

Great Barrier Reef

Teacher Notes

Secondary (7-10)

ACTIVITY DESCRIPTION

Students will learn about one of the threats to the ongoing health and survival of the Great Barrier reef - decreasing water quality. They will review information from various sources and interpret catchment data from a map.

Students will investigate the potential impact to water quality of the reef of the proposed Adani coal mine development and develop an article or campaign showing their understanding of the issue.

INSTRUCTIONS

1. Tune in

Watch the video **Threats to the Reef (land-based run-off)**: <https://youtu.be/KMWdx9xtaV0>

Invite students to note down any new vocabulary. After the clip, discuss these words and create a vocab wall.

As a class, discuss the current water quality of the Great Barrier Reef and the factors that are influencing it.

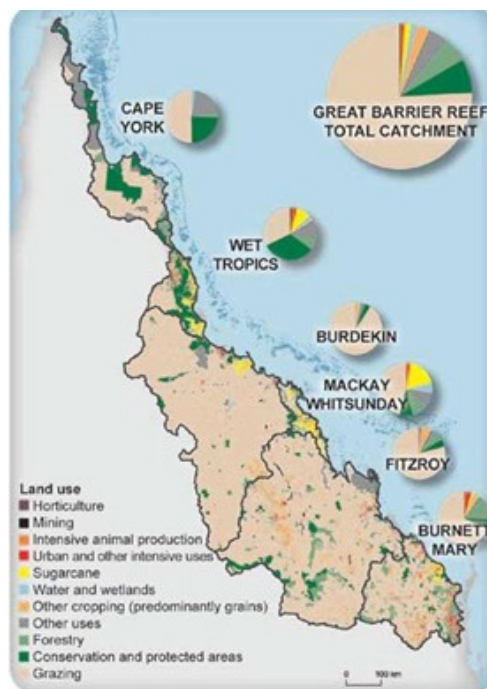
What are some actions the video suggests as solutions?

2. Interpret data

Review the map of The Barrier Reef catchment (see below). You can view this online.

Website: <https://www.reefplan.qld.gov.au/about/regions/great-barrier-reef/gbr-first-report-card/>

What is the main activity in the water catchment? How is this linked to water quality?



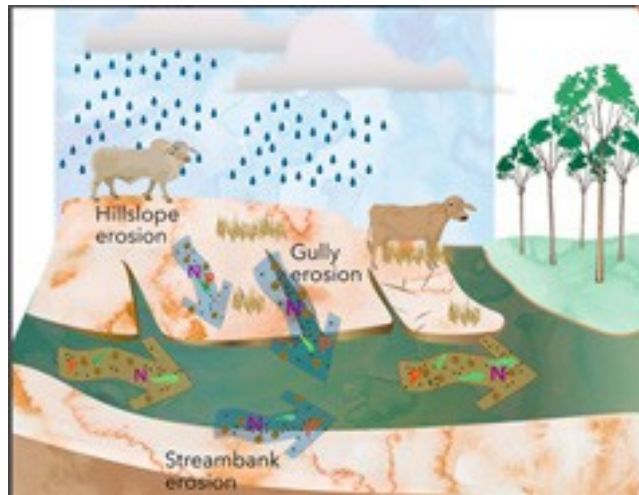
INSTRUCTIONS (Cont'd)

3. Grazing

The grazing lands that surround the reef are a key source of increased sediment and nutrient concentrations. This sediment can reduce sunlight available to sea grasses and corals and can smother coral growth. Overtime, unsustainable grazing practices reduce pasture and ground cover, which increases the risk of valuable top-soil being lost and drained away into the reef. The resulting decline in water quality for the reef increases the risk of serious long-term effects on its health.

To help students understand run-off from grazing and its impacts, you can watch this short clip:

Source: <https://www.qld.gov.au/environment/agriculture/sustainable-farming/reef/reef-regulations/about/sediment-runoff>



4. Discussion

Explain how the water catchments of the Great Barrier Reef are impacting on the water quality and environment. List the different factors that are contributing to reduced water quality. How might run-off from our schools and homes affect our waterways and beaches here in Melbourne?

5. Take Action

Students could work on one of the following projects to take positive action to protect either the Great Barrier Reef or a local waterway

- Write an article in the school newsletter outlining the issue and solutions
- Produce a poster of things that affect water quality in the Great Barrier Reef
- Develop a campaign that outlines all the reasons why we should protect the Great Barrier Reef

SUGGESTIONS FOR ASSESSMENT

Formative

- Participation in the activities: understanding the video content and interpreting map data
- Completion of Discussion questions above
- Development of an article or campaign

BACKGROUND NOTES

The Great Barrier Reef receives runoff from 35 major catchments that drain water from 424,000 square kilometres of coastal Queensland.

Reefs grow best in waters with naturally low nutrient (nitrogen and phosphorus) and sediment concentrations. However, increased use of nutrients, pesticides and other pollutants on land has resulted in higher nutrient and sediment loads in waterways and the Great Barrier Reef. Over the past 150 years, sediment flowing into the Great Barrier Reef catchment has increased on average four to five times, even up to ten times in some catchments.

The grazing lands that surround the reef are a key source of increased sediment and nutrient concentrations. This sediment can reduce sunlight available to sea grasses and corals and can smother coral growth. Overtime unsustainable grazing practices reduce pasture and ground cover, which increases the risk of valuable top soil being lost and drained away into the reef. The resulting decline in water quality for the reef increases the risk of serious long-term effects on its health.

Declining water quality can impact corals in many ways, here are just a few:

- reduced light can reduce hard coral cover
- increased algal growth due to increased nutrients in the water reduces space for coral polyps to settle and grow
- coral disease and crown-of-thorns starfish outbreaks can be attributed to nutrients in the water and reduce resilience of reefs

New developments on land can further impact water quality. It is feared that the Adani coal mine project could directly and indirectly further degrade the water quality of the reef.

For more information, see <https://www.theguardian.com/business/2017/aug/16/why-adanis-planned-carmichael-coalmine-matters-to-australia-and-the-world>

KEY TERMS:

Litter

Contaminants

Nutrients

Run-off

Sediments

Resilience

RESOURCES

<https://elibrary.gbrmpa.gov.au/jspui/retrieve/f595b582-afe0-49cb-a964-8a1a44604594/ReefBeat-Threats-to-the-Reef-activity-book-v2.pdf>

<http://www.gbrmpa.gov.au/managing-the-reef/threats-to-the-reef/declining-water-quality>

<https://www.theguardian.com/business/2017/aug/16/why-adanis-planned-carmichael-coalmine-matters-to-australia-and-the-world>

<https://oceanservice.noaa.gov/facts/coral-pollution.html>

<https://www.reefplan.qld.gov.au/about/regions/great-barrier-reef/gbr-first-report-card/>

https://www.gbrmpa.gov.au/_data/assets/pdf_file/0005/9923/Reef-Beat-activities-tsv.pdf

ACCESS THIS ACTIVITY

Visit the **CERES School of Nature and Climate** website to download the activity - <https://sustainability.ceres.org.au/education-resources/curriculum-activities/>

Curriculum and RSS Links

KEY CONCEPTS

Water Footprint, Water Use, Water Conservation

KEY LEARNING INTENTIONS

1. Students will be able to interpret information from several sources: video, map and newspaper articles
2. Students will research a proposed development and its potential impact on water quality and write an article or campaign about this development

VICTORIAN CURRICULUM

Science

7 - 8

Water is an important resource that cycles through the environment ([VCSSU101](#))

Geography

7 - 8

Identify, analyse and explain interconnections within places and between places and identify and explain changes resulting from these interconnections ([VCGGC101](#))

Analyse maps and other geographical data and information using digital and spatial technologies as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology ([VCGGC104](#))

Ways that flows of water connect places as they move through the environment and the ways this affects places ([VCGGK106](#))

9 - 10

Identify, analyse and explain significant interconnections within places and between places over time and at different scales, and evaluate the resulting changes and further consequences ([VCGGC129](#))

Analyse and evaluate data, maps and other geographical information using digital and spatial technologies and Geographical Information Systems as appropriate, to develop identifications, descriptions, explanations and conclusions that use geographical terminology ([VCGGC132](#))

The interconnection between food production and land and water degradation; shortage of fresh water; competing land uses; and climate change, for Australia and other areas of the world ([VCGGK135](#))

SUGGESTED RESOURCESMART SCHOOLS MODULE LINKS



Undertaking the activity as described above links to the *ResourceSmart Schools Water Module - actions B1.1, B1.2, B1.3*

Below is a list of extension activities that link to additional actions of the Water module:

1. Conduct a water audit at your school to identify ways that water is used and any possible water saving strategies and recommendations (*Resourcesmart Schools Water Module - actions A1.1, B1.4, B1.8, C2.1*)
2. Implement a water saving strategy at your home for one week. Document the process and report your challenges and successes to the class (*ResourceSmart Schools Water Module - action B1.3*)
3. Create interpretive signage about water conservation and display them around the school to raise awareness and to encourage water savings (*ResourceSmart Schools Water Module - action A2.5*)
4. Design and create a water efficient school garden that includes local, drought tolerant plants to suit the local environment and climatic conditions. Talk to a local plant expert or friends group for advice on appropriate plants (*ResourceSmart Schools Water Module - actions A4.2, B1.3, B1.6, B1.8*)
5. Invite a local indigenous group(s) to share their traditional perspectives on the uses and value of water (*ResourceSmart Schools Water Module - actions B1.5, B1.6*)
6. Create an education brochure or pamphlet educating people about water conservation in the home. Distribute these in the school e-newsletter (*ResourceSmart Schools Water Module - actions C1.1, C3.5*)

Speak to your CERES ResourceSmart Schools Facilitator about further links to the Water Module.