rocky Shore Structure and Rocky Shore Zones	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications of human action on long term effects.

REFERENCES:
Use your class rocky shore resource/classification booklet, marine text book.

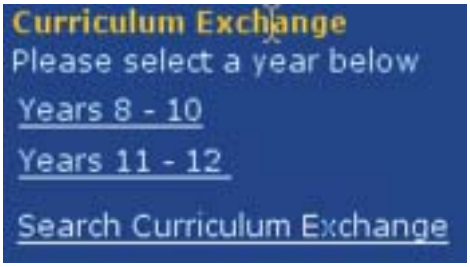
Students Task

- You will go on an excursion to the rocky shore and you must perform tests and observations to complete the fieldwork booklet.
- You will work in pairs in the field and individually work on your reports.
- You must conduct research to add to your booklet in the format of appendices thereby adding more information to your field data.

Use the search function at the bottom of the choice list.

Eg: You are planning a rocky shore excursion. So type into the search function the words:

rocky shore



Examples of the MTAQ Yr 8-10 curriculum exchange

Posted by: Sheree Bell Sunshine Beach State High School

Last updated: 9/06/2004

Where: Years 8-10

1. Assessment outcomes for 7 units of work

Content area: Course outlines

File Type: Program Outline

3D Model of the coral polyp

Artificial baits – lure construction and written report

Conservation of the sea – Written Report 800 word

Rocky Shore – Field Research Booklet

Marine Plants – Informative Brochure

2. Revision Test Coral Polyp

Content area: Animals

File Type: Test

25 Short answer questions on Biology and Ecology or coral polyps Coral Polyps

3. Reef Guardians Action Plan Ideas

Content area: Saving the sea

File Type: Task

23 group project or individual student ideas on how to save the sea through the GBRMPA Reef Guardians program

4. Year 10 Saving the sea - reef guardians project

Content area: Saving the sea

File Type: Task

Students devise (in groups) a plan to reduce litter waste (calico bags) (reduce, recycle, reuse) in schools and in the neighbourhood Students develop an education program (signs posters, murals, newsletters) about litter and waste reduction for school and community

5. Year 8 Saving the Sea - Reef Guardians Project

Content area: Saving the sea

File Type: Task

Students map the catchment area of Burgess Creek, participate in water testing, visit Noosa Wastewater Treatment Plant and devise a plan to better manage the catchment area.

6. Fishing - Lure construction assignment

Content area: Fishing

File Type: Task

Recreational Fishing – Lure Construction A task is to design and construct a lure specifically targeted to a specific fish using particular buoyant structural materials.

7. Rocky Shore - Criteria and assessment sheets

Content area: Course outlines

File Type: Unit Outline

Rocky Shore Ecology ideas for assessment outlines includes – Coast and Marine Level Outcomes for Ecology, anticipated evidence, tasks, criteria sheets, standards and indicators of achievement.

The purpose of this unit is to give students an understanding of the physical elements of the rocky shore ecosystem including biotic and abiotic factors. Students will be testing abiotic factors and making inferences as to how

Posted by: Martin Taylor Sunshine Beach State High School

Last updated: 9/06/2004

1. Parts of an aquarium

Syllabus: Industry

Content area: Aquariums

File Type: Worksheet

Student notes or a good OHP on the nitrogen cycle in an aquarium, the parts of an aquarium and a worksheet.

2. Boat hull testing procedures

Syllabus: Industry

Content area: Employment

File Type: Test

Four procedures to test a student designed hull

Hull Design Testing Procedure (The full worksheet is on the curriculum exchange - just type in hull to the search function

TEST 1 Boat Hull Speed Test (Standard Weight or Motor)

Method:

Place boat at one end of the testing tank. Attach pulley system and record weight used Use a stopwatch to time how long it takes the boat to travel 2 m. Calculate the speed by the formula

Speed = Distance /Time

Record the speed and acceleration using a graphics calculator. Copy the graph curve from calculator Repeat test 3 times and average results

TEST 2 Boat Hull Speed Test (Wind Power)

Method:

Place boat at one end of the testing tank. Turn on Fan and watch boat sail for 2 metres. Use a stopwatch to time how long it take the boat to travel 2 m. Calculate the speed by the formula

Speed = Distance /Time

Record the speed and acceleration using a graphics calculator. Copy the graph curve from calculator

Repeat test 3 times and average results

TEST 3 STABILITY

Method: Place boat in sink and add weights along one side of the boat until the gunnel is under water. Record the weight required

TEST 4 CARRYING CAPACITY

Method: Place boat in sink and add weights along the centre of the boat until the boat takes water over the gunnel. Record the weight required.

THIS REPORT RECOMMENDS THAT

- the syllabus be submitted to QSA for accreditation subsequent to minor modifications and editorial changes indicated throughout the trial period, Jan 2004- November 2004
- a one day workshop on the syllabus be held at the MTAQ annual state Conference at Noosa in 2004 (see below).
- a teacher be seconded to assist schools (GBRMPA to assist)
  - develop syllabus elaborations for the five syllabus strands for the MTAQ web site
  - assist schools to write workprograms and assess in out-comes
  - develop task sheets and anticipated evidence assessment statements
  - collect workprograms, task sheets etc and place them on MTAQ web site
  - liaise with QSA and Education Queensland on current pedagogy to ensure these are embedded in school workprograms as well as licence and copyright issues
  - liaise with teachers, administrators, parents, students, industry representatives, QSA staff and panel members, and career advisers to make suggestions for improving the syllabus
  - network and run in-service workshops in the ten MTAQ regions with other MTAQ industry partners

Syllabus sponsorship acknowledgements be given to GBRMPA for assistance with teacher secondment

NOOSA HALF DAY CME WORKSHOP

This will be held in conjunction with our State conference

DATE, TIME AND VENUE

Wednesday 29 September 9am - 12noon Moana Conference Room, South Pacific Resort, 179 Weyba Rd, Noosaville: Ph: 5473 1200

PROGRAM

9.00 am	Welcome and Syllabus presentation - Sheree Bell MTAQ Syllabus Chairperson, Questions on the syllabus design
10.00am	Evaluators report
10.30am	Morning tea
11.00am	Group workshops run by trial school teachers A. Schools with outcomes based assessment B. Schools contemplating CME as part of rich tasks C. Schools using outcomes but reporting in criteria
12.30pm	Lunch and informal networking

HANDOUTS INCLUDE

Workprograms from Sunshine Beach, Kirwin and Mercy College

COST

MTAQ and MESA financial members $Nil, Non-financial members $55

MTAQ DECISIONS AGM SEPT. 2004

- The syllabus be submitted to QSA for accreditation and MTAQ pay $3000 from members funds for this process
- A position called Syllabus Officer (Hon) to be created on the executive to carry the syllabus forward to 2005 and beyond
- To recover the funds MTAQ Syllabus Officer (Hon) to organise:
  - Sale of a annual licence, the licence fee NOT to exceed the School B membership (Present is $66)
  - Advertise the syllabus NATIONALLY
  - Print 3000 copies of the syllabus and distribute to members
  - Press 500 CD's and place syllabus and MTAQ curriculum exchange on the disk
  - Sell add space in the syllabus to AMC, GBRMPA, Wet Paper and Yachting Qld
- To administer the syllabus MTAQ to
  - contract out a administration firm to complete the tasks of the syllabus officer as outlined above
  - that can work with our web designer to create with the admin. from a mechanism to track licences and to make sure they keep up their payments annually and inform them of updates to the syllabus
  - work with the arrange whatever meetings are necessary to
- Approvals need for:
  - Cover on and marketing materials on following pages
  - Selling and administration of the licence
  - Creation of Syllabus Project Officer (Hon)
  - Contracting of admin. firm to assist, printing and managing the resources
  - Selling adds in the syllabus and accepting our sponsors
  - Ratification of the following copyright statement and acknowledgements

AGM Noosa 2004

Copyright and licensing details (Bob Moffatt to work out final wording with Ed Qld)

Acknowledgements

The Marine Teachers Association of Queensland acknowledges the assistance of the Queensland Studies Authority, Education Queensland, Australian Maritime College, Yachting Queensland, Great Barrier Reef Marine Park Authority, Wet Paper Publications and Maritime Safety Queensland in the development of this syllabus and their permission to reproduce text, tables and figures from their generic documents.

The Marine Teachers Association of Queensland is also grateful to the following members who participated in syllabus development from 2000 – 2004.

Principal authors

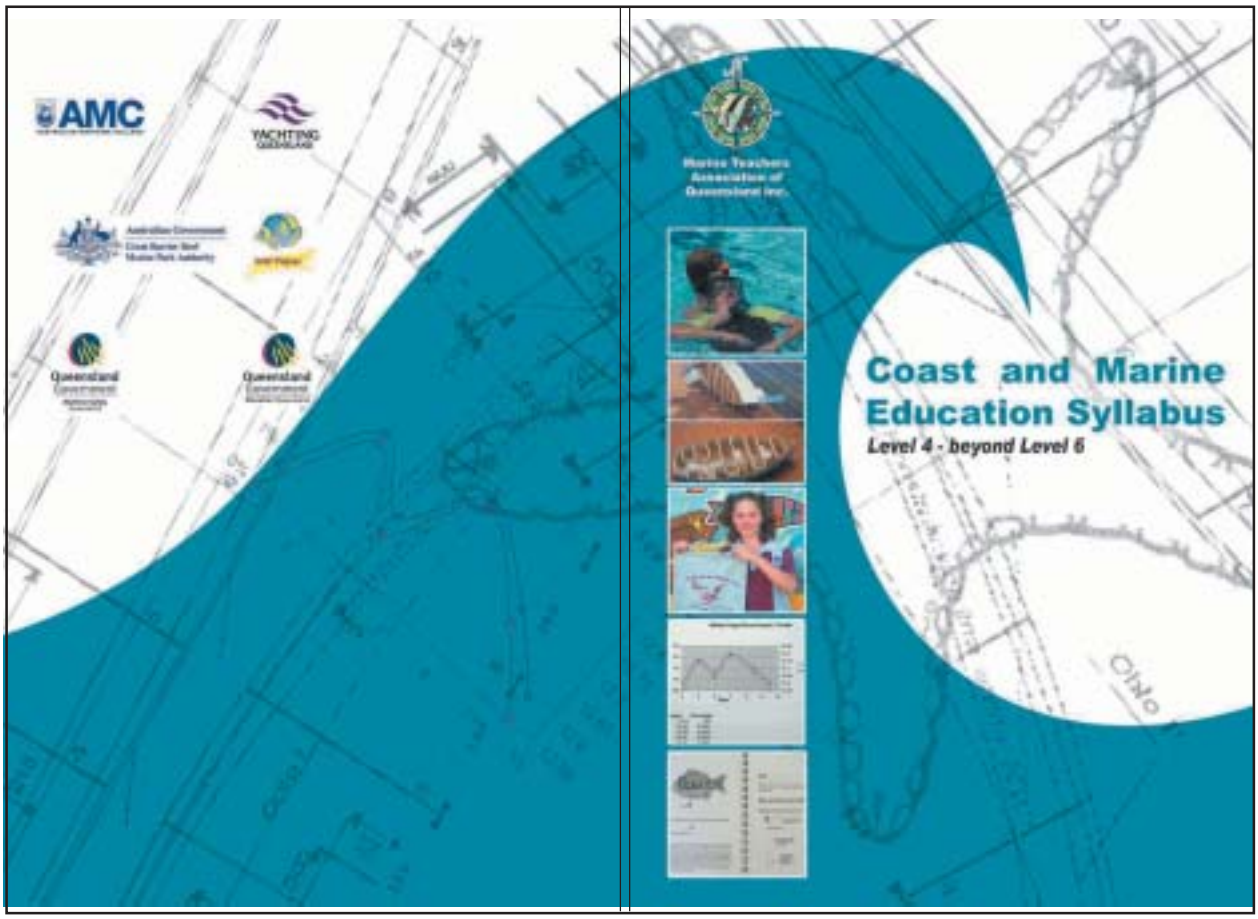
Sheree Bell, Kelly Goodingham and Bob Moffatt

Committee and contributing authors

Rob Armstrong, Simone Baker, Sheree Bell, Karen Beutel, Dr Beth Brook, Dr Terri Burnett, Angela Colliver, Mark Cooper, Brendan Crowley, Karen Domotor, Bryce Goldburg, Kelly Goodingham, Mike Halpin, Paul Hand, Zoe Hiddins, Lloyd Jones, Meg Jones, Peter Kiernan, Kym McKauge, Bob and Paula Moffatt, William Rankine, Craig Reid, Adam Richmond, Stuart Russell, Tim Ryan, Peter Slaughter, Phil Smith, Mark Snartt, Kathy Steggles, Martin Taylor and Jim Townson.

Proposed syllabus cover

- Our designer has come up with the following cover subject to the receipt of sponsors cheques



Term 4

Accreditation process

- The syllabus is now with the QSA committees for accreditation due March 2005.
- Special evaluation committee to be set up and paid for from our $3000

Copyright

- Letter and discussions with Education Queensland reveals that
  - MTAQ owns copyright.
  - Has no objection to MTAQ charging schools to use syllabus by way of membership
  - No warranty or licence required

Secure funding for cover and syllabus CD

- Bob to source funds for printing of syllabus and CD
- Logos and cover to be finalised by January 2005

Syllabus Awards presentation

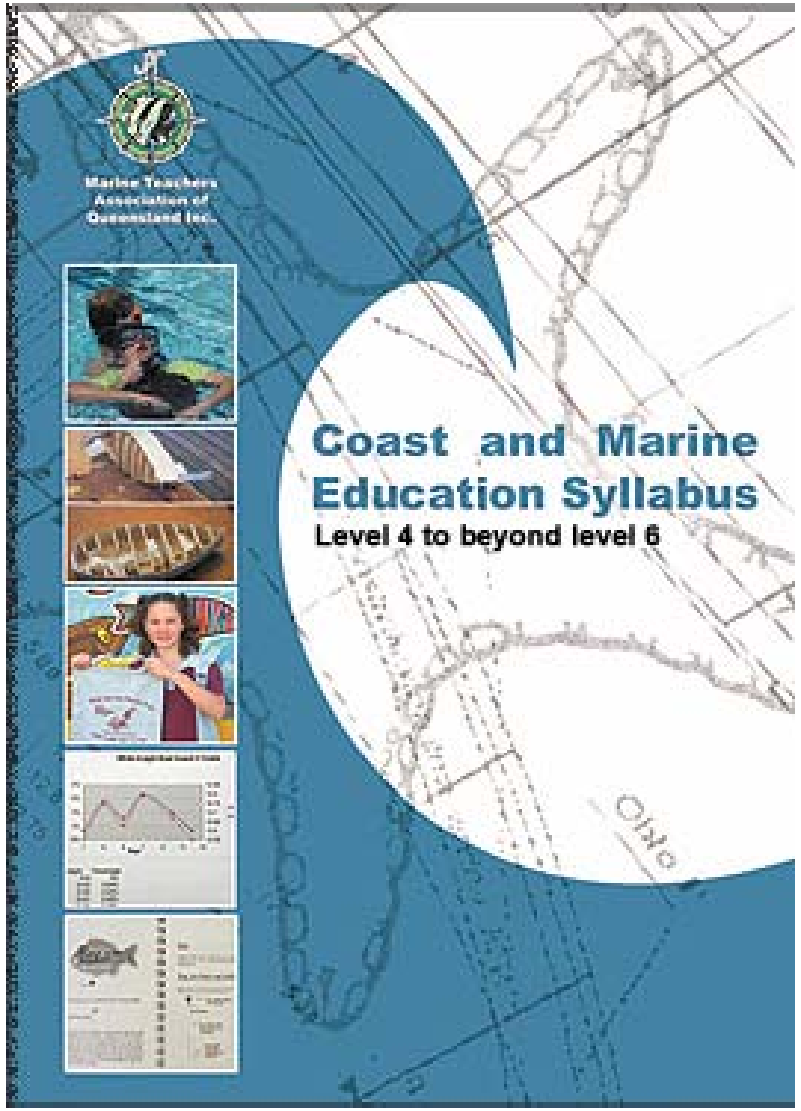
- Proposed December 3rd
- Bob to hand over to Sheree Bell

Syllabus Birth - 2005

Birth of the syllabus

- MTAQ web site news to take over further syllabus reporting and development following the birth in 2005

Workshop presentation - Explaining the syllabus



A joint venture between MTAQ, Education Queensland and the Marine Education Industry

The syllabus was developed from school and industry partners

Holy Spirit College
Kirwan SHS
Sunshine Beach SHS
Mercy College
Southern Cross College
Hervey Bay SHS
Clontarf Beach SHS

North West Cape College
Mackay SHS
Rockhampton Grammar School
Yeppoon SHS
Tin Can Bay Sec Department
Dunwich SHS
Victoria Point SHS

Queensland Government
Maritime Safety Queensland

YACHTING QUEENSLAND

Australian Government
Quality Teacher Programme

Wet Paper

Australian Government
Great Barrier Reef
Marine Park Authority

Queensland Government
Education Queensland

AMC
AUSTRALIAN MARITIME COLLEGE

The purpose of this presentation is to:

- Give you some background to MTAQ
- Detail the features of the syllabus
- Describe a few case studies from the syllabus trial

This will take 30 minutes and please feel free to ask any questions during the presentation

MTAQ has become the peak body for Marine Education in Queensland

Marine Teachers Association of Queensland

mtaq

home about mtaq join us conferences & workshops newsletter news members area

Member's Options

> Visit Members Forum
> Visit Curriculum Exchange
> Run Region Reports
> Run Conference Convenor Reports
> Edit my details
> Junior Marine Studies Syllabus Project:

Junior Marine Studies Project Reports

Coast and Marine Education 2004 Draft Syllabus

The syllabus was developed to

- Engage students from Year 8-10 with content and tasks relevant to their daily lives

- Introduce students to marine education to show them a pathway into the Year 11-12 Marine Studies as well as careers in the maritime industry

- Engage teachers in relevant curriculum using latest curriculum practices

Courses developed from the syllabus will

- use existing equipment and curriculum resources supplied to industrial arts, science, SOSE or Physical Education subject departments

and

- allow a first year graduate teacher with
  - a love of the sea
  - A Science or SOSE background and
  - minimal qualifications (Eg: a speed boat drivers licence, a first aid certificate and/or an ability to snorkel)

to teach the subject

The syllabus has five strands

Courses of study can be planned using learning outcomes from

a single strand

or

from a number of strands.

Practices and skills:

that allow people to use marine and coastal environments

identify situations that are potentially dangerous to humans.

Industries:

that are related to coastal and marine environments.

Oceanography:

the physical and chemical interactions between the ocean and the coast.

Coast and Marine Education

Conservation:

the sustainability of coastal and marine systems

Ecology :

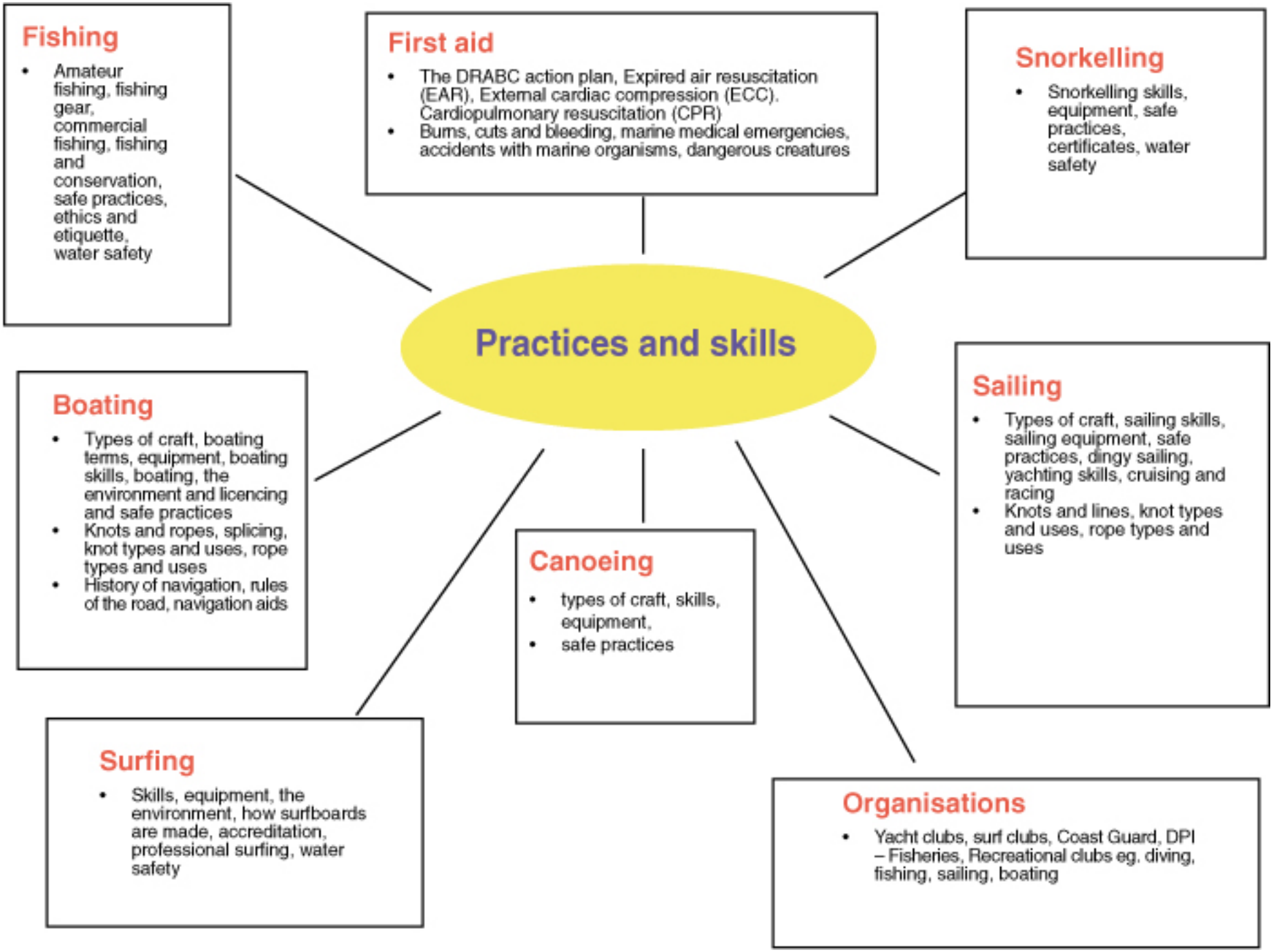
the biological interactions that occur between the ocean and the coast.

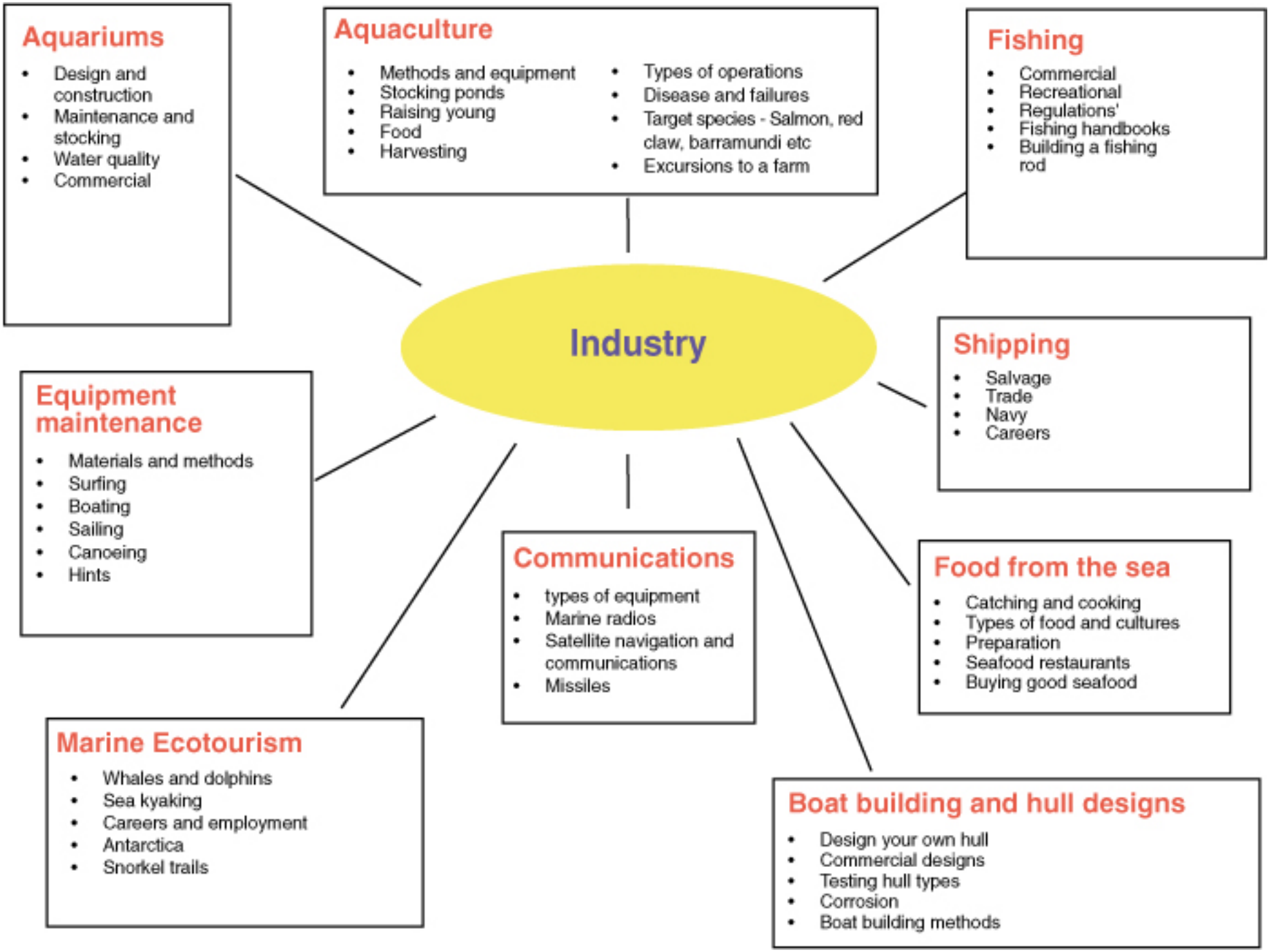
Central content

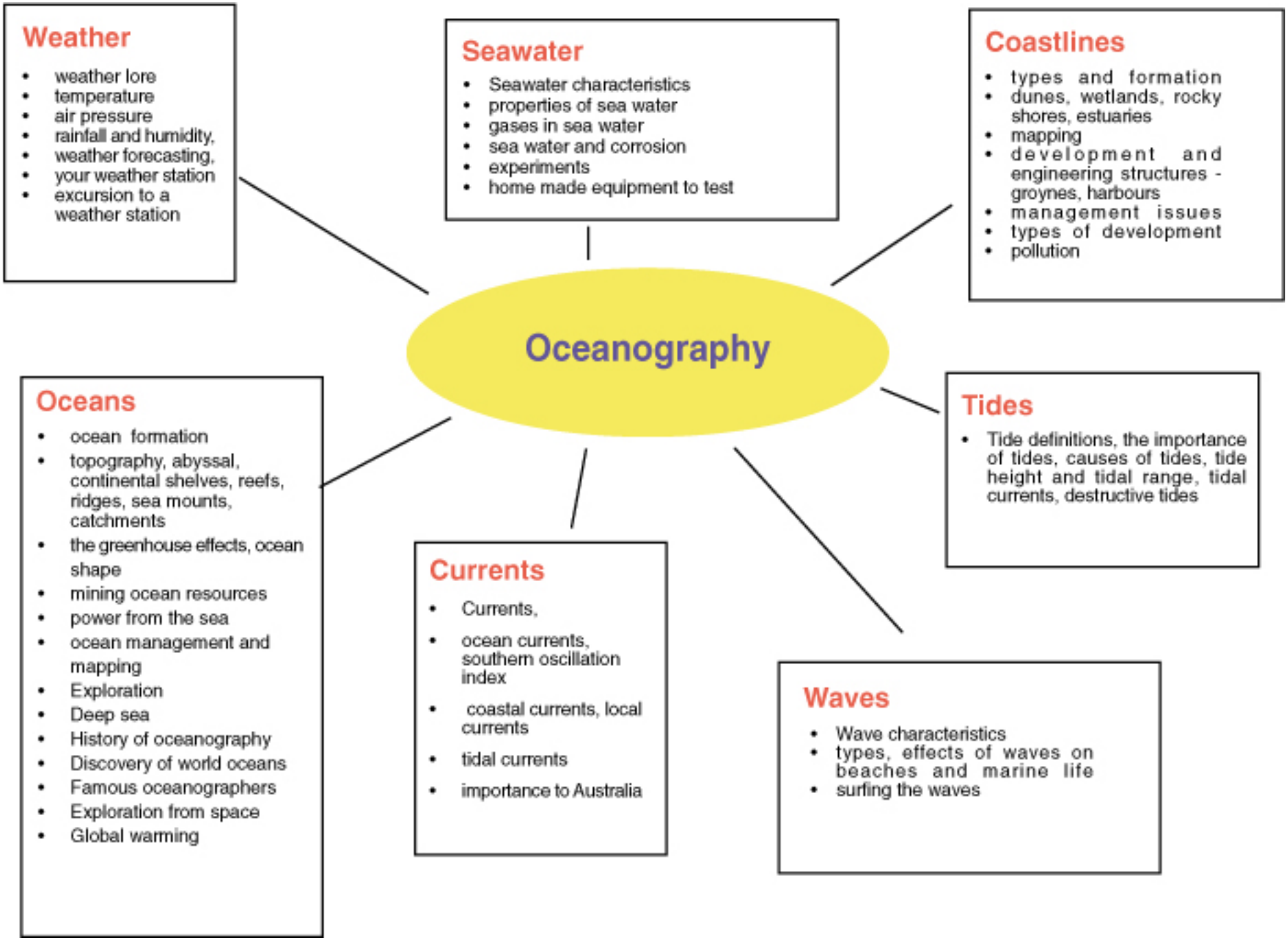
Students will engage with central content when they are provided with opportunities to demonstrate central learning outcomes.

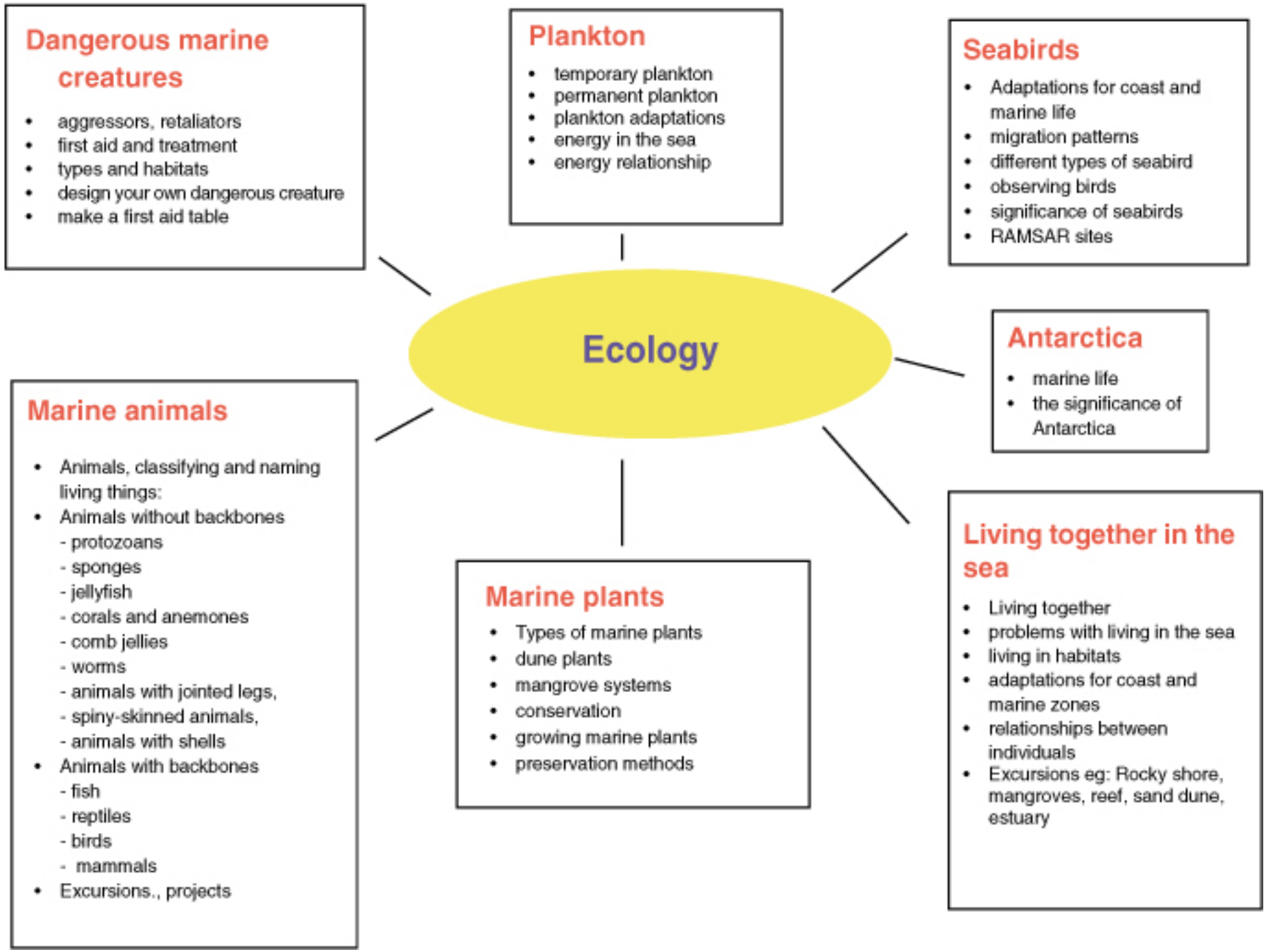
Features of the content outlined in the syllabus

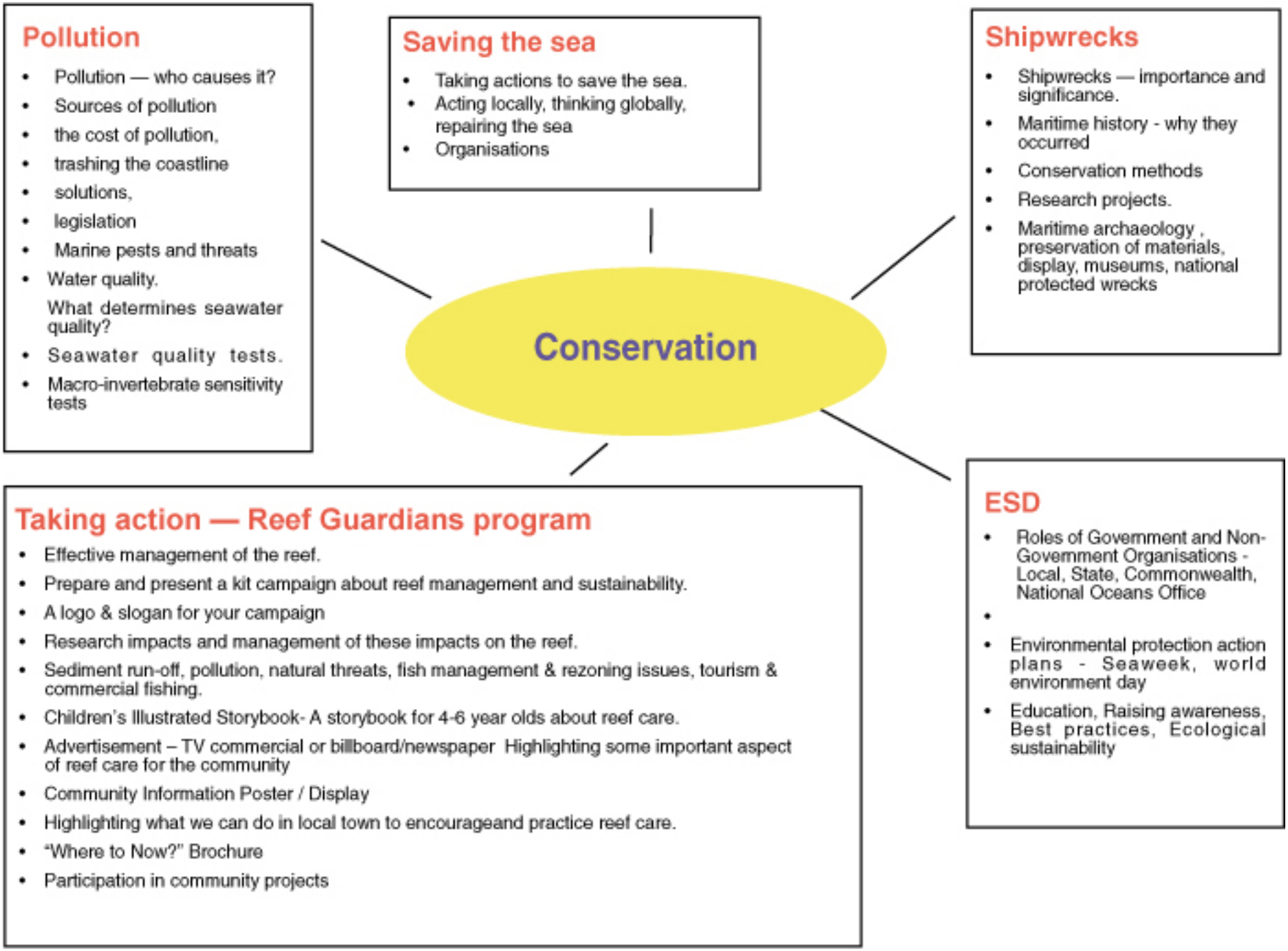
- Content engages students with concepts and tasks familiar to them, in their daily lives. Students perceive it as "I can do this", "I can use this" , "I can get fit"
- Content lists enable teachers to select tasks and activities to suit students' needs, interests and abilities and to take account of their prior knowledge and experiences.
- The content is NOT hierarchical or exhaustive and can be added to easily by a teacher who has a general knowledge or interest in the sea - it's teacher motivating.
- Any of the content can be addressed at ANY level and not all of the content need be addressed at every level - VERY flexible.


Practices and skills
Fishing
Amateur fishing, fishing gear, commercial fishing, fishing and conservation, safe practices, ethics and etiquette, water safety
First aid
The DRABC action plan, Expired air resuscitation (EAR), External cardiac compression (ECC). Cardiopulmonary resuscitation (CPR)
Burns, cuts and bleeding, marine medical emergencies, accidents with marine organisms, dangerous creatures
Snorkelling
Snorkelling skills, equipment, safe practices, certificates, water safety
Boating
Types of craft, boating terms, equipment, boating skills, boating, the environment and licencing and safe practices
Knots and ropes, splicing, knot types and uses, rope types and uses
History of navigation, rules of the road, navigation aids
Sailing
Types of craft, sailing skills, sailing equipment, safe practices, dingy sailing, yachting skills, cruising and racing
Knots and lines, knot types and uses, rope types and uses
Canoeing
types of craft, skills, equipment,
safe practices
Surfing
Skills, equipment, the environment, how surfboards are made, accreditation, professional surfing, water safety
Organisations
Yacht clubs, surf clubs, Coast Guard, DPI – Fisheries, Recreational clubs eg. diving, fishing, sailing, boating


Aquariums
Design and construction
Maintenance and stocking
Water quality
Commercial
Aquaculture
Methods and equipment
Stocking ponds
Raising young
Food
Harvesting
Types of operations
Disease and failures
Target species - Salmon, red claw, barramundi etc
Excursions to a farm
Fishing
Commercial
Recreational
Regulations'
Fishing handbooks
Building a fishing rod
Industry
Shipping
Salvage
Trade
Navy
Careers
Equipment maintenance
Materials and methods
Surfing
Boating
Sailing
Canoeing
Hints
Communications
types of equipment
Marine radios
Satellite navigation and communications
Missiles
Food from the sea
Catching and cooking
Types of food and cultures
Preparation
Seafood restaurants
Buying good seafood
Marine Ecotourism
Whales and dolphins
Sea kyaking
Careers and employment
Antarctica
Snorkel trails
Boat building and hull designs
Design your own hull
Commercial designs
Testing hull types
Corrosion
Boat building methods


Weather
weather lore
temperature
air pressure
rainfall and humidity,
weather forecasting,
your weather station
excursion to a weather station
Seawater
Seawater characteristics
properties of sea water
gases in sea water
sea water and corrosion
experiments
home made equipment to test
Coastlines
types and formation
dunes, wetlands, rocky shores, estuaries
mapping
development and engineering structures - groynes, harbours
management issues
types of development
pollution
Oceanography
Oceans
ocean formation
topography, abyssal, continental shelves, reefs, ridges, sea mounts, catchments
the greenhouse effects, ocean shape
mining ocean resources
power from the sea
ocean management and mapping
Exploration
Deep sea
History of oceanography
Discovery of world oceans
Famous oceanographers
Exploration from space
Global warming
Currents
Currents,
ocean currents, southern oscillation index
coastal currents, local currents
tidal currents
importance to Australia
Tides
Tide definitions, the importance of tides, causes of tides, tide height and tidal range, tidal currents, destructive tides
Waves
Wave characteristics
types, effects of waves on beaches and marine life
surfing the waves


Ecology
Dangerous marine creatures
aggressors, retaliators
first aid and treatment
types and habitats
design your own dangerous creature
make a first aid table
Plankton
temporary plankton
permanent plankton
plankton adaptations
energy in the sea
energy relationship
Seabirds
Adaptations for coast and marine life
migration patterns
different types of seabird
observing birds
significance of seabirds
RAMSAR sites
Antarctica
marine life
the significance of Antarctica
Marine animals
Animals, classifying and naming living things:
Animals without backbones
- protozoans
- sponges
- jellyfish
- corals and anemones
- comb jellies
- worms
- animals with jointed legs,
- spiny-skinned animals,
- animals with shells
Animals with backbones
- fish
- reptiles
- birds
- mammals
Excursions., projects
Marine plants
Types of marine plants
dune plants
mangrove systems
conservation
growing marine plants
preservation methods
Living together in the sea
Living together
problems with living in the sea
living in habitats
adaptations for coast and marine zones
relationships between individuals
Excursions eg: Rocky shore, mangroves, reef, sand dune, estuary

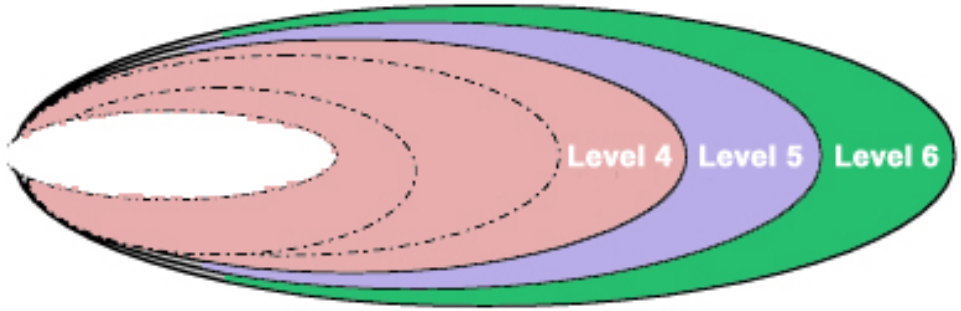

Pollution
Pollution — who causes it?
Sources of pollution
the cost of pollution,
trashing the coastline
solutions,
legislation
Marine pests and threats
Water quality.
What determines seawater quality?
Seawater quality tests.
Macro-invertebrate sensitivity tests
Saving the sea
Taking actions to save the sea.
Acting locally, thinking globally, repairing the sea
Organisations
Shipwrecks
Shipwrecks — importance and significance.
Maritime history - why they occurred
Conservation methods
Research projects.
Maritime archaeology , preservation of materials, display, museums, national protected wrecks
Conservation
Taking action — Reef Guardians program
Effective management of the reef.
Prepare and present a kit campaign about reef management and sustainability.
A logo & slogan for your campaign
Research impacts and management of these impacts on the reef.
Sediment run-off, pollution, natural threats, fish management & rezoning issues, tourism & commercial fishing.
Children's Illustrated Storybook- A storybook for 4-6 year olds about reef care.
Advertisement – TV commercial or billboard/newspaper Highlighting some important aspect of reef care for the community
Community Information Poster / Display
Highlighting what we can do in local town to encourageand practice reef care.
"Where to Now?" Brochure
Participation in community projects
ESD
Roles of Government and Non-Government Organisations - Local, State, Commonwealth, National Oceans Office
Environmental protection action plans - Seaweek, world environment day
Education, Raising awareness, Best practices, Ecological sustainability

Outcomes and organisation

The central learning outcomes are the focus for planning learning activities and assessment tasks.

The syllabus describes learning outcomes for Level 4, Level 5, Level 6 and Beyond Level 6.

The sequencing of the learning outcomes is such that each level is 'nested' within the following level. Learning outcomes for successive levels are conceptually related to each other, forming a continuum rather than existing simply as a number of discrete entities.



A level statement is included for each level of each strand of the syllabus which summarises the learning outcomes at each level and provides a framework for developing the central and supplementary learning outcomes.

A set of organisers for each strand set the parameters for the outcomes

For example

Learning outcomes

Practices and skills

Organisers for the learning outcomes in the practices and skills strand are:

Coast and marine activities – skills

Coast and marine activities – equipment and services

Coast and marine activities – management and safe practices

Level 4	Level 5
Level statement Students understand the skills involved in a coast and marine activity. They investigate the equipment and services required for an activity. They understand that safe and unsafe behaviours and situations require management. **Central learning outcomes** PS 4.1 Students participate and report on a coast and marine activity. PS 4.2 Students compare and contrast a selection of equipment and services to meet their recreational needs. PS 4.3 Students identify and explain situations and behaviours that are safe or unsafe after assessing personal behaviours and consequences.	**Level statement** Students perform the skills of a coast and marine activity. They investigate the reasons behind their choices of equipment for an activity. They perform behaviours to control an unsafe situation. **Central learning outcomes** PS 5.1 Students demonstrate specific skills in a coast and marine activity. PS 5.2 Students analyse factors that influence their selection of equipment and services for an activity. PS 5.3 Students demonstrate safe behaviours and actions to minimise unsafe situations.

Level 6	Beyond Level 6
Level statement Students evaluate their performance in an activity and design ways for everyone to participate. They evaluate the equipment and services used in an activity. They design strategies to respond to unsafe situations. **Central learning outcomes** PS 6.1 Students evaluate their own performance and plan strategies to ensure everyone can participate in an activity. PS 6.2 Students use and evaluate a variety of equipment and services for an activity. PS 6.3 Students devise and implement personal and community strategies to respond to unsafe situations.	**Level statement** Students evaluate the skills required to receive a community award. They promote an activity to the community. They evaluate strategies that are used to respond to unsafe situations. **Supplementary learning outcomes** PSS 6.1 Students analyse and evaluate performance skills required to receive a community award. PSS 6.2 Students design a community promotion for an activity based on the equipment and services available. PSS 6.3 Students evaluate strategies for potentially unsafe situations and behaviours in order to optimise benefits.

*L*earning outcomes
Industry
Organisers for the learning outcomes in the industry strand are: Coast and marine industries – properties of materials Coast and marine industries – operating procedures **Core Content can be found on page 19**

Level 4	**Level 5**
Level statement Students investigate properties of materials specific to their use. They research the operations of an industry. **Central learning outcomes** I 4.1 Students investigate how the properties of materials influence their use. I 4.2 Students investigate a local industry and report on its operations.	**Level statement** Students test the properties of materials. They analyse the operations of an industry. **Central learning outcomes** I 5.1 Students devise tests to show that the properties of materials influence their use. I 5.2 Students analyse the efficiency of the operations within an industry.

Level 6	**Beyond Level 6**
Level statement Students evaluate commercial products and their requirements to meet specific standards. They make recommendations to the operations of an industry. **Central learning outcomes** I 6.1 Students evaluate different commercial products to test if their materials meet specific standards for their use. I 6.2 Students evaluate and make recommendations on the operations of an industry.	**Level statement** Students construct a product that meets specific standards. They devise a coast and marine industry operation. **Supplementary learning outcomes** IS 6.1 Students design and construct a product using materials which meet specific standards for their use. **IS 6.2 Students design and plan a coast and marine industry operation.**

***L*earning outcomes**
Oceanography
Organisers for the learning outcomes in the oceanography strand are: Coast and marine environments – systems Coast and marine environments - research Core content can be found on page 20

Level 4	Level 5
Level statement Students identify the natural systems and research methods of the ocean. Central learning outcomes O 4.1 Students identify the natural systems of the ocean. O 4.2 Students identify various research methods.	Level statement Students understand that there are the natural systems of the ocean. They can explain the procedures of a research method. Central learning outcomes O 5.1 Students explain the interactions between the natural systems of the ocean. O 5.2 Students investigate the procedures of a research method.

Level 6	Beyond Level 6
Level statement Students explain features and events caused by the interaction of the natural systems of the ocean. They evaluate a research method used to study the ocean systems. Central learning outcomes O 6.1 Students use scientific ideas and theories about interactions within and between the natural systems of the ocean to explain past and present features and events. O 6.2 Students evaluate a research method for effective design and implementation.	**Level statement** Students understand how features and events can be predicted using knowledge of the oceans natural systems. They select a research method and design an appropriate tool. **Supplementary learning outcomes** OS 6.1 Students explain how and why scientific ideas of the oceans systems can be used to predict features and events. OS 6.2 Students design a research tool specific to a research method.

***L*earning outcomes**
Ecology
Organisers for the learning outcomes in the ecology strand are: Coast and marine environments – living things Coast and marine environments – interactions Coast and marine environments - classification Core content can be found on page 21

Level 4	Level 5
Level statement Students understand that the features of organisms and their interactions with living and non-living parts of their environment enable them to survive and reproduce. They understand the grouping process of organisms. Central learning outcomes E 4.1 Students identify features of organisms that enable them survive and reproduce E 4.2 Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment. [Science LL 4.3] E 4.3 Students make inferences about the groupings of organisms.	**Level statement** Students explain how the features of organisms can enable them to survive and reproduce. They understand that interactions between living and non-living parts of an environment have consequences. They explore the use of characteristics in the classification process. **Central learning outcomes** E 5.1 Students examine the internal and external features of organisms and relate these features to survival and reproduction. E 5.2 Students evaluate the consequences of interactions between the living and non-living parts of environments. [Science LL 5.3] E 5.3 Students explain how characteristics are used for classification

Level 6	Beyond Level 6
Level statement Students understand the abilities of organisms to enhance their survival and reproduction. They describe how human action can affect biodiversity. They use characteristics to classify organisms. **Central learning outcomes** E 6.1 Students evaluate the different strategies of organisms in terms of their relative efficiency in survival and reproduction. E 6.2 Students prepare scenarios to describe the potential long-term effects of changes in biodiversity caused by human action on ecosystems. [Science LL 6.3] E 6.3 Students classify organisms using internal and external characteristics.	**Level statement** Students understand the changing effects of an organism in response to its environment. They understand that human activities result in long-term effects. They design and use a classification key in the field. **Supplementary learning outcome** ES 6.1 Students identify the reasons why functioning and behaviour of organisms change in response to variations in internal and external conditions. ES 6.2 Students examine potential long-term effects of human activities on the environment. [Science LL DB6.3] ES 6.3 Students participate in a field study and design a classification key for observed organisms.

*L*earning outcomes
Conservation
Organisers for the learning outcomes in the conservation strand are: Coast and marine environments – user groups Coast and marine environments – impacts and management Core content can be found on page 22

Level 4	Level 5
Level statement Students understand that different user groups impact on a coast and marine environment, making recommendations for sustainability. **Central learning outcomes** C 4.1 Students identify the different user groups within a coast and marine environment. C 4.2 Students identify impacts on a coast and marine environment and recommend effective ways to sustain it.	**Level statement** Students understand the cultural differences between user groups of a coast and marine environment. They explore how an organisation ensures sustainability. **Central learning outcomes** C 5.1 Students compare and contrast the culture of the different user groups within a coast and marine environment. C 5.2 Students investigate an existing organisation designed to establish a sustainable future.

Level 6	Beyond Level 6
Level statement Students understand that user groups impact on each other. They develop a sustainability plan for a coast and marine environment. **Central learning outcomes** C 6.1 Students investigate the interactions between the user groups within a coast and marine environment. C 6.2 Students develop an action plan for a coast and marine environment to establish a sustainable future.	**Level statement** Students understand the need for a collaborative plan for all user groups of a coast and marine environment. They promote and implement a community awareness sustainability program. **Supplementary learning outcomes** CS 6.1 Students devise a proposal coordinating the collaboration of the user groups within a coast and marine environment. CS 6.2 Students promote and implement a community awareness program designed to establish a sustainable future.

Trial school case studies

Kirwan SHS

Sunshine Beach SHS

Mercy College

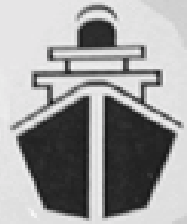
Holy Spirit College

Kirwan SHS

-Zoe Hiddins

Your Task:

For centuries, shipwrights have been trying desperately to discover which materials are more suited to shipbuilding. Early attempts focused on natural materials such as wood but with advancements in technologies, more sturdier materials such as metals became popular. Despite many years of experimentation, the current materials still are not without problems associated with the ocean.



Context:

You have been commission by Ross Haven Marine, a local shipwright company, to investigate different materials with respect to their suitability for ship building purposes.

In doing so, you are required to investigate the properties and characteristics associated with the ocean and how they impact on the various materials you have selected.

Ross Haven Marine require you to design, implement and report your findings in the form of a Scientific Report. You should also keep a log of your activities along the way. Your report should adhere to appropriate report genre and address the necessary criteria.

Kirwan SHS

-Industry outcomes

Kirwan State High School Science Department

Year 9 , Research & Technology
Semester 1 : Corrosion Control!

Experimental Report

Teacher: HIDDZO Name: _____ Due Date: _____

Conditions of Task:

- Experimentation to be completed in groups of 3 – 4 students
- Written work for submission to be completed individually
- Each student is permitted two drafts only
- Several weeks class time will be allowed for completion of this report
- Report length to be 500 – 600 words.

Year 9 SRT

Experimental Report Outcomes Criteria Sheet: Corrosion Control

Name : _____ Teacher: _____

Outcome	Demonstrated	Progressing	Not Yet Demonstrated
Industry 4.1	Materials selected for experimental investigation are appropriate for use as shipbuilding use and justification of selection refers to their properties.	An attempt to select and justify appropriate materials but selection does not necessarily relate to properties.	Materials selected are not justified i terms of their properties or are not relevant to their intended use.
Industry 5.1	Tests devised which demonstrate the properties of materials selected and relates the results to its intended use.	An attempt to devise tests which examine the properties of various materials. Tests do not necessarily indicate suitability of materials to intended use.	Tests devised do not examine mate properties. Suitability of materials to purpose is not addressed.
Industry 6.1	Evaluation of local shipbuilding materials undertaken and justifiable conclusions made. Industry standards used.	Evaluation attempted but does not consider current industry standards.	Evaluation not undertaken or evalu is not justifiable.

Kirwan SHS - Students results

7	12.8	1.59%
10	12.7	0.79%
12	12.6	0%

Day	Weight	Percentage
1	12.4	0%
3	12.43	0.24%
5	12.43	0.24%
7	12.47	0.56%

Year 9 Sunshine Beach SHS

Martin Taylor

Sunshine Beach State High School

Marine Studies SCI2M

Program

Semester 1 2004

Week	Unit	Topics Covered	Assessment Items Due
Week 1	**Introduction To Marine Studies**	❑ Introduction to Marine Studies ❑ Safety for Specific Marine Sports ❑ Careers in Marine	
Week 2	**Unit 1 Coast and Marine Ecology** "Dangerous Creatures"	❑ Creatures of the Sea ❑ Marine Classification ❑ Reef Communities	
Week 3		❑ Similarities and Differences ❑ Food Glorious Food ❑ Sharks and Safety	
Week 4	**Unit 2 Practices and Skills** "Model Boat Project"	❑ **Underwater World Excursion** ❑ Dangerous Creatures ❑ DANGEROUS CREATURES ASSIGNMENT	Poster (__/__/04)
Week 5		❑ Boating ❑ Types and parts of sailing & power boat	
Week 6	**Unit 3 Marine Industry** Recreational Fishing	❑ Boat Hull Types and Design ❑ Boat Building Part A (Design) ❑ Boat Building Part B Build	
Week 7		❑ Boat Building Part C Test Tank ❑ Boat Building Part D Report ❑ **BOAT BUILDING ASSIGNMENT**	
Week 8	**Unit 4 Marine Industry** Aquariums	❑ Fishing ❑ Setting Up Tackle ❑ Bait Gathering	Model & report (__/__/04)
Week 9		❑ Local Fish Habitat ❑ Fishing and Bait Gathering Field Trip	
Week 10	**Unit 5 Oceanography**	❑ Fish Parts (Fish Dissection) ❑ Crustaceans	
		❑ Aquariums Set up Tanks ❑ Aquarium Fish Fresh and Salt Water **FISHING TACKLE BOOK ASSIGNMENT**	
		Easter Holidays	
Week 12 TERM 2	**Unit 6** "Shipwrecks and Pollution"	❑ ❑ Filtration and Aeration ❑ Abiotic Factor	
Week 13		❑ Monitoring Tanks ❑ Marine Pests & Threats	
Week 14		❑ Tides, Swell ❑ Currents, Waves	
Week 15		❑ Wind Direction and Speed ❑ Synoptic Charts	
Week 16		❑ **Tides and Weather Test**	
Week 17		❑ Marine Accidents ❑ Survivor at Sea ❑ Survival Techniques ❑ Marine Rescue Procedures	
Week 18		❑ Marine Pollution and Effects on the Environment	
Week 19		❑ Shipwreck Research Project ❑ Titanic Case Study	
Week 20		**SHIPWRECK ASSIGNMENT**	

Sunshine Beach State High School

Coast and Marine Exit Achievement Statement

Student Name: _____ **Class:**_____ **Teacher:** **M Taylor**

STRAND	LEVEL 4	LEVEL 5	LEVEL 6
Marine Practice and Skills **Model Boat Assignment**	Practices and Skills Model Boat shows original design and sound construction. Report demonstrates scientific testing and judgements made on quantitative data	**Practices and Skills** **Model Boat shows original design and sound construction. Report demonstrates scientific testing and judgements made on quantitative data**	Practices and Skills Model Boat shows original design and sound construction. Report demonstrates scientific testing and judgements made on quantitative data
Marine Industry **Aquariums and Fishing Tackle Book**	Industry Tackle Book demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.	**Industry** **Tackle Book demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.**	Industry Tackle Book demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.
Oceanography **Tides and Weather Test**	Oceanography Test Results indicate that students has achieved a satisfactory standard	**Oceanography** **Test Results indicate that students has achieved a high Standard**	Oceanography Test Results indicate that students has achieved a very high Standard
Coast & Marine Ecology **Dangerous Creatures**	Coast and Marine Ecology Poster demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.	**Coast and Marine Ecology** **Poster demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.**	Coast and Marine Ecology Poster demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.
Coast and Marine Conservation **Shipwrecks Assignment**	Coast and marine Conservation demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.	**Coast and marine Conservation** **demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.**	Coast and marine Conservation demonstrates considerable effort in research, explaining concepts and clear presentation of scientific facts.

SUNSHINE BEACH STATE HIGH SCHOOL

Student Name:	Topic:	Subject
	Boat Design and Construction	SCI2M SCI2M
Teacher's Name:	**Date Due**	**Project S**
M Taylor	Monday 15th March 2004	Mr Ta

I 5.1 Students devise tests to show that the properties of materials influence their use.

I 6.1 Students evaluate different commercial products to test if their materials meet specific standards for their use.

IS 6.1 Students design and construct a product using materials which meet specific standards for their use.

Task 1 Design and construction of model boat

In pairs you need to design and construct a model boat that is no larger than the specifications below

Task 2 Boat Testing (DATE: / /)

Test the performance of the boat for:

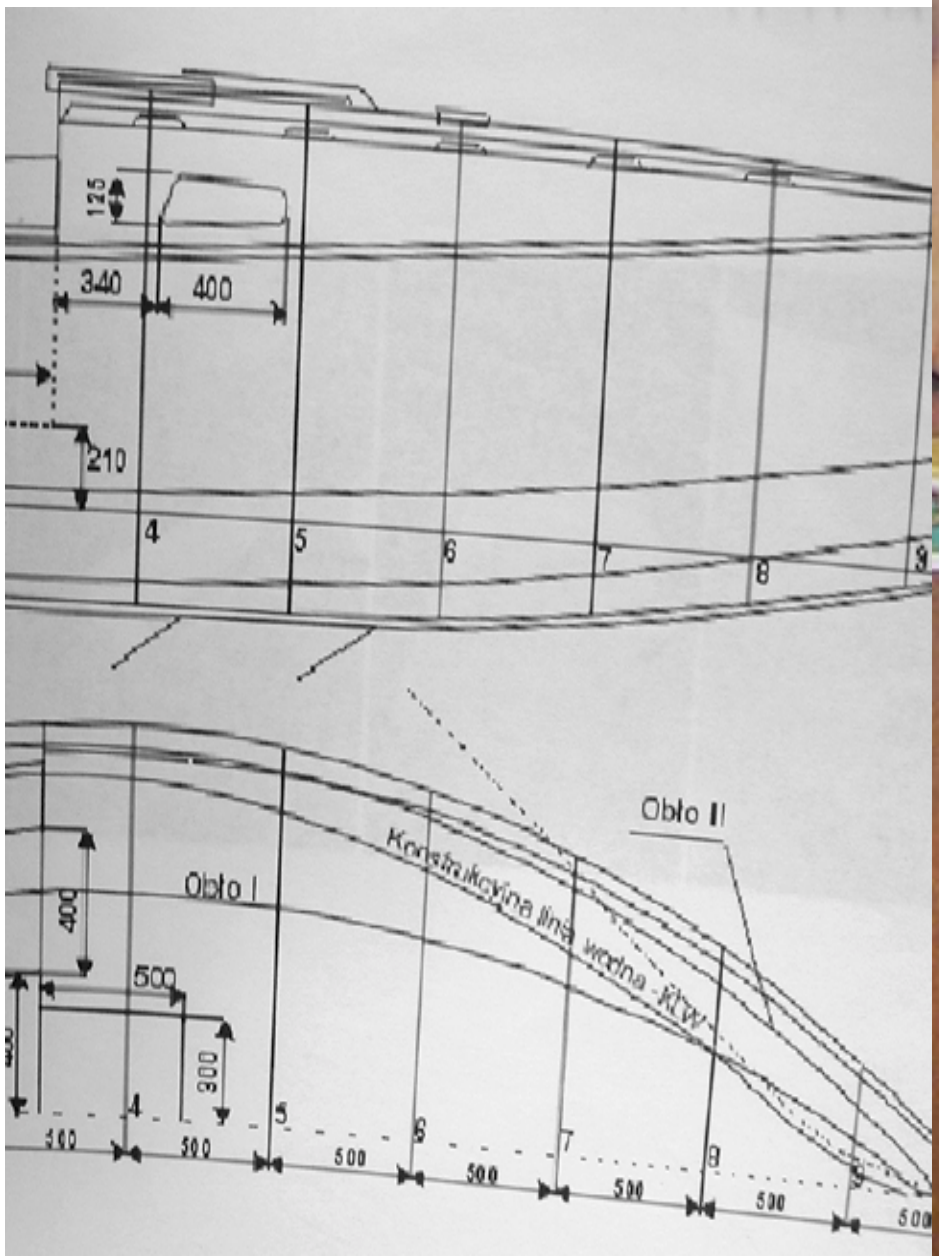
(a) Hull Speed (Using a Standard Weight Tow)
(b) Speed under Sail (Using a Fan)
(c) Stability
(d) Carrying Capacity

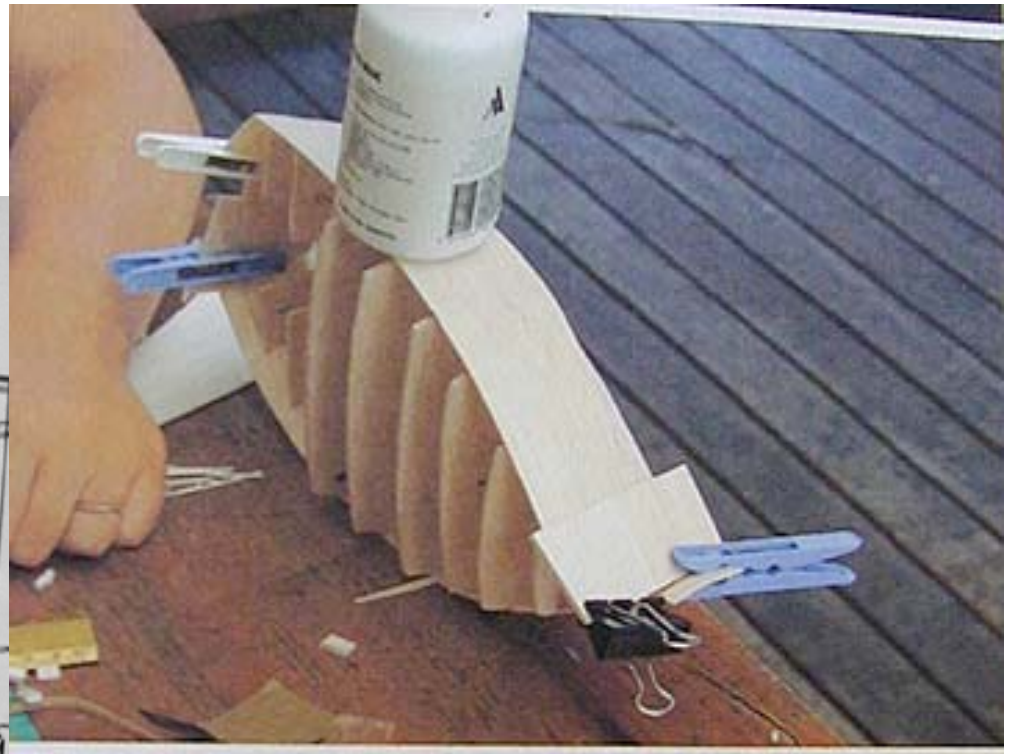
Task 3 My Boats Performance Report (DATE: / /)

(a) Describe the Hull shape
(b) Describe the advantages and disadvantages of the hull shape
(c) Drawing of Hull with parts labelled including actual dimensions
(d) Describe the materials used and method of construction
(e) Present the results of your tests including a summary of overall performance
(f) Describe the changes in design and or construction materials that would improve the boats overall performance

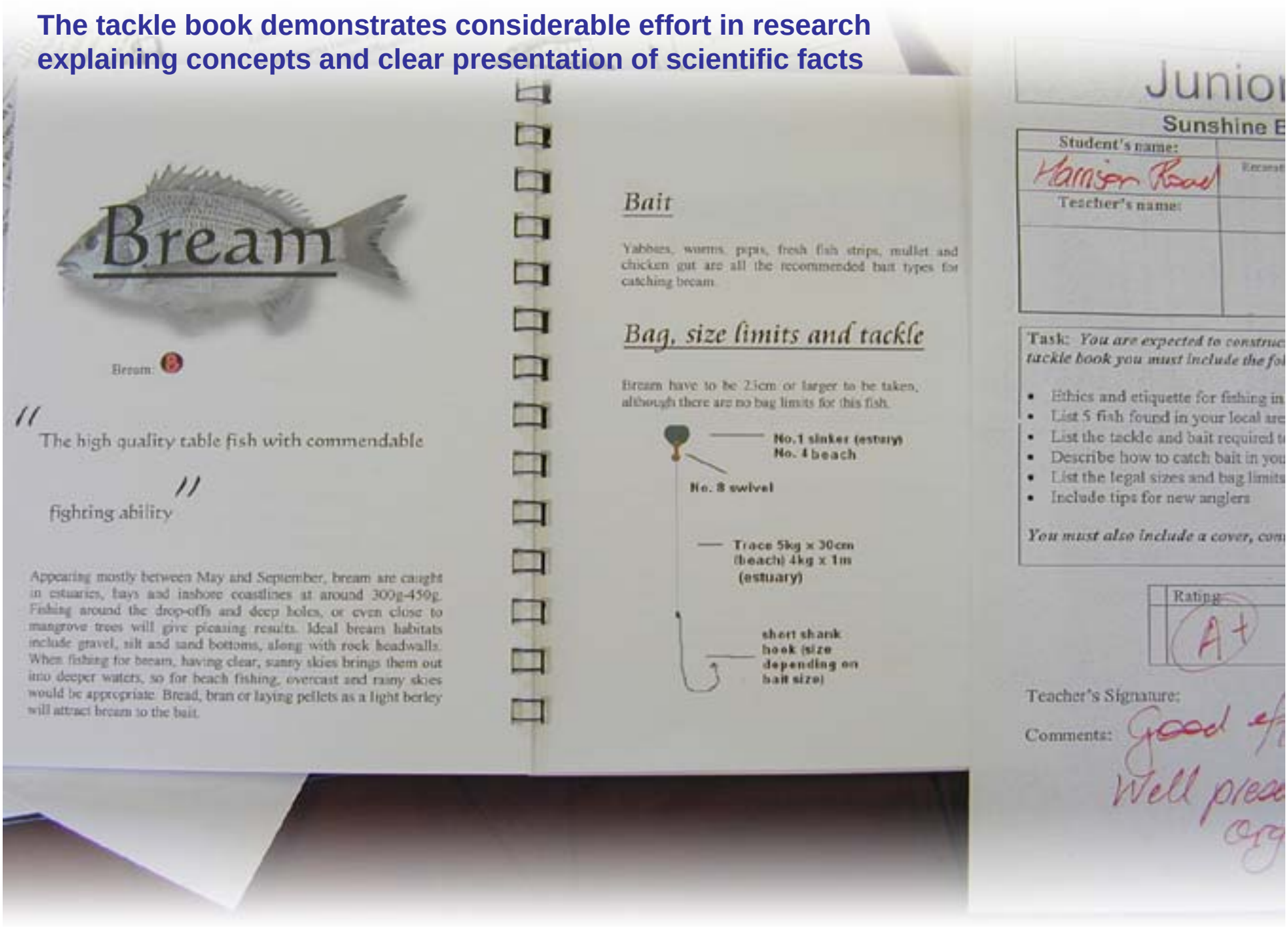
(400 words)

Students design and construct a product





The tackle book demonstrates considerable effort in research explaining concepts and clear presentation of scientific facts



Year 10 Sunshine Beach SHS

Sheree Bell

TASK:

- You will go on an **excursion to the rocky shore** and you must perform tests and observations to complete the fieldwork booklet.
- You will **work in pairs in the field** and **individually work on your reports.**
- You must conduct research to add to your booklet in the format of appendices thereby adding more information to your field data.

ANTICIPATED EVIDENCE: FIELDWORK BOOKLET WITH APPENDICES

Strand/Outcome	Level 4	Level 5	Level 6
EC.1	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications for survival and reproduction
EC.2	. Answers to the questions in sections: Rocky Shore Ecosystems, Rocky Shore Structure and Rocky Shore Zones	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications of human action on long term effects.

REFERENCES:

Use your class notes, rocky shore creature classification booklets, marine text book.

TASK:

- You will go on an **excursion to the rocky shore** and you must perform tests and observations to complete the fieldwork booklet.
- You will **work in pairs in the field** and **individually work on your reports.**
- You must conduct research to add to your booklet in the format of appendices thereby adding more information to your field data.

ANTICIPATED EVIDENCE: FIELDWORK BOOKLET WITH APPENDICES

Strand/Outcome	Level 4	Level 5	Level 6
EC.1	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications for survival and reproduction
EC.2	. Answers to the questions in sections: Rocky Shore Ecosystems, Rocky Shore Structure and Rocky Shore Zones	Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided	. Answers to the questions in sections: Biotic Features of the Rocky Shore Plants and Animals with appendices provided and justifications of human action on long term effects.

REFERENCES:

Use your class notes, rocky shore creature classification booklets, marine text book.

Example 4

Vertical time table Mercy College

Kelly

Goodingham

Marine Units 2005

Outcome ↓	Let's Get Wet * (4)	Aqua-culture * (5)	Reef Ecology * (5)	Fish & Fisheries (5)	Ocean-ography * (6)	Tourism (6)	Marine World in Crisis * (6+)
P&S .1			✓	✓	✓		
P&S .2			✓	✓			
P&S .3			✓		✓		
Industry .1				✓			
Industry .2		✓				✓	✓
Industry .3		✓				✓	
Oceanography .1					✓		
Oceanography .2					✓		
Ecology .1	✓			✓			
Ecology .2	✓	✓	✓				
Ecology .3	✓		✓				
Conservation .1	✓					✓	✓
Conservation .1	✓					✓	✓

Unit layout

MERCY COLLEGE

SCIENCE KLA

Student Name: _____ Teacher's Name: Miss Goodingham

Unit Code: SC555 Unit Name: Aquaculture

Task Name: Marine Aquarium Design

Date Given: _____ Date Due: _____

Possible Outcomes

Strand/Outcome	Level 4	Level 5	Level 6
CME E.1	Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment.	Students evaluate the consequences of interactions between the living and non-living parts of environments.	Students prepare scenarios to describe the potential long-terms effects of changes in biodiversity caused by human action on ecosystems.
CME I.2	Students incorporate feedback to refine and modify systems and/or subsystems.	Students incorporate control and management mechanisms in systems that include subsystems.	Students devise ways to manage and monitor the operation of complex systems.

Dimensions

Level 4	Level 5	Level 6
Incorporate Make generalisations	Incorporate Evaluate	Design methods Prepare scenarios Describe

Example aquarium task

You work in a large aquarium shop and the director of the local childrens hospital has called your manager with a proposal.

She wants to fit each floor of the hospital out with a new aquarium with living plants and animals in it.

The purpose is to give the children something to make them smile at and take an interest in.

Your manager has divided the employees into small groups. Each group will research and design their own aquarium.

The hospital director wants you to come into the hospital, set up and maintain the aquariums.

She wants a manual with each aquarium that details every aspect of the control and management required.

The trial has concluded that

- Students found the content engaging and could achieve in either level 4, 5 or 6 from the tasks their teachers set them
- Teachers were able to design tasks to allow reporting in outcomes
- Many syllabus strands provide a pathway to senior Marine Studies and Marine and Aquatic Practices courses.
- Up to 10 schools want to implement an CME accredited subject next year
- The syllabus should be submitted to QSA for accreditation ASAP so it is available to schools by the end of the year
- Help is going to be needed for teachers to develop work programs and promote the subject in 2005

For example

Teachers will need training in writing outcomes based anticipitated evidence

Without training teachers will become frustrated, confused and revert to a non - engaging pedagogy

Anticipated Evidence

	Level 4	Level 5	Level 6
E.1	θ Student has listed all the interactions between the living and non-living parts of the aquarium that will occur.	θ Student has listed all the interactions between the living and non-living parts of the aquarium that will occur. θ Student has described the consequences that will result from these interactions. θ Student has evaluated these consequences with regard to the survival of the animals being kept in the aquarium.	θ Student has identified potential changes in biodiversity of the local ecosystem that could be caused by the aquarium. θ Student has analysed what interactions are causing these changes to occur. θ Student has described the potential long-term effects of these changes.
I .2	θ Student designs an aquaculture farm system with subsystems. θ Student has received feedback on their design and incorporated the feedback into their design.	θ Student has provided a brief description and diagram showing what the aquarium will look like once set up. θ Student has shown the subsystems that are involved in the marine aquarium, including their functions in the system. θ Student has provided a list of the aspects of the tank that need to be controlled, and what level of balance is required. θ Student has provided a clear, easy to follow manual describing how to maintain the marine aquarium, including all the subsystems.	θ Student has provided a diagram of the public marine aquarium display they have designed and has given a brief description of all the involved components. θ Student has presented all the subsystems and explained their functions in the system, including why they are necessary. θ Student has explained the level of control that is required for each subsystem to continue to function at its best. θ Student has devised ways to manage and monitor the operation of the system (the aquarium) and its subsystems and presented these in the format of a manual. θ Student has devised ways to manage and monitor the interactions that the public aquarium has with the local community.

The next steps

Accreditation - MTAQ to pay QSA for approval application

- Sheree and Bob to work fulfill all QSA requirements to have an accredited syllabus by November

Unit development

- Martin and Zoe to work on further unit development for presentation at MTAQ September conference
- Simone to travel to USA on Westfield Premiers scholarship to collect additional units and junior marine activities for 2005

Resourcing

- Bob to use contacts to see if he can get a seconded teacher to help with project development for part of 2005 before he retires

Marketing and promotions

Coast and Marine Education Level 4 - Beyond Level 6 Syllabus

A joint venture between Education Queensland and the Marine Education Industry in consultation with the Queensland Studies Authority

Available November 2004

The syllabus was developed to

Engage students from Year 8-10 with content and tasks relevant to their daily lives

Introduce students to marine education and show them a pathway into Year 11-12 Marine Studies

Report in outcomes that follow existing syllabus formats and philosophies

QSA Accredited

Courses developed from the syllabus will

use existing school equipment and curriculum resources and allow a first year graduate teacher with a love of the sea and minimal qualifications to teach the subject

$110

AMC Australian Maritime College · Yachting Queensland · Australian Government Quality Teacher Programme · Wet Paper · Queensland Government Maritime Safety Queensland · Australian Government Great Barrier Reef Marine Park Authority · QSA · Queensland Government

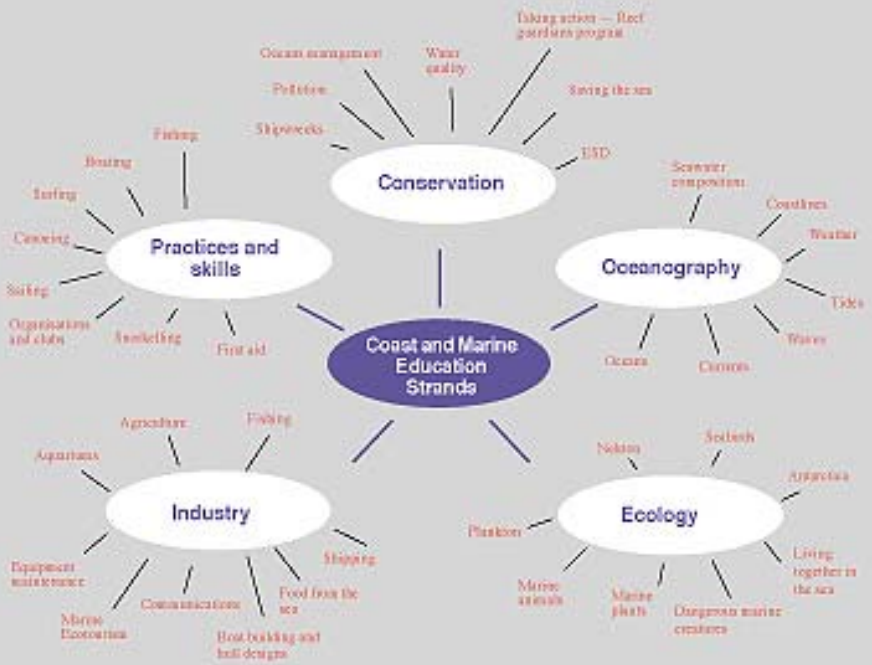
Syllabus content

The syllabus has five strands

Courses of study can be planned using learning outcomes

from a *single strand* or

from a *number of strands*.

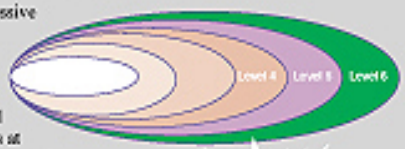


Features

- Content engages students with concepts and tasks familiar to them, in their daily lives. Students perceive tasks as "I can do this" or "I can use this"
- Content lists enable teachers to select tasks and activities to suit students' needs, interests and abilities and to take account of their prior knowledge and experiences.
- The content is NOT hierarchical or exhaustive and can be added to easily by a teacher who has a general knowledge or interest in the sea - it's teacher motivating.
- Any of the content can be addressed at ANY level and not all of the content need be addressed at every level - VERY flexible.
- Students engage with central content when they are provided with opportunities to demonstrate central learning outcomes.

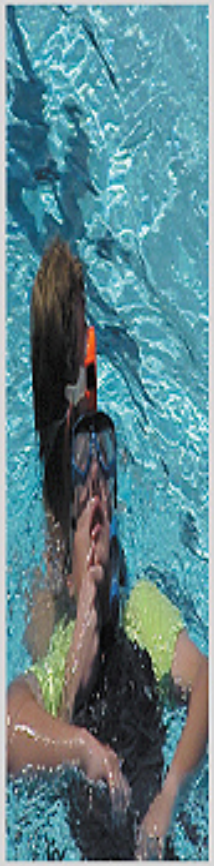
Outcomes and organisation

- The central learning outcomes are the focus for planning learning activities and assessment tasks.
- The syllabus describes learning outcomes for Level 4, Level 5, Level 6 and Beyond Level 6.
- The sequencing of the learning outcomes is such that each level is 'nested' within the following level. Learning outcomes for successive levels are conceptually related to each other, forming a continuum rather than existing simply as a number of discrete entities.



- A level statement is included for each level of each strand of the syllabus which summarises the learning outcomes at each level and provides a framework for developing the central and supplementary learning outcomes.
- A set of organisers for each strand set the parameters for the outcomes

Sample page



Learning outcomes

Practices and skills

Organisers for the learning outcomes in the practices and skills strand are:

- Safe practices involve an understanding of safe and unsafe situations, behaviours and their consequences.
- Matching approved equipment with desired use is necessary to effect skills and practices.
- Skills and strategies are required to participate in marine recreational activities.

Level 4

Level statement

- Students understand that specific equipment is required for use to perform specific skills.
- Students recognise that special skills and qualifications are needed to use that equipment.
- Students identify and explain various safe situations and behaviours.

Central learning outcomes

PS 4.1 Students participate and report on a coast and marine activity.

PS 4.2 Students compare and contrast a selection of equipment and services to meet their recreational needs.

PS 4.3 Students identify and explain situations and behaviours that are safe or unsafe when assessing personal behaviours and consequences.

Level 5

Level statement

- Students modify their performance of various skills.
- Students analyse their choice of equipment and services leading to a community award.
- Students demonstrate actions to minimise unsafe situations.

Central learning outcomes

PS 5.1 Students demonstrate specific skills in a coast and marine activity.

PS 5.2 Students analyse factors that influence their selection of equipment and services for an activity.

PS 5.3 Students demonstrate safe behaviours and actions to minimise unsafe situations.

Level 6

Level statement

- Students evaluate their own and others performances of an activity and design a promotion of an activity.
- They plan strategies to ensure everyone can participate in an activity.
- They devise strategies to respond to unsafe situations.

Central learning outcomes

PS 6.1 Students evaluate their own performance and plan strategies to ensure everyone can participate in an activity.

PS 6.2 Students use and evaluate a variety of equipment and services for an activity.

PS 6.3 Students devise and implement personal and community strategies to respond to unsafe situations.

Beyond Level 6

Level statement

- Students understand how to analyse and evaluate different levels of performance.
- Students use information on performance to design and implement strategies to improve their own and others performances.
- Students determine ways of optimising and enhancing beneficial impacts.

Supplementary learning outcome

PSS 6.1 Students analyse and evaluate performance skills required to receive a community award.

PSS 6.2 Students design a community promotion for an activity based on the equipment and services available.

PSS 6.3 Students evaluate strategies for potentially unsafe situations and behaviours in order to optimise benefits.

Interested?

Teachers fill in and return

Name _____

School _____

E mail _____

Address _____

_____ Code _____

Marine Teachers Association of Qld Inc
Coast and Marine Education Project
PO Box 540
COOLANGATTA 4225
Tel: (07) 5525 6122
Fax: (07) 5525 7066
ABN

School order No _____

Please send the following

Item code	Details	
MTAQ 1	Coast and Marine Studies Syllabus registration package includes • associate membership to MTAQ for one year • details on how to implement syllabus • registration details for MTAQ workshops • catalogue of resources • hard copy of syllabus	☐ $110 Price includes pack and post
CME 001	Coast and Marine Studies Syllabus	
CME 002	Power point presentation for school staff	
CME 003	Resource list and catalogue	
CME 004	Set of case studies	
CME 005	Curriculum exchange documents	
CME 006	Sample anticipated outcomes sheets	
CME 007	Sample task sheets	

MTAQ collects money and pays office staff to distribute resources

Schools register for $110

Then pay a $55 yearly licence

Please register me for one year and send the following

Item code	Details
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To download conference forms and read more about the 2004 Conference
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Conference 2004

Hosted by: Sunshine Coast Branch

Dates: Wed 29th Sept — Sun October 2nd 2004

Venues: Sunshine Coast

Conference Convenors

Jim Kneale and Mark Cooper
Noosa District State High School
Tulip Street
COOROY 4563
Telephone: 07 5447 6622
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MTAQ News

June News now on line

Posted: 21-Jun-2004

June news has been posted on web and all memebrs

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Queensland Government

Office of the
Minister for Education

02 SEP 2003

Mr Bob Moffatt
Honorary Patron
Marine Teachers Association of Queensland Inc
P O Box 540
COOLANGATTA QLD 4225

FAXED 2.9.03

Dear Mr Moffatt

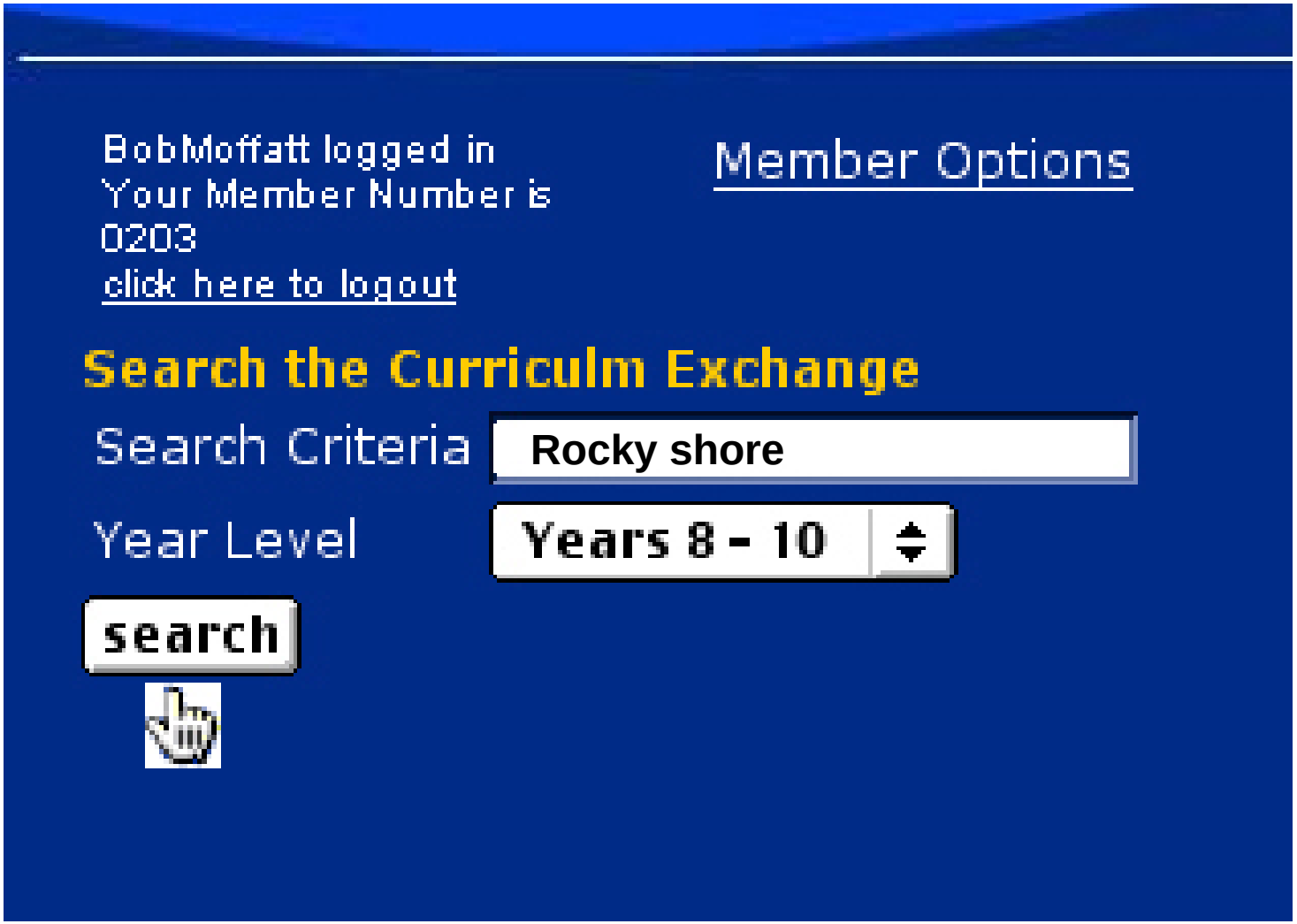
Thank you for your letter received on 14 August 2003 regarding your request for permission for Education Queensland teachers to place their Marine Education resources on your association's website at www.marineteachers.org.au. The Minister for Education, Anna Bligh MP, has asked me to respond to you on her behalf. I sincerely apologise for the delay in replying to you.

The Minister supports your request as a very productive professional exercise for teachers to share their work programs with other teachers. This is the same process that is employed through the Curriculum Exchange section of the Education Queensland website at education.qld.gov.au/tal/curriculum_exchange/.

Your members might also be interested in sending their units of work to the Education Queensland website, for the benefits of other marine educators across Queensland. For further information, please contact Ms Beryl Quayle, Information Officer, ICTs and Learning Branch on telephone (07) 3421 6490.

On behalf of the Minister, I would like to thank you and your members for all your efforts in the area of Marine Education, as I am sure the students are the beneficiaries of your professionalism.

Yours sincerely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- Industry
- Oceanography
- Ecology
- Conservation
- Admin

%>Years 11 - 12

Search Curriculum Exchange

Your search for: Rocky shore:
returned: 6 documents

Assessment outcomes for 7 units of work

Syllabus: Admin
Content area: Course outlines
File Type: Program Outline

BIOLOGY OF MARINE CREATURES BIOLOGY OF THE CORAL REEF – 3D Model of the coral polyp and Written Exam CAREERS IN THE MARINE BIOLOGY INDUSTRY FISHIN – Artificial baits – lure construction and written report 400 words CONSERVATION O THE SEA – Written Report 800 word ROCKY SHORE – Field Research Booklet MARIN PLANTS – Informative Brochure

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Info sheet on some biological terms

Syllabus: Ecology
Content area: Animals
File Type: Info Sheet

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Rocky shore field study booklet

Syllabus: Ecology

MERCY COLLEGE

COAST AND MARINE EDUCATION

Student Name: _____Teacher's Name: Miss Goodingham

Unit Code: SC555 Unit Name: **Rocky shore**

Task Name:

Date Given: _____

Possible Outcomes

KLA: Strand	Level 4	Level 5	Level 6
E1. Ecology	Students make generalisations about the types of interaction which take place between the living and non-living parts of the environment.	Students evaluate the consequences of interactions between the living and non-living parts of environments.	Students prepare scenarios to describe the potential long-terms effects of changes in bio diversity caused by human action on ecosystems.

Dimensions

Level 4	Level 5	Level 6
Make generalisations	Evaluate	Prepare scenarios

Task

MUD CRAB

Students Name: _____

Teacher: _____

What are my parts used for ?

Purpose

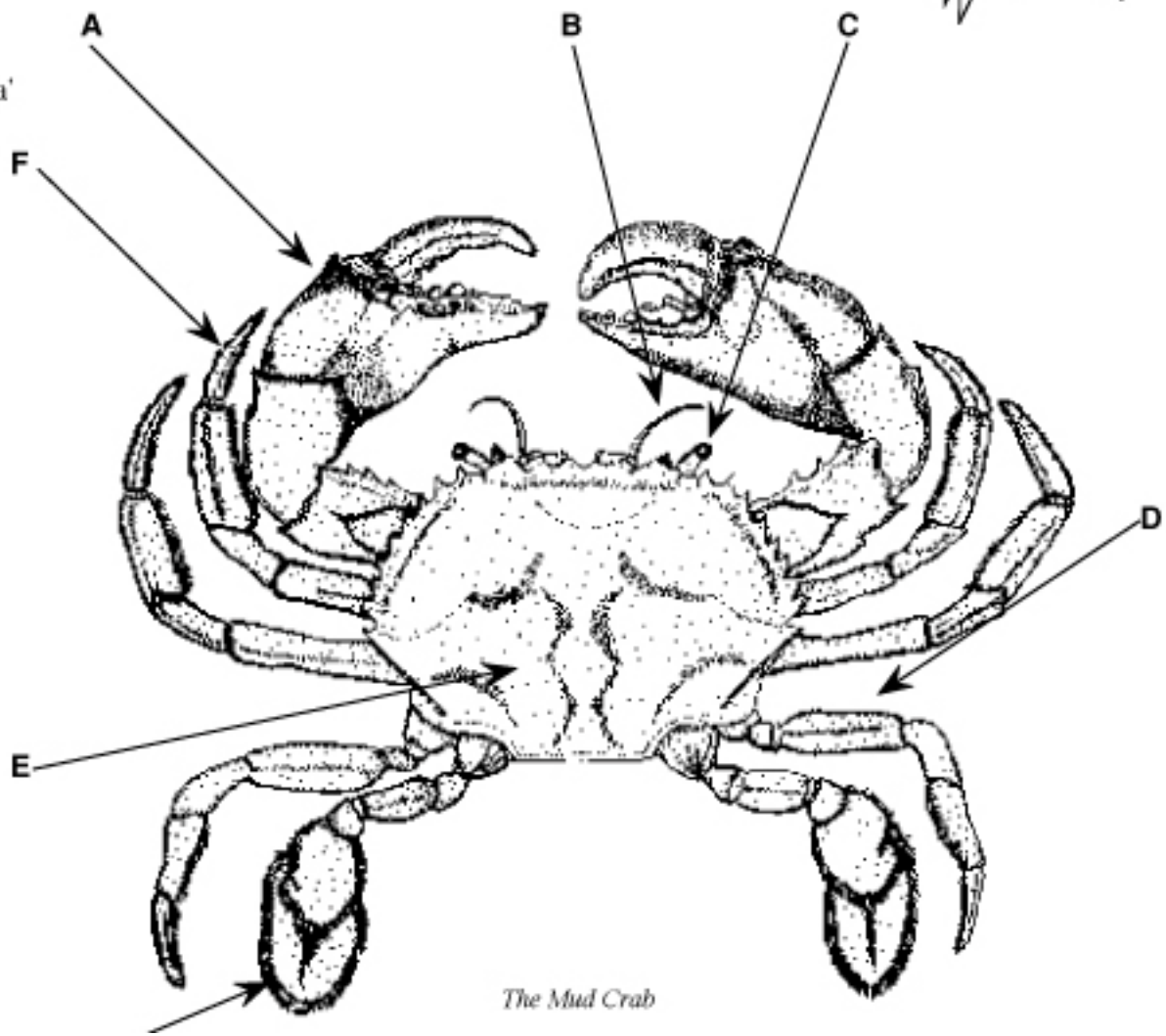
To discover the externa'
by completing a table.

What to do

Use the word list
below to complete
the table above.

Word list

Swimming leg
Eye
Antennae
Third walking le
Carapace
Claw
First walking



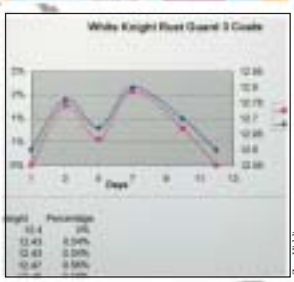
The Mud Crab

Marine Teachers Association of Queensland Inc.

Simone Baker

Martyn Taylor

GBRMPA



Zoe Hiddins

Martyn Taylor

Coast and Marine Education Syllabus

Level 4 - beyond Level 6

QSA

Accredited Syllabus

Publisher

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c/- Heatley Secondary College
TOWNSVILLE Q 4814
www.marineteachers.org.au

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Kerry Kitzelman

Editor

Kelly Goodingham

Trial schools

Clontarf Beach State High School, Hervey Bay State High School, Kirwan State High School, Sunshine Beach State High School, Mercy College Mackay and Holy Spirit College Mackay.

Accreditation

This syllabus has been accredited by the Queensland Studies Authority (QSA) for the period 2006 to 2010. Accreditation means any school may offer this syllabus as stipulated by the syllabus owner. The QSA is not responsible for implementation.

The accreditation register, and further information about accreditation, are available on the QSA's website, www.qsa.qld.edu.au

Introduction

This syllabus has been developed to cater for specialised student interests within the framework of a core and common curriculum in Queensland.

The common curriculum and the subject areas

The role of the common curriculum for Queensland schools is to provide a comprehensive education for all students during the compulsory years of schooling. It consists of the eight nationally agreed key learning areas:

- The Arts
- English
- Health and Physical Education (HPE)
- Languages other than English (LOTE)
- Mathematics
- Science
- Studies of Society and Environment (SOSE)
- Technology

The Queensland curriculum for the compulsory years of schooling is based on an outcomes approach.

The core of the Queensland Curriculum for the Compulsory Years of Schooling consists of a selection of essential learning expressed as 'core learning outcomes'. Typically, all students are expected to demonstrate core learning outcomes.

'Discretionary learning outcomes' describe what students know and can do beyond what is essential at a particular level. It is not expected that all students will demonstrate these learning outcomes.

Key learning area syllabuses describe core learning outcomes in developmental levels along learning continua for the 10 years of compulsory schooling. The common curriculum is conceptualised as a whole, rather than segmented into sections for different phases of schooling.

During the later years of compulsory schooling, many schools may offer their students subjects that allow them to engage in specialised studies in specific contexts.

Syllabuses have been developed by the Queensland Studies Authority for subject areas that are typically a focus of curriculum choice and specialisation in the later years of compulsory schooling. Coast and Marine Education is akin to their style of syllabus.

Through the experiences, challenges and opportunities associated with each subject area, students develop a unique range of knowledge, practices and dispositions.

These can be described through learning outcomes that are specific to the subject area. In certain contexts, some learning outcomes from different key learning areas contribute to a subject area.

Subject area syllabuses and guidelines

Syllabuses and guidelines have been developed for six subject areas. Typically, schools will use the subject area syllabuses to plan a variety of courses of study that will provide particular students with specialised learning experiences in specific contexts.


Bob Moffatt

This syllabus is most suited to middle school students.

Subject area strands are contextual. They are the organisers for the learning outcomes in the syllabus. The strands contain two types of learning outcomes - 'central learning outcomes' and 'supplementary learning outcomes'. The central learning outcomes describe the learning that is considered fundamental to the subject area. It is recommended that these be the primary focus of a course of study developed for a subject area. Central learning outcomes consist of subject area-specific learning outcomes and some core learning outcomes from different key learning areas. Supplementary learning outcomes are additional learning outcomes that could be considered for inclusion to enrich a course of study.

Central and supplementary learning outcomes have codes that identify the strand and developmental level to which they belong (see Outcomes section). If these learning outcomes have been selected from a key learning area syllabus, the key learning area code for that learning outcome is indicated in parentheses.

Subject area syllabuses describe learning outcomes from Level 4 to beyond Level 6. Subject area syllabuses are not specifically associated with particular year levels of schooling; however, it is anticipated that they will be used for planning courses of study in middle and lower secondary schools. These subject area syllabuses may also be used in other educational settings where there are specific student interests in the subject area, appropriate school resources and teacher expertise.

Subject area syllabuses cannot be regarded as alternatives to each other or to particular key learning areas. Each subject area syllabus contains different subsets of learning outcomes from different key learning areas, as well as learning outcomes that are specific to particular subject areas.

Courses of study

Courses of study are planned sets of learning experiences and assessment tasks that have a specified duration and location in a school's overall curriculum offering. They may be units offered within a vertical timetable, a semester, a single year or multiple years. Courses of study may be

developed from any of the subject area and key learning area syllabuses. The time allocation for courses of study based on subject area syllabuses is a school-based decision.

Subject area syllabuses enable schools to plan courses of study that meet a variety of student needs and interests.

When planning courses of study, the following should be considered:

- needs of students
- resources and staff
- place and role of courses of study within the total school curriculum.

Rationale

Nature of the subject area

For thousands of years, people all over the world have used the sea and coastal zone for survival, work and recreation. These practices associated with the coast and marine zone have helped form individual and national identities and values, and local and global cultures and economies.

Coast and marine practices make use of scientific, technological, ecological, social and economic knowledge to meet the needs and wants of consumers. Today's practices are designed to make the coast and marine zones safe places to visit, sustainable environments in which to live, contribute to the scientific understanding of the sea and coastal zone and reflect a commitment to conservation and community health.

Coast and Marine Education focuses on the safety systems, practices and skills needed for work and recreation and manufacturing of materials necessary to withstand the forces of the sea and coastal zone. It provides opportunities for students to learn lifelong practical skills, explore career opportunities, appreciate how the coast and marine zone is researched and become actively engaged in local conservation projects.

Students studying the entire Coast and Marine Education syllabus develop understandings of how science is applied to industry, research, management and conservation. They become familiar with sustainable uses of the coast and marine zones and the development of land and marine enterprises for recreational use. They investigate the role of culture, finance and politics in industry and decision-making. Students understand that in this subject area, knowledge, concepts and applications are continually changing and that there are many opportunities for critical and creative thinking.

Nature of learning in the subject area

Coast and marine education provides opportunities for students to contribute to society as active and informed citizens. It provides opportunities for all students, including those with a general interest in coast and marine education and those intent on careers directly involved in marine science or maritime studies, such as oceanographer, coastal management officer, ships master, naval architect, surfboard manufacturer, clothing retailer or navy diver.

Coast and marine education embraces theoretical understandings and practical applications in a range of marine and coastal activities.

In coast and marine education, students use scientific practices to design, plan, implement and evaluate coast and marine enterprises, activities and equipment. Coast and marine practice involves aspects of 'working scientifically' and 'working technologically'.

Courses of study in coast and marine education include learning activities related to enterprises such as aquaculture, seafood handling and fishing. Increasingly, these courses of study include new and emerging industries such as water quality monitoring, growing stockfeed for aquaculture, by-catch minimization for example, turtle exclusion nets and control of introduced pests and threats such as ballast water thermal cleaning. Through participating in coastal and marine enterprises that closely approximate real-life situations, students develop understandings about the nature of work and the safety issues associated with this area.

These enterprises provide relevant learning contexts for students to develop knowledge, practices and dispositions that are transferable to other marine and life contexts. They also provide opportunities to encourage the spirit of entrepreneurship in both profit and non-profit activities.

The Coast and Marine Education syllabus provides the context for students to develop a unique repertoire of knowledge, practices and dispositions. Students also have opportunities to develop some knowledge, practices and dispositions from the key learning areas of Science, Technology, Studies of Society and Environment and Health and Physical Education in coast and marine education contexts.

Emphasis on middle schooling

This subject area syllabus is suitable for middle school students and focuses on outcomes from levels 4 to beyond Level 6. Students from coastal schools as well as regional and rural Australia can complete all syllabus strands provided they can access a local swimming pool, an artificial and/or natural body of water.

Emphasis on practical skills as a learning/teaching methodology

Opportunities in this syllabus exist for students to gain a wide variety of practical skills and schools should explore


Bob Moffatt

Students use scientific practice to design activities.

the full range of opportunities. Community qualifications are available in snorkelling, first aid and resuscitation, canoeing, sailing, surfing, fishing, surf bronze, bronze star and community environmental awards. In addition a wide variety of life skills such as communication, seafood cooking, production of an everyday implement, (for example a crab pot or fishing rod) and environmental appreciation can be incorporated into learning/ teaching methodologies. Finally skills such as using scientific equipment to measure water quality, currents or beach profiles can translate into science classes.

Practical work and field studies form an integral part of this subject. Practical studies must include time spent on the performing of tasks and using and applying equipment and technology. It is important that schools recognise the need to provide adequate time for activities of a practical nature. This field work may range from local, short duration activities to extended excursions.

Contribution of the subject area to lifelong learning

The Queensland school curriculum is designed to assist students to become lifelong learners. The overall learning outcomes of the curriculum contain elements common to all key learning areas and subject areas and collectively describe the valued attributes of a lifelong learner.

A lifelong learner is a:

- knowledgeable person with deep understanding
- complex thinker
- active investigator
- responsive creator
- effective communicator
- participant in an interdependent world
- reflective and self-directed learner.

The Coast and Marine Education syllabus subject area provides many opportunities for students to develop the valued attributes of lifelong learners.

Knowledgeable person with deep understanding

Learners understand that the knowledge and practices of coast and marine education are used to meet the needs of people and societies. They understand that coast and marine education is an endeavour that affects the whole population and includes a variety of coastal and marine enterprises and related industries. Learners understand coastal and marine safety systems and practices, related industries, ecology, oceanography that contribute to the sustainability of the coast and marine zone.

Complex thinker

Learners design, plan, implement and evaluate coastal and marine activities and investigations. They gather information on the options and variables that impinge on coastal and marine enterprises. Learners think deductively and make decisions about how activities should progress. They critically analyse and synthesise information and make judgments about the relevance of data.

Active investigator

Learners monitor and assess aspects of coastal and marine activities in order to maintain and improve sustainable use of the sea. They collect and collate information and use a range of technologies to enhance their investigations and improve their efficiency in proposing new management practices. Learners investigate regulations and market forces that impinge directly on coastal and marine industries. They collect evidence in a way similar to marine research scientists.

Bob Moffatt

Students critically analyse and synthesise information.

Responsive creator

Learners imagine and create a range of possible solutions to coast and marine challenges particularly when resources are limited. They consider and explore the consequences of a range of options before offering possible solutions. Learners generate new ways of undertaking coastal and marine activities that demonstrate their personal water skills, ingenuity and enterprise, as well as ethical, social and environmental responsibility.

Effective communicator

Learners gather and comprehend information from many sources in order to develop greater understandings of new skills, methods and technologies. They critically explore and discuss new ideas, and communicate clearly with a range of audiences. Learners communicate using appropriate genre and coastal and marine terminology. They use information and communication technologies to enhance communications where appropriate.

Participant in an interdependent world

Learners understand that every coastal and marine enterprise should be assessed for its impact on individuals, communities and the environment, both locally and globally. They observe, assess and make judgments about different perspectives and consider the concerns of all stakeholders. Learners demonstrate their responsibility for stewardship of the coastal and marine environment.

Reflective and self-directed learner

Learners reflect on, evaluate and re-examine their conclusions in the process of planning coastal and marine activities. They seek opportunities to use their coast and marine knowledge, practices and dispositions in new situations. Learners evaluate their own and others' assumptions and opinions and are able to make fair judgments about implications for themselves, others, future coastal and marine activities and the environment.

Cross-curricular priorities

The Coast and Marine Education syllabus subject area incorporates and promotes the cross-curricular priorities of literacy, numeracy, life-skills and a futures perspective.

Literacy

Literacy is a social practice that uses language for thinking and making meaning in cultures. It includes reading and writing, speaking and listening, viewing and shaping, often in combination in multi-modal texts within a range of contexts. Critical thinking is also involved in these practices. Students seek and critically appraise information, make choices and use their literacy skills to become independent learners. They develop critical literacy by questioning the cultural and social practices embedded in various kinds of texts. Students learn about relationships between the contexts and audiences of those texts. They understand that literacy influences how people view themselves, their identities and their environments as well as providing ways to represent these views.

Students read, write, speak, listen to, view and exchange information about coast and marine issues. They use a range of genres including written, visual and oral in critically evaluating coast and marine issues, developing plans, procedures, implementation strategies and reports. They use electronic, print and other media to gain access to Australian and international coast and marine information.

Numeracy

Numeracy is the demonstration of practices and dispositions that accurately, efficiently and appropriately meet the demands of typical everyday situations involving number, space, measurement and data.

Students develop numeracy as they plan, implement and evaluate coast and marine activities. They estimate costs, develop budgets and assess enterprises from an economic perspective.

Students may also calculate tide heights, wave velocities or keep records on dune vegetation changes. They may develop and demonstrate numeracy in navigation, interpreting boat hull construction plans or when estimating dissolved oxygen or salinity levels in estuaries.

Life-skills

'Life-skills' is a term used to describe the knowledge, practices and dispositions considered necessary for people to function adequately in their contemporary and changing life roles and situations. Demonstration of life-skills takes place in two overlapping dimensions: practical performance of, and critical reflection on, those skills.

It is possible to identify at least four sets of life-skills that enable students to participate in four life roles. The life-skills, and related life roles, are:

- personal development skills - growing and developing as an individual
- social skills - living with and relating to other people
- self-management skills - managing resources

Simone Baker

Team building is a very important life-skill.

- citizenship skills - receiving from and contributing to local, state, national and global communities.

Courses of study in Coast and Marine Education contribute to the development of life-skills by providing students with opportunities to develop:

- as individuals by taking responsibility for their own actions, forming their own opinions and building self-respect and self-esteem
- social and interpersonal skills by taking part in group activities, listening to the points of view of others, consulting and negotiating with others and contributing to group decisions
- self-management and resource management skills by accepting individual responsibility for specific aspects of coast and marine activities
- citizenship skills through active participation, discussion and consideration of their ethical, social and environmental responsibility in using the coastal and marine environment for recreation and commerce.

Futures perspective

The syllabus builds dispositions towards sustainability and management of natural resources development in that it improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. Students have the opportunity in the syllabus to take part in practical projects involving recycling, reusing and reducing as well as become actively involved in programs such as WaterWatch, Fish for the Future, WaterWise or Reef Guardians programs.

A futures perspective involves knowledge, practices and dispositions that enable students to identify individual and shared futures. A futures perspective leads to insights and understandings about thinking ahead and the roles of individuals and groups in envisioning and enacting preferred futures. Students with insights and knowledge about the past and present consider the consequences of past and future actions. They take responsibility for their actions and decisions and are empowered to participate optimistically in processes of social innovation, recovery and renewal.

Students consider the current expectations people have with regard to coast and marine development including consumer expectations related to living on the coast.

Students debate issues impacting on coastal and marine development such as the impact of catchments on the sea. They explore social and ethical issues, such as biotechnology or aquaculture, from local and global perspectives. Students consider present practices and propose possible, probable and preferred futures for coast and marine development.

Other curricular considerations

Integration with Senior Marine Studies and Marine and Aquatic Practices

While this syllabus caters for many different learning experiences, it is up to each school to ensure that these learning experiences do not take away from the experiences in their senior subjects. For example, a school with a snorkelling and diving program in Senior Marine Studies or Marine and Aquatic Practices, would have to consider very carefully the skills taught and qualifications issued in Coast and Marine Education.

Physical education and fitness

The Coast and Marine Education syllabus subject area addresses the current need for all Australian students to develop regular exercise.

The subject area introduces students to challenging practical applications of fitness such as snorkelling and sailing where they can see the need for high levels of stamina. Other areas or motor skill development can be found in boating and fishing. Many students can experience a full range of these skills in outdoor camping where the need for flexibility and endurance is important. The coast and marine environment with its diverse range of national parks provides excellent venues for these outdoor pursuits.

Work education

The Coast and Marine Education subject area incorporates work education.

Work involves both the paid employment that people undertake and the unpaid work they perform within the groups, communities and societies to which they belong. It occurs with different types and groupings of people in different settings and is performed under many different conditions.

Work education involves learning for work, learning about work and understanding the nature of work. Learning for work:

- involves developing work-related knowledge, practices and dispositions and
- emphasises student understandings about work and the settings and conditions that characterise workplaces. It highlights the benefits of work to individuals and communities.

Understanding the nature of work involves critically reflecting on and analysing the socio-cultural, economic and political forces that influence the ways society values different kinds of work.

While work education includes providing opportunities for students to explore options for future education, training and paid employment, this is not its sole purpose; nor is it intended to focus exclusively on the development of vocationally oriented skills. Work education has a much broader role - that of preparing students for work in all the forms and contexts in which it occurs. This includes preparing students to participate effectively in both paid and unpaid work, to understand the issues involved in balancing these different kinds of work (including family responsibilities) and to recognise the benefits to society of assisting workers to achieve this balance.

Students learn for work by participating in a variety of coastal and marine enterprises and planning and managing coast and marine activities. They have opportunities to develop sea time and mariners skills that can contribute to internationally recognised certificates (for example, coxswains or yacht master).

Students are given personal responsibility for different tasks within a range of school enterprises that require dispositions of care and reliability. For example, they may be required to meet obligations, use time productively, work cooperatively with others and display initiative and commitment.

They also have the opportunity to drive a speed-boat, use a marine radio, sail, snorkel or gain a swimming qualification. In doing so they will work with adults from the marine industry.

In Coast and Marine Education, students learn about work and work opportunities through the study of, and participation in, school and local marine enterprises such as aquaculture.

These contexts provide opportunities for students to understand and experience the types of work available in coastal and marine and related fields. Students understand workplace practices and regulations needed to create safe and equitable workplaces.

Students understand the impact of changes such as technological developments, globalisation and division of labour on the nature of coastal and marine work. They develop understandings about the contribution and value of different types of work to the coastal and marine industry within local, national and global communities. Students understand the role of paid, unpaid and voluntary work in shaping and promoting local and Australian industries. They understand the types of workforces required for these industries.


Bob Moffatt

The Coast and Marine Education syllabus subject area also incorporates work education.

Possible learning pathways

Table 1 below shows some possible learning pathways from the syllabus strands to specific courses. Strands may lead to Senior Marine Studies, certificate and degree courses and/or other school subjects. Appendix 3 also lists contacts for some organisations that could provide students with alternative pathways.

Relationship and articulation with other key learning areas

Many Coast and Marine Education syllabus outcomes articulate with other key learning areas syllabuses.

Explicit links could be made with the key learning areas in English, Health and Physical Education, Science, Studies of Society and Environment and Technology. Links to English exist in most syllabus strands and aspects of the Industry strand could be linked to Mathematics in topics involving measuring and calculating, for example aquarium building or boat building. If schools adopt the multiple intelligences theory and students complete outcomes in the visual/special or music/rhymic domains (see Appendix 2), elements of The Arts syllabus could be involved.

Schools attempting to incorporate concepts and activities from the Coast and Marine Education syllabus will need to carefully plan cross curricula activities to avoid duplication and conflict in standards. For example, it would be important to teach practices and skills to one standard across the school curriculum.

Table 2 below explicitly describes the links between relevant key learning areas syllabuses and the Coast and Marine Education syllabus outcomes.

Table 1: Possible learning pathways following participation in courses based on this syllabus

Practices and skills	Industry	Oceanography	Ecology	Conservation
↓	↓	↓	↓	↓
Certificates, or community qualifications in first aid, snorkelling, surfing, canoeing, sailing, windsurfing, fishing, water safety	Trade courses in marine industries boat building, hull design, surfboard manufacture, retail, aquarium industries	Bachelor courses in Chemistry, Physics, Biology, Geography, Coastal engineering	Bachelor courses in Biology, Geography, TAFE certificate courses in tourism	Bachelor courses in Geography, Certificates courses in tourism, Regional town planning

Table 2: Links between relevant key learning areas syllabuses and Coast and Marine syllabus outcomes

KLA	Practices & Skills	Industry	Oceanography	Ecology	Conservation
English	PS 4.1, PS 4.3	IS 6.2, I4.2	O 4.1, OS 6.1	ES 6.3	C4.1, CS 6.1
Health and Physical Education	PS 5.1, PS 4.2, 5.2, 6.2 PSS 6.2	I 6.1	O 4.1	E5.2	CS 6.2
Science	PS 6.3, PSS 6.3	I4.1, I5.1, I6.1	O 4.1 — O 6.1 O 4.2 — O 6.2	O 4.1 — O6.1, O 4.2 — O 6.2	C4.2, C6.2
Studies of Society and Environment	PS 4.1, PS4.2	I4.2, I5.2, I6.2, IS6.2	O4.1, O5.1, O6.1, OS6.1	ES6.3	C4.1 — CS6.1 C4.2 — C6.2
Technology	PS 4.2	I4.1, I5.1, I6.1	O4.2, O5.2, O6.2	C6.2	C6.2

Contribution to building dispositions towards sustainability and management of natural resources

The Coast and Marine Education syllabus involves students, teachers and the community in environmental action that focuses on 'thinking globally, and acting locally'. This syllabus has been developed in the context of the United Nation's Decade of Education for Sustainable Development (DESD). The vision of the DESD is a world where everyone has the opportunity to benefit from education and learn the values, behaviour and lifestyles required for a sustainable future.

The syllabus builds dispositions towards sustainability and management of natural resources development in that the conservation strand encourages students to improve the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.

Students have the opportunity in this syllabus to take part in practical projects involving recycling, reusing and reducing as well as become actively involved in programs such as Surfrider, WaterWatch, WaterWise or GBRMPA Reef Guardians programs.

In addition schools completing the conservation strand of this syllabus will demonstrate their commitment to sustainability and management of natural resources by fulfilling the requirements of the State Government's environmental policy and by supporting communities to take action at the local level and ensuring sustainable practices within our cultural infrastructure. The conservation strand has been established as a response to, and is part of, the Federal Government's national Action Plan: *Environmental Education for a Sustainable Future*.

The Plan has as its focus the effective co-ordination and provision of environmental education as part of Australia's commitment to ecologically sustainable development.

The syllabus as a State initiative with its industry partners, seeks to meet these global and national objectives and see them successfully applied to, and achieved, at the local school and community level.

Bob Moffatt

Surfrider Foundation and Reef Guardians stormwater education program

Time allocation

The syllabus allows for a flexible amount of time to be allocated to school developed courses. The time needed will be determined by the breadth of any course devised from the syllabus. It is important that this is a school decision based on the particular students who will do the course and the need to meet the academic, social and industrial related goals of the target group.

Program development

In schools with Senior Marine Studies there will be specialised equipment available to meet the needs of courses such as boating, snorkelling and sailing. However schools do not need any equipment or specially trained staff if they take advantage of community resources such as dive shops, sailing schools, canoe clubs and fishing shops. Many of these businesses or community organisations are only too willing to assist students attain the necessary practical skills. This will assist developed courses matching school resources and student groups.

Flexibility of the syllabus

The Coast and Marine Education syllabus is a flexible syllabus that could be used by schools in a number of discipline areas. It has the potential to enable cross-credit of assessment to be negotiated. It has sufficient variety of content and range of learning outcomes from which to develop a range of courses and to allow student choice and the capacity to follow their interests.

The Coast and Marine Education syllabus has the potential to form a basis for courses for a range of students with differing experiential backgrounds, abilities and disabilities and could be used to extend students' interests. It articulates well with the senior syllabus in Marine Studies and Marine and Aquatic Practices.

The approach to learning through purposeful, practical activities is very appealing to many students. It has the potential to engage the interest of middle school students in particular, and could link to TAFE courses and apprenticeships as well as senior subjects. Learning in the Science and other key learning areas could be integrated with courses based on this syllabus. Indeed, a course could be offered that had Science, Health and Physical Education and English learning outcomes.

Programs can be developed from this syllabus to meet the academic, social and industry related goals of target groups.

Understandings about learners and learning

The following assumptions about learners and learning underpin the Coast and Marine Education subject area.

Learners

- Learners are unique individuals and thinkers with divergent views about the world.
- Learners have a broad range of knowledge, attitudes, values and experiences shaped by their gender, socioeconomic status and geographical location, and by other aspects of their background, all of which form part of their learning environment. Their prior knowledge and experiences influence the meaning they make of any new learning experience.
- Learners grow, develop and learn in different ways, in different settings and at different rates. By engaging in learning activities that match their needs, interests, understandings and individual learning styles, learners have opportunities to develop and extend their capabilities.

Learning

- Learning is a lifelong process.
- Learning occurs within particular social and cultural contexts.
- Learning is most effective when it involves active partnerships with students, parents/carers, peers, teachers, and school and community members.
- Learning contexts should acknowledge equity principles by being inclusive and supportive, and by celebrating diversity.
- Learning requires active construction of meaning and is most effective when it is developed in meaningful contexts and accommodates, acknowledges and builds on prior knowledge.
- Investigative and learner-centred strategies are most effective in enabling learners to make informed choices and to take actions that support their own and others' wellbeing.
- Learning is enhanced by the use of a range of technologies.
- Learning occurs when learners have opportunities to reflect on their own thinking and learning.
- Learning is most effective when the learning environment is safe, supportive, enjoyable, collaborative, challenging and empowering.

Learner-centred approach to learning and teaching

This approach views learning as the active construction of meaning, and teaching as the act of guiding and facilitating learning. This approach considers knowledge as being ever-changing and built on prior experience.

A learner-centred approach provides opportunities for students to practise critical and creative thinking, problem solving and decision making.

This involves recall, application, analysis, synthesis, prediction and evaluation, all of which contribute to the development and enhancement of conceptual understandings.

A learner-centred approach also encourages students to reflect on and monitor their thinking as they make decisions and take action (see Appendix 2).

Coastal and marine education encourages students to contribute to group decisions and actions related to designing, planning, implementing and evaluating coast and marine activities. Responsible use of the sea can be encouraged in projects such as designing plastic bag reduction programs or determining correct size limits for recreational fishing. Coastal and marine education allows students to actively participate in conservation programs.

Students are encouraged to take responsibility in practical coastal and marine activities and learn through reflection on, and evaluation of, the outcomes.

Designing plastic bag reduction programs as part of accepting social responsibility.

Equity in the curriculum

The Queensland school curriculum is designed to challenge inequities by:

- acknowledging and minimising unequal outcomes of schooling for different groups of students
- identifying and minimising barriers to access, participation, active engagement, construction of knowledge and demonstration of learning outcomes
- using the knowledge, practices and dispositions of all students as a basis for their learning and for enhancing the learning of others in the community
- developing understanding of, and respect for, diversity within and among groups
- making explicit the fact that knowledge is historically, socially and culturally constructed
- making explicit the relationship between valued knowledge and power relations
- identifying and promoting the capacity of the Coast and Marine Education syllabus subject area to develop knowledge, practices and dispositions that empower students to challenge injustices and inequities.

An equitable curriculum also provides opportunities for students to learn about equity and equity issues in the context of the subject area.

Student access and participation

In an inclusive curriculum, consideration is given to the interrelationships between culture, language, ability, gender, location and socioeconomic circumstance, and their impact on students' perspectives and experiences, and therefore access to and success in the curriculum.

Students bring varied prior experiences to the classroom, some of which support their learning in Coast and Marine Education, and others that may make this more difficult for them. Students' diverse experiences and their resultant perspectives of coast and marine education need to be considered when planning.

The selection of concepts, contexts, contents and learning experiences need to accommodate the diverse learning styles, interests and experiences of students if learning is to be maximised.

Learning about equity

Students explore, express and challenge personal, group and societal values that reinforce and perpetuate inequities.

Through the learning activities in coast and marine education, students understand and appreciate diverse needs and perspectives, and learn to value and respect people, cultures and their environments. Students develop knowledge, practices and dispositions to critique social and political structures and power relations created through coast and marine activities that have the potential to work for or against individuals or groups.

Students develop understandings about the historical, social, cultural, spiritual, political and economic constructions of and contexts in which coast and marine products and practices are created and valued, and the dynamic interrelationships that exist between these.

This promotes understanding of the heterogeneity of practices, beliefs and values within and across cultural groups. This, in turn, empowers students to become lifelong learners, and active and critical participants in our interdependent society.

Outcomes

Framework

This syllabus provides a framework for planning learning activities and assessment opportunities through which students have opportunities to demonstrate what they know, and can do with what they know, in the Coast and Marine Education syllabus subject area.

Subject area outcomes

The subject area outcomes highlight the uniqueness of Coast and Marine Education and their particular contribution to lifelong learning. In this subject area, students develop knowledge, practices and dispositions necessary to:

- investigate recreational skills and practices necessary to use the coast and marine zone safely
- respond to changes in technology and design of marine products
- investigate the ecology of coast and marine ecosystems
- value the roles of coast and marine conservation agencies
- reflect on society's views about coast and marine industries
- reflect on and evaluate current and emerging technologies
- evaluate coast and marine conservation strategies as they relate to development of natural resources
- develop a commitment to sustainability and conservation of the environment while undertaking action based research.

Strands of the subject area

The learning outcomes of the Coast and Marine syllabus subject area are organised into five strands:

1. Practices and skills
2. Industry
3. Oceanography
4. Ecology
5. Conservation

Students further develop their understandings of the concepts within the strands throughout the later years of compulsory schooling.

Courses of study can be planned using learning outcomes from a single strand or from a number of strands.

1. Practices and skills

This strand focuses on the practices, skills, management and safety aspects that allow people to participate in coastal and marine activities. The organisers for this strand are:

Coast and marine activities - skills
Coast and marine activities - equipment and services
Coast and marine activities - management and safe practices

2. Industry

This strand focuses on industries that are related to coastal and marine environments. The organisers for this strand are:

Coast and marine industries - properties of materials
Coast and marine industries - operating procedures

3. Oceanography

This strand focuses on the physical and chemical interactions between the ocean and the coast. The organisers for this strand are:

Coast and marine environments - systems
Coast and marine environments - research

4. Ecology

This strand focuses on the biological interactions that occur between the ocean and the coast. The organisers for this strand are:

Coast and marine environments - living things
Coast and marine environments - interactions
Coast and marine environments - classification

5. Conservation

This strand focuses on the sustainability of coastal and marine systems. The organisers for this strand are:

Coast and marine environments - user groups
Coast and marine environments - impacts and management

Levels

The levels outlined on the following pages indicate progressions of increasing sophistication and complexity in learning outcomes. This syllabus describes learning outcomes for Level 4, Level 5, Level 6 and beyond Level 6. The sequencing of the learning outcomes is such that each level is 'nested' within the following level. Learning outcomes for successive levels are conceptually related to each other, forming a continuum rather than existing simply as a number of discrete entities.

A level statement is included for each level of each strand of the syllabus. The level statement summarises learning outcomes at each level and provides a framework for developing the central and supplementary learning outcomes. This continuum is illustrated in Figure 1.


Bob Moffatt

Coast and marine activities - skills, equipment, services, management and safe practice

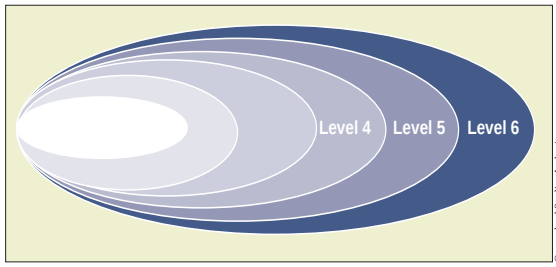


Figure 1: Progression of conceptual development of outcomes

Progression of outcomes

Central learning outcomes

Central learning outcomes describe the learning that is considered fundamental to a course of study based on a subject area syllabus.

They describe what students know, and can do with what they know, as a result of planned learning activities.

The central learning outcomes are presented in order of increasing complexity from Level 4 to beyond Level 6.

A course of study may include all or only some of the learning outcomes described in this syllabus.

Design of central learning outcomes and levels

In their books, *Taxonomy of Educational Objectives*, Bengamin Bloom, Bertram Mesia and David Krathwohl outline a methodology for the development of knowledge and intellectual skills in the cognitive domain. See - Bengamin S. Bloom, Bertram B. Mesia, and David R. Krathwohl (1964). *Taxonomy of Educational Objectives* (*two vols: The Affective Domain and The Cognitive Domain*). New York. David McKay.

In this syllabus, as a general rule, the outcomes from each strand increase in complexity from level to level according to Blooms Taxonomy (see Appendix 1). Note that the taxonomy has renamed Blooms original synthesis domain as creating, and added the verbs and statements from educators since the hierarchy was originally developed.

Typically outcomes from:

- Level 4 have been derived from the knowledge and understanding domain,
- Level 5 from the application and analysis domain and
- Level 6 and beyond Level 6 from the creating and evaluating domain.

Central learning outcomes may be of two types

- Core learning outcomes - these are fundamental to the subject area.
- Specific learning outcomes from other syllabi.
  One set of outcomes has been included from the key learning area of Science and one modified from Health and Physical Education (see PS 4.2, PS 5.2, PS 6.2 and PSS 6.2, pages 12 and 13).
  The Science outcomes can be found in the ecology strand and are labelled to indicate their key learning area code.

Supplementary learning outcomes

Supplementary learning outcomes describe what students know and can do with what they know beyond what is considered fundamental at a particular level. They indicate additional learning considered desirable. It is not expected that these supplementary learning outcomes will be demonstrated by all students. The supplementary learning outcomes are included to assist teachers in broadening the understandings of those students who have already demonstrated central learning outcomes. Additional supplementary learning outcomes could be developed by schools or teachers. At beyond Level 6 all learning outcomes are supplementary.

Practical skills outcomes

Practical skills outcomes have been restricted to:

- Practices and Skills Level 5.1 and
- Industry Level 6.1.

Relationship of outcome levels to year levels

For the purposes of planning learning activities and assessment opportunities, outcome levels typically relate to years of schooling as follows:

- students demonstrating Level 4 outcomes are at the end of Year 7, students demonstrating Level 5 outcomes are in the middle of Year 9, students demonstrating Level 6 outcomes are at the end of Year 10
- some students will demonstrate the learning outcomes beyond the typical levels described above and some students will require more time to demonstrate the learning outcomes.

Using learning outcomes to plan for learning and assessment

Learning outcomes provide a framework for planning learning and assessment by describing what it is that students should know and be able to do with what they know. Using learning outcomes for planning involves:

- adopting a learner-centred approach to learning and teaching
- planning learning activities and assessment at the same time
- assisting students to work towards demonstrating the learning outcomes
- establishing clear expectations of student demonstrations as a basis for monitoring the progress of student learning.

The learning outcomes are sequenced conceptually in four progressive levels. This conceptual development is represented in the level statements for each strand. Learning outcomes at each level are qualitatively different from the corresponding learning outcomes at the levels before and after. This sequencing across levels assists teachers in planning learning activities to cater for the range of developmental characteristics of students.

When planning units of work, teachers could select learning outcomes from within a strand, across strands, across levels or across subject areas and key learning areas. Assessment tasks may provide opportunities for students to demonstrate more than one learning outcome.

Planning should make provisions for students to demonstrate learning outcomes in more than one context and on more than one occasion. Activities incorporating a variety of content and contexts should be organised to provide these opportunities.

Planning for learning and planning for assessment are concurrent processes. Learning activities can be opportunities for teachers to gather evidence about students' demonstrations of learning outcomes.

Content

The central learning outcomes are the focus for planning learning activities and assessment tasks. Students will engage with content when they are provided with opportunities to demonstrate central learning outcomes.

The organisation of content within a strand should not be considered hierarchical. Any of the content can be addressed at any appropriate level; not all of the content need be addressed at every level. Each list should not be considered exhaustive. Central content should be selected to suit students' needs, interests and abilities and to take account of their prior knowledge and experiences.

In the Coast and Marine Education subject area, there is an overlap of content across strands. For example, safety is in the content for the practices and skills strand, but is also relevant to other strands.

Learning outcomes and suggested content of each strand are identified on pages 12 - 23.

Content examples

Examples of how specific concepts link to the outcomes are given for each outcome. These are examples only and must not be considered compulsory content coverage. Further examples can be found on the MTAQ web site.

Using content with multiple intelligences

In his 1983 book Frames of Mind, Howard Gardner, introduces the concept of multiple intelligences. (See Howard Gardner, *Frames of Mind*, 1993, Basic Books, New York.) To help all our students to learn, schools can plan lessons to reach as many of these intelligences as possible.

Students could be provided with an opportunity, at some stage in a course of study, to demonstrate their different intelligences using content applied to Blooms Taxonomy and those learning outcomes selected from Gardners seven categories.

An example of how this could work is detailed in Appendix 2.

CSIRO

Marine scientists water sampling Australian oceans to determine salinity, temperature, dissolved oxygen.

Practices and skills strand - learning outcomes


Lloyd Jones

Organisers for the practices and skills strand learning outcomes are:
Coast and marine activities - skills
Coast and marine activities - equipment and services
Coast and marine activities - management and safe practices

Suggested content can be found on page 22, further examples at *www.marineteachers.org.au*

Level 4

Level statement

Students understand the skills involved in a coast and marine activity. They investigate the equipment and services required for an activity. They understand that safe and unsafe behaviours and situations require management.

Central learning outcomes

PS 4.1 Students describe a coast and marine activity.

Example

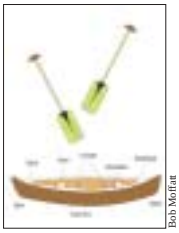
In canoeing students describe:
- skills and locations required for canoeing
- suitable canoeing locations
- activities associated with canoeing for example, safe water entries, first aid.


Wet Paper Publications

PS 4.2 Students locate and distinguish between a selection of coast and marine equipment and services to meet their recreational needs.

Example

In canoeing students locate and distinguish:
- equipment to go canoeing
- features of equipment such as flexibility, durability, comfort and design
- service providers such as canoe shops, sports stores, tourism operators, and sports clubs to meet their recreational needs.


Bob Morfatt

PS 4.3 Students state and describe ways of responding to coast and marine situations and behaviours that are unsafe, harmful or risky, after assessing options and consequences.

Example

In canoeing students state and describe:
- safe practices required while canoeing
- unsafe practices and their consequences
- personal fitness, attitudes and behaviours required while canoeing after assessing personal options and consequences.


Bob Morfatt

Level 5

Level statement

Students perform the skills of a coast and marine activity. They investigate the reasons behind their choices of equipment for an activity. They perform behaviours to control unsafe situations.

Central learning outcomes

PS 5.1 Students demonstrate practical skills in a coast and marine activity.

Practical skills example

In canoeing students demonstrate:
- practical skills, such as basic stroke making or turning according to national canoe standards.


Sally Flynn

PS 5.2 Students analyse factors that influence their selection of coast and marine equipment and services for an activity.

Example

In canoeing students analyse:
- features of equipment such as costs, design and safety standards before selecting or purchasing
- the services provided by suppliers such as costs, equipment, activities, opportunities for a canoeing trip.


Bob Morfatt

PS 5.3 Students demonstrate safe behaviours and actions to provide care or manage risk while responding to unsafe or risky coast and marine situations and behaviours.

Example

In canoeing students demonstrate:
- water safety skills such as communication signals or strategies to avoid hypothermia
- actions to avoid drowning such as capsize drill, entanglement, injury and/or cuts.


Laurie Adams

Level 6	Beyond Level 6
Level statement Students evaluate their performance in an activity and design ways for everyone to participate. They evaluate the equipment and services used in an activity. They design strategies to respond to unsafe situations.	**Level statement** Students evaluate the skills required to receive a community award. They promote an activity to the community. They evaluate strategies that are used to respond to unsafe situations.
Central learning outcomes	**Supplementary learning outcomes**
PS 6.1 Students evaluate their own performance and plan strategies to ensure everyone can participate in a coast and marine activity. **Example** In canoeing students evaluate: • skills performance levels to national canoe standards • performance identification such as stroke difficulties.  Sally Flynn	PSS 6.1 Students assess performance skills required to receive a coast and marine community award. **Example** In canoeing students assess: • skills performance levels required to receive a Level 1 Canoe Coach qualification.  Qld Canoeing
PS 6.2 Students recommend coast and marine equipment and services suitable for a variety of global situations. **Example** In canoeing students recommend: • equipment and services suitable for aquatic conditions unlike their local area, for example rapids, mangrove, estuary or open water.  Ken MacLean	PSS 6.2 Students design and discuss a coast and marine community promotion for an activity based on the equipment and services available. **Example** In canoeing students design and discuss: • a canoeing advertising brochure • a canoe ecotourism business marketing plan for a set number of people.  Bob Moffatt
PS 6.3 Students devise and debate personal and community strategies to respond to unsafe coast and marine situations. **Example** In canoeing students devise and debate: • a personal plan in response to situations such as rapids, unfavourable weather conditions and accidents • community strategies such as signage, response teams and emergency centres for stings, counting team members back onshore before departure.  Jan Taylor	PSS 6.3 Students evaluate and justify strategies for potentially unsafe coast and marine situations and behaviours in order to optimise benefits. **Example** In canoeing students evaluate and justify: • local canoeing sites for dangers to beginners • first aid strategies for a canoeing injury involving dangerous coast and marine situations.  Bob Moffatt

Industry strand - learning outcomes


Bob Moffatt

Organisers for the industry strand learning outcomes are:
Coast and marine industries - properties of materials
Coast and marine industries - operating procedures

Suggested content can be found on page 22, further examples at *www.marineteachers.org.au*

Level 4

Level statement

Students investigate properties of materials specific to their use. They research the operations of an industry.

Central learning outcomes

I 4.1 Students relate how the properties of coast and marine materials influence their use.

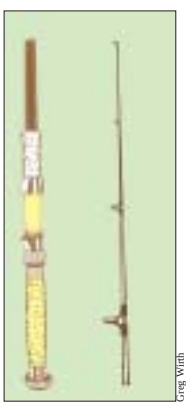
Examples

In recreational fishing students relate:

- the properties of materials (strength and flexibility of a fishing rod blank) to their use in an estuary fishing rod.

In boat maintenance students relate:

- the types of anti-fouling paints to the boating materials they are applied to.


Greg Wirth

I 4.2 Students locate a local coast and marine industry and describe its operations.

Examples

In recreational fishing students locate:

- a local fishing tackle shop and describe its operations for example, products, services, personnel, demand and supply.

In the boat building industry students locate:

- a boat manufacturer and describe its operations for example research, sales, production or marketing.

In the aquaculture industry students locate:

- an aquaculture farm and describe the operations involved in stocking, harvesting and exporting.


Bob Moffatt

Level 5

Level statement

Students test the properties of materials. They analyse the operations of an industry.

Central learning outcomes

I 5.1 Students investigate and report on how the properties of coast and marine materials influence their use.

Examples

In recreational fishing students investigate and report on:

- how properties of fishing line such as strength, colour, elasticity and thickness influence their use in catching a target species of fish.


Simone Baker

In boat maintenance students investigate and report on:

- how the properties of antifouling paint influence their use on different boats in different areas.

I 5.2 Students analyse and report on the efficiency of operations within a coast and marine industry.

Examples

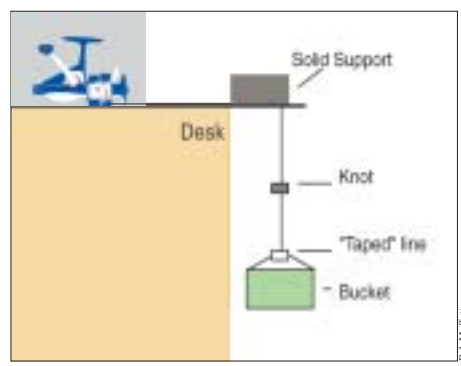
In recreational fishing students analyse and report on:

- the efficiency (by survey of customers) of a local fish tackle shop and report on how it meets the demand and supply for its local area.

In the aquaculture industry students analyse and report on:

- the operations involved in maintaining the farm
- the sale of seafood products at a local market.


Qld Fisheries

Level 6	Beyond Level 6
Level statement Students construct a product that meets specific standards. They make recommendations on the operations of an industry.	**Level statement** Students evaluate commercial products and their requirements to meet specific standards. They devise a coast and marine industry operation.
Central learning outcomes	**Supplementary learning outcomes**
I 6.1 Students design and construct a product using materials, meeting specific standards for its use in coast and marine environments. **Practical skills examples** In recreational fishing students design and construct: • an estuary fishing rod to local fishing club standards incorporating design features such as taper and placement of parts • a crab pot to local fishing regulations and community standards. In aquarium building students design and construct: • a small aquarium using materials that will maintain water quality to a sufficient standard that will keep a fish alive.  Simone Baker	IS 6.1 Students evaluate different commercial products to test if their materials meet specific standards for their use in coast and marine environments. **Example** In recreational fishing students evaluate: • various fishing line types to meet standards such as breaking strain • different types of fishing reels. They test to see if these materials meet the requirements to catch target fish in local estuaries.  Bob Moffatt
I 6.2 Students evaluate and make recommendations on the operations of a coast and marine industry. **Example** In recreational fishing students evaluate and make recommendations on: • a fishing publication • the sale of fishing equipment in a local store • the operations of a local fishing club • fishing equipment manufacturing.  Martyn Taylor	IS 6.2 Students argue and debate a coast and marine industry operation. **Examples** In recreational fishing students argue and debate the: • the effects on local fish populations • the value to society • the operations of a local fishing competition. In aquaculture students argue and debate the: • viability of a red claw farm • suitability of silver perch as a table fish • costs involved in maintaining water quality.  Kerry Kuzelman

Oceanography strand - learning outcomes


Alan Wolfe

Organisers for the oceanography strand learning outcomes are:
Coast and marine environments - systems
Coast and marine environments - research

Suggested content can be found on pages 22 and 23, further examples at *www.marineteachers.org.au*

Level 4

Level statement

Students identify the natural systems and research methods of the coast and ocean.

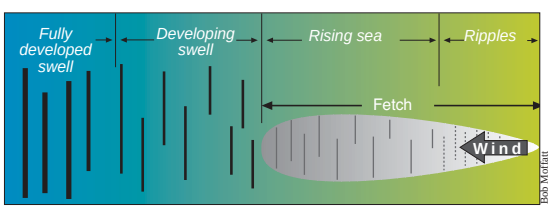
Central learning outcomes

O 4.1 Students name and describe the natural systems of the coast and ocean.

Examples

In a study of ocean systems students name and describe:
- systems such as precipitation, temperature, salinity, deep sea, currents, wind and air pressure.

In a study of beach systems students name and describe:
- waves system generation in a fetch.



Bob Moffatt

O 4.2 Students outline various coast and ocean research methods.

Examples

In a study of deep sea exploration students outline:
- research methods such as remote operating vehicles, bathyspheres and depth soundings.

In a study of beach research methods students outline:
- research methods used to show how wave height is dependant on length of fetch.


Surfing Australia

Level 5

Level statement

Students understand that there are natural systems of the coast and ocean. They can explain the procedures of a research method.

Central learning outcomes

O 5.1 Students investigate the interactions between the natural systems of the coast and ocean.

Examples

In a study of ocean systems students investigate:
- interactions between tides and weather and their effects.

In a study of beach systems students investigate:
- the effects of waves on beaches.

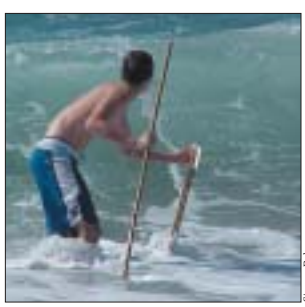

Bob Moffatt

O 5.2 Students examine and explain the procedures of a coast and ocean research method.

Examples

In a study of deep sea exploration students examine and explain:
- the procedures used to locate samples and specimens for research purposes.

In a study of beach research methods students examine and explain:
- the procedure for measuring and calculating longshore drift.


Simone Baker

Level 6

Level statement

Students explain features and events caused by the interaction of the natural systems of the coast and ocean. They evaluate a research method used to study coast and ocean systems.

Central learning outcomes

O 6.1 Students research scientific ideas and theories about interactions within and between the natural systems of the coast and ocean to justify past and present features and events.

Examples

In a study of ocean systems students research:

- scientific ideas and theories such as El Nino and its effects on the weather, justifying past and present current movements.

In a study of beach systems students research:

- beach erosion and the effects of cyclones past and present
- sand grain size to justify past and present dunes and erosion events.

Gold Coast City Council

O 6.2 Students assess a coast or ocean research method for effective design and implementation.

Examples

In a study of deep sea exploration students assess:

- the design of a remote operating vehicle for its effectiveness in accessing and retrieving deep sea specimens.

In a study of beach research methods students assess:

- longshore drift research variables.

Bob Moffatt

Beyond Level 6

Level statement

Students understand how features and events can be predicted using knowledge of the coast and ocean's natural systems. They select a research method and design an appropriate tool.

Supplementary learning outcomes

OS 6.1 Students debate how and why scientific ideas of coast and ocean systems can be used to predict features and events.

Examples

In a study of ocean systems students debate:

- El Nino's effects on weather and how it can be used to predict droughts and current movements.

In a study of beach systems students debate:

- the research into wave and sand movement in coastal areas to predict effects of erosion on beaches.

Simone Baker

OS 6.2 Students design and discuss a coast or ocean research tool specific to a research method.

Examples

In a study of deep sea exploration students design and discuss:

- a vehicle used to access and retrieve deep sea specimens.

In a study of beach research methods students design and discuss:

- a method to simulate longshore drift in a wave tank.

Bob Moffatt

Ecology strand - learning outcomes


Bob Moffatt

Organisers for the ecology strand learning outcomes are:
Coast and marine environments - living things
Coast and marine environments - interactions
Coast and marine environments - classification

Suggested content can be found on page 23, further examples at *www.marineteachers.org.au*

Level 4

Level statement

Students understand that the features of organisms and their interactions with living and non-living parts of their environment enable them to survive and reproduce. They understand the grouping process of organisms.

Central learning outcomes

E 4.1 Students draw and describe features of coast and marine organisms that enable them to survive and reproduce in aquatic habitats.

Example

In a rocky shore study students draw and describe:

- features such as exoskeletons, mouth parts and motile appendages and describe how they enable survival and reproduction.


Wet Paper

E 4.2 Students make generalisations about the types of interactions which take place between the living and non-living parts of the (coast and marine) environment. [Science LL 4.3]

Example

In a rocky shore study students make generalisations about:

- the effects of desiccation on crustaceans.

E 4.3 Students interpret the groupings of coast and marine organisms.

Example

In a rocky shore study students interpret similarities and differences:

- of groups of organisms such as crustaceans, molluscs and algae.


Bob Moffatt

Level 5

Level statement

Students explain how the features of organisms can enable them to survive and reproduce. They understand that interactions between living and non-living parts of an environment have consequences. They explore the use of characteristics in the classification process.

Central learning outcomes

E 5.1 Students examine the internal and external features of coast and marine organisms and relate these features to survival and reproduction in aquatic habitats.

Example

In a rocky shore study students examine:

- features such as respiratory systems and protective coverings and relate these to survival and reproduction.


Bob Moffatt

E 5.2 Students evaluate the consequences of interactions between the living and non-living parts of (coast and marine) environments. [Science LL 5.3]

Example

In a rocky shore study students evaluate the consequences of:

- the lack of water and its desiccation effects on organisms.

E 5.3 Students explain how characteristics are used for classification of coast and marine organisms.

Example

In a rocky shore study students explain how characteristics:

- such as body coverings, respiratory systems and reproductive processes are used to group organisms.

Level 6

Level statement

Students understand the abilities of organisms to enhance their survival and reproduction. They describe how human actions can affect biodiversity. They use characteristics to classify organisms.

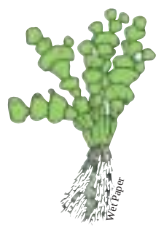
Central learning outcomes

E 6.1 Students evaluate the different strategies of coast and marine organisms in terms of their relative efficiency in survival and reproduction.

Example

In a rocky shore study students evaluate strategies:

- of rocky shore animals and plants such as cementing themselves to rocks and spawning on spring tides or full moons, ensuring survival and reproduction.



E 6.2 Students prepare scenarios to describe the potential long-term effects of changes in biodiversity caused by human actions on (coast and marine) ecosystems. [Science LL 6.3].

Example

In a rocky shore study students prepare scenarios to describe:

- future populations of organisms affected by stormwater run-off
- effects on coast and marine biodiversity from land development.


Bob Moffatt

E 6.3 Students verify the classification of coast and marine organisms using internal and external characteristics.

Example

In a rocky shore study students verify their methods:

- for classification of organisms using characteristics such as body coverings, skeletal and respiratory systems as well as reproductive processes.


Bob Moffatt

Beyond Level 6

Level statement

Students understand the changing effects on an organism in response to its environment. They understand that human activities result in long-term effects. They design and use a classification key in the field.

Supplementary learning outcomes

ES 6.1 Students justify the reasons why functioning and behaviour of coast and marine organisms change in response to variations in internal and external conditions.

Example

In a rocky shore study students justify the reasons:

- why trap doors and cementation of barnacles is a response to wave or tidal movement.


Bob Moffatt

ES 6.2 Students examine potential long-term effects of human activities on the (coast and marine) environment. [Science LL DB6.3].

Example

In a rocky shore study students examine potential long-term effects of:

- the populations of coast and marine organisms due to human coastal development.

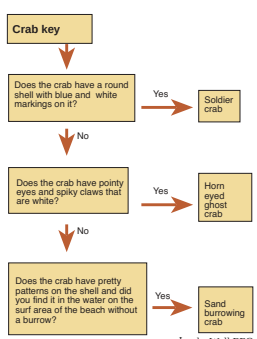

Murray Waite

ES 6.3 Students conduct a field study and discuss and design a classification key for observed coast and marine organisms.

Example

In a rocky shore study students conduct a field study to discuss and design:

- a classification key for organisms in a rock pool.



Jacobs Well EEC

Conservation strand - learning outcomes


EPA Victoria

Organisers for the conservation strand learning outcomes are:

Coast and marine environments - user groups

Coast and marine environments - impacts and management

Suggested content can be found on page 23, further examples at *www.marineteachers.org.au*

Level 4

Level statement

Students understand that different user groups impact on a coast and marine environment, making recommendations for sustainability.

Central learning outcomes

C 4.1 Students name and describe different user groups within a coast and marine community.

Example

In a study of the Great Barrier Reef students name and describe:

- what different user groups do when using the reef.


Daryl Pierce

C 4.2 Students list impacts on coast and marine environments and describe effective ways to sustain or restore coast and marine biodiversity.

Example

In a study of the Great Barrier Reef students list and describe:

- impacts such as pollution, poor catchment management, litter, farming and industries affecting water quality
- ways to sustain biodiversity such as zoning, legislation
- ways to restore biodiversity for example, plastic bag reduction, closed seasons and or marine protected species legislation.


Qld Fisheries

Level 5

Level statement

Students understand the cultural differences between user groups of a coast and marine environment. They explore how an organisation ensures sustainability for the coast and marine environment.

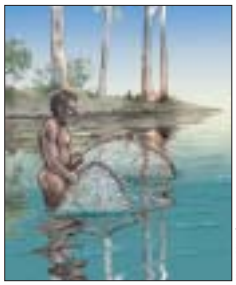
Central learning outcomes

C 5.1 Students compare and contrast the culture of different user groups within a coast and marine environment.

Example

In a study of the Great Barrier Reef students compare and contrast:

- cultural aspects of user groups such as history, rites and rituals.


Kerry Kitzelman

C 5.2 Students investigate and report on the methods and or strategies an existing coast and marine organisation implements to establish a sustainable future.

Example

In a study of the Great Barrier Reef students investigate and report on:

- the methods and strategies Queensland National Parks and Wildlife use with campers to conserve a coral cay in the Capricorn Bunker group.


Qld National Parks

Level 6	Beyond Level 6
Level statement Students understand that user groups impact on each other. They develop a sustainability plan for a coast and marine environment.	**Level statement** Students understand the need for a collaborative plan for all user groups of a coast and marine environment. They promote and implement a community awareness sustainability program.
Central learning outcomes	**Supplementary learning outcomes**
C 6.1 Students evaluate and assess the interactions between the user groups within a coast and marine environment. **Example** In a study of the Great Barrier Reef students evaluate and assess: • the interactions between user groups such as conservation and tourism and the environment.  Qld Fisheries	CS 6.1 Students devise a proposal coordinating the collaboration of the user groups within a coast and marine environment. **Example** In a study of the Great Barrier Reef students devise a proposal coordinating the collaboration of: • commercial fishing and conservation through zoning.  Qld Fisheries
C 6.2 Students devise a management plan for a coast and marine environment to establish a sustainable future. **Example** In a study of the Great Barrier Reef students devise a management plan to: • establish a sustainable future which may include zoning and regulations.  GBRMPA	CS 6.2 Students propose, implement and recommend a coast and marine community awareness program designed to establish a sustainable future. **Example** In a study of the Great Barrier Reef students propose, implement and recommend: • a sustainability awareness program through advertising and promotion.  Bob Moffatt

Suggested content

Use this content to devise examples to the learning outcomes from the previous pages when planning units of work.

Practices and skills

Water safety

- Safety rules around water
- Safe practices and behaviours in the water
- Correctly fit a life jacket (PFD)
- Complete a recognised swimming award
- Identify dangerous water situations
- Location and storage of marine equipment
- Warning signs animals may be dangerous
- Territorial nature of some marine creatures
- Accreditation agencies eg, SLSA, RSLA

First Aid

- DRABC action plan
- Expired air resuscitation (EAR)
- External cardiac compression (ECC)
- Cardiopulmonary resuscitation (CPR)
- Burns, cuts and bleeding
- Marine medical emergencies
- Treatment for bites, stings and puncture wounds
- Accreditation agencies eg, Ambulance, Red Cross

Boating, sailing, canoeing, kayaking and or rowing

- Types of craft
- Terminology
- Equipment, safety and maintenance
- Skills
- Environmental considerations
- Licensing and qualifications
- Safe practices
- Boat building
- Clubs and organisations
- Knots and ropes
- Splicing ropes
- Knot types and uses
- Rope types and uses
- Communications
- Accreditation agencies eg, QYA, MSQ

Fishing

- Amateur fishing
- Fishing gear and maintenance
- Commercial fishing
- Aboriginal and Torres Strait fishing
- Traditional fishing methods
- Fishing and conservation
- Safe practices
- Ethics and etiquette
- Clubs and organisations
- Making a fishing rod
- Employment opportunities
- Knowledge of fisheries habitats
- Preparing and purchasing seafood
- Cooking seafood
- Accreditation agencies eg, ANSA

Canoeing

- Canoeing skills
- Canoeing equipment maintenance
- Hypothermia
- Safe practices
- Canoeing first aid
- Service providers
- Repairing and purchasing equipment
- Awards and qualifications
- Communications in and around water
- Accreditation eg, Canoe federation

Surfing

- Coastlines, weather
- Types of equipment
- Performance design features
- Fitness and safety
- How surfboards are made
- Repairing equipment
- First aid and resuscitation
- Surfers as environmental ambassadors
- Clubs, careers and qualifications
- Accreditation agencies eg, SLSA, Surfing Australia

Management agencies

- Statutory bodies and volunteer organisations that regulate and manage aquatic habitats
- Agency programs that promote the wise use and sustainability of the marine and coastal zone
- Types of regulations
- The management legislation process
- Cultural considerations

Industry

Commercial fishing industry

- Types, quality, price and availability
- Catching/buying your own food
- Seafood cooking and preparations
- Diet, health, omega factors
- Commercial operations
- Employment
- Materials used – nets, pots, lines, lures, bait

Recreational fishing industry

- Materials used - equipment, tackle, bait
- Retail shops, what they sell, how they are organised
- Build a fishing rod, crab pot/dilly
- Regulations

Manufacturing and retail industries

- World of work, structured work placements, work experience
- Significance of sea time
- Tourism and recreation
- Aquarium design, construction and maintenance
- Aquarium types - freshwater or marine
- Construction
- Stocking
- Maintenance

Aquaculture industry

- Identification of types
- Role of hatcheries
- Methods used to grow food
- Farming fish species
- Careers and employment
- Sea water properties necessary
- Export marketing eg, Salmon, Tuna
- Case studies eg, Red Claw, Barramundi, Silver Perch, Oysters
- Designing systems and infrastructure
- Economics, operations and equipment
- Growing stockfeed for aquaculture
- Biology of native crayfish
- Growing crustaceans
- Asian aquaculture systems
- Fish biology
- Managing fish production
- Pests and diseases
- Careers and qualifications
- Water quality as applied to aquaculture and other industries
- Significance of water quality in the aquaculture industry
- Equipment required
- Tests that can be conducted
- Safety and health issues
- Macro invertebrate sensitivity tests

Shipping and ship building industry

- Shipping, boat building, hull design
- Communications
- Overseas trade and terminal operations
- Oil and gas
- Ports, harbours and marinas
- Employment

Industry employment

- Opportunities
- Work experience

Oceanography

Weather

- Importance of weather and coastline
- Temperature, coastal fires, disaster planning
- Air pressure, cyclones, tidal surges
- Rainfall and humidity
- Weather forecasts
- Your weather station

Waves

- Wave characteristics
- Wave types, seismic waves
- Effects of waves on beaches and marine life
- Surfing the waves

Coastal engineering

- Effects of engineering on coastal sediment flow
- Sand bypass systems, artificial reefs
- Effects of waves, tides and currents on marine and coastal engineering

Sea water
- Composition, corrosion effects, metals in sea water
- Properties, temperature, buoyancy, light, colour
- Salinity, plimsoll line
- Sacrificial anode
- Pressure, colour, sound
- Dissolved gases, photosynthesis
- Australian temperate and tropical bioregions

Oceans
- Ocean formation, depth and characteristics
- The greenhouse effect
- Ocean shape
- Mining ocean resources
- Power from the sea
- Ocean management and mapping
- Properties of sea water
- Exclusive Economic Zone
- The abyss

Coastlines and geomorphology
- Formation, sediment composition
- Beaches, rock platforms
- Reefs – fringing, patch, oceanic, ribbon
- Ridges and sea mounts
- Catchments and sheltered coastlines

Tides and currents
- Causes of tides
- Tide heights and ranges
- Reading the tide book
- Ocean, coastal, local and tidal currents
- Southern Oscillation Index and El Nino
- Important Australian currents
- Local currents, rips and safety
- Tidal currents

Ecology

Plankton
- Temporary plankton
- Important commercial life cycles – prawns, lobsters, crabs, fish
- Permanent plankton
- Algal blooms, red tides, zooxanthellae and coral bleaching
- Plankton adaptations
- Identifying plankton
- Plankton and the photic zone

Coast and marine plants
- Marine plants
- Dune plants
- Mangroves
- Conservation

Dangerous creatures
- Active - sharks, crocodiles
- Passive - oysters, barnacles, jellyfish
- Bites, stings and envenomations
- The biology of treatment, first aid and safety

Coast and marine animals
- Classifying and naming living things
- Protozoans, sponges, jellyfish, corals and anemones, comb jellies
- Worms, animals with jointed legs, spiny-skinned animals, animals with shells
- Acidians
- Sharks and rays
- Bony fish
- Turtles and crocodiles
- Marine mammals

Living together in the sea or on the coast
- Problems with living in the sea
- Living in habitats
- Temperate and tropical ecosystems
- Adaptations for coast and marine zones

Sea Birds
- Adaptations for coast and marine life
- Migration patterns
- Different types of seabird
- Observing birds
- Significance of seabirds

Conservation

Pollution
- Marine pollution - who causes it
- Sources of pollution - point and non point sources
- Effects of aquaculture farms, fertilizer from farms, pollution from cities
- Solutions - think globally, act locally
- Repairing the sea
- Sea water quality, catchment management
- Marine pests and threats

Taking actions to save the sea
- Acting locally
- Thinking globally
- Repairing the sea
- Environmental protection action plans
- Community education

User groups
- Local, State, Commonwealth
- Australian Maritime College
- National or state education programs
- Community and recreational
- Commercial fishing
- Aquaculture
- Shipping, ports
- Clubs – diving, fishing, surfing etc
- Tourism
- Conservation

Shipwrecks
- The importance of shipwrecks
- Maritime archaeology
- Preservation of materials
- Display
- Museums
- Nationally protected wrecks

Reef guardians program
- Enrolling and action planning
- Video conferences
- Programs to reduce, reuse and recycle materials in schools
- Reducing plastic bags and replacement with calico bags
- Drain spraying programs to reduce litter into sea
- Community education programs development
- School composting programs
- Conduct school water/energy audit
- Design conservation signs – keep to beach walkways
- Help construct beach walkways
- Surveys with local fishers
- Explanation of marine parks and rules to parents
- Help design and construct mangrove, coastal walkways

Antarctica conservation
- The continent and territories that belong to Australia
- Climate and weather patterns
- Ecological importance and environmental significance
- Marine life and tourism
- Relationships between individuals

Estuaries, coastlines and marine life
- Significance
- Sand dune ecology
- Rocky shore ecology
- Adaptations for coast and marine zones
- Importance of estuaries
- Mangrove ecology, reproductive biology and life cycles
- Seagrasses significance and importance
- Estuarine food chains
- Problems facing estuaries

Antarctica
- About Antarctica
- Marine life in Antarctica
- The significance of Antarctica


Bob Morfatt

Assessment

Assessment is the purposeful, systematic and ongoing collection of evidence for use in making judgments about students' demonstrations of learning outcomes. In this syllabus, the central learning outcomes are presented in levels of increasing sophistication and complexity to form a continua of learning. The assessment focuses on monitoring demonstrations of these learning outcomes to provide evidence of student progress in this subject area.

Purposes of assessment

Information obtained from assessment can be used for a variety of purposes including providing feedback on student progress and informing decision making related to student learning.

Providing feedback

Assessment:

- provides ongoing feedback on the progress of individual students and groups of students in relation to learning outcomes throughout the learning and teaching process
- informs students, teachers, parents/carers, others in the community and/or school authorities about students' demonstrations of learning outcomes.

Informing decision making

Assessment information helps teachers to:

- make decisions about student needs, the learning and teaching process, and resource requirements
- plan learning and teaching programs for individuals, classes and the whole school
- discuss future learning pathways with students and parents/carers
- make decisions about providing learning support to particular groups of students
- develop learning resources and curriculum materials.

Principles of assessment

For assessment to be effective, it should:

- focus on students' demonstrations of learning outcomes
- be comprehensive
- be valid and reliable
- take account of individual learners
- be an integral part of the learning and teaching process
- provide opportunities for students to take responsibility for their own learning and for monitoring their own progress
- reflect equity principles.

Demonstrations of learning outcomes

Assessment focuses on students' demonstrations of learning outcomes. Assessment opportunities are typically designed to provide opportunities for students to demonstrate more than one outcome. When assessment is focused on learning outcomes, students are made aware of what is being assessed, how and when they will be assessed, and how judgments will be made about their demonstrations of learning outcomes. Teachers may then use information from assessment to plan further learning.

Comprehensive range of evidence

Judgments about students' demonstrations of learning outcomes should be based on a comprehensive range of evidence gathered and recorded over time. To collect such evidence, teachers need to provide multiple opportunities in a variety of contexts for students to demonstrate learning outcomes, and use a variety of assessment techniques and recording instruments. Because students have different learning styles, evidence should be gathered from various sources. Examples of assessment techniques, recording instruments and sources are provided in Table 3 on page 25.

Valid and reliable evidence

Assessment should provide valid, reliable evidence that relates directly to specific learning outcomes. It is essential that judgments about students' demonstrations of learning outcomes are based on a broad range of evidence gathered and recorded over time. Teachers' judgments about students' demonstrations of learning outcomes should be consistent within their own classes for different students, for different assessment opportunities and at different times. They should also be consistent with the judgments of other teachers in their own school and other schools.

Individual learners

At any one time in their schooling, students could demonstrate learning outcomes in different ways and at different levels. When planning assessment, teachers need to take account of the fact that each student will progress at a different rate across and within the subject area. They also need to take account of factors that influence students' learning - in particular, their prior knowledge, experiences and unique circumstances, and their social, emotional, physical, cognitive and linguistic development.

Integral part of learning and teaching process

Assessment is an integral part of the learning and teaching process and should support students' learning. As teachers plan learning activities, they should also plan how they will monitor student progress. Learning activities can be used as opportunities to gather evidence of students' demonstrations of learning outcomes.

Assessment opportunities should match the learning activities and teaching methods students have experienced. Assessment opportunities should be meaningful, interesting and challenging and contribute to the development of students as lifelong learners.

Responsibility for own learning and self-monitoring

Assessment should provide feedback and support to assist students take responsibility for their own learning. This involves giving students opportunities to set their own learning goals, to monitor their progress in relation to the learning outcomes and to gather information that they and others can use to make decisions about future learning. Opportunities also need to be provided for students and teachers to develop shared understandings about how learning outcomes might be demonstrated and for students to explain how they might demonstrate the learning outcomes in their own terms.

Equity principles

Assessment based on principles of equity enables students to demonstrate learning outcomes in ways that are sensitive to, and inclusive of, their circumstances. When planning and conducting assessment, teachers therefore need to take account of students' learning styles, abilities, disabilities, gender, sexual identity, socioeconomic circumstances, cultural and linguistic backgrounds, and geographical locations. This includes:

- providing assessment opportunities that assist students or groups of students to overcome barriers that might limit their demonstrations of learning outcomes
- negotiating assessment with students so that they maximise their opportunities to demonstrate learning outcomes.

Process of assessment

The process of assessment involves:

- providing students with opportunities to demonstrate what they know, and can do with what they know, in terms of identified learning outcomes
- gathering and recording evidence of students' demonstrations of these learning outcomes
- using evidence to make overall judgments about students' demonstrations of learning outcomes.

Opportunities to demonstrate learning outcomes

Students should have multiple opportunities to demonstrate learning outcomes that have been the focus of planned activities. Assessment opportunities need to be provided over time and in a range of contexts. Teachers can use learning activities as assessment opportunities, or design specific tasks that provide students with opportunities to demonstrate learning outcomes.

Gathering and recording evidence

Evidence about students' demonstrations of learning outcomes should come from several different sources and be gathered and recorded over time using a variety of assessment techniques and recording instruments. This evidence should be relevant to the learning outcomes being assessed and be collected in a focused and systematic way.

Sources of evidence

Using evidence from a variety of sources accommodates different learning styles, different types of learning outcomes, the different ways in which students may demonstrate learning outcomes, and learning that has taken place in different contexts. Sources of evidence can include learning activities as well as specifically designed assessment tasks. Examples of activities, tasks, products or processes that could be used as sources of evidence are shown in Table 3.

Assessment techniques

Assessment techniques include observation, consultation and focused analysis. Peer- and self-assessment can also be used to gather evidence about students' demonstrations of learning outcomes. Combinations of these techniques provide teachers with more comprehensive evidence on which to base judgments.

Assessment techniques should be selected to suit the context in which the learning outcome is being demonstrated and the type of evidence required. Teachers should familiarise students with the techniques through modelling and practice. Descriptions of these techniques are provided in Table 3.

Record keeping

Record keeping must support planning and be manageable and easily maintained. It must also provide accurate evidence drawn from a range of contexts about student learning related to the demonstrations of learning outcomes.

Teachers need to keep records on observation, consultation, focused analysis and peer- and self-assessment. Several examples of recording instruments are listed in Table 3.

Table 3: Examples of ways to gather and record evidence from a variety of sources
(From Queensland Studies Authority generic syllabus documents – reproduced with permission)

Sources of evidence	Assessment technique	Recording instruments
Students can provide evidence about what they know, and can do with what they know, in a variety of forms. Sources of student evidence of the demonstrations of learning outcomes may include: • practical tasks such as participation in plant or animal enterprises, group tasks, displays/shows, simulations, constructed models, use of marine equipment • oral tasks such as discussions, seminar presentations, debates, demonstrations, persuasive speeches, interviews • project folios including design briefs, design ideas, management plans and procedures, data collection and results (trials, tests, surveys), project diary • diaries/journals/learning logs such as management processes, group consultations • written tasks such as short and extended responses, instructions, explanations, reviews, creative writing, planning sheets, reports • computer-generated presentations/ projects such as enterprise proposals, presentation of data and findings • photographic records, video or audio tapes such as student demonstrations, explanations of processes • peer- and self-reflection through feedback from small or large group discussions or responses to evaluation questions. • practical skills such as snorkelling, fishing, surfing, water skiing, sailing, canoeing, rowing, rod making, aquarium building, net throwing, yabbie pumping, model hull building, surfboard repairs, knot tying, raft building, water sample equipment making, current measuring drogues, cleaning snorkels, boats, motors, changing spark plugs, mixing outboard fuel etc	**Observation** Teachers observe students as they participate in planned activities. Teacher observation occurs continually as a natural part of the learning and teaching process and can be used to gather a broad range of evidence about students' demonstrations of learning outcomes. Teacher observations can also be structured to gather particular kinds of information in relation to learning outcomes. **Consultation** Teachers discuss student work with students, colleagues, parents/carers or other paraprofessionals. The varying perspectives of the participants in consultations can help enrich the evidence gathered about students' demonstrations of learning outcomes. Consultation can be used to verify the evidence gathered using other techniques. Some consultation may reveal a need for more detailed assessment. **Focused analysis** Teachers examine in detail student responses to tasks or activities. This technique provides detailed evidence about students' demonstrations of learning outcomes. **Peer- and self-assessment** Students use the above techniques to assess their own and the work of their peers. Peer- and self-assessment allow teachers to take account of students' perceptions when gathering evidence. **Community standards** Teachers adopt community standards from accredited organizations such as Ambulance, Red Cross, Royal or Surf Life Saving, Yachting Australia, NAUI Snorkelling or the Canoe Federation of Australia. By obtaining their training manuals and completing their instructor programs, teachers can use all or parts of their skills checklists to verify practical skills. In the absence of organizations, teachers could use standards found in retail stores. A fishing rod made by a student could be compared with a fishing rod sold at a retail chain or if it could catch a fish. An aquarium should not leak or crab pot could be compared with one sold at an aquarium shop or if it caught a crab.	Teachers can record their judgments about students' demonstrations of learning outcomes using a variety of instruments. Recording instruments include: • anecdotal records • teacher/student journals • folios • checklists • statements of anticipated evidence or criteria sheets • annotated work samples • audio and visual (including photographic and video or multimedia) recordings • test results over time • observation notes • feedback sheets • peer- and self-assessment sheets • profiles • progress charts • sea time log • community awards.

Queensland Studies Authority

Community certificates

Opportunities in this syllabus exist for students to gain community qualifications in snorkelling, first aid and resuscitation, canoeing, sailing, surfing, fishing, surf bronze, bronze star or community environmental awards.

A **student folio** is a useful way of collating and storing evidence about a student's demonstrations of learning outcomes. Folios are developed over time and can include evidence such as responses to assessment tasks, products from learning activities, annotated samples of work, anecdotal records, checklists, photographs or video/audio tapes. This collection of work provides an informative picture of a student's accomplishments. Materials for the folio could be selected by the student or the teacher, or by negotiation between the two. The use of the folio will determine which materials are included. Examples of folios include working folios for ongoing feedback, documentary folios for making judgments, and show folios for reporting and comparing judgments.

Making judgments about demonstrations of learning outcomes

Judgments about what students know, and can do with what they know, are an integral and ongoing part of the assessment process. For example, throughout the assessment process, teachers make judgments about:

- students' responses to particular assessment tasks
- what students know and can do with particular content
- whether students can demonstrate aspects of learning outcomes.

Such judgments are part of the ongoing monitoring of student progress and allow planning for future learning activities and assessment opportunities.

From time to time, overall judgments can be made about students' demonstrations of learning outcomes in relation to the continua of learning described by the learning outcomes. That is, judgments are made that there is sufficient evidence available to show that students can demonstrate the learning outcomes identified for a particular level.

Teachers, therefore, make judgments about students' demonstrations of learning outcomes when satisfied that they have sufficient evidence. In making these judgments, teachers need to:

- analyse what it is that students are expected to know and be able to do with what they know
- consider the outcomes at the levels before and after the focus learning outcomes
- use a range of evidence
- make judgments about which learning outcomes the students have demonstrated.

Some students may be able to demonstrate a learning outcome the first time they have an opportunity to do so. When they have additional opportunities that result in further demonstrations of the outcome, they are deemed to have demonstrated it consistently. Other students may need more opportunities to demonstrate a learning outcome before the same decision can be made.

A judgment can be made when a consistent pattern of demonstrations has been established.

The exercise of each teacher's professional judgment is fundamental to the assessment process. Decisions should be based on explicit criteria, using a range of evidence to determine demonstrations of learning outcomes. Judgments about a student's demonstrations of learning outcomes should be made without reference to the performance of other students.

A flow chart summarising the process of making overall judgments about students' demonstrations of learning outcomes is provided in Figure 2.

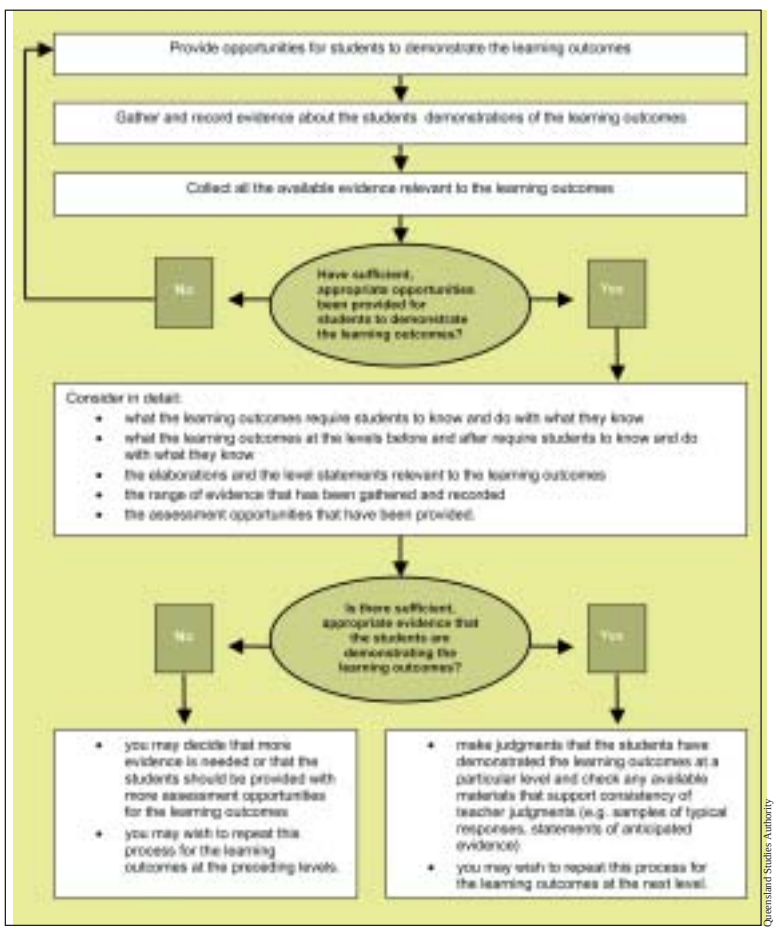
Consistency of teacher judgments

To be consistent, teacher judgments about students' demonstrations of learning outcomes must hold true in later situations and be comparable with the judgments of other teachers.

An individual teacher's judgments need to be consistent:

- within their own classes for different students
- for different assessment opportunities at different times
- with other teachers in the same school (ie, consistency within schools)
- with teachers in other schools (ie, consistency among schools).

Figure 2: Making judgments about the demonstrations of learning outcomes (From Queensland Studies Authority generic syllabus documents – reproduced with permission)



Strategies for ensuring consistency of teacher judgments include:

- *sharing of understandings about the learning outcomes*: Teachers discuss the meaning of learning outcomes and what students have to know and do to demonstrate these outcomes.
- *collaborative planning*: Teachers work together to plan for learning and assessment and to reach shared understandings about what is required for demonstrations of learning outcomes. Collaborative planning in middle or secondary schools may involve teachers of the same year level, teachers of consecutive year levels, or teachers with subject expertise in two or more areas. Primary and secondary teachers might also plan collaboratively, especially for the transition from Year 7 to Year 8.
- *common assessment tasks*: Teachers cooperatively plan and/or moderate assessment tasks focusing on identified learning outcomes. A common assessment task that provides students with opportunities to demonstrate learning outcomes at a range of levels allows teachers to develop shared understandings about the demonstrations of learning outcomes at different levels.
- *statements of anticipated evidence, or criteria sheets*: Teachers identify the properties, components or dimensions by which students' demonstrations of learning outcomes will be judged. In developing a common statement of anticipated evidence, or criteria sheet, teachers collaboratively analyse the learning outcomes to identify and record the anticipated evidence or criteria that will be used as the basis for judgments. Anticipated evidence could be identified in a design brief, criteria sheet, assessment task or verbal description.
- *moderation processes (formal and informal)*: Teachers discuss and compare judgments made about students' work and associated demonstrations of learning outcomes. Formal moderation processes occur when school authorities require teachers from within or among schools to discuss the consistency of judgments about demonstrations of learning outcomes. Informal moderation occurs any time that teachers discuss and compare their judgments of students' work.
- *samples of typical responses*: Teachers compile, and refer to, samples of student work that show how learning outcomes may be demonstrated. The samples could be annotated samples of student responses to selected assessment tasks.

Reporting

Reporting is the process of communicating timely, accurate information about students' demonstrations of learning outcomes. Its main purpose is to acknowledge and support student learning. Reporting may be formal or informal.

Reporting to students and parents/carers

Teachers need to provide regular feedback to students and parents/carers about student learning and progress in relation to learning outcomes. This kind of reporting is an important and ongoing part of the learning and teaching process and can occur incidentally as well as in planned ways.

Students and parents/carers also need to be provided with information about student progress at certain points in time as identified by schools in their overall plans for learning, assessment and reporting.

Reporting on student progress in relation to learning outcomes

Information reported to students and parents/carers as part of the ongoing learning and teaching process includes:

- explanations of particular assessment opportunities
- evidence about demonstrations of learning outcomes
- judgments about demonstrations of particular learning outcomes
- clarification of learning outcomes and how they could be demonstrated
- identification of future assessment opportunities and anticipated evidence.

Information reported to students and parents/carers at particular points in time could include:

- records of the learning outcomes previously demonstrated by the student
- descriptions of learning outcomes that students have had opportunities to demonstrate since reporting last occurred
- statements about what students were expected to know and do to demonstrate the learning outcomes
- descriptions of the contexts in which learning and assessment has occurred
- records of the learning outcomes demonstrated by the students since the previous report
- records of the learning outcomes that the student is currently working towards
- information about the relationship between levels of learning outcomes and year levels
- information that is specific to individual students, such as the student's self-assessment or future learning plans and goals.

Language, formats and modes of reporting

The language, formats and modes used for reporting should be meaningful and relevant to the proposed audience. Possible modes for reporting include:

- written reports (print or electronic)
- student–teacher conferences
- teacher–parent interviews
- student-led three-way conference (student, teacher and parents/carers)
- culminating presentations
- community awards eg, Surf bronze, AYF Sailing certificate, First Aid certificate)
- portfolios (print or electronic).

For further information on assessment and reporting, refer to *Position Paper and Guidelines: An Outcomes Approach to Assessment and Reporting* available on the Queensland Studies Authority website: *http://www.qsa.qld.edu.au/research/qscc/pdf/PositGLdoc.pdf*

Legal requirements

Coast and Marine Education courses of study are conducted subject to a range of legislation and regulations. Courses of study in Coast and Marine Education need to be planned taking account of legal requirements. The underlying principle of legislation and regulations is protection for the people who work in the industry, the consumers who use the products, and the animals, plants and environment used in the process.

Safety

All learning activities undertaken in this subject area need to be planned and conducted with due regard for the safety of all concerned. Legal requirements to do so are described in the documents listed below.

Teachers and students must follow safe work practices in a designated area free of avoidable hazards. They must be provided with appropriate safety equipment. Students should not participate in activities until they have been advised of the risks involved and provided with demonstrations of correct procedures. Staff and facilities must have current accreditation or certification for proposed activities and relevant material safety data sheets (MSDS) must be available and used to identify risks and precautions. Whenever specific tools or equipment are used, their 'safe' use is as described in the manufacturer's instructions.


MSQ

The standards for establishing and maintaining a safe workplace in Queensland are set by the *Workplace Health and Safety Act 1995*.

This Act provides for a number of regulations, advisory standards and codes of practice that apply to specific industries - for example, Workplace Health and Safety Regulation 1997, and Workplace Health and Safety (Miscellaneous) Regulation 1995.

Education Queensland has developed policies related to risk assessment and risk management. The *Department of Education Manual (DOEM)*, which is published by Education Queensland and is available on their website, includes a number of general requirements for its teachers. To access copies of these modules, go to:

http://education.qld.gov.au/corporate/doem

The following modules are specifically for planning courses of study in Coast and Marine Education:

- HS-10-9: Handling Living Marine Organisms - Risk Assessment Criteria
- HS-10-9: Handling Living Marine Organisms - Risk Assessment Criteria: Procedures
- AM-07: Resource Replacement Scheme: Procedures
- HS-10-8: Bait Gathering - Risk Assessment Criteria: Procedures
- HS-10-7: Fishing - Risk Assessment Criteria: Procedures
- HS-10-97: Scuba Diving - Risk Assessment Criteria: Procedures
- HS-10-99: Snorkelling - Risk Assessment Criteria: Procedures
- HS-10-1: Power Boating in Small Craft - Risk Assessment Criteria
- HS-10-1: Power Boating in Small Craft - Risk Assessment Criteria: Procedures
- HS-10-2: Sailing in Small Craft - Risk Assessment Criteria: Procedures
- HS-10-107: Surfing - Body and Board - Risk Assessment Criteria: Procedures
- HS-10-74: Canoeing and Kayaking - Risk Assessment Criteria: Procedures
- HS-10-114: Water Skiing - Risk Assessment Criteria: Procedures
- HS-10-4: Sailboarding - Risk Assessment Criteria: Procedures
- HS-10-5: Power Boating in Large Craft - Risk Assessment Criteria: Procedures
- HS-10-6: Sailing in Large Craft - Risk Assessment Criteria: Procedures
- CS-29: Animal Ethics and Welfare in Schools: Preface

Animal welfare

The *Animal Care and Protection Act 2001* and the accompanying *Animal Care and Protection Regulation 2002* govern the treatment and use of all animals in Queensland. The Queensland Department of Primary Industries and Fisheries (QDPI&F) is responsible for enforcement of the legislation. The purpose is to prevent animal suffering, to improve the welfare of animals and to ensure all use of animals for scientific purposes is justified, open and accountable. 'Scientific purposes' is defined to include activities for the purposes of demonstration and teaching. The legislation covers animals described as 'any live vertebrate, and includes live prenatal or prehatched creatures in the last half of gestation or development'. Further details of the categories covered by the legislation can be obtained from the QDPI&F web page http://www.dpi.qld.gov.au/animalwelfare/9713.html. Click on the link 'What is an animal?'.

The Act also requires compliance with the *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes.* The current version can be downloaded from www.health.gov.au/nhmrc/research/awc/code.htm.

The *Queensland Schools Animal Use Guidelines* explain what Queensland schools need to do if they are to satisfy the requirements of the *Animal Care and Protection Act 2001*. The Act imposes strict requirements on schools wishing to use animals for teaching. The guidelines provide advice and recommendations for schools using animals in pursuit of their educational objectives and related outcomes. The guidelines supersede *The Care and Use of Animals in Schools: Policy and Guidelines* published in 1997 and are available from:

www.qcec.qld.catholic.edu.au/curriculum

National industry codes of practice are available for most aquaculture industries, and outline acceptable standards of husbandry and management. Schools wishing to undertake aquaculture projects should consult the Queensland Department of Primary Industries web site:

www.dpi.qld.gov.au/fishweb

Codes may also be downloaded from http://www.affa.gov.au/docs/ (follow the links).

If animals are to be used for scientific purposes (which includes teaching), the Act must be complied with in the following ways:

1. Teachers (or their employing institution) must register with QDPI&F and nominate the Animal Ethics Committee (AEC) that will assess their animal use.
2. All animal use must be approved by the AEC prior to the activity commencing.
3. An annual report needs to be made to the DPI of activities where animals are used.

An employer may register with the QDPI&F as a 'user of animals for scientific purposes' to cover employee activities requiring the use of animals for scientific purposes. An animal ethics application must be made to the AEC for each 'use of animals' or 'type of use of animals' for a series of similar events. AECs may approve activities that are frequently repeated in a school program. Approval can be given for a three-year period but activities must be reported annually to the AEC. Check with your employing authority for details of any guidelines or processes in place to assist you to meet the requirements of the legislation.

Non – scientific use

If animals are to be used for non - scientific purposes such as recreational fishing, they must comply with agreed community standards and should refer to the A.N.S.A. Rules and Code of Ethics http://www.ansaqld.com.au, the Queensland Department of Primary Industries web site, www.dpi.qld.gov.au/fishweb or the MTAQ website members area for the association's recreational fishing policy.

Resources

Further information on service providers, professional associations, conferences or to download samples of work units see:

www.marineteachers.org.au (members area)

Further information

The Marine Teachers Association of Queensland
Membership Office
PO Box 9278
Gold Coast Mail Centre QLD 9726

Trent Moffatt

Appendix 1: Blooms taxonomy (modified with verbs as used in syllabus outcomes)

Knowledge

Verbs

- Describe
- Find
- List
- Locate
- Name
- Relate
- State
- Tell
- Write

Questions

- Can you name the
- Describe the appearance of
- Find the meaning of the following terms
- How many
- What happened after
- What is the name of
- Who was the person that
- Which is the right answer

Instructions/activities

- List all the stages of
- Make a time line of the events
- Prepare a chart showing
- Recite a poem
- Write the formula for photosynthesis
- Describe the events leading up to
- Locate a place that
- Name the animals in the
- State the formula for
- Tell the story about
- What is the scientific name for, the common name for

Understanding

Verbs

- Convert
- Draw
- Describe
- Distinguish
- Express
- Interpret
- Match
- Outline
- Restate
- Translate

Questions

- Write the formula for photosynthesis in your own words
- Give a definition of species
- Provide an example of a
- Write a brief outline for
- What differences exist between
- What do you think could have happened next?
- What was the main idea of the article?
- Match the .... with the description

Instructions/activities

- Draw pictures to show
- Convert this ..... into a statement
- Describe/express in your own words restate the
- Give an example of a
- Illustrate the main ideas of the article
- Prepare a flow chart of the steps involved in
- Outline the main reasons for
- Distinguish between

Applying

Verbs

- Calculate
- Classify
- Construct
- Complete
- Examine
- Illustrate
- Record
- Report
- Show
- Solve
- Use

Questions

- Calculate the number of ... in the square
- Classify the following into the phyla
- Construct a diagram to show
- Plan and conduct an experiment to show that

Instructions/activities

- Calculate the number of .. per minute
  Calculate the number of
- Classify the following
- Construct a food chain from the following
- Complete the sentence
- Examine the illustration and
- Draw a diagram/map/plan and label it correctly
- Use a collection of plants to show that
- Make a model to show that
- Record your results in the table below
- Use your knowledge to show that
- Plan an experiment to show that
- Explain the procedure for
- Illustrate your answer with a

Analysing

Verbs

- Analyse
- Arrange
- Categorise
- Compare
- Contrast
- Distinguish
- Examine
- Explain
- Identify
- Investigate
- Separate
- Survey

Questions

- Which events could not have happened and why?
- How is this similar to or different from
- What was the main theme?
- Distinguish between
- What was the turning point in the development?
- Explain what must have happened when
- Are there any other possible outcomes?
- What were some of the motives behind
- Write a number of questions that could be used in the interview:
- Write ... similarities and ... differences between ...

Instructions/activities

- Design a questionnaire to gather data
- Write a commercial for a coast care add
- Make a flow chart to show the reproductive cycle of a
- Construct a graph to illustrate the relationship between
- Which events could not have happened and why
- Write a number of questions that could be used to
- Explain the difference between the following words
- Identify the following animals from the illustrations below
- Investigate the effects of
- Carry out a survey to
- Prepare a scientific report of

Creating

Verbs

- Compose
- Research
- Create
- Design
- Devise
- Estimate
- Formulate
- Imagine
- Improve
- Invent
- Plan
- Predict
- Propose
- Conduct

Questions

- Create new uses for ...
- If you had access to all the necessary resources, how could you stop ships hitting the reef
- Invent a solution to ...
- Can you develop a proposal which will ...?
- How may ways can you ...
- Propose how we could improve this experiment/
- Predict what will happen if ....

Instructions/activities

- Create a new product (fish) and plan a marketing campaign
- Devise a number of ways to improve
- Write and perform a play to illustrate a barnacle feeding
- Invent a machine to
- Design a cover for a brochure
- Compose a rhythm and/or add new words to a well known tune
- Devise an experiment that will extract more ..... from tidal energy
- Construct a model of a (copepod)
- Design a wave power house
- Suggest ways to improve the management of
- Choose music to reflect the movement of ...

Evaluating

Verbs

- Argue
- Assess
- Choose
- Debate
- Decide
- Determine
- Evaluate
- Discuss
- Judge
- Justify
- Prioritise
- Rate
- Recommend
- Verify

Questions

- Plan and conduct an experiment to justify your answer/
- How would you defend your position in relation to ...?
- Assess and choose a better solution to .....
- How would you have handled ..... ?
- What changes would you recommend to... ? Why?
- Do you believe that ....
- How would you feel if
- How ineffective are
- What is the most valuable

Instructions/activities

- Prepare a list to be used by .... to judge a
- Organise and conduct a debate about a controversial issue
- Prepare a booklet that could be used by tour operators to
- Write a letter to the editor of the local newspaper advising on changes needed to
- Prepare a report in which you evaluate the research on
- Recommend new strategies to be adopted by the ..... based on your strategic plan and group's analysis

Appendix 2: Planning a unit of work from outcomes


Bob Moffatt

In his 1983 book *Frames of Mind*, Howard Gardner introduces us to the concept of multiple intelligences.

To help all our students to learn, the teacher can plan lessons to reach as many of these intelligences as possible. The table below is an adaptation of one given by Ralph Pirozzo. It combines Blooms taxonomy, with the concepts of seven different ways learners think.

To plan a unit, you could set a learning contract which can have a number of different options.

- Option A - Choose a minimum of 2 activities from each column —> 14 activities
- Option B - Choose a minimum of 2 activities from each row —> 12 activities
- Option C - Complete all activities that have been shaded (see examples) —> 15 activities

Assessment option examples

Select 12 or more tasks from Columns 1, 2, 3 etc, then assign points and set criteria (Knowledge and Understanding) etc. Set a number of points to finish with and shade core activities for example, you must finish with 40 points, 21 have been shaded as compulsory.


Bob Moffatt

Example: Life on a rocky shore

Gardner's intelligences Seven ways to complete this unit	Knowing Describe, find, list, locate, name, relate, state, tell, write 1 point	Understanding Convert, draw, describe, distinguish, express, interpret, match, outline, restate, translate, apply 2 points	Applying Calculate, classify, construct, complete, examine, illustrate, record, report, show, solve, use 3 points	Analysing Analyse, arrange, categorise, compare, contrast, distinguish, examine, explain, identify, investigate, separate, survey 4 points	Creating Compose, research, create, design, devise, estimate, formulate, imagine, improve, invent, plan, predict, propose, conduct 5 points	Evaluating Argue, assess, choose, debate, decide, determine, evaluate, discuss, judge, justify, prioritise, rate, recommend, verify 6 points
1. Verbal/linguistic (I enjoy reading, writing and speaking)	Locate the animal you want to study in Chapter 26 or 27 and state why you have chosen it.	Draw your selected animal and describe its external appearance.	From the animals in the hat provided by your teacher, draw one and classify it to species level.	Write 6 similarities and 6 differences between two animals in the same phylum in one A4 page.	Write a poem/ brief skit to describe how this animal feeds or reproduces.	Write 4 of the animals adaptations and rate it's chances of survival from pollution.
2. Maths/logical (I enjoy working with numbers and science)	Count the number of external features on the animal.	Construct a food web showing the trophic relationships of the animal and possible predator-prey relationships.	Explain in clear logical steps how the animal moves.	Decide if the animal is radially or bilaterally symmetrical or another form.	Design another way the animal could defend itself from predators using chemicals. Explain how they may work.	Decide if the animal lives in a population and determine the habitat size.
3. Visual/spatial (I enjoy painting drawing and visualising)	Paint a colour illustration of the animal showing clearly its external features.	Use a map of hypothetical bay to show where the animal would live. Explain your reasoning.	Prepare a map of Australia to show the distribution of the animal.	Compare the external features of the animal with one from a different phylum.	Make a model of the animal and paint it explaining your choices.	Prepare a map of the continental shelf and decide and label the distribution of the animal.
4. Body/kinaesthetic (I enjoy doing hands on activities)	Mime the movements of how the animal could defend itself from a possible predator.	Describe what could be in an invertebrate board game.	Prepare a museum mount of the animal (microscopic, embedded or preserved).	Analyse the pleopod of a mantis shrimp and work out how it can move at the speed of a .22 calibre bullet.	Make a diorama of the animals habitat to show parts of the food chain.	Evaluate the performance of a group members poem/rhyme/song/ rap.
5. Music/rhythmic (I enjoy making and listening to music)	Recall a song about a marine animal, record it and play it in class.	Make a chant using invertebrates with the same name eg 1,2,3 we love the sea, sea star, sea urchin, sea cucumber.	Convert the words from a song into a story board interpreting the lyrics.	Select some music for a play on the octopuses garden.	Write a song/rap to describe how an invertebrate moves or reproduces.	Review the music of any students work prior to presentation and make a written report.
6. Interpersonal (I enjoy working with others)	In a pair, present a power point or story board/flip card presentation on the life history of a marine invertebrate.	As a group, select any marine invertebrate discussed and make a summary chart.	As a group, select any marine invertebrate discussed and explain using visuals, its role in its habitat.	Make a summary chart comparing an arthropod and a mollusc.	Make a set of back labels for a Who am I game.	In a pair evaluate the author's interpretation of any marine animal from the chapters in your textbook.
7. Intrapersonal (I enjoy working by myself)	Copy and colour in the tree of marine life from your textbook.	Make a drawing of a prawn labelling all parts.	Examine any of the case studies and report on their intended purpose.	Analyse all of the appendages of a crab and explain their functions.	Create a model of an echinoderms tubed foot so you can show how the animal uses it.	Find a brochure, museum model or aquarium display and evaluate how the information has been communicated.

Bob Moffatt

Appendix 3: Some organisations and contact groups

General contacts

Education Queensland, PO Box 33, 50 Albert Street, Brisbane Q 4002

Marcom Project Videos, PO Box 3148, Loganholme Q 4129

Reef HQ, PO Box 1379, Townsville Q 4810

Sea World, PO Box 190, Surfers Paradise Q 4217

Sea Life Australia, PO Box 702 Springwood, Q 4127 (Neville Coleman)

Underwater World Mooloolaba, Corner Parkyn Parade and River Road, Mooloolaba Q 4557

Video Classroom Pty Ltd, 142 Coppin Street, Richmond Vic 3121

Wet Paper Publications, PO Box 540 Coolangatta Q 4214

Practices and skills strand

Australian Underwater Federation, PO Box 1006, Civic Square ACT 2608

Bundaberg Marine College of TAFE, PO Box 512, Bundaberg Q

Department of Transport - see regional offices in local telephone book

Department of Transport, PO Box 2595, Brisbane Q 4001

Queensland Yachting Federation, PO Box 5462, Manly, 4179

Queensland Canoeing - http://www.canoe.org.au

See also the providers section on our web site

Industry strand

Department of Primary Industries - see regional offices in local telephone book

Queensland Commercial Fishermen's Organisation, PO Box 392, Clayfield Q 4011

Queensland Department of Primary Industries Publications, GPO Box 46, Brisbane Q 4011

Oceanography and ecology strands

Australian Institute of Marine Science, LMB 3, Townsville Q 4810

National Oceans Office, www.oceans.gov.au

Great Barrier Reef Marine Park Authority, PO Box 1379 Townsville Q 4810

Conservation strand

Bilai Environment Education Centre, PO Box 1010, Nambour Q 4560

Boyne Island Environmental Education Centre, C/- Boyne Island Q 4680

Cairns Environmental Education Centre, PO Box 5976, Cairns Mail Centre Q 4870

Daradgee Environmental Education Centre, c/- PO Garradunga via Innisfail Q 4860

Fortitude Valley Environmental Education Centre, PO Box 151, Spring Hill Q 4004

Holloways Beach Environmental Education Centre, 46 Poinsettia Street, Holloways Beach Q 4878

Jacobs Well Environmental Centre, MS 1372, Beenleigh Q 4207

Mandala Habitat Centre, MS 394, North Branch Road, Maryvale Q 4370

Minjerribah Study Accommodation Centre, 3-5 Cunningham Street, North Stradbroke Island Q 4183

Nudgee Beach Environmental Education Centre, 1588 Nudgee Beach Road, Nudgee Q 4016

Queensland Department of Environment and Heritage Marine Parks Section, PO Box 155, Brisbane Albert Street 4002

Bob Moffatt

The Queensland Department of Primary Industries has many resources for teachers

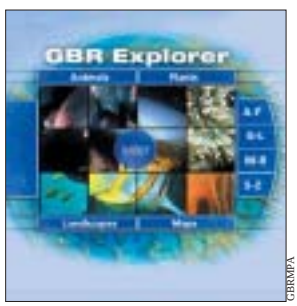
Queensland National Parks and Wildlife Service – see regional offices in local telephone book

QUT Kelvin Grove Campus, Victoria Park Road, Kelvin Grove Q 4059

St Helena Environmental Education Centre, c/- Darling Point Special School, 368 Upper Esplanade, Manly Q 4179

University of Queensland Marine Studies Department, c/- St. Lucia Brisbane 4217

Web sites with resources



GBRMPA

Reef GBR Explorer

Activities, images, movies, photographs and information of reef animals and plants free to download - *www.reefed.edu.au*

Wet Paper Teachers page

Over 300 classroom ready activities free to download - *www.wetpaper.com.au*

Bob Moffatt

MESA

Coastal and marine studies in Australia: a workshop manual for teachers activities, information, current research, seaweeks and much more - *www.mesa.edu.au*

Queensland Department of Primary Industries

Fishing and aquaculture industry worksheets and fact sheets *www.dpi.qld.gov.au/fishweb*

MTAQ Coast and Marine Education Accredited Syllabus Licence Agreement

Background

On 1 July 2002, The Education (Queensland Studies Authority) Act 2002 established the Queensland Studies Authority (hereafter the QSA), and gave the QSA the authority to develop and accredit Years 1 to 12 syllabuses and preschool guidelines.

The QSA can not only develop its own syllabuses, but also has the authority to accredit syllabuses prepared by people and outside agencies. The reason for the QSA having this accreditation authority is to give Queensland students the maximum access to learning based on world-class syllabuses.

Details of the process can be found in the Education (QSA) Amendment Regulation No 1 2002 which describes the accreditation process of this syllabus (www.qsa.qld.edu.au/accreditation/index.html).

The Marine Teachers Association of Queensland Inc. has developed a Coast and Marine Education QSA Accredited, Level 4 to beyond Level 6 Syllabus, 2006 - 2010, (hereafter the CME accredited Syllabus).

The CME accredited Syllabus is the first to be accredited under the 2002 Education Act.

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This licence agreement defines the ways in which you can use the CME accredited Syllabus and the outcomes and content contained in it. As it is the first syllabus to be accredited under the 2002 Act, the licence agreement may be reviewed during the life of the accreditation.

The licence also allows your school, under specific terms, to copy more than 10% of the document thus avoiding criminal prosecution under Australian copyright laws.

Please read this agreement carefully as you would read any other legal document.

Syllabus support materials

MTAQ membership grants a licence to schools to use the syllabus for one year. As part of this membership schools will receive:

- A hard copy of the syllabus document for all marine teachers at the school
- A password to the MTAQ curriculum exchange which contains over 500 worksheets, evaluation guides, sample exam papers and excursion notes that support this syllabus
- Details on syllabus in-service and support documents
- Annual conference invitation
- Invitations to regional syllabus workshops.

All inquiries should be directed to

The President
Marine Teachers Association of Queensland
PO Box 9278
Gold Coast MC Qld 9726
Telephone: (07) 5532 7230

Web address

Information about the Marine Teachers Association of Queensland can be found on their web site:

www.marineteachers.org.au

MTAQ

Licence agreement

Definitions

Association includes all successors of the Marine Teachers Association of Queensland Inc.

Licensor includes all financial school, organisation or individual members of the Association. A school, organisation or individual becomes a licensor when they become a financial member of the Association.

Syllabus refers to pages 1 - 32 of the document entitled Coast and Marine Education QSA Accredited Syllabus - ISBN 186283 087 8.

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The licensor can use the syllabus

- to implement the syllabus at their school
- to develop lesson plans, work programs, run courses and report to students and parents
- to incorporate it into a document that requires advertising of courses for parent nights or student enrolment
- for private study.

The licensor cannot

- sell the syllabus
- share the syllabus between schools, individuals or other organisations
- place the syllabus on any web site
- use the syllabus for any other purpose other than prescribed in this licence agreement without written permission of the Association's President.

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The licensor may copy any or all parts of the syllabus for the purposes outlined in permitted uses in 2 and 5 above.

The syllabus may only be copied or distributed to staff members of the licensed school. Teachers transferring to schools who are not MTAQ members are not permitted to copy the syllabus.

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It is the responsibility of the licensor to use the syllabus in accordance with the current Queensland Education Act. The Association accepts no responsibility for any accident or legal action that may arise as a result of the licensor's use of this syllabus.

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