Let’s go fishing!

Year 6

Learning area: Science

Science Understanding (sub-strand):   
Biological sciences

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Let’s go fishing! — Year 6

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# Unit overview

| Unit title | Let’s go fishing! |
| --- | --- |
| Learning Area | Science |
| Science Understanding  (sub-strand) | Biological sciences |
| Year level | 6 |
| Duration | Approximately 7 weeks (13 lessons)\*  *\*based on 2 lessons of science per week for Year 6 (50 minutes per lesson). This time will extend if students go on a fishing day excursion.* |
| Unit description | In this unit, students will investigate fish species and their survival needs. They will explore the habitats in which they live and identify how changes to the physical conditions of the habitat e.g. by pollution, can affect the growth and survival of fish. Students will identify fishing rules and investigate sustainable fishing practices. Students will use their knowledge about fish growth and survival to inform decisions about fishing and sustainable fishing practices. |

# Teacher information

## Safety and risk management

You will need to identify safety issues and conduct your own curriculum activity risk assessments for all activities and excursions in this unit.

For advice and documents refer to the Department of Education and Training Curriculum Activity Risk Assessment Guidelines: <http://education.qld.gov.au/health/safety/hazards/curriculum-activities.html>

The actual risk level for activities in this unit will vary according to the specific circumstances of the activity and your school and classroom context. You must consider all specific circumstances when you complete a risk assessment. Examples of considerations include, but are not limited to:

Is the activity occurring within, or outside school grounds e.g. an excursion?

Will students be in the sun? What sun protection will students have?

How will students be supervised during the activity?

What will students do during the activity?

Are there any special student considerations e.g. medical, behavioural or special needs?

What hazards do you need to take into account e.g. hazardous substances, tools or equipment, fishing hooks, etc.?

## Unit details

The Great Barrier Reef Marine Park Authority (GBRMPA) Let’s go fishing! unit is a Year 6 Science unit of work. The content descriptions for this unit are from the Australian Curriculum: Science (Version 7.4 dated 30th March 2015 <http://www.australiancurriculum.edu.au>).

The unit follows the inquiry-based 5Es approach to teaching science. The inquiry questions that underpin the unit are:

Where do fish live?

What are their survival needs?

What happens when their habitats are polluted or modified?

What role do we play in this change to habitats?

What are sustainable fishing practices and why are they important?

## Time allocation

The unit is based on two lessons of science per week for Year 6 students. Each lesson is approximately 50 minutes long.

The overall unit, or the individual lessons, can be extended or shortened to cater for individual classes as deemed necessary by the class teacher.

Unit aims

The lessons are structured to build students’ knowledge of fish habitats, their breeding cycle and the importance of sustainable fishing practices.

Fish play an important role in providing food for hundreds of marine animals as well as food for humans. Caring for all 1625 species of fish found in the Great Barrier Reef Marine Park is imperative to the overall health of the Great Barrier Reef. For more information on fish in the Great Barrier Reef Marine Park see below in ‘Background information - Fish’ and also <http://www.gbrmpa.gov.au>.

Teaching students about fish and their environment will build their environmental knowledge and encourage students’ understanding of sustainability and stewardship.

## Key threats to the Reef

GBRMPA encourages teachers, students and communities to follow the main aim of Reef Guardians – to be custodians of their local ecosystems and stewards of the Reef. In the Great Barrier Reef Outlook Report 2014, the key threats to the reef are identified as climate change, land-based run-off, coastal development, and other direct impacts such as unsustainable fishing activities and marine debris. (See <http://www.gbrmpa.gov.au> for more information on the Outlook Report 2014).

In this unit, students explore the threats of direct use (human use) e.g. marine debris and fishing to the Great Barrier Reef.

## Stewardship

The Reef Guardian Schools Program encourages responsible use and protection of the Great Barrier Reef ecosystems. Schools are encouraged to take ownership of conservation activities and on-ground projects that involve students, teachers and their local communities. These environmental actions foster a greater appreciation and understanding of the Great Barrier Reef and empower students to become lifelong stewards.

The following are examples of stewardship activities that relate to the learning experiences of this unit:

* Organise and participate in a clean-up of local litter hotspots. Support source reduction initiatives within the school environment e.g. no popper drinks with plastic straws, single use plastic bottles, etc.
* Conduct a marine debris clean-up and record data using the Tangaroa Blue data collection methods: (see <http://www.tangaroablue.org/>). Take particular note of the ‘fishing items’ section. Brainstorm how this information could be used in a local context to influence the practise of local fishers (recreational and commercial).
* Hold a community fishing day and use the opportunity to educate participants about responsible fishing practices.

Citizen science participation

Citizen science is scientific research conducted by non-professionals – in this case by students, teachers and communities. Schools can participate in the collection and submission of scientific data to local management authorities including GBRMPA, local councils and local Natural Resource Management agencies where the data can be used to inform sustainable ecosystem management decisions.

## Building partnerships

Delivery of this unit can be enhanced by building partnerships within the school and wider community.

Partner organisations could include the following:

* local council
* Local Marine Advisory Committees (LMAC)
* Department of Agriculture and Fisheries <https://www.daf.qld.gov.au/>
* Australian Maritime Safety Authority
* your nearest Natural Resource Management organisation (NRM): <http://www.nrm.gov.au/regional/regional-nrm-organisations>
* other schools
* Invite a local aquarium owner (parent, shop owner) to come in to the classroom and discuss the aquariums they care for. Request the visitor brings images and information to share.
* Invite someone from the local fisheries department, someone who studies fish or someone who works at a fish farm to discuss what they know about looking after fish.
* Invite a Reef Guardian Fisher, a professional fisherman or a parent/community member that fishes to come in and discuss fishing rules and the processes they follow.
* Invite local community groups (or your local Natural Resource Management agency) that look after aquatic habitats to discuss what makes an aquatic habitat healthy and unhealthy and what they do in their work.

Background information – Fishing in the Marine Park

There are approximately 1625 different species of fish found in the Great Barrier Reef Marine Park. Fish are an essential part of the entire Great Barrier Reef ecosystem. The Great Barrier Reef Marine Park Authority contributes to fisheries management through the use of management zones which restrict fishing activities and also through involvement in fisheries management planning conducted by the Queensland Government.

The Great Barrier Reef Marine Park Authority recognises that the harvesting of fisheries resources is an important and reasonable use of the Marine Park and consistent with use of the Great Barrier Reef World Heritage Area. However, it also acknowledges that fishing affects target species, non-target species and their habitats and consequently has the potential for producing ecological effects in both the fished areas and the Reef system as a whole. The Great Barrier Reef Marine Park Authority is working to ensure that all fishing activities in the Great Barrier Reef Marine Park and World Heritage Area are ecologically sustainable.

Through collaboration with fisheries management agencies and stakeholders, the Great Barrier Reef Marine Park Authority seeks to:

* minimise ecological impact through the restriction, cessation or mandatory adoption of new technologies to minimise ecological damage of fishing activities that are deemed to be significantly damaging the ecosystems (using the best information available)
* work with fisheries’ stakeholders and utilise their knowledge to modify fishing practices and develop bycatch reduction tools and strategies to assist in minimising the ecological impacts of fishing
* establish a comprehensive system of protected areas that are representative of the complex range of ecological communities found in the Marine Park
* ensure monitoring and assessments are undertaken to determine the impacts of fishing activities and the status of harvested stocks, non-target species and the ecosystems on which they depend
* undertake and sponsor research designed to quantify the ecological impact of fishing activities judged to be ecologically damaging
* ensure that ecologically sustainable fishing activities are managed in a way that is continually reviewed as new information becomes available.

The Great Barrier Reef Marine Park Authority aims to ensure understanding of, and compliance with the management regimes in the Great Barrier Reef region through public information and education programs and the adoption of satellite monitoring and communications technology.

The Great Barrier Reef Marine Park Authority is developing ongoing and effective communications with stakeholders associated with fisheries in the entire World Heritage Area. These stakeholders include commercial, recreational and Indigenous fishers, conservation groups, other community groups and government agencies.

With the increasing national and global demand for fish resources, it is important to develop a strategic approach to the management of commercial, recreational and Indigenous fishing practices in order to achieve ecological sustainability.

## Useful websites

ReefVid – a resource of free coral reef video clips:  
[http://www.reefvid.org](http://www.reefvid.org/)

Fact sheets on marine debris: Fact Sheets – Tangaroa Blue Foundation – <http://www.tangaroablue.org/resources/fact-sheets.html>

SBS – What’s the catch? – interactive questions, videos and teacher resources:  
<http://www.sbs.com.au/programs/whats-the-catch/learn>

Eco Kids:   
<http://www.ecokids.ca>

Great Barrier Reef Marine Park Authority – Visit the Reef: fishing:  
<http://www.gbrmpa.gov.au/visit-the-reef/responsible-reef-practices/fishing>

Department of Agriculture, Fisheries and Forestry:  
<http://www.daff.qld.gov.au/home.htm>

Middle School Science Resources:  
<http://www.middleschoolscience.com>

The Biology Corner:  
<http://www.biologycorner.com>

The Better Fish – Traditional Aboriginal Story about barramundi:  
<http://www.thebetterfish.com/the-healthy-fish/barramundi-fun-facts>

Department of Agriculture and Fisheries (DAF) – information about barramundi:  
<https://www.daf.qld.gov.au/fisheries/species-identification/inshore-estuarine-species/barramundi>

Sustainable seafood:  
<http://www.goodfishbadfish.com.au>

The Marine Discovery Centre, Henley Beach, Fishing with Les Game:  
<http://www.marinediscoverycentre.com.au/Marine_Discovery/games/FishingWithLes.html>

## Useful books

*The World that we Want*, Kim Michelle Toft

*One Less Fish*, Kim Michelle Toft and Alan Sheather

*Salmon Forest*, David Suzuki and Sarah Ellis

*Leo the Littlest Seahorse*, Margaret Wild and Terry Denton

*The Rainbow Fish Series*, Marcus Pfister Herbert and J. Alison James

# Curriculum intent

## Australian Curriculum: Science

## Year 6 Level Description

The Science Inquiry Skills and Science as a Human Endeavour strands are described across a two-year band. In their planning, schools and teachers refer to the expectations outlined in the Achievement Standard and also to the content of the Science Understanding strand for the relevant year level to ensure that these two strands are addressed over the two-year period. The three strands of the curriculum are interrelated and their content is taught in an integrated way. The order and detail in which the content descriptions are organised into teaching/learning programs are decisions to be made by the teacher.

Over Years 3 to 6, students develop their understanding of a range of systems operating at different time and geographic scales. In Year 6, students explore how changes can be classified in different ways. They learn about transfer and transformations of electricity, and continue to develop an understanding of energy flows through systems. They link their experiences of electric circuits as a system at one scale, to generation of electricity from a variety of sources at another scale and begin to see links between these systems. They develop a view of Earth as a dynamic system, in which changes in one aspect of the system impact on other aspects; similarly they see that the growth and survival of living things are dependent on matter and energy flows within a larger system. Students begin to see the role of variables in measuring changes and learn how look for patterns and relationships between variables. They develop explanations for the patterns they observe, drawing on evidence.

Content descriptions

This unit provides opportunities for students to engage in the following Australian Curriculum Content descriptions:

| Science Understanding (SU) | Science as a Human Endeavour (SHE) | Science Inquiry Skills (SIS) |
| --- | --- | --- |
| Biological sciences   * The growth and survival of living things are affected by the physical conditions of their environment [(ACSSU094)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU094) | Nature and development of science   * Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena [(ACSHE098)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE098)   Use and influence of science   * Scientific knowledge is used to inform personal and community decisions [(ACSHE220)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE220) | Questioning and predicting   * With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be [(ACSIS232)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS232)   Planning and conducting   * Use equipment and materials safely, identifying potential risks [(ACSIS105)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS105)   Processing and analysing data and information   * Construct and use a range of representations, including tables and graphs, to represent and describe observations, patterns or relationships in data using digital technologies as appropriate [(ACSIS107)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS107) * Compare data with predictions and use as evidence in developing explanations [(ACSIS221)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS221)   Communicating   * Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS110)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS110) |

Year 6 achievement standard

By the end of Year 6, students compare and classify different types of observable changes to materials. They analyse requirements for the transfer of electricity and describe how energy can be transformed from one form to another to generate electricity. They explain how natural events cause rapid change to the Earth’s surface. They describe and predict the effect of environmental changes on individual living things. Students explain how scientific knowledge is used in decision making and identify contributions to the development of science by people from a range of cultures.

Students follow procedures to develop investigable questions and design investigations into simple cause-and-effect relationships. They identify variables to be changed and measured and describe potential safety risks when planning methods. They collect, organise and interpret their data, identifying where improvements to their methods or research could improve the data. They describe and analyse relationships in data using graphic representations and construct multi-modal texts to communicate ideas, methods and findings.

General capabilities

This unit provides opportunities to address the following organising elements of the general capabilities:

| Literacy   * Comprehending texts through listening, reading and viewing * Composing texts through speaking, writing and creating * Text knowledge * Grammar knowledge * Word knowledge * Visual knowledge | ICT capability   * Investigating with ICT * Communicating with ICT * Managing and operating ICT |
| --- | --- |
| Numeracy   * Recognising and using patterns and relationships * Use special reasoning | Critical and creative thinking   * Inquiring – identifying, exploring and organising information and ideas * Generating ideas, possibilities and actions * Reflecting on thinking and processes |
| Personal and social competence   * Self-awareness * Self-management * Social awareness * Social management | Ethical understanding   * Exploring values, rights and responsibilities |
| Intercultural understanding   * Reflecting on intercultural experiences and taking responsibility | |

Cross-curriculum priorities

This unit provides opportunities for students to address aspects of the following cross-curriculum priorities:

| Sustainability  Students will:   * recognise the dependence of living things on healthy ecosystems * identify how scientific knowledge informs personal and community decisions * understand the importance of sustainable fishing practices. |
| --- |

## Relevant prior curriculum

Students require prior experience from Year 5 with:

### Science Understanding

#### Biological sciences

* Living things have structural features and adaptations that help them to survive in their environment [(ACSSU043)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU043)

### Science as a Human Endeavour

Nature and development of science

* Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena [(ACSHE081)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE081)

Use and influence of science

* Scientific knowledge is used to inform personal and community decisions [(ACSHE217)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE217)

Curriculum working towards

The teaching and learning in this unit works towards the following in Year 7:

### Science Understanding

#### Biological sciences

* Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions [(ACSSU112)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU112)

### Science as a Human Endeavour

Nature and development of science

* Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people’s understanding of the world [(ACSHE119)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE119)

#### Use and influence of science

* Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations [(ACSHE120)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE120)

# Feedback

Supportive learning environment

| Differentiation  Consider the individual needs of your students – including gifted and talented, ESL and students requiring additional support.  For information refer to the Australian Curriculum, Assessment and Reporting Authority (ACARA) web pages on student diversity:  <http://www.australiancurriculum.edu.au/studentdiversity/student-diversity-advice>  Further information for Queensland state schools can be found as part of the P-12 curriculum, assessment and reporting framework and associated resources:  <http://education.qld.gov.au/curriculum/framework/p-12/> | Feedback to students  Teachers:   * plan opportunities for conversations to provide ongoing feedback (spoken and written) and encouragement to students on their strengths and areas for improvement * reflect on and review learning opportunities to individualise learning experiences required * provide multiple opportunities for students to experience, practise and improve knowledge, processes and skills.   Students:   * identify what they can do well and what they need to improve * provide feedback to a peer on interaction skills and suggest some strategies for improvement (written and spoken feedback). |
| --- | --- |
| Reflection on the unit plan  At the conclusion of the unit teachers can reflect on the unit for future planning by answering the following questions:   * What worked well in this unit? * What was a stumbling block? * How would you refine it? * What trends and gaps in learning have you identified? * How will you build on these learning experiences next term and beyond? | |

# Assessment

Assessment is the purposeful, systematic and ongoing collection of information as evidence for use in making judgements about student learning and to support improving student learning.

## Monitoring student learning

Student learning should be monitored throughout the unit. Each lesson in this unit provides opportunities for monitoring learning and for gathering evidence of student progress. For examples of ways to monitor learning, refer to each of the lesson plans under the section ‘Teaching sequence’.

## Assessing student learning

| Summative assessment task: | Let’s go fishing - information placemat for a restaurant (Lesson 11 - 13) |
| --- | --- |
| Description: | Students will create an eye-catching, A3 sized placemat for food trays at a local restaurant. The purpose of the placemat will be to inform the audience about a local fish, the habitat they live in and ways to keep fish habitats healthy and follow sustainable fishing practises. |
| This assessment task provides opportunities to gather evidence of student learning in: | Science Understanding  Biological sciences   * The growth and survival of living things are affected by the physical conditions of their environment [(ACSSU094)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU094)  Science as a Human Endeavour Use and influence of science   * Scientific knowledge is used to inform personal and community decisions [(ACSHE220)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE220)   Science Inquiry Skills  Communicating   * Communicate ideas, explanations and processes in a variety of ways, including multi-modal texts [(ACSIS110)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS110) |

**See Resource section: Resource 10 for the Student task sheet and the Guide for making judgements for the assessment task: Let’s go fishing - information placemat for a restaurant.**

# Sequencing teaching and learning

A suggested learning sequence for this unit is summarised below. For detailed information for each lesson in this sequence go to the section ‘Teaching Sequence’.

| Inquiry phase | Lesson | Purpose |
| --- | --- | --- |
| Engage | **Lesson 1:** Fishing stories | To identify what students already know about fish and fishing. |
| Explore | **Optional Lesson:** How do you set up a fish aquarium? | To set up and manage a healthy fish aquarium. |
| **Lesson 2:** The pollution tank experiment | To set up an experiment into the effect of pollution in water and to predict how pollution might affect the health of fish. |
| Explain | **Lesson 3–5:** Fish research | To understand the survival needs of fish and how they breathe. To research different fish and understand how they live and grow in different environments. |
| **Lesson 6:** How might pollution affect the survival of fish? | To observe the pollution tank experiment and draw conclusions about pollution and fish survival. |
| **Lesson 7 and 8:** What are the rules for fishing? | To identify and describe rules for fishing and recognise how they relate to fish growth and survival and inform personal and community decisions about fishing. |
| Elaborate | **Lesson 9 and 10:** Sustainable fishing investigation | To investigate and gather data about sustainable fishing practices and explain how these practices impact on the survival of fish. |
| **Excursion: optional** | To go on a fishing day and gather and analyse data about fish health and their environment. |
| Evaluate | **Lesson 11–13:** Reflections and assessment task | To review and reflect on learning and introduce and complete the assessment task. |

**TOTAL: 13 Lessons *(50 minutes per lesson)***

# Making judgements

## Achievement standard

In this unit, assessment of student learning aligns to the following components of the Year 6 achievement standard.

By the end of Year 6, students compare and classify different types of observable changes to materials. They analyse requirements for the transfer of electricity and describe how energy can be transformed from one form to another to generate electricity. They explain how natural events cause rapid change to the Earth’s surface. They describe and predict the effect of environmental changes on individual living things. Students explain how scientific knowledge is used in decision- making and identify contributions to the development of science by people from a range of cultures.

Students follow procedures to develop investigable questions and design investigations into simple cause-and-effect relationships. They identify variables to be changed and measured and describe potential safety risks when planning methods. They collect, organise and interpret their data, identifying where improvements to their methods or research could improve the data. They describe and analyse relationships in data using graphic representations and construct multi-modal texts to communicate ideas, methods and findings.

## Guide for making judgements

**See Resource section: Resource 10 for the Student task sheet and the Guide for making judgements for the assessment task: Let’s go fishing - information placemat for a restaurant.**

# Teaching sequence

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 1:** Fishing stories

**Duration:** 50 minutes

**Lesson objectives**Students will:

identify and communicate what they already know about fish and fishing.

Suggested learning sequence

**Introduction** – Fishing stories

1. Show students an image or footage of someone catching a fish.
2. Ask students to share their fishing experiences. They can also share experiences of other family members or friends if they have don't have much fishing experience.
3. Ask students to write their stories as short, illustrated stories as a part of a class display.

**Activity** – Class discussion

1. Have a discussion with students about what they know about fish and fishing e.g. different fish and their features, where fish live, the survival needs of fish, rules for fishing and reasons for fishing rules. The following questions could be used as a guide:

* What do you know about the fish you catch?
* What different fish do you know of?
* What are the common features of fish?
* What do fish need to survive?
* Where do different fish live?
* Where do you catch fish? Do you have a favourite fishing spot?
* Why do people go fishing?
* What different types of fishing are there?
* Do you know any rules for fishing? Why do we have rules?

1. Start a class or individual TWHL chart to record students’ knowledge (T) and questions (W) about fish and fishing. You can add to this chart throughout the unit (See *Resource 1 – TWLH chart* for individual charts).

For example:

| **T**  What we think we know about fish and fishing practises | **W**  What we want to learn about fish and fishing practises | **L**  What we learned about fish and fishing practises | **H**  How we know (scientific understanding) |
| --- | --- | --- | --- |
|  |  |  |  |

**Note:** Information added to this TWLH chart can be organised under headings such as types of fish, fish life cycles, survival needs of fish, fish habitats, fishing methods and fishing rules.

1. Start a word wall to continuously add to throughout the unit. (See *Resource 2 – Word bank* for examples of vocabulary). This should be displayed in a place where students can add to it each lesson. It may be done in alphabetical order or on moveable cards so that students can interact with the words and sort them into categories as they progress throughout the unit.
2. Have students start a science journal to record their learning and reflections after each science lesson. (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections). The science journal could be done in a simple ruled exercise book or a scrap book, or done on a computer in a format suitable to the class.

 Science journal

A science journal is a record of observations, experiences and reflections. It contains a series of dated, chronological entries. It may include written text, drawings, labelled diagrams, photographs, tables and graphs. The science journal can be used as a part of student assessment.

Opportunities to monitor student learning

**Diagnostic assessment opportunities:**

Use students' drawing and/or written work and the TWHL chart to assess their current knowledge of fish and fishing practices. Use this when planning for future lessons.

Resources

Printable resources

*Resource 1 – TWLH chart*

*Resource 2 – Word bank*

Resource 3 – Student reflections

Other resources

Paper and pencils for students to draw

Engage

Explore

Explain

Elaborate

Evaluate

**OPTIONAL Lesson:** How do you set up a fish aquarium?

**Duration:** 50 minutes

**Lesson objectives**Students will:

identify the physical conditions that are managed in a healthy fish aquarium

record observations as they care for fish.

Suggested learning sequence

**Introduction** – What is in an aquarium?

1. Discuss with students what is needed to set up an aquarium for fish. Find out what they already know. Some discussion questions could include:

* What do fish in an aquarium need to survive?
* What do we need to set up a fish aquarium? E.g. filter, pump, water, heater, light, glass scrubber or cleaner, gravel cleaner, fish food, plant life, shelters. Why do you think you need these different things? What could happen if you didn’t have them?
* What things do you need to monitor regularly in an aquarium to ensure it stays healthy? E.g. temperature, cleanliness, water level and other tests and indicators.
* Do all fish need the same things in an aquarium? E.g., discuss fresh water versus salt water.

1. Students might also share experiences they have had with keeping fish in aquariums at home or places they have visited that have had fish in aquariums.

**Activity –** Set up a fish aquarium

If you are not able to set up a class aquarium then view the suggestions in ‘**Alternative activity – Exploring aquaria’**.

1. Set up a fish aquarium in the class so students can observe and care for fish throughout the unit.
2. Have students draw an annotated diagram of the aquarium and its parts.
3. Ensure students follow The Animal Care and Protection Act 2001 and The Australian Code of Practice for the Care and Use of Animals for Scientific Purposes, 2013, 8th Edition in accordance with Education Queensland Guidelines when setting up the aquarium. See <http://education.qld.gov.au/curriculum/area/science/animals-ed.html> for more information.
4. Discuss with students the guidelines they must stick to when caring for the fish or other living things in the aquarium.
5. Draw up a roster for students to observe and care for the fish and plants in the aquarium. E.g. create a class data table next to the aquarium where students can record some simple daily activities such as food given and water quality parameters e.g. temperature.
6. Students can also record daily observations in a special diary/journal such as algae/dirt build-up, fish behaviours, e.g. gills and breathing, eating and hiding.
7. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
8. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Alternative activity – Exploring aquaria

If you do not have the resources to set up an aquarium in the classroom, an alternative activity is to invite a local aquarium owner (parent, shop owner) to come into the classroom and discuss the aquariums they care for. Request the visitor brings images and information to share.

Have students generate questions to interview the visitor to learn about:

How do you set up a fish aquarium? What is the purpose for each part of the fish aquarium? What would happen if they didn’t have these parts?

What do fish need to survive and be healthy in aquarium?

What do you do for your fish to breed in aquaria?

What do you need to do regularly to keep the aquarium healthy? Why is this important?

What conditions in the aquarium must you monitor regularly? Why?

Do all fish need the same things in an aquarium? E.g., discuss fresh water versus salt water.

Have students use the information shared by the visitor to create a virtual aquarium display in the classroom using cut-out images and written descriptions as labels.

Alternatively, or in addition to above, you could invite someone from the local fisheries department, someone who studies fish, or someone who works at a fish farm to discuss what they know about looking after fish.

Opportunities to monitor student learning

**Formative assessment opportunities:**

record of students’ answers during discussion about fish survival and needs

students’ annotated diagrams of aquarium set-up

Resources

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

Other resources

Aquarium, pump, pH kit, gravel, fish food, aquarium plants, water thermometer, glass scrubber, dechlorinator, items fish can hide in e.g. rocks

Images of aquarium parts and different fish (if not setting up an aquarium)

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 2:** The pollution tank experiment

**Duration:** 50 minutes

**Lesson objectives**Students will:

investigate the effect of pollution in water.

Suggested learning sequence

**Introduction –** Pollution discussion

1. Discuss with students how they think pollution could affect fish in their habitats:

What types of pollution occur in fish habitats?

Where does the pollution come from?

What impact does pollution have?

1. Show photos of marine pollution to generate further discussion and questions students may have.
2. As a class, read *Resource 4 – How biodegradable is your rubbish?* Discuss the information and how students think this affects habitats when these items are not disposed of in a proper way. How can we dispose of these things in a proper way?

**Activity –** Pollution experiment

1. Explain to students they are going to set up a class experiment to investigate how pollution can affect a fish habitat. They are going to use pollution from their own school environment.
2. Discuss what pollution is found around the school.
3. You could also discuss household pollution – what gets washed down the drain e.g. oil, detergents, washing powder. If the school has some of these available (only those safe to use in the classroom), they could also be added to the experiment.
4. Explain to students you will be setting up the experiment today and observing the results over the next couple of weeks.

**Note:** Make sure students are reminded that these tanks/containers must not have any living things in them.

1. Read *Resource 5 – Procedural text – Pollution tank experiment.*
2. Discuss what the experiment is about. Use *Resource 6 – Predict Observe Explain Poster*, to generate discussion about how the experiment will be conducted.
3. Have students identify any potential hazards and ways to be safe when they are conducting this experiment. Make a list of the hazards and put this on display near the tanks as a reminder to students.

**Note:** *Some safety considerations* – Ensure students do not touch, or put their hands into the water. Keep the tanks/containers in a safe location away from accidental knocks.

1. Provide students with a POE chart. (See *Resource 7 – POE chart.)* Ask students to record their individual prediction for what they think will happen to the two tanks/containers of water in their POE chart:

* What do you think will happen in the tank? Why?

1. Set up the two tanks/containers as a class (as described in *Resource 5*) and locate them where changes can be observed regularly (remember to include observations such as smells).
2. Create a chart to sit beside the tank/container for recording observations. Rotate students to regularly observe the tanks and record observations in this class chart. Students could also take photographs each day. This information will be used later in the unit when students summarise and explain these observations (lesson 6).
3. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
4. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use discussion to assess students' developing knowledge of fish needs and water conditions.

Resources

Useful web links

Pollution photos can be found at:  
<http://www.marinephotobank.org/secure/gallery.php>

2011 Reef Beat posters 1-10 have useful information about impacts to aquatic habitats such as pollution. View the posters ‘waste watchers’, ‘Wetland warriors’, ‘farming and grazing’:   
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2778>

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

*Resource 4 – How biodegradable is your trash?*

*Resource 5 – Procedural text - Pollution tank experiment*

*Resource 6 – Predict Observe Explain Poster*

*Resource 7 – POE chart*

Other resources

Equipment as listed in *Resource 5 – Procedural text - Pollution tank experiment*.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 3–5:** Fish research

**Duration:** 2 hours 30 minutes

**Lesson objectives**Students will:

understand the survival needs of fish

understand how fish breathe

understand how different fish live, grow and survive in different environments.

Suggested learning sequence

**Introduction** – Fish needs and features

1. Ask students if they know what fish need to survive. They should know the basics of all living things and may identify other things specific to fish. (If you have set up a class aquarium, use this to stimulate ideas.) Together, list the basic needs for a fish to survive and grow.

Examples:

* **Oxygen:** Fish live in water and need oxygen to survive which is in the water and absorbed via their gills.
* **Food:** The aquatic (water) habitats fish live in must provide them with food.
* **Shelter:** The aquatic habitat must provide the fish with shelter/places to hide and breed.
* **Water type:** The water must be the right type for the particular fish e.g. fresh water, salt water or estuarine.
* **Water conditions:** The water must be at the right temperature for the fish and be at the right quality e.g. clean versus polluted.

1. Show different pictures of fish to discuss their common features and how they are used to help the fish survive in their habitats.
2. Ask students if they know how fish breathe in water and obtain oxygen. Use pictures or YouTube clips of fish breathing, showing the gills. Discuss this with students and clarify any questions. (If you have created a class aquarium, students can directly observe fish breathing and the movement of the gills).
3. Have students draw a picture of a fish and label the external features of a fish including the gills.

**Note:** Students will need to use this learning about fish breathing and gills when they draw conclusions about the pollution tank experiment in lesson 6.

**Activity** – Fish research

1. Explain to students that they are going to conduct research into different types of fish and how they live and survive in their environments.
2. Ask students to identify specific fish species they may know about.
3. Show pictures in books or on the Internet of different types of fish e.g. seahorses, coral trout and whale sharks. Ask students if they can identify why a seahorse, a coral trout and a whale shark are all fish, but a dolphin is not. If students are not sure, make one of the questions they need to research in their investigation – What makes a fish a fish?
4. As a class, come up with a list of questions students could investigate to find out more about different fish. Some questions might be:

* What makes a fish a fish?
* What fish are found in our local area?
* What are the differences and similarities between a seahorse and a whale shark?
* Give examples of aquatic habitats where fish live.
* Give examples of what different fish eat.
* What is the difference between a saltwater and freshwater fish?
* Can some fish live in both saltwater and freshwater?
* What is an example of a life cycle of a fish? Where does this fish breed?

1. Have a range of books, Internet access, posters and fact sheets available for students to research.
2. In pairs, groups or individually, students choose one or two questions to research and answer.
3. You may decide to focus students in researching specific fish species and their survival needs, life cycles and habitats (take note of the assessment task so students do not overlap).
4. Once the research is complete, students then share their information with the rest of the class and discuss any questions or interesting facts they have discovered.
5. The information collected could be used to create posters or fact sheets for a fish display around the classroom.
6. Review what is happening in the pollution experiment (Lesson 2) and the observations made so far.
7. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
8. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections.

### Opportunities to monitor student learning

**Formative assessment opportunities:**

Use the students’ fish drawings and discussions about the features of the fish to assess students' knowledge of what fish need to survive in their environment.

Use students’ research findings to assess their developing knowledge of how fish grow and their survival in different environments.

Resources

Useful web links

YouTube clips of fish breathing. For example: Fish breathing –   
<https://www.youtube.com/watch?v=XEIRlw5rCUk>

**Hint:** Access and pre-load YouTube clips before the lesson so that you can play them immediately for students when required.

Images and some information about different fish:

Fish of the Great Barrier Reef –  
<http://www.greatbarrierreef.com.au/animals/fish/>

Species identification –   
<https://www.daf.qld.gov.au/fisheries/species-identification>  
(search under ‘Fresh water fish’, ‘Reef fish web guide’ and ‘Inshore and estuarine species’).

2011 Reef Beat posters 1-10 have information about fish and fish habitats:  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2778>

**Great Barrier Reef Outlook Report 2014**

Access the report at: <http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2855>

A range of useful information and graphics about fishing at the Great Barrier Reef can be found on:

page 118-128: Fishing

Some information about coral trout and their management can be found on:

page 232: Coral trout

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

Other resources

Books, Internet access, fact sheets, posters for research. Paper and pencils to draw and label fish.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 6:** How pollution can affect the survival of fish?

**Duration:** 50 minutes

**Lesson objectives**Students will:

examine the pollution tank experiment and explain how pollution can affect fish survival.

Suggested learning sequence

**Introduction** – Pollution tank review

**Note:** If there have not been significant changes in your pollution tank by this lesson, then this lesson can be moved to later on in the unit.

1. As a class, look at the pollution tank experiment. Review the observations in the chart that have been made over time. Ask students to summarise these observations in the O of their individual POE chart. (See *Resource 7 – POE chart).*
2. Have students review their predictions for this experiment. How close were their predictions to the observations? Ask students to explain these observations in the E of the POE chart. Questions to help with these explanations include:

* What has happened to the tank with pollution? Why does it look and smell this way?
* What has happened to the tank with no pollution? Why?

**Activity** – Gill demonstration

1. Explain to students you are going to demonstrate how a fish might breathe in clean verses dirty water.
2. Remind students of how fish breathe and absorb oxygen through their gills.
3. Use a paper coffee filter as a model for fish gills. You will need to wear gloves and have access to a sink or container.
4. With help from a volunteer, use a jug to pour water from the clean tank/container through the paper coffee filter and observe. Is anything caught in the filter (gills)?
5. Repeat this gill demonstration by pouring water from the polluted tank through a new paper coffee filter and observe what happens. Is anything caught in the filter (gills)?
6. Ask students to imagine the paper coffee filter is a fish’s gills. Compare what happened to the filter with the two types of water and answer the following two questions:

* Would fish gills be able to easily absorb oxygen through clean water? Why do you say that?
* Would fish gills be able to easily absorb oxygen through murky polluted water? Why do you say that?

1. Ask students to imagine a fish living in a polluted habitat such as in the pollution tank/container. Remind students of what they have learnt so far about the survival and growth needs of fish and the habitats they live in. Observe your class aquarium as well if you have one.
2. Ask students to answer the following question:

* Describe ways that pollution might affect the ability for fish to survive and grow in their habitat.

1. **Optional:** You may choose to keep the tanks/containers in the classroom for the remainder of the unit and continue to observe them.
2. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
3. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use students’ answers to questions to assess their knowledge of how fish breathe and how the growth and survival of fish is affected by the physical conditions of their environment.

Resources

Useful web links

2011 Reef Beat posters 1-10 have useful information about impacts to aquatic habitats such as pollution. View the posters ‘waste watchers’, ‘Wetland warriors’, ‘farming and grazing’:  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2778>

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

*Resource 7 – POE chart*

Other resources

Paper coffee filters, jug, gloves and access to a sink

Water from the pollution tank/container and control tank/container

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 7 and 8:** What are the rules for fishing?

**Duration:** 1 hour 20 minutes

**Lesson objectives**Students will:

identify and describe rules for fishing and recognise how they relate to fish growth and survival, and inform personal and community decisions.

Suggested learning sequence

**Introduction** – Marine Park legal requirements

1. Ask students if they know of any rules for fishing. Students may have already identified rules at the beginning of the unit. If so, review these rules and add to them if students think of more.
2. Discuss with students why there are rules in place for fishing. Record students’ responses to refer to at the end of the lesson.
3. Read *Resource 8 – Marine Park zoning rules.*
4. Discuss these rules with students and clarify any unknown words. Identify what protected and restricted species are.

**Activity** – Fish rules research

1. Explain to students they are going to research what the rules are for fishing and work out why there are rules.
2. Have books, posters, Internet access and pamphlets available for students to research fishing rules that apply to their local area or the Great Barrier Reef Marine Park in general (See ‘**Useful web links’** for links to zoning maps and fishing rules).
3. Make a list of inquiry questions with students to help them conduct their research. The research could be done in a variety of ways according to the needs of the class. One way would be for students to choose from the following suggestions:

Research the size limits for catching fish.

Research the different fishing rules for each zone type.

Research the rules for catching a specific species of fish such as barramundi or coral trout.

Research the different types of fishing methods used in the Marine Park.

1. Students could use the information they gather to write a report to share with the class or for use in the school newsletter.
2. Discuss the information gathered and clarify why fishing rules are so important. Ask students:

What do they think would happen if there were no rules for fishing and everyone could fish however they wanted?

1. **Optional:** Review what is happening in the pollution tank experiment (Lesson 2).
2. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
3. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use students’ research to assess their developing knowledge of how scientific data and knowledge is used to make personal and community decisions.

Resources

Useful web links

Information on zoning including maps (you can select each zoning map for a close up):

Zoning, Permits and Plans – <http://www.gbrmpa.gov.au/zoning-permits-and-plans/zoning>

Zoning maps – <http://www.gbrmpa.gov.au/visit-the-reef/zoning/zoning-maps>

Information on fishing rules and regulations:

Recreational fishing rules and regulations for Queensland – <https://www.daf.qld.gov.au/fisheries/recreational/rules-regulations>

2011 Reef Beat posters 1-10 have information about fishing rules. View the poster ‘fishing’.  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2778>

2012 Reef Beat posters 1-10 have information about fishing:  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2777>

Great Barrier Reef Outlook Report 2014

Access the report at: <http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2855>

Some information about coral trout and their management can be found on:

page 232: Coral trout

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

*Resource 8 – Marine Park zoning rules*

Other resources

Books, posters, Internet access, pamphlets for research on fishing rules.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 9 - 10:** Sustainable fishing investigation

**Duration:** 1 hour 20 minutes

**Lesson objectives**Students will:

investigate and gather data on sustainable fishing practices and explain how these practices impact on the survival of fish.

Suggested learning sequence

**Introduction** – What is sustainability?

1. Discuss with students what sustainable means in different contexts:

sustainable fishing

sustainable farming

sustainable living.

1. Create a definition for sustainable fishing; write this down to refer back to at the end of the lesson.

**Activity** – Sustainable fishing activity

1. Follow the activity in *Resource 9 – Sustainable fishing activity.*
2. This activity also covers the concept of bycatch which may need to be explained to the students before starting the activity if they are unsure of its meaning.
3. When the activity is finished, discuss the concept of sustainability. Ask students why sustainability might be an important goal for a community and why it might be difficult to achieve that goal.
4. Have each group of students brainstorm ways that they might have made the fisheries more sustainable. Some possible ways are catch limits (a certain number of popcorn pieces), marine reserves (an area of the plate where fishing is not allowed), and bans against fishing (no use of spoons).
5. If any group did not completely deplete their fish, discuss why this happened (ie. less people fishing, etc.)
6. Review and reflect on the sustainable fishing definition created at the beginning of the lesson. Does it need to be changed or added to?
7. Ask students if they have a better understanding of the reasons behind fishing rules and sustainable fishing. Have students answer the following question:

Why are fishing rules important?

What could happen if there were no fishing rules?

1. View ***Extension ideas - Sustainable fishing activity*** for additional ideas if you have time at the end of the activity.
2. **Optional:** Review what is happening in the pollution tank experiment (Lesson 2).
3. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
4. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for examples of sentence starters you can use to guide student reflections).

Extension ideas - Sustainable fishing activity

If you have time you could do the following:

Have each group decide on a plan to make their fishery more sustainable.

Conduct another six rounds (or less) of fishing, using the sustainability plans that the students developed.

Have students record their new season catches and compare them to the trend seen in the previous seasons.

Another modification to this activity can be the introduction of different ‘species’ (e.g. M&M’s). These species can be more valuable (although more difficult to catch) or incur a penalty if one or more are caught, such as protected or restricted species.

Opportunities to monitor student learning

**Formative assessment opportunities:**

Use conclusions students draw about sustainable fishing practices to assess their knowledge of how fish are affected by people in their environment and how scientific knowledge is used to make personal and community decisions.

Resources

Printable resources

*Resource 2 – Word bank*

*Resource 3 – Student reflections*

*Resource 9 – Sustainable fishing activity*

Other resources

Resources listed in *Resource 9 – Sustainable fishing activity*

Engage

Explore

Explain

Elaborate

Evaluate

**Optional Excursion:** Catch and release fishing day

**Duration:** 1 day plus review time

**Lesson objectives**Students will:

gather and analyse data about fish health and their environment during a school organised fishing day.

Suggested learning sequence

**Activity** – fishing day

1. Organise a catch and release fishing day with the local community at a beach, estuary or other familiar fishing spot. Ask parents, community members, other classes and staff to be involved. You may need to run some workshops at the school to teach students about fishing methods.

**Note:** you will need to identify safety issues and conduct your own curriculum activity risk assessment for a fishing day. View the section ‘**Safety and Risk management’** in this unit for more information.

1. The aim of the fishing day is for students to assess the health of the local waterways, practise their fishing skills and collect data about different fish species.
2. View – ***Fishing day ideas*** for further information.
3. Discuss with students the types of equipment you would need for a fishing day e.g. rod, bucket, drinking water, hat, protective clothing, sun screen and what you would need to take on the day e.g. fishing maps, bait, tackle and chair.
4. Provide a worksheet for the students to complete during the day. This will need to be written in context to the place visited during the excursion. Some suggestions include:

* Have you visited \_\_\_\_\_\_\_\_before?
* Have you observed any changes over the time of your visits?
* Make an assessment of the health of the habitat at \_\_\_\_\_\_\_.
* Provide reasons for your assessment – what did you see, smell or hear?
* Record the size and species of each fish you catch and release. You could also take a photo of each fish you catch to help identify which species it is. Here is an example of a data table to record fish caught:

| Time | Place | Species | Size (length or weight or both) | Bait used |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |

* Release fish in a safe way to ensure fish survival

**Activity** – Review of data

1. Review the day with students. What worked? What could be improved?
2. As a class, look at the data students collected. Ask students if there are any interesting stories to tell about their data. Discuss with students the health of the fishing spot visited and other relevant information they gathered on the day. Example questions include:

* What suggestions do you have to keep or improve the health of this fishing spot including sustainable fishing practices?
* Why is the health of the fishing spot important?
* Why are sustainable fishing practices important?
* What might be the effects if the health and sustainability of the area are not looked after?

1. Add new words to the word wall (See *Resource 2 – Word bank* for examples of vocabulary).
2. Students add their learning and reflections to their science journal (See *Resource 3 – Student reflections* for sentence starters you can use to guide student reflections).

Fishing day ideas

Some ideas for a school organised fishing day:

Consider using hand lines as well as fishing rods for greater likelihood of success.

As an alternative, you might organise a class visit to a controlled environment such as a barramundi fish farm to catch fish.

If you visit a fish farm, students can devise questions to ask someone who works there to find out:

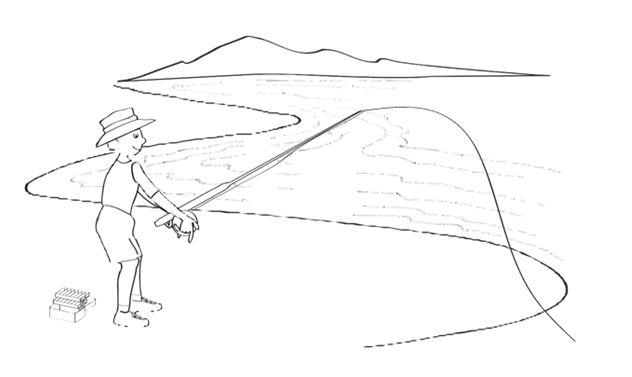
what is in the fish environment for the fish to have their needs met

how the fish are cared for to ensure they survive and grow

how the environment is monitored and managed to ensure the fish are healthy

what can go wrong for the fish

what processes and decisions are made for how fish are caught/taken.

**

### Opportunities to monitor student learning

Use conclusions students draw about sustainable fishing practices to assess their knowledge of using science to make personal and community decisions and know how fish are affected by people in their environment.

Resources

Resources and equipment for a school organised fishing day will need to be decided on by the teacher and the students when organising the excursion.

Engage

Explore

Explain

Elaborate

Evaluate

**Lesson 11 - 13:** Reflections andassessment task

**Duration:** 2 hours 30 minutes

Suggested learning sequence

**Introduction** – reflections and task introduction

1. As a class, reflect and record what has been learned and how in the L and H of the original TWLH chart.
2. Explain to the students that they are going to begin their final assessment task. Present them with the task sheet and the Guide for making judgements *(Resource 10 – Student task sheet and Guide for making judgements).*
3. Read through the Task sheet and Guide for making judgements together and identify all the requirements of the task.

**Note**: Students do not need to do the task based on a local fish and local fish habitat. You may choose another location such as the Great Barrier Reef. If so, adjust the language in the Task sheet and Guide for making judgements.

1. Show students examples of tray displays and placemats (see links in **‘Resources’** section).
2. Contact local restaurants e.g. a fish and chip restaurant. See if they will agree to use the best placemats in their restaurant for a period of time on food trays or at tables. These placemats may be laminated for re-use.
3. Discuss available resources (identify all the work done throughout the unit that will help the students complete the task).
4. Students may write out or create the A3 display digitally.
5. Set out a plan for time management and resource management.

**Activity –** Create an A3 sized placemat for a local restaurant

1. Allow students time to research and prepare their placemat design and production.
2. Depending on the needs of the class, students may require scaffolding for different parts of the task.
3. How much time students are able to spend preparing, designing and creating their A3 food placemat will depend on the needs of the class and the length of time available in the school term.

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Opportunities to monitor student learning

**Summative assessment opportunities:**

The students’ task can be used to assess their knowledge and understanding of science understandings, science as a human endeavour and science inquiry skills.

Resources

Useful web links

Examples of food tray displays/placemats:

* <https://commons.wikimedia.org/wiki/File:Buragerkingset.JPG>
* <https://commons.wikimedia.org/wiki/File:ZOO_Bangkok_food.JPG>
* <https://commons.wikimedia.org/wiki/File:Israel_Batch_1_(919).JPG>

2011 Reef Beat posters 1-10 could be used as research in this task. View the posters ‘waste watchers’, ‘Wetland warriors’, ‘farming and grazing’ and ‘habitat heroes’:  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2778>

2012 Reef Beat posters 1-10 have information about fishing:  
<http://elibrary.gbrmpa.gov.au/jspui/handle/11017/2777>

Printable resources

*Resource 10 – Student task sheet and Guide for making judgements*

Other resources

A3 paper

laminator

Resources

Resource 1 – TWLH chart

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

| T  What we THINK we know about fish and fishing practises | W  What we WANT to learn about fish and fishing practises | L  What we LEARNED about fish and fishing practises | H  HOW we know (scientific understandings) |
| --- | --- | --- | --- |
|  |  |  |  |

Resource 2 – Word bank

| Gills | Aquarium | Pollution | Estuarine |
| --- | --- | --- | --- |
| Aquatic | Freshwater | Salt water | Algae |
| Breeding | Marine | Biodegradable | Water quality |
| Oxygen | Absorb | Fish | Features |
| Fish zones | Sustainable | Sustainable fishing | Size limits |
| Protected species | Restricted species | Bycatch | Marine reserves |

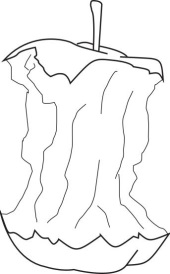
Resource 3 – Student reflections

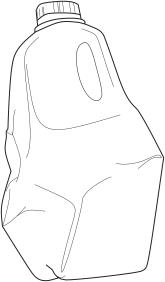
Consider displaying sentence starters or questions such as below in the classroom. Alternatively, they could be turned into laminated thought bubbles that are passed to students directly. Students could choose two or three to complete in their journal then share their responses with the class.

| End of lesson reflections | | Guiding students to reflect on their own thinking | |
| --- | --- | --- | --- |
| Today I discovered …  I want to know more about …  Something new I found out was …  I am excited about …  Something I am finding interesting is …  The most challenging thing was … | I am most proud of …  I feel confident about …  I am enjoying … because …  I am confused by …  Today I asked …  A question I have is … | I am starting to think differently about …  I got stuck when … and I got back on track by …  I figured out that …  I solved a problem by …  I first thought … but then I realised that … | This idea is useful for …  Some things I didn’t understand are …  To help me understand better I will …  Before I didn’t know …  Now I realise/know … |
| Reflecting on stewardship and taking action | | End of unit reflections – where I was and where I am now | |
| This information can make a difference by …  It is important to know about this because …  Something I will now do as a result of my learning is …  Something I want to do next is … | Something I will now help others understand is …  I can make a difference by …  An action I/we can take is …  If we don’t … the consequences could be …  It is important to … because … | 1. I used to think … 2. Now I know … 3. This causes me to (re)think/ wonder … | * **Revisit** your first journal entry. What do you understand now that you didn’t back then? * **Review** your work so far. What has been the biggest discovery/learning/challenge? * **Reconsider** your initial ideas. Have your ideas changed? If so how? |
| 1. I didn’t know how to … 2. Now I can … 3. In the future I will … |

Resource 4 – How biodegradable is your rubbish?

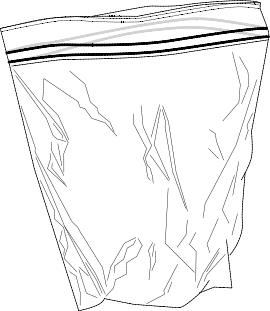
From Pocket guide to marine debris, 2003, The Ocean Conservancy <http://www.mass.gov/eea/docs/czm/coastsweep/pocket-guide-2003.pdf> adapted from U.S. National Park Service; Mote Marine Lab, Sarasota, FL and “Garbage In, Garbage Out,” Audubon magazine, Sept/Oct 1998.



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| Item | Biodegradable Timeline |
| --- | --- |
| Banana peel | 2 – 5 weeks |
| Newspaper | 6 weeks |
| Apple core | 2 months |
| Waxed milk carton | 3 months |
| Cigarette butt | 1 – 5 years |
| Plastic bag | 10 – 20 years |
| Nylon fabric | 30 – 40 years |
| Aluminium can | 80 – 200 years |
| Baby’s disposable nappy | 450 years |
| Plastic drink bottles | 450 years |
| Monofilament Fishing line | 600 years |
| Glass bottle | 1 million years |





Resource 5 – Procedural text – Pollution tank experiment

| Aim |
| --- |
| To find out how pollution will affect a fish habitat |
| Equipment per group |
| * Two tanks/containers with lids * Water (add salt to water to create a marine environment) * Playground sand (to represent the bottom of the habitat where the fish live) * Rubbish from around the school e.g. drinks cans, food scraps and left over food wrappings to act as pollution * Gloves |
| Procedure |
| 1. Put a layer of sand or dirt into each tank or container. 2. Fill one of your tanks/containers with water. This is your control. No pollution will be put into this tank/container. Label it as ‘control’. 3. Fill the other tank/container with water. This will have pollution put into it. Label it as ‘pollution’. Cover the tank/container. 4. Find some rubbish e.g. drinks cans, food scraps and left over food wrappings. If you have a very clean school and there is no rubbish, keep some scraps or wrappings from your own lunch to act as pollution. 5. If you are collecting rubbish from around the school grounds, make sure you wear gloves. 6. Put the rubbish into the ‘pollution’ tank/container. Cover this tank/container. 7. Over the next couple of weeks, regularly observe and record what happens to the ‘control’ tank and the ‘pollution’ tank.   **Some safety considerations:**   * Ensure students do not touch or put hands into the water. * Keep the tanks/containers in a safe location away from accidental knocks. |

Resource 6 – Predict Observe Explain poster







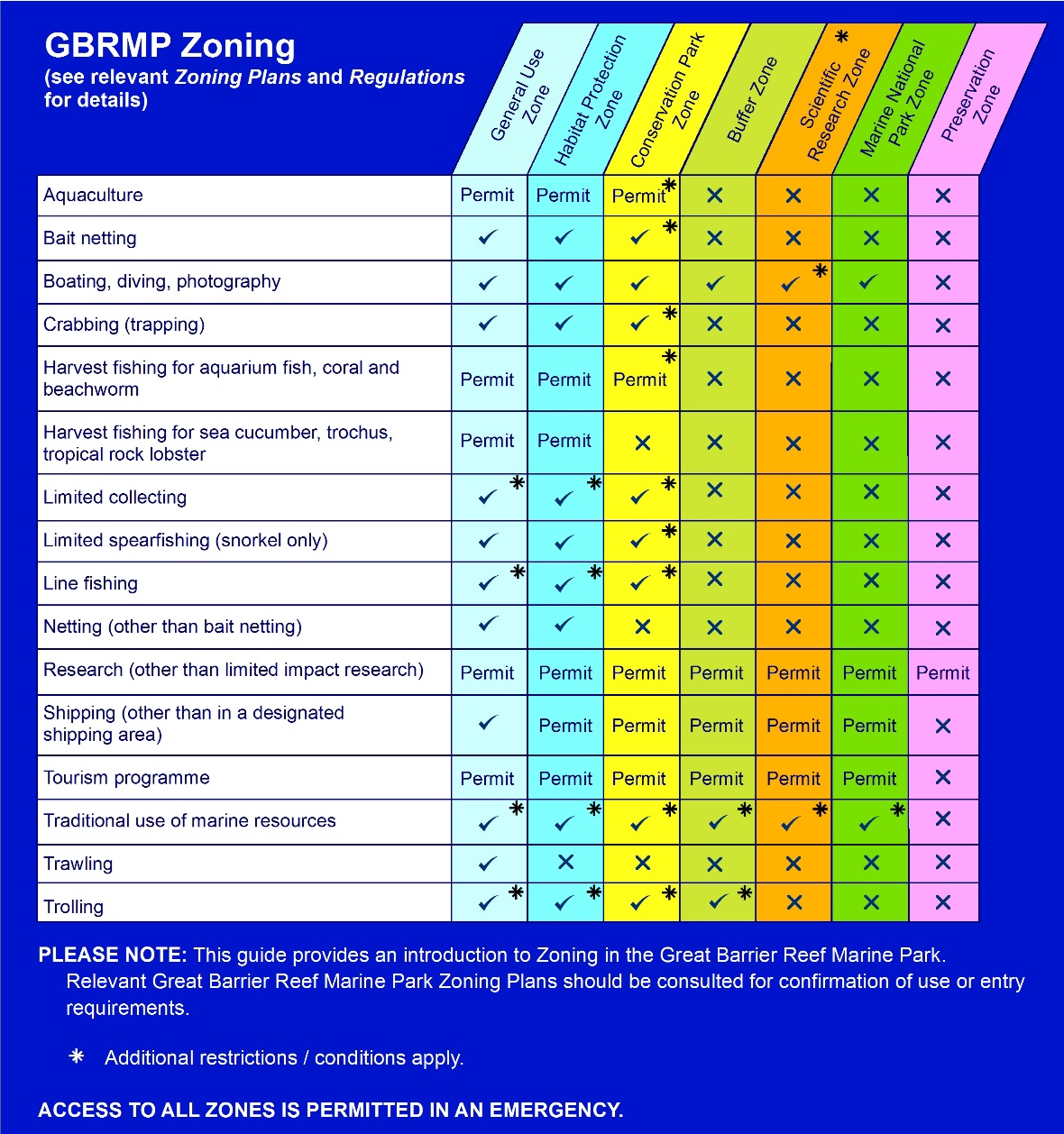
Resource 7 – POE chart

A large POE chart such as the one below can be displayed in class or used individually for the pollution tank experiment.

| Set up | Predict | Observe  [photos/notes/sketches] | Explain |
| --- | --- | --- | --- |
| Control tank/container | We predict that …  because … |  | What happened?  Why? |
| Pollution tank/container | We predict that….  because … |  | What happened?  Why? |

Resource 8 – Marine Park zoning rules

*Information sourced from the Great Barrier Reef Marine Park Authority (*<http://www.gbrmpa.gov.au>*)*

For further fishing and zoning information, please visit the Great Barrier Reef Marine Park Authority website at: [http://www.gbrmpa.gov.au](http://www.gbrmpa.gov.au/)

Resource 9 – Sustainable fishing activity

*Adapted and modified from Sustainable Fishing, California Academy of Sciences -* <http://www.calacademy.org/educators/lesson-plans/sustainable-fishing>. *Originally adapted from Fishing for the Future in Curriculum Guide 2002. Retrieved from* <http://www.facingthefuture.org>

| Objectives |
| --- |
| Students will see how unregulated fishing can lead to depletion of fish stocks. They will also have an opportunity to discuss the factors that may contribute to their depletion and come up with ways (regulations) to better manage their resource |
| Rules – describe to students |
| * Each student will be a “fisher” whose livelihood depends on catching fish. * Each piece of popcorn represents a fish. * Each fisher must catch at least two fish in each round to survive to the next fishing season. * When the fishing season begins, students must hold their hands behind their backs and use the “fishing rod” (straw) to suck “fish” (pieces of popcorn) from the “ocean” (plate) and deposit them into their “boat” (cup). * The fish remaining in the ocean after each fishing season represent the reproductive population, and thus one new fish will be added for every fish left in the ocean (plate). * After each round, fishers must record their group’s catch in a fishing log |
| Materials |
| * Line illustration - fishTwo or three bags of popped, plain popcorn (amount depends on class size) * Small paper cups (one per student) * Large paper plates (one per group) * Spoons (one per group) * Straws (one per student) * Stopwatch (for the teacher to time the activity) e.g. 20 second intervals * Fishing log (one per group or student) |

| Procedure |
| --- |
| 1. Divide the class into groups of three or four students and have them come up with a name for the area or reef where they fish. 2. Give each group one plate, a copy of the fishing log and each student one cup, and one straw. 3. Put 30 popcorn pieces on each group’s plate. These are the fish that inhabit their fishing area or reef. 4. Have students start the fishing log by writing in the season (round 1), the number of straws in the group and the starting fish population (number of popcorns on the plate i.e.30). 5. Remind students that all fishers fish at the same time and must keep their hands behind their backs and wait for a signal to start fishing. 6. Start the stopwatch and give students 20 seconds for the first “season” of fishing. Note: You can change the time allotted for each season to get the required effect. For example, if students are not depleting their stocks fast enough, you may increase the “season” to 30 seconds or if they are depleting the stocks too fast, you can decrease the time. 7. After the first round, have each fisher count the total catch for the group (fish in their cup), the total bycatch for the group (dropped before reaching the cup) and the total fish left in the ocean (plate). Have them record the data in their fishing log. In the game, a “fish” that leaves the ocean but is not placed into the “boat” is considered bycatch and cannot be put back into the ocean or counted as catch. 8. In order to survive to the next fishing season, fishers must catch at least two fish. Fishers who did not catch the minimum amount must sit out for the following rounds. 9. Add one new fish for every fish left on the plate, explaining that the fish reproduced in between the seasons. 10. Have students continue the fishing log by writing in the season (round 2), the number of straws in the group and the starting fish population (number of popcorns on the plate). 11. Play a second round and have students record catches in the fishing log. 12. For the third round, tell students that some fishers have decided to use other “gear types” to increase their catch. Give a spoon to one fisher from each group (use of the spoon represents trawling). Record catches in the fishing log for season (round) 3. Make sure students note how many spoons and straws are now in use. 13. Continue playing more rounds until one group runs out of fish. Note: If students are not depleting their stocks fast enough, you may give more fishers spoons. 14. When one group runs out of fish, ask them what they would do in the real world if they caught all of the fish who inhabited their surrounding waters. (One option is to switch to a different profession, but another option is to move to another area to fish). Allow students to “invade” other groups when their area is depleted, but don’t tell them that they can do this beforehand. Fishers may either go as a group or they may disperse separately to other areas. 15. Repeat fishing, recording and replenishing fish stocks until all (or most) groups run out of fish in their areas. |

### Fishing log

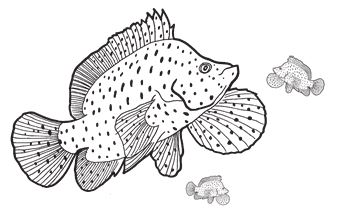
Fishers: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name of reef area: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

| Season  (round) | Types of fishing in the group | | Fish in ocean before  (popcorn on plate before) | Fish caught  (popcorn in cups) | Bycatch  (popcorn dropped) | Fish left in ocean  (popcorn on plate after) |
| --- | --- | --- | --- | --- | --- | --- |
| Fishing rods  (number of straws) | Trawling  (number of spoons) |
| Example  1 | Example  4 | Example  0 | Example  30 | Example  14 | Example  9 | Example  7 |
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Resource 10 – Student task sheet and Guide for making judgements

### Let’s go fishing – Year 6 information placemat for a restaurant

### Your task:

Create an eye-catching A3 sized placemat for food trays at a local restaurant. The purpose of the placemat is to inform the audience about a local fish, the habitat it lives in and to use your knowledge about fish to persuade the audience to keep fish habitats healthy and follow fishing rules and sustainable fishing practises.

### Your A3 placemat must include the following:

a labelled drawing of a fish in their local area

information about where this fish lives and what it needs to survive and grow in its habitat

ways to keep local fish habitats healthy and clean

an explanation of what can happen to fish survival if the physical conditions of its habitat changes (to be unhealthy)

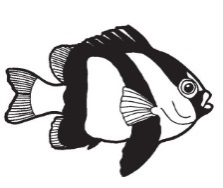
a summary of local fishing rules/zones

an answer to this question:

* *Why is it important to have knowledge about fish when deciding on fishing rules and sustainable fishing practices?*

**Hint:** To help answer this question, think about what would happen if you didn’t know anything about fish when deciding on rules for fishing? What might the consequences be to this?

### What to include in your A3 sized placemat?

To attract people into reading your placemat, consider communicating your ideas in multiple ways e.g. using:

a catchy title

slogans

drawings and images

data or tables

succinct written information

small games or activities.

|  |  |
| --- | --- |
| Year 6 Science: Let’s go fishing – information placemat for a restaurant | Name: |

**Purpose:** To describe what a fish needs to survive and grow in its habitat. To explain how fish survival can be affected by changes to the physical conditions in its habitat. To explain why is it important to have knowledge about fish when deciding on fishing rules and sustainable fishing practices.

Explains how relationships with other living things and the [environment](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=Environment) assist or hinder its survival

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Science Understanding | | Science as a Human Endeavour | | Science Inquiry Skills | |  |
| Biological sciences | | Use and influence of science | | Communicating | |
| Describes what a fish needs to survive and grow in its habitat. Explains how fish survival can be affected by changes to the physical conditions in its habitat. | | To explain why is it important to have knowledge about fish when deciding on fishing rules and sustainable fishing practices. | | Constructs multi-modal texts to communicate ideas. | |  |
|  | Integrates descriptions and explanations with scientific knowledge. |  | Explanations are comprehensive. |  | Communicates coherently. | A |
| * Links descriptions and explanations with scientific knowledge. | * Explanations are detailed. | * Communicates using relevant scientific terminology throughout. | B |
| * Describes what a fish needs to survive and grow in its habitat. Explains how fish survival can be affected by changes to the physical conditions in its habitat. | * Explains why is it important to have knowledge about fish when deciding on fishing rules and sustainable fishing practices. | * Constructsmulti-modal texts to communicate ideas. | C |
| * Partially describes what a fish needs to survive and grow in its habitat. Partially identifies how fish survival can be affected by changes to the physical conditions in its habitat. | * Partially explains why is it important to have knowledge about fish when deciding on fishing rules and sustainable fishing practices. | * Communicates ideas using everyday language. | D |
| * Recalls some survival and growth needs of fish in their habitats. | * Statements about why is it important to have knowledge about fish. | * Fragmented communication of information and ideas. | E |
| Teacher feedback: | | | | | | |