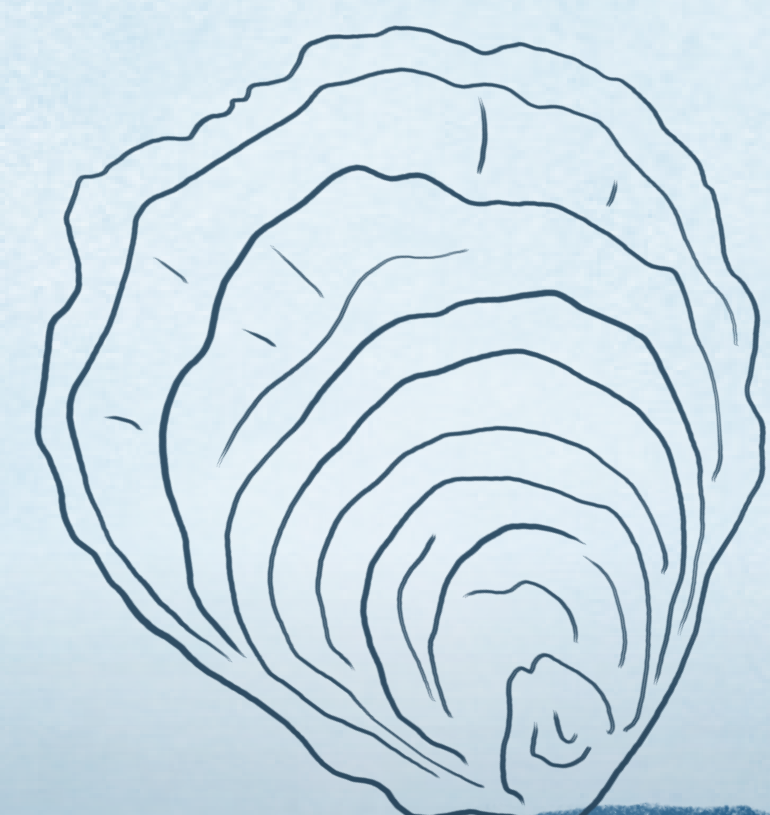
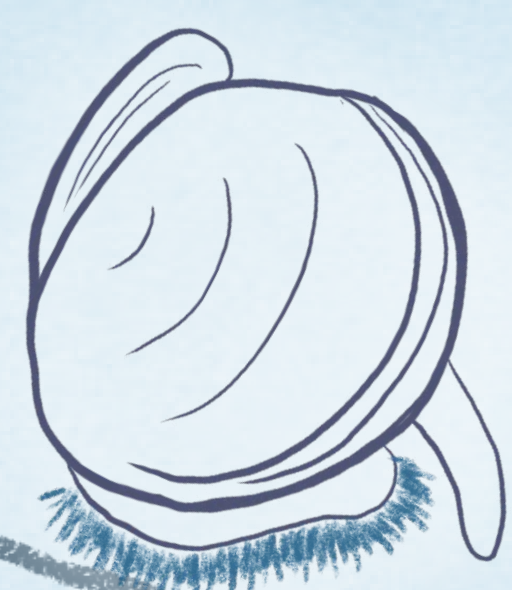
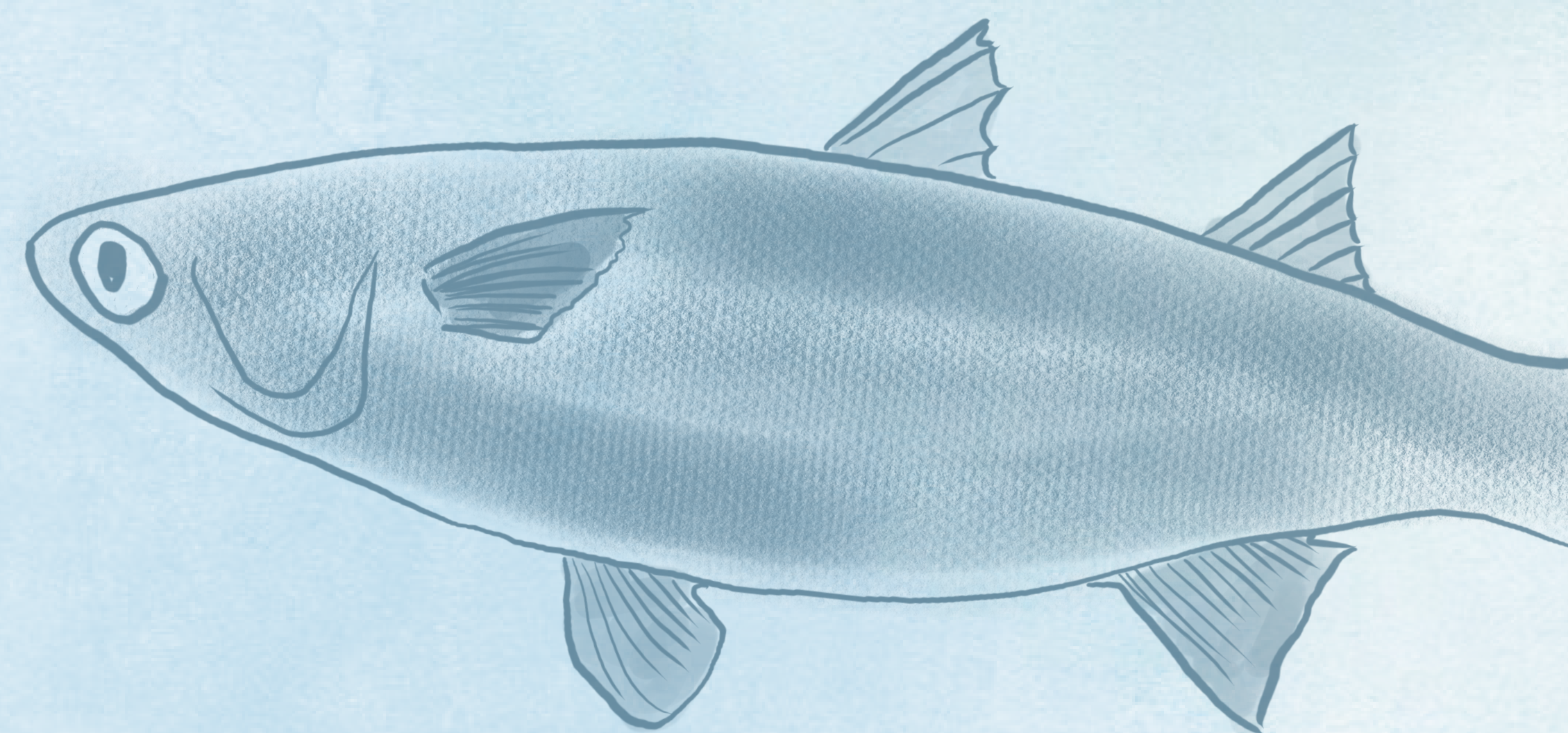


THE OYSTER GARDENER



Learning about our local waterways
Years 9 and 10 science lesson



Learning about our local waterways

A Cross Curricular Approach - Connecting Science, The Arts and Aboriginal & Torres Strait Islander Perspectives

This resource has been developed to be used stand alone or in conjunction with the cross curricular ART classroom resource.

Year 9 Level Description

The science inquiry skills and science as a human endeavour strand 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 and learning programs are decisions to be made by the teacher.

Incorporating the key ideas of science

Over Years 7 to 10, students develop their understanding of microscopic and atomic structures, how systems at a range of scales are shaped by flows of energy and matter and interactions due to forces and develop the ability to quantify changes and relative amounts.

In Year 9, students consider the operation of systems at a range of scales. They explore ways in which the human body as a system responds to its external environment and the interdependencies between biotic and abiotic components of ecosystems. They are introduced to the notion of the atom as a system of protons, electrons and neutrons, and how this system can change through nuclear decay. They learn that matter can be rearranged through chemical change and that these changes play an important role in many systems. They are introduced to the concept of the conservation of matter and begin to develop a more sophisticated view of energy transfer. They begin to apply their understanding of energy and forces to global systems such as continental movement.

Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems (ACSSU176 – Scootle)

Australian Curriculum Content Description

Biological sciences

Multi-cellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment ([ACSSU175 - Scootle](#))

Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems ([ACSSU176 - Scootle](#))

Nature and development of science

Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries ([ACSHE158 - Scootle](#))

Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems ([ACSSU176 - Scootle](#))

Elaborations

- investigating the interdependence of communities and the role of Aboriginal and Torres Strait Islander Peoples in maintaining their environment ([01.2](#), [01.5](#))
- exploring interactions between organisms such as predator/prey, parasites, competitors, pollinators and disease
- examining factors that affect population sizes such as seasonal changes, destruction of habitats, introduced species
- considering how energy flows into and out of an ecosystem via the pathways of food webs, and how it must be replaced to maintain the sustainability of the system
- investigating how ecosystems change as a result of events such as bushfires, drought and flooding

Questioning and predicting

Formulate questions or hypotheses that can be investigated scientifically ([AC SIS164 - Scootle](#))

- acknowledging and using information from Aboriginal and Torres Strait Islander Peoples to hypothesise about fauna or flora distributions
- collaborating with Aboriginal and Torres Strait Islander Peoples to formulate questions and hypotheses that can be investigated scientifically regarding disrupted ecosystems
- using internet research to identify problems that can be investigated
- evaluating information from secondary sources as part of the research process
- revising and refining research questions to target specific information and data collection or finding a solution to the specific problem identified
- developing ideas from students own or others' investigations and experiences to investigate further

By the end of Year 9, students analyse how biological systems function and respond to external changes with reference to interdependencies, energy transfers and flows of matter. They describe social and technological factors that have influenced scientific developments and predict how future applications of science and technology may affect people's lives.

Students design questions that can be investigated using a range of inquiry skills. They design methods that include the control and accurate measurement of variables and systematic collection of data and describe how they considered ethics and safety. They analyse trends in data, identify relationships between variables and reveal inconsistencies in results. They analyse their methods and the quality of their data and explain specific actions to improve the quality of their evidence. They evaluate others' methods and explanations from a scientific perspective and use appropriate language and representations when communicating their findings and ideas to specific audiences.

Aboriginal Perspectives

Students will have opportunities to learn that Aboriginal and Torres Strait Islander Peoples have long standing scientific knowledge traditions and developed knowledge about the world by:

1. observation, using all the senses
2. prediction and hypothesis
3. testing (trial and error)
4. making generalisations within specific contexts such as the use of food, natural materials, navigation and sustainability of the environment.

Humanities and Social Sciences

The diverse cultures of Aboriginal and Torres Strait Islander Peoples are explored through their:

- long and continuous strong connections with Country/Place and their economic, cultural, spiritual and aesthetic value of place, including the idea of custodial responsibility. Students examine the influence of Aboriginal and Torres Strait Islander Peoples on the environmental characteristics of Australian places, and the different ways in which places are represented.
- experiences before, during and after European colonisation including the nature of contact with other peoples, and their progress towards recognition and equality. In particular, students investigate the status and rights of Aboriginal and Torres Strait Islander Peoples, past and present, including civic movements for change, the contribution of Aboriginal and Torres Strait Islander Peoples to Australian society, and contemporary issues.
- exploration of how groups express their identities and come to understand how group belonging influences perceptions of others.
- The use of primary and secondary sources, including oral histories, gives students opportunities to see events through multiple perspectives, and to empathise and ethically consider the investigation, preservation and conservation of sites of significance to Aboriginal and Torres Strait Islander Peoples.

Learning about our local waterways

LESSON PLAN OVERVIEW

In this lesson, students will connect with The Oyster Gardener short film and the themes presented in the film. Exploring the film as a case study, students will reflect on how young people can participate in conservation. Students will then dive into learning about the importance of shellfish reef systems in our Australian marine ecology, through practical examples of shellfish restoration projects in Australia. The lesson makes relevant, and real, the context of how oysters and other species and ecosystems contribute to improving water quality in our catchments.

Next, students will be invited to conduct research to find out about their local waterways and marine ecosystems. They will then undertake a mapping activity, drawing up a partnership model of the various groups and organisations who manage, protect and care for their local waterways and marine ecosystems.

Finally, students will brainstorm and share ways that young people could get involved in caring for their local waterways and ecosystems.

Topics explored

1. Marine and water ecosystems are affected by human interactions.
2. Sediment flows are harmful to these ecosystems, but there are nature-based solutions such as oyster reefs and soil erosion protection via riparian (waterside) vegetation.
3. There are groups who manage, care for, and are champions of, these ecosystems.
4. In order to care for our lands and waterways, we must have a firm knowledge and understanding of the traditional lands that we are on.
5. Indigenous knowledge in land care management is pivotal in conservation and includes the understanding that we are all responsible for the care and maintenance of the ecosystems on which we depend.
6. Young people can help our waterways by supporting these groups and participating in grassroots action locally.

PART A: The Oyster Gardener - Scene Setting

Play the short film The Oyster Gardener (11 mins) to provide background information for student's research.

Shellfish reefs are an important part of our marine ecosystems. Information about Australia's shellfish restoration projects and their importance can be found [here](#). Shellfish reefs are one of Australia's most critically endangered marine ecosystems. These reefs, made from billions of oysters and mussels, once thrived in over 200 locations in Australia's bays and estuaries from Noosa in Queensland right around Australia's southern coastline to Perth in Western Australia. Now less than 10% remain. [The Nature Conservancy](#) aims to restore 60 shellfish reef systems across Australia.

The [Oyster Gardener](#) is a short film about the oyster restoration project happening in the Noosa River in Queensland. See the **Noosa Oyster Ecosystem Restoration Project** brochure, provided with these learning materials, for more details of this project.

How to watch the film with your class

If your school or institution has a ClickView subscription, you can watch The Oyster Gardener on the [ClickView](#) platform. If you do not have access to ClickView, you can purchase an educational licence to screen the film to your class and request a streaming link to share with your students. Please complete the [Host a Screening](#) form on our website and our team will be in touch to assist you.



Post film reflection

- What themes do you feel this film explores?
- What role do oysters play in the marine ecosystem?
- Why do you think the filmmakers made this film?
- What feeling did it leave you with?
- What are the challenges Jolie is facing?
- How is she addressing them?
- What of Jolie's experience do you relate to?
- Did anything surprise, delight, or confuse you?
- What have you learned from Jolie and the project that you could apply to yourself?
- What would you ask Jolie about the project?
- Does the film inspire you to do something?

The project was delivered via a unique community collaboration, which is important for ongoing monitoring, and provides a great real-life learning example for schools on how projects such as this are achieved. See the **Partnership Model** that comes with the lesson materials.

There are many organisations working to protect marine and water ecosystems across Australia, and many are run by volunteers who would appreciate support from the community.

There are over 30 different [shellfish regeneration projects](#) now completed across Australia. The Noosa River Oyster Reef Restoration is just one example. The project is being led by The Nature Conservancy and their partners.



About oysters and the role they play in a marine ecosystem:

Oysters in particular, reside in brackish water systems. Brack or brackish is a broad term used to describe water that is more saline than freshwater but less saline than true marine environments. Often these are transitional areas between fresh and marine waters. An estuary, which is the part of a river that meets the sea, is the best-known example of brackish water. This area of a catchment is the perfect environment for shellfish such as oysters, as it is also tidal.

Oysters will attach to all sorts of structures such as rock walls and bridge pylons. Oysters provide filtration of the river system and are referred to as the engineers of reef ecosystems, as they provide habitats for other species and their own set of structures as they grow and form.

Traditional uses and sustainable resource management:

Traditionally Aboriginal people utilised the Noosa river in a sustainable fashion. Aboriginal people understood that they are responsible for the care and maintenance of the ecosystems on which we depend, and as such they only took what was needed from their local environment. They practiced detailed aquaculture and fishing practices, which allowed them to cater for large gatherings.

Evidence of Kabi Kabi activity in the Noosa area includes shell middens, stone tools, scar trees and Bora rings. Middens were formed from the discarded shells from the seafood eaten by the Kabi Kabi, and were common along the banks of the Noosa River and nearby Weyba, Doonella, Cooroibah and Cootharaba Lakes.

These large accumulations of shell material were strategically placed to help support the shoreline. They were considered a ready resource by the European settlers and used to create road bases in the early days of settlement. This was a major reason for the depletion of reef systems across the region, as well as to provide safe and easy passage for logging boats.

For more information about Kabi Kabi people's utilisation of oysters in the area, please view [Tewantin Oyster Feasts](#).

"For more than 65,000 years, Aboriginal communities of the Noosa area have lived sustainably and have only taken what they need from the ecosystems that support us." — *Aunty Bev Hand, Kabi Kabi Educator*

[Visit this page](#) to learn more about the use of oyster shells for road base during early development of the area.

PART B: Student Task Overview

Students will expand upon their learning in The Oyster Gardener case study, by undertaking research (working either individually or in groups) to find out more about their local waterways and marine ecosystems. The following research questions have been designed to guide students through an exploration of their local area, to understand where their water comes from, the interconnectedness of systems, and why it's important to have clean water and healthy ecosystems.

Students will then be invited to map out the groups and organisations who manage their local water systems, and find out what environmental initiatives and opportunities there are to get involved with - just like Jolie did in The Oyster Gardener when she volunteered with her community!

The following activity can be completed in groups or by individual research and exploration.

"Understanding and connecting with your local Aboriginal community is an important step to Reconciliation - do you know which lands you are now Custodians of?" — *Aunty Bev Hand, Kabi Kabi Educator*

Research activity: Get to know your local area and waterways

Task students to research and respond to the following questions.

- Do you know which traditional land, language group, clan or nation, our home/school is located on? Visit the [AIATSIS website](#) to find out.
- Where does your water come from? Find out the name of the catchment in your area and see if you can find it on a map!
- Is the Catchment a freshwater or tidal system? What sorts of plants and animals live by or in the water? What is unique about this ecosystem?
- Is there any information on the historic use of the river or waterway both pre and post colonisation?
- Can you see evidence of oyster reef systems in your catchment? i.e. can you see oysters growing on rock walls or bridge foundations? If you're not near brackish water, what other species can you observe?
- Are there signs of shell middens or other archaeological evidence from Aboriginal use? What do we know of Aboriginal people's use of water locally?
- How did colonisation change your local catchment, i.e. was it used for logging or dredged for road base use, or something else?

Research tip: Explore local museums, libraries (including the heritage section). You could reach out to historical groups and connect with your local Council and your local Land Council.

- What are some of the factors that impact the health of your local water system? Consider things like sediment, human activity, invasive species.
- Does the catchment change in any way after heavy rains? Think about what it looks like. Is there marine debris, a lot of sediment, change in colour of the water etc? What do you observe is occurring and why?
- What are some of the traditional sustainable management methods that local Aboriginal people have been practicing to take care of this ecosystem?
- What are some of the current environmental initiatives that are happening to either clean up, protect, preserve or restore areas of your local water system?

Mapping Activity: Who manages and looks after the water ways?

- Which groups are currently responsible for the care of the river catchment or water system?
- Take a look at the Partnership Model, which is part of the lesson materials. You will see an example of the partnership model for catchment protection and restoration in Noosa - some of these individuals and groups you will recognise from The Oyster Gardener.
- Draw up your own version of a Partnership Model with the research you've done. Map out the individuals, organisations and groups who manage your local water sources. Try to see if you can map the connections between them and summarise how they might work together.
- How can you get involved in caring for your local waterways? Hint: You could find out from your local Council or by visiting your local Catchment Authority website.
- (Optional) Invite students to create a poster showcasing their learnings and including all the ways that they could get involved in caring for their local waterways - whether that be joining or starting a clean-up day, getting involved in a restoration project like Jolie did, or taking actions at home and school, that help to minimise impact on the local waterways.

Share your work

The filmmakers of The Oyster Gardener, and the team at Regenerators, always love to see the work that students create! If your students would like to share what they have done, please email us at contact@regenstudios.com and put 'The Oyster Gardener - Science Lesson' in the subject header. We may showcase these pieces on our social media (@regenerators) and [website](#). If we do, we will be sure to reach out and let you know before we publish anything.

Take it further

Learning extension ideas:

1. Organise an excursion to take the students to a catchment site for water testing and observation. This could include an activity of reflection, sitting quietly and writing reflections with prompting questions, sketching species, guided meditation to connect to Country, etc.
2. Research and organise a walk on Country for your class with a Traditional Owner or Elder, to learn more about the local waterways and traditional sustainable practices and uses. For more ideas and learning, you can visit the Regenerators platform here: [Learn about healing Country and Indigenous knowledge in land care management](#).
3. Invite your students to learn about nature-based solutions to the climate and biodiversity crisis. Task them with researching and finding another example of a nature-based solution, researching it and presenting their learnings to the class.
4. Students could learn about and contribute to the Ocean Youth Group's (OYG) [Wave of Change](#) project, which is open all year round for submissions. OYG is a leading ocean action & innovation organisation for youth. Students are invited to create ocean themed art, pitch an idea for an advocacy project, or share an innovative idea to help the ocean.



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