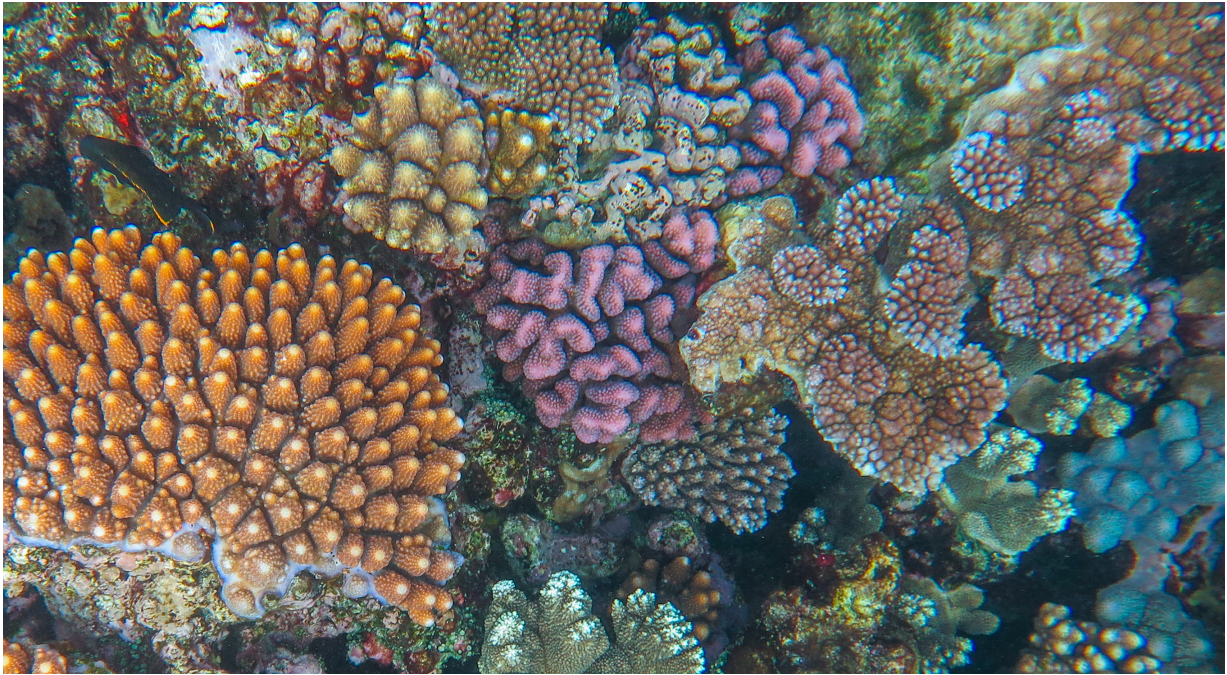


CORALWATCH

Corals are Cool and Crucial



Year 4 Unit plan

Includes: Importance of coral reefs, threats, coral lifecycle, sustainability, citizen science.



THE UNIVERSITY
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AUSTRALIA



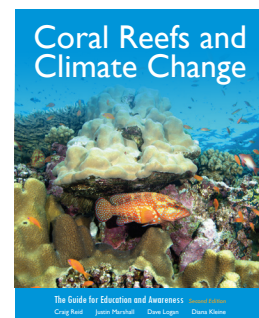
CoralWatch education

The lessons and resources of this '***Coral Watch*** are produced by CoralWatch and are aimed at year 4 Science and are linked to the Australian Curriculum v8.4

CoralWatch is a not-for-profit marine citizen science organisation based at The University of Queensland. CoralWatch uses the Coral Health Chart to promote active learning opportunities for citizen scientists of all ages. The content of this booklet extends beyond monitoring, and provides worksheets to bring reef science into the classroom.

Most lessons relate to chapters in the education guide and DVD series, '***Coral Reefs and Climate Change – The Guide for Education and Awareness***' published by CoralWatch. The Virtual Reef tools provide a real opportunity to learn about coral bleaching and reef monitoring in the classroom. They can be used to assist student preparations for a field trip, or can provide a valuable alternative to a field trip. However, we encourage you to take students in the field since this is the most valuable and intense experience learning about our beautiful coral reefs.

All CoralWatch materials can be downloaded or ordered from CoralWatch (www.coralwatch.org). See pages 22-24 for an overview of resources.



'Coral Reefs and Climate Change' book.

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TEACHER GUIDE - BACKGROUND CORAL REEFS

In our 'Corals are Cool and Crucial' program students will learn about the importance of The Great Barrier Reef and local reefs, the lifecycle of corals and gain understanding how living things in the ocean depend on each other to survive. Students learn about threats to coral reefs and climate change and how citizen scientists collect data on coral health. Students will practice coral monitoring, collecting and analysing virtual data using virtual tools. Students will learn about sustainable actions they can take in everyday life and how community action is required to sustain reefs for the future.



Soft coral

What are corals?

Corals are living animals and are part of the same invertebrate phylum as jellyfish, known as Cnidaria. Reef-building corals are part of the class Anthozoa, and order Scleractinia. A single animal is called a coral polyp. Polyps can range in size from less than 1mm to more than 15cm. Most corals form colonies, where thousands of polyps share the same physical skeleton. Some corals are solitary and live as a single polyp. Corals absorb calcium and carbonate molecules from the seawater to construct a skeleton. Tiny algae, called zooxanthellae (or symbiotic algae), live within the coral tissue.

Corals are animals that build large hard structures that can be seen from the air and even from space. When viewed close up, tentacles and a mouth are visible. Corals use these external features at night to capture plankton and feed. However, during the day something very different happens. Corals have a special relationship (symbiosis) with a microscopic type of algae/plant called zooxanthellae (pronounced 'zoo-zan-thel-ay'). Corals provide a home for the zooxanthellae and in return they provide food and colour. There are more than 800 different species of hard corals. Corals come in many different shapes and sizes - these are called coral growth forms. Branching corals are fast-growing. Boulder corals grow more slowly and some may be more than 100 years old. CoralWatch uses four growth forms that you can easily recognise.

Soft corals are soft and bendable, they don't have a skeleton. They are identified by the sets of eight tentacles that surrounds each polyp (as opposed to six in hard corals).

The Great Barrier reef is home to over 400 species of hard corals.



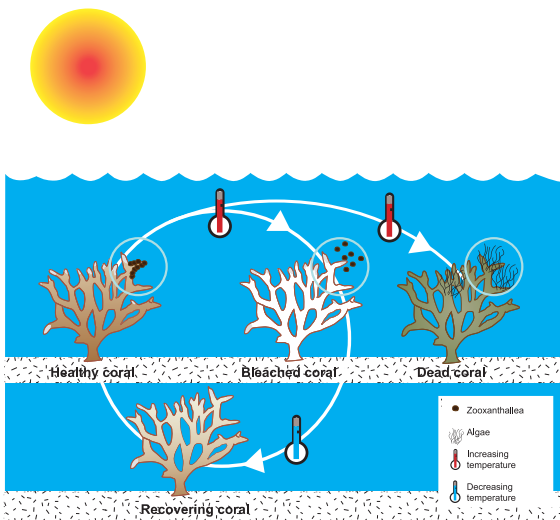
TEACHER GUIDE - BACKGROUND CORAL REEFS

Why are corals important?

The GBR is home to a vast array of marine species (fish, sharks, turtles, rays, corals and many inverts) providing essential habitat. Reefs protect our coastlines from storms and cyclones, and allow seagrass and mangroves (nursery grounds) to grow in calm waters. The GBR is the medicine cabinet of the future, providing chemicals for new pharmaceuticals.

Coral lifecycle

The coral lifecycle involves both sexual and asexual reproduction. Sexual reproduction in corals begins when coral colonies release eggs and sperm (gametes) into the water column. Usually, this only occurs once a year and is timed with the lunar cycle. In the water column, the sperm fertilises the egg to form a zygote, which develops into a free swimming larva called a planula. The planulae drift with the ocean currents for around 4-5 days and uses chemical signals to 'search' for a place to settle on the reef, such as a rock or the skeleton of a dead coral. Here, the planulae begin to develop into a polyp, with a mouth and tentacles, and start to form a coral colony through a process called coral recruitment. Asexual reproduction can occur in these coral colonies. This involves the polyps budding off to form new identical polyps which then grow and develop into colonies, also known as coral fragmentation.



Coral symbiosis and bleaching

When coral becomes stressed from rising ocean temperatures, the coral expels the symbiotic algae living inside. This process is known as coral bleaching. Zooxanthellae give the coral their brown or green appearance and when gone the white skeleton is visible underneath. Without the zooxanthellae, corals do not get enough food/nutrients, and may die if the stressful conditions are severe. The main cause of large bleaching events is increased water temperature. Sea temperatures are predicted to rise due to climate change, and bleaching events are expected to occur more frequently. There are many things you can do to reduce the impact of climate change: renewable energy, public transport, recycling etc.

Threats to coral reefs

Coral reefs face a number of threats:

1. Climate change: Rising sea temperatures and ocean acidification can harm coral reefs.
2. Overfishing: Overfishing can cause imbalances in the food chain, resulting in the loss of important fish species that help to maintain coral reef health.
3. Pollution: Pollution such as agricultural runoff and plastics can introduce harmful nutrients and chemicals into the ocean, which can damage coral reefs.
4. Physical Damage: Human activities, such as anchoring boats, standing on corals, or collecting corals can damage and destroy coral reefs.
5. Invasive Species: Invasive species can outcompete native species, disrupting the delicate balance of coral reef ecosystems, for example the Crown of Thorn starfish.
6. Coastal development can result in sedimentation which can smother corals
7. Cyclones and destructive storms.

Overall, the biggest threat to reefs is climate change and the biggest solution to protect reefs is reducing carbon emissions.

TEACHER GUIDE - BACKGROUND CORALWATCH MONITORING

[CoralWatch](#) is a marine citizen science organisation at The University of Queensland in Brisbane, Australia. As colour is an indicator of coral health, CoralWatch uses the Coral Health Chart as a non-invasive method for the monitoring of coral health. In the field, users simply compare colours of corals with colours on the chart and record matching codes and coral type. The method is simple and anyone can get involved including your students, who can practise this in class with virtual reefs



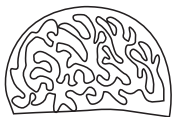
The Coral Health Chart uses four coral types to classify corals. **Boulder** refers to any massive or rounded coral such as some *Platygyra* and *Porites* species. **Branching** refers to any branching coral such as *Acropora* and *Pocillopora* species. **Plate** refers to any coral that forms a plate-like formation such as tabular *Acropora* species, and the **soft** category refers to corals lacking a hard skeleton, such as *Xenia* species.

Corals can exist in many shapes, and some corals may not clearly match any of these categories. Our aim is to keep the chart and survey as simple as possible, so if you're experiencing difficulties when classifying your corals, please simply choose the closest coral type.



Boulder (BO)

Any massive or rounded coral, such as some *Porites* species.



Branching (BR)

Any branching coral, such as some *Acropora* species.



Plate (PL)

Any plate-like shape coral, such as tabular *Acropora* species.



Soft (SO)

Any corals lacking a hard skeleton, such as *Sarcophyton* species.



B1	B2	B3	B4	B5	B6	C1
E6	<p>CORALWATCH CORAL HEALTH CHART</p> <p>THE UNIVERSITY OF QUEENSLAND AUSTRALIA</p> <p>Atlas of Living Australia</p> <p>BioCollect</p>					C2
E5						C3
E4						C4
E3						C5
E2						C6
E1						D6

How to Use the Coral Health Chart

1. Choose a random coral and select the lightest area.
2. Rotate the chart to find the closest colour match.
3. Record the colour code on a data slate.
4. Select the darkest area of the coral and record the matching colour code.
5. Record the coral type.
6. Continue your survey with other corals. Record at least 20 corals.
7. Submit your data online at www.coralwatch.org.

Survey Methods include (depending on experience and location):

- **Random Survey** – Select corals randomly, such as the closest coral after every second fin kick.
- **Transect Survey** – Select corals by following a line (transect) and record every few meters.
- **Easily Identified Corals** – Select corals you can recognise and return to (permanent transect).

Tips

- Corals are fragile animals, make sure your survey has no effect on marine life.
- Due to colour loss at depth, use a torch when diving below 5 metres/15 feet.
- Avoid measuring growing tips of branching and plate corals since they are naturally white.
- Do not monitor blue or purple corals because they have a different bleaching response.
- Some corals are naturally lighter than others. Regular surveys are needed to look at coral health over time or pick up trends of bleaching and recovery.

Coral Types



Boulder (BO)



Branching (BR)



Plate (PL)



Soft (SO)

Basic instructions on how to use the Coral Health Chart can be found on the back of the chart.

TEACHER GUIDE - CURRICULUM LINKS

Australian Curriculum links - Year 4 Science learning outcomes

SCIENCE UNDERSTANDING

Biological Sciences

- Living things have life cycles (ACSSU072)
- Living things depend on each other and the environment to survive (ACSSU073)

SCIENCE AS A HUMAN ENDEAVOUR

Nature and development of science

- Science involves making predictions and describing patterns and relationships (ACSHE061)

Use and influence of science

- Science knowledge helps people to understand the effect of their actions (ACSHE062)

SCIENCE INQUIRY SKILLS

Processing and analysing data and information

- Use a range of methods including tables and simple column graphs to represent data and to identify patterns and trends (AC SIS068)
- Compare results with predictions, suggesting possible reasons for findings (AC SIS216)

Communicating

- Represent and communicate observations, ideas and findings using formal and informal representations (AC SIS071)

THE ARTS

Visual Arts

- Use materials, techniques, and processes to explore visual conventions when making artworks (ACAVAM111)

TECHNOLOGIES

Knowledge and Understanding

- Recognise different types of data and explore how the same data can be represented in different ways (ACTDIK008)

Processes and Production Skills

- Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)
- Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)

MATHS

Data representation and interpretation

- Select and trial methods for data collection, including survey questions and recording sheets (ACMSP095)

CROSS-CURRICULUM PRIORITIES

Sustainability

- The biosphere is a dynamic system providing conditions that sustain life on Earth (OI.1)
- All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival (OI.2)
- World views are formed by experiences at personal, local, national, and global levels, and are linked to individual and community actions for sustainability (OI.4)
- The sustainability of ecological, social, and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future (OI.6)
- Actions for a more sustainable future reflect values of care, respect, and responsibility, and require us to explore and understand environments. (OI.7)

TEACHER GUIDE - KEY LEARNING POINTS

Key learning points

- The Great Barrier Reef (GBR) is the largest reef in the world and can be seen from space.
- The GBR provides a habitat for marine plants and animals and is important as a food source, a protective barrier, provides products, income and employment.
- The GBR is impacted by threats such as coral bleaching, cyclones, crown-of-thorns starfish and water quality. The biggest threat to reefs is climate change.
- Coral reefs are dependent on the environment around them for survival and require warm, clear and nutrient poor water.
- Corals can also be found in coastal areas south of the GBR such as Moreton Bay.
- Corals are living organisms with a life cycle, reproduction, egg development, settlement, budding.
- Corals live in symbiosis with a plant called zooxanthellae, they have a mutualistic relationships, where both benefit.
- Mass coral bleaching events are a stress response to rising ocean temperatures as a result of global warming.
- Bleached corals can recover when water temperatures return to normal within thresholds.
- Not only scientists, anyone can help monitoring reefs using the Coral Health Chart with CoralWatch.
- There are many things you can do at home to protect coral reefs for the future.

Curriculum linked activities

1. Presentations with teacher notes that includes; coral reefs, importance, threats, sustainability

Science – ACSSU072, ACSSU073, ACSHE062, Sustainability – OI.1, OI.2, OI.4, OI.6, OI.7

2. Coral lifecycle

Science – ACSSU072, ACSSU073, ACSHE061, ACSIS216, ACSIS071, Sustainability – OI.1

3. Symbiosis game

Science – ACSSU073, Sustainability – OI.1

4. Ozbots: Help the fish swim from the mangrove to the reef

Science – ACSSU073, Technologies (digital) – ACTDIPO10, ACTDIP011, ACTDIK008, Sustainability – OI.6

5. Virtual reality: visit the reef and learn about citizen science. Create your own headset.

Science – ACSSU073, ACSHE062, Arts – ACAVAM111, Maths - ACMSP095, Sustainability – OI.6

6. Become a citizen scientists - virtual reef activity

Science – ACSSU073, ACSHE062, ACSIS068, Sustainability – OI.6, OI.7

7. 'Coral Reefs' interactive online game

Science – ACSHE062, ACSSU073, Sustainability – OI.4, OI.6, OI.7

8. Do's and Dont's for the reef

Science – ACSSU073, ACSHE062, Sustainability – OI.2, OI.4, OI.7

9. Art activity: Create your own reef from recycled materials

Arts – ACAVAM111

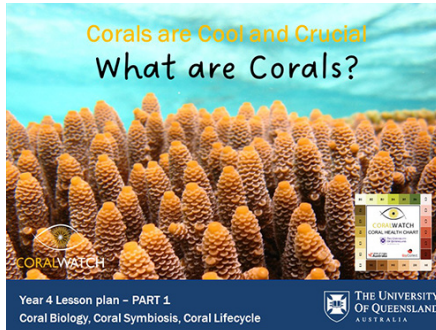
10. Take a pledge for the reef

Science – ACSHE062, Sustainability – OI.6, OI.7, Arts – ACAVAM111

CLASSROOM PRESENTATIONS

Lesson plan sequence

There are three presentations with teacher notes available for this lesson series. Each presentations suggests related activities.



Presentation 1 (15-20 min)

What are Corals?

Coral Biology, coral symbiosis and coral lifecycle

Activities:

1. Coral reef lifecycle game
2. Symbiosis game



Presentation 2 (15-20 min)

Great Barrier Reef

Coral reef environment, threats such as coral bleaching

Activities:

3. Ozbot: Help the fish swim from the mangrove to the reef
4. Become a citizen scientists - Virtual reef activity
5. Virtual reality: Visit the reef and learn about citizen science.



Presentation 3 (15-20 min)

Help protect reefs

Citizen science, saving reefs from home

Activities:

6. 'Coral Reefs' interactive online game
7. Take a Pledge for the reef
8. Do's and Dont's for the reef
9. Art activity: Create your own reef from recycled materials

All activities downloadable from the [education](#) section on the CoralWatch website. All presentations are downloadable from [google drive](#)

Extra resources

- Coral Reefs and Climate Change book and videos
- Great Barrier Reef and What Can I do? factsheet
- Coral Health Charts
- Virtual reefs

ACTIVITY 1: CORAL LIFECYCLE

Students learn about 4 different stages in the coral lifecycle by cutting out stages and creating their own reef picture.

Teacher instructions

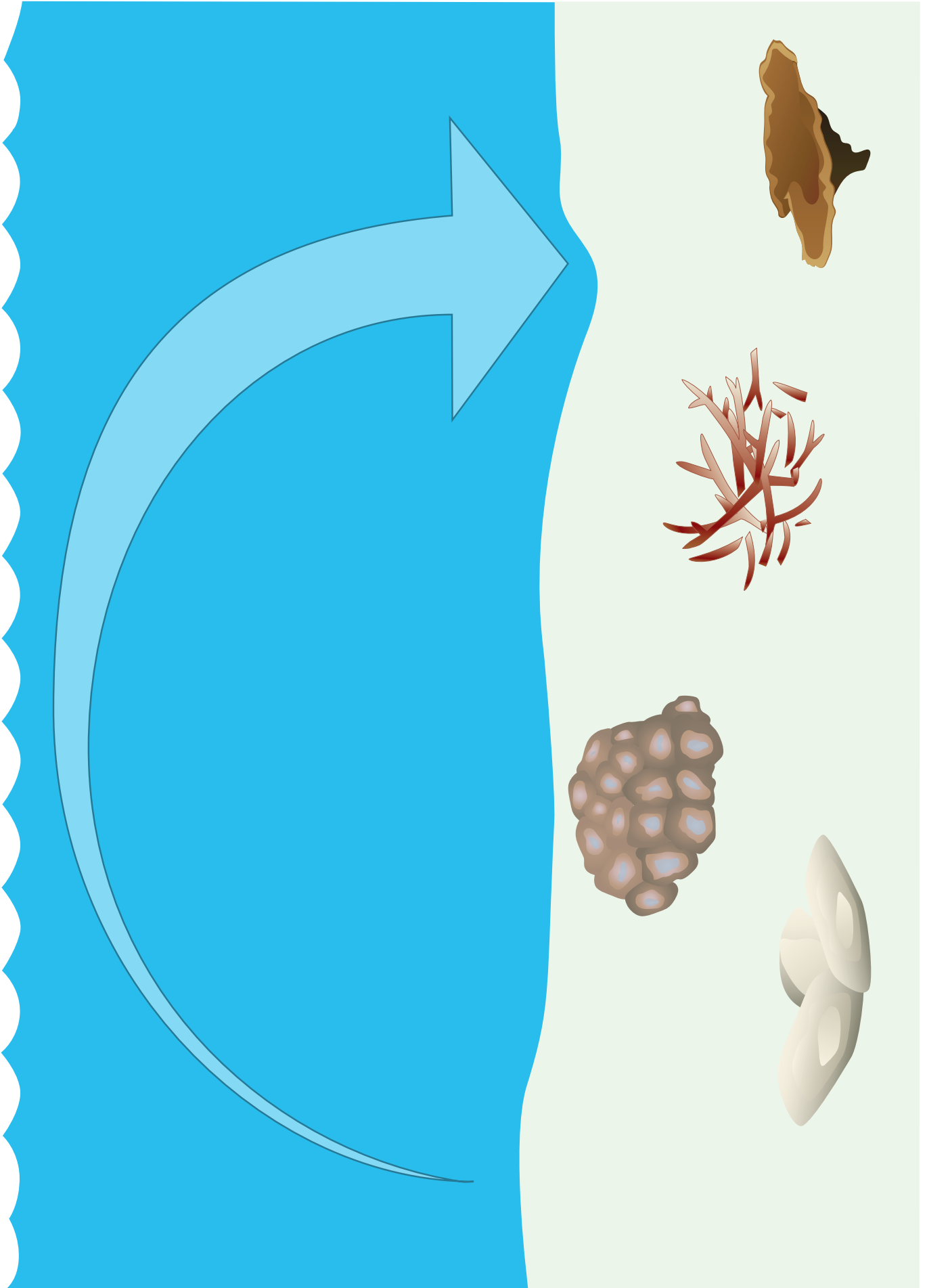
1. Distribute hand-outs to each student.
2. Students cut out 4 life-cycle stage icons, text and stages.
3. Students arrange the order they think they would occur on the coral life-cycle diagram on the background provided.
4. Review and discuss what students think is a coral lifecycle. Show (or co-create) the accurate lifecycle to students and give them time to fix their own life-cycle.
4. Students glue cutouts and draw and add more marine creatures to the picture.
5. Review final work and repeat the different life-cycle stages with students.

Materials

- [Download](#) Handout: Coral life stage icons, descriptions and headers
- [Download](#) Handout: Coral life cycle diagram/background
- Scissors
- Glue stick
- Paper
- Pencils



ACTIVITY 1: CORAL LIFECYCLE BACKGROUND



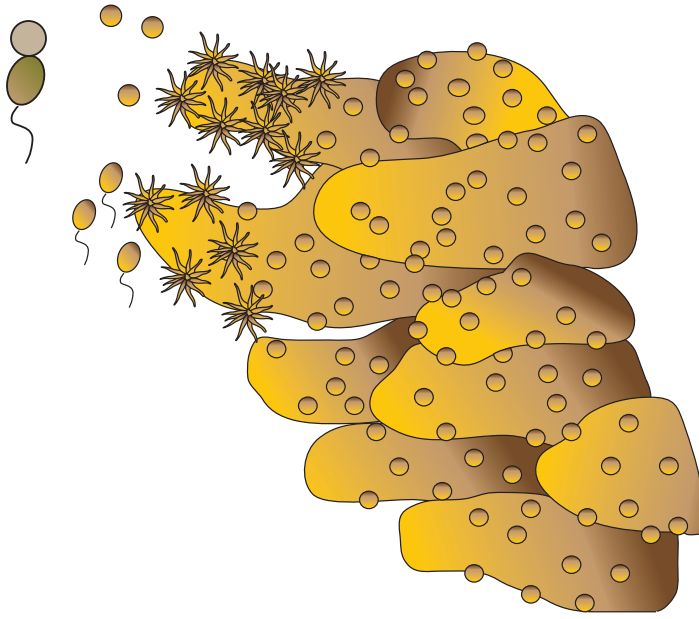
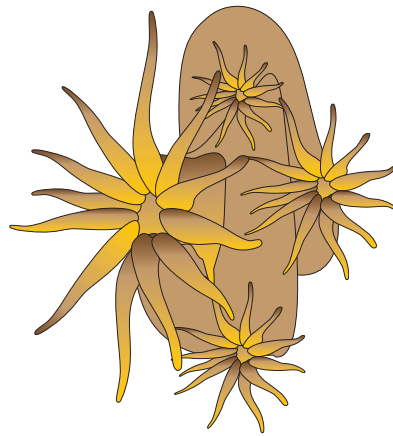
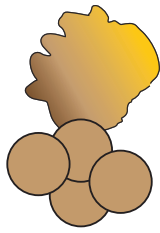
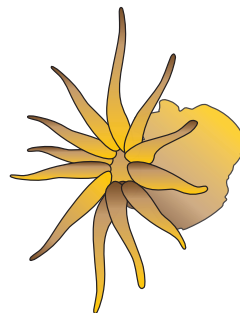
ACTIVITY 1: CORAL LIFECYCLE ELEMENTS

REPRODUCTION

BUDDING

SETTLEMENT

EGG DEVELOPMENT



The eggs begin to divide and develop into a coral larva, which drifts with the ocean current.









The coral larva finds a hard surface to settle, where it develops into a polyp with a mouth and tentacles.

The polyp begins to mature into an adult, dividing into more polyps to create a coral colony.

Once a year, mature coral polyps release eggs and sperm clusters which float to the surface and fertilise.

ACTIVITY 2: SYMBIOSIS GAME

Corals live in symbiosis with a tiny plant called zooxanthellae. Learn about other interactions between two similar organisms. The most common types of symbiosis found in the ocean are mutualism and commensalism. Mutualistic relationships refer to pairings who live and work together for mutual benefit. A commensalistic relationship is one where one party in the relationship benefits, and the other is neither helped nor harmed by the process.

 <p>Corals</p>	<p>CORALWATCH</p> <p>Corals are animals providing a home for tiny algae called zooxanthellae.</p> <p>MUTUALISM</p> 	 <p>Moray eel</p>	<p>CORALWATCH</p> <p>Moray eels will seek out cleaner shrimp and let them clean any parasites from their teeth and skin, giving the shrimp a free meal!</p> <p>MUTUALISM</p> 
 <p>Zooxanthellae</p>	<p>CORALWATCH</p> <p>Zooxanthellae are microscopic algae living in the coral providing food and colour.</p> <p>MUTUALISM</p> 	 <p>Cleaner shrimp</p>	<p>CORALWATCH</p> <p>Cleaner shrimp are moray doctors! They will eat any parasites and dead skin from on moray eels, ensuring the eel stays healthy.</p> <p>MUTUALISM</p> 

Teacher instructions

1. [Download the symbiosis game](#) from our website
2. Create your own set by printing and laminating
3. Play the game
4. Place all cards on the floor with the pictures facing up.
5. Pair the photos of underwater animals that you think live together or have a special relationship.
6. Turn the card over to find the answers and more information.
7. To advance the game, try to decide what kind of symbiosis the animals have; mutualism or commensalism.

Materials

- Printer
- Scissors
- Laminator



ACTIVITY 3: OZBOTS

Help the little fish swim from the mangrove to the reef with the ozbot.

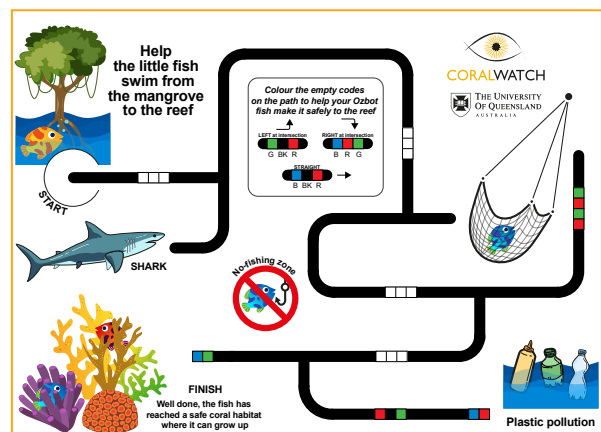
Ozobot presents a fun, easy way to get kids comfortable with robotics and programming. Ozbots use downward facing cameras to detect the color of the line and coloured blocks under it. Students use a sheet of codes and can draw designs on a piece of paper with colored markers.

Teacher Instructions

1. [Download CoralWatch Ozbot](#) template as below.
2. Students colour the codes on the path to help the Ozbot fish make it safely to the reef
3. Advanced option is to have students develop their own track.

Materials

- Ozbots
- Ozbot track 'Help the little fish swim from the mangrove to the reef' downloadable from
- Coloured pens
- Colour codes chart ([downloadable](#))

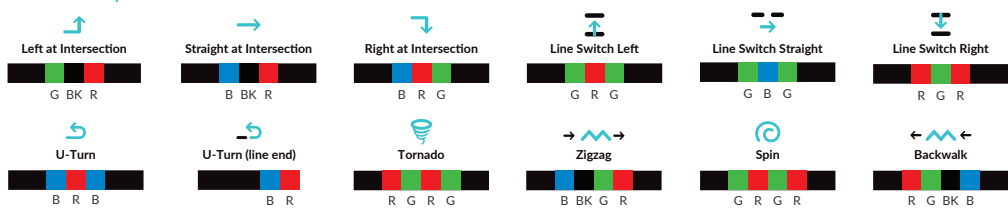


Color Codes | Chart

Speed



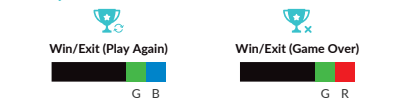
Direction & Special Moves



Timers



Wins/Exits



Counters See reverse for definitions

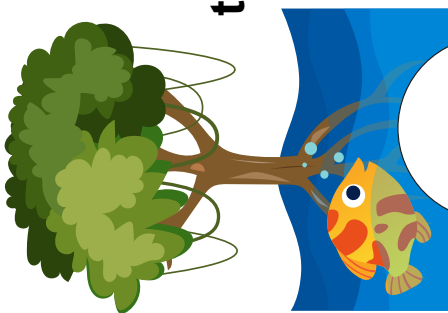


ozobot.com Key: BK = Black B = Blue G = Green R = Red

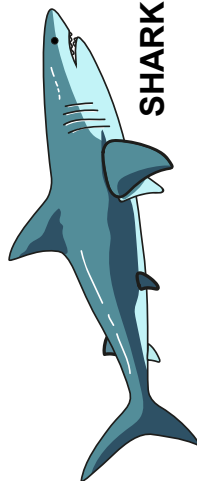
ozobot

ACTIVITY 3: OZBOTS

Help the little fish swim from the mangrove to the reef



START



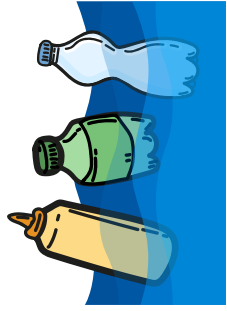
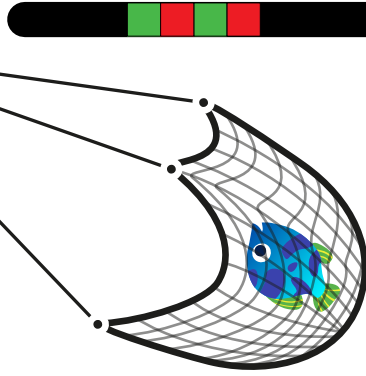
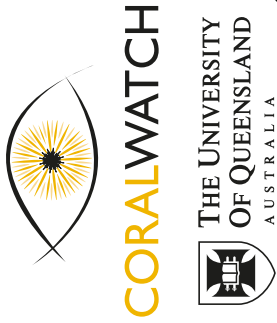
SHARK

Colour the empty codes on the path to help your Ozbot fish make it safely to the reef

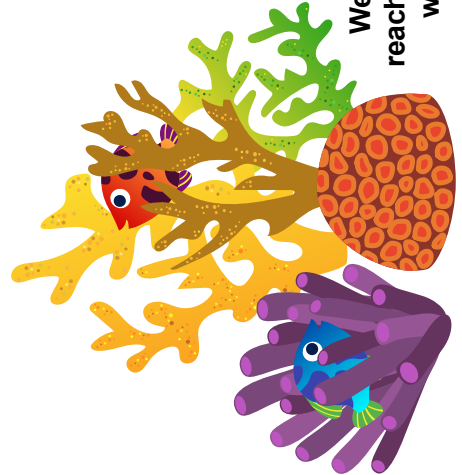
LEFT at intersection
G BK R

RIGHT at intersection
B R G

STRAIGHT
B BK R



Plastic pollution



FINISH

Well done, the fish has reached a safe coral habitat where it can grow up

ACTIVITY 4: VIRTUAL REALITY

Immerse your students in the underwater world in class using virtual reality. Learn about CoralWatch monitoring, watching reefwalkers, snorkelers and divers using the Coral Health Chart on reefs at Lady Elliot Island and Northern Great Barrier Reef.

A fun activity combining science and art, you can create your own headsets if the real ones are not available to you.



Teacher instructions

- Download CoralWatch VR video content from YouTube (<https://youtu.be/he4bIVn1qpU>)
- Create your own headset. Follow YouTube instructions (<https://youtu.be/q0U2lhRyKn0>)
- Create your own lenses. Follow YouTube instructions (https://youtu.be/Za_h1resks0)

Materials

- Cardboard
- Scissors
- Glue gun or epoxy
- Sticky tape
- Plastic waterbottle
- Knife
- Sanding paper
- Smartphone



ACTIVITY 5: BECOME A CITIZEN SCIENTIST

You can bring the reef into the classroom using virtual tools such as virtual reefs and virtual reality (activity 6). Learn about coral bleaching, coral types and data collection using the Coral Health Chart.

Teacher instructions

1. Read CoralWatch background and instructions on page 5 or [online](#)
2. Watch Youtube [instructional video](#)
3. To practice monitoring you can use:
 - [virtual reefs](#) from CoralWatch
 - [coral photos](#)
 - the printed certificate from the online interactive reef game (activity 4).
3. Follow the instructions on the back of the Coral Health Chart, and get students to match the coral colours on the pictures with the colours on the chart.
4. Record your colour scores and coral types on a data sheet

Materials

- [Coral Health Charts \(only to be used for this exercise\)](#)
 - Data slates
 - Coral photos
 - Excell data entry sheet for virtual reef exercise
 - Virtual reef poster
- Printed copies (72 x 36 cm) are available for purchase.



CORALWATCH

Your name: _____
 Reef name: _____
 Country: _____

Coral NO.	COLOUR CODE		CORAL TYPE (please tick)				GPS coordinates (if available):
	Lightest	Darkest	Boulder	Branching	Plate	Soft	
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Date: _____
 Time: _____
 Depth: m / feet _____
 Sea temp: C / F _____
 Sunny / cloudy / raining _____
 Walking / snorkelling / diving (please circle) _____

Your DATA is important to us, transfer your findings using 'CoralWatch Data Entry' Apps
 ► Google play ► App Store
 or enter your data online at WWW.CORALWATCH.ORG

Follow us

ALWAYS use the original Coral Health Chart available from CoralWatch for monitoring corals in the field.

Virtual Reef

This virtual reef shows you different coral types and the difference between bleached and healthy corals. You can use the Coral Health Chart to measure the health of these corals.

CORAL HEALTH CHART

The Coral Health Chart is based on the actual colours of bleached and healthy corals. Each square on the Chart corresponds to the concentrations of symbiotic algae which live in the coral tissue.

TIP
Avoid packaging grinding type of corals because they are extremely white.

INSTRUCTIONS

For each coral, use the Coral Health Chart to record:

- darkest and lightest colour scores
- coral type

Boulder (BO)
 Branching (BR)
 Plate (PL)
 Soft (SO)

WWW.CORALWATCH.ORG

Visit our website to see worldwide data for reefs and compare coral health scores between reefs and over time.

CORALWATCH
 Operational Marine Institute
 The University of Queensland

© 2017 CoralWatch
 This poster is part of the CoralWatch Data Entry package. To order contact CoralWatch: info@coralwatch.org

Project: Reef Edge, James Hutton, Coral Reef Observations & Corals

ACTIVITY 6: 'CORAL REEFS' INTERACTIVE ONLINE GAME

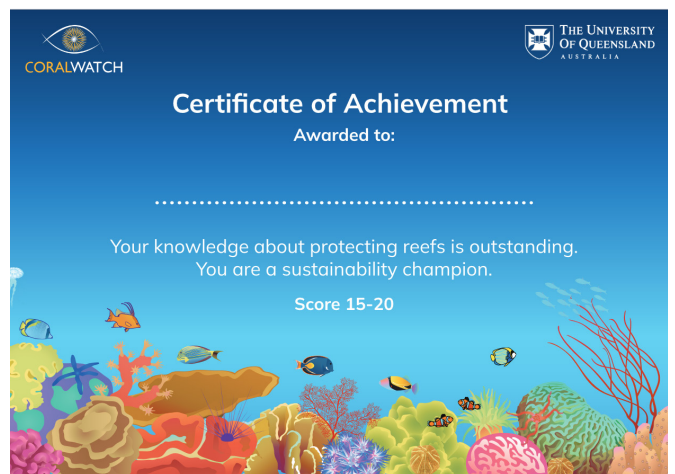
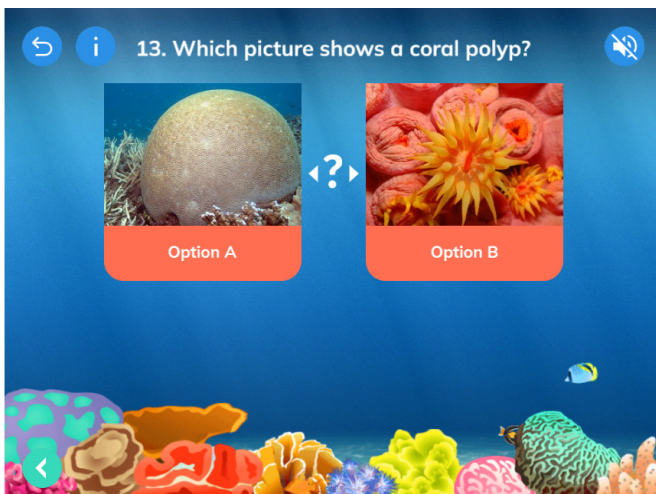
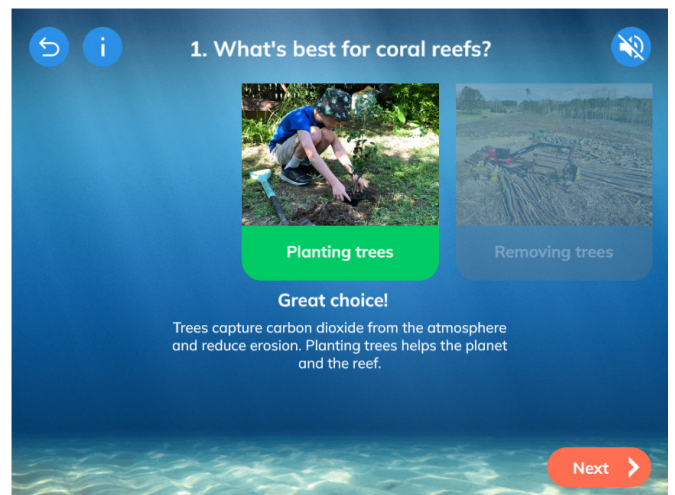
Learn about the Great Barrier Reef and discover what you can do at home to help save the reef!

Teacher instructions

1. Go to [CoralWatch website](#) to start the game online.
2. Answer all 20 questions about sustainability and coral reefs.
3. See how your answers impact the reef. Each correct answer seeds a new coral, each wrong answer takes a coral away from your digital reef.
4. You have the option to change your answers as you gain more information.
5. You will be awarded a certificate with your score at the end of the activity (a pre-formatted PDF)
 - 15-20 (sustainability hero)
 - 10-14 (environmental crusader)
 - below 10 (fledgling warrior, there are more ways to help the reef).
6. Print your certificate and take the next step. Become a citizen scientist and measure the health of the reef using the Coral Health Chart.
7. Keep up the good work and implement what you have learned at home to help the reef!

Materials

- Computer with internet access
- Printer
- Coral Health Charts



ACTIVITY 7: DO'S AND DON'T FOR THE REEF

There are many factors that determine whether a coral reef is healthy or unhealthy.

A healthy reef has high cover of colourful corals. Those corals appear in shades of olive green, brown, tan and pale yellow and there are lots of fish! There are not many threats such as Crown-of-Thorn starfish, sediment runoff, coral bleaching, pollution, storms present.

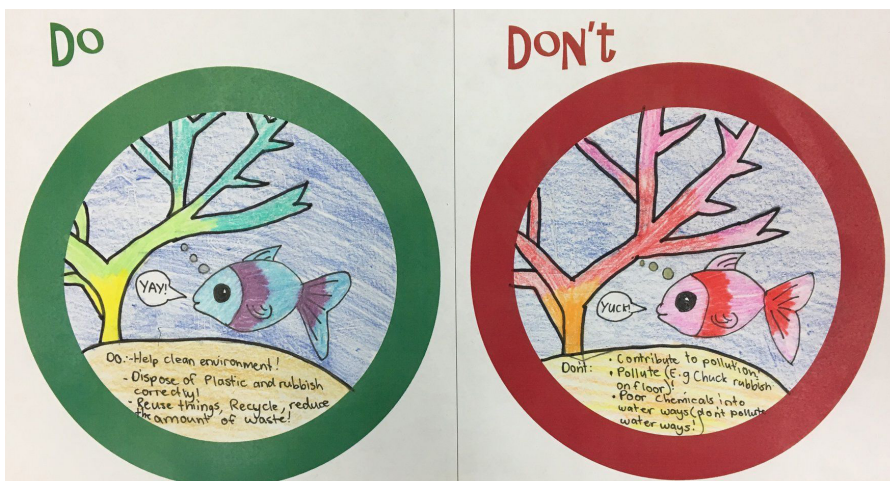
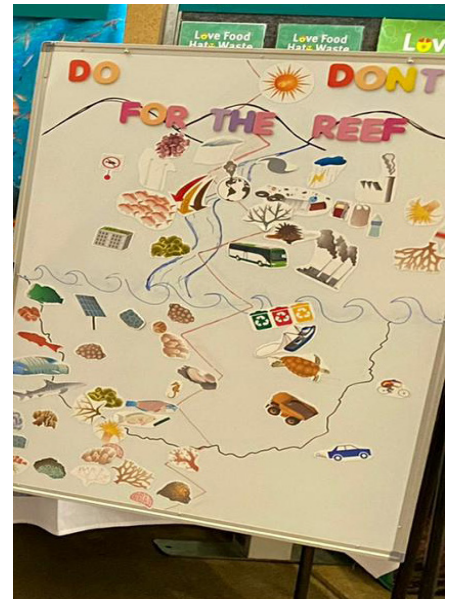
An unhealthy reef has low coral cover, corals might be covered with algae or are bleached. There are many threats to this reef.

Teacher Instructions

1. [Download the icons](#) from the CoralWatch website and print them on magnetic paper. Cut out the individual icons.
2. Draw a reef outline on a magnetic whiteboard and put a vertical line in the middle.
3. Write 'DO' and 'DON'T' on the board.
4. Use the magnetic icons to build a healthy and an unhealthy reef.
5. To advance the game, try to improve on the health of the reef. What icons can you replace or take away that will create a better environment for corals to grow in?
6. Alternative option for this topic is shown in the picture below. Let students draw a red and a green circle on a piece of paper or use our [template](#). Students can draw and write their important message for the reef.

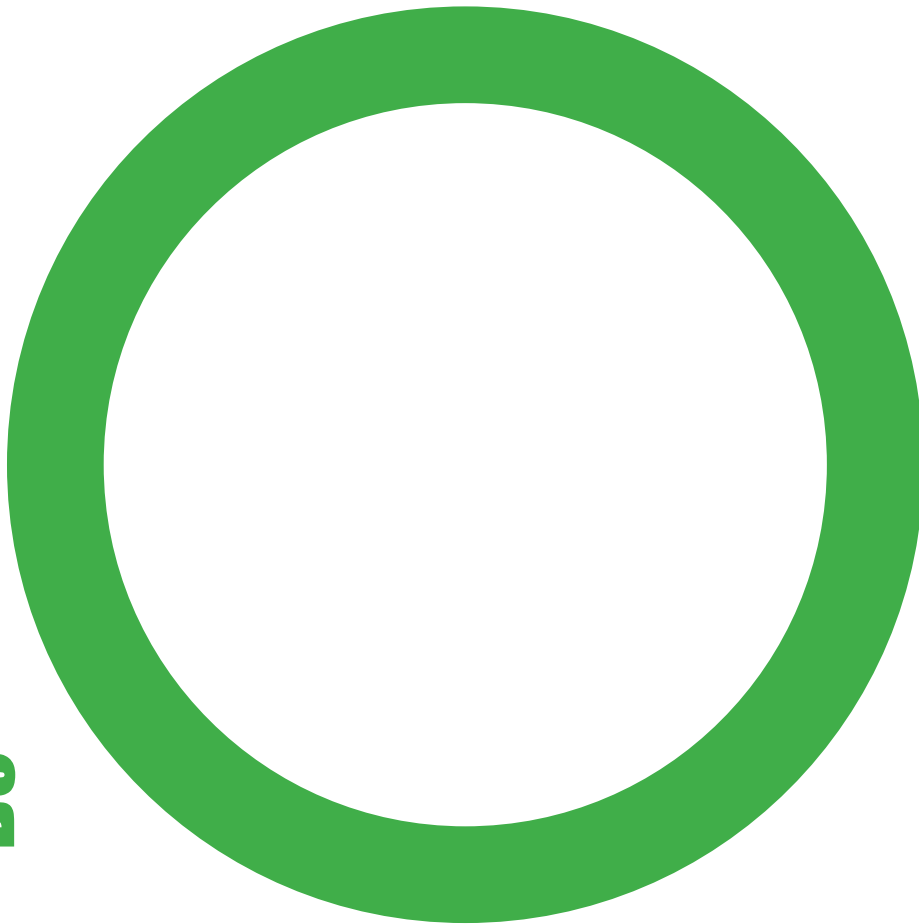
Materials

- Printer
- Magnetic paper
- Scissors
- White board
- White board markers
- Paper
- Colouring-in pencils

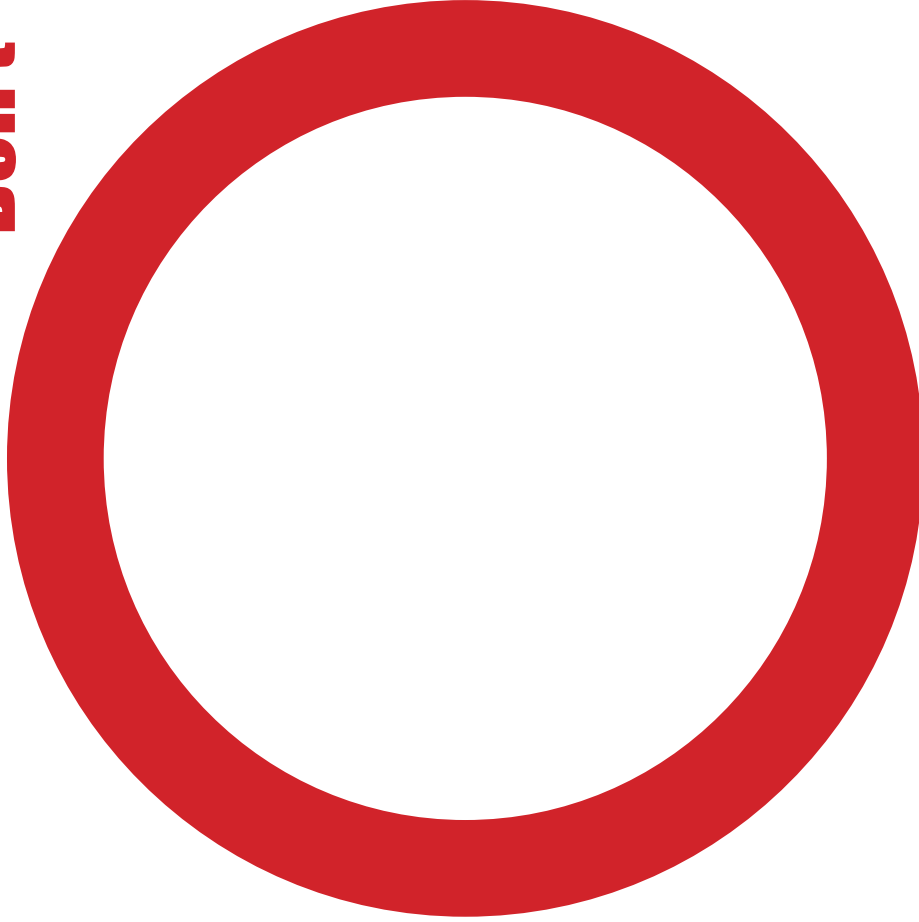


Protect our Corals

DO



DON'T



Name: Class:



ACTIVITY 8: ART ACTIVITY

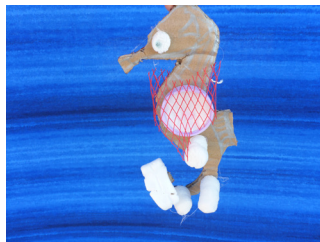
Create your own reef from recycled materials.

Teacher Instructions

1. Ask students to bring in recycled materials or organise a clean-up and collect them together.
2. Use cardboard for fish and coral shapes. You can paint them and decorate with plastic items

Materials

- Recycled materials, bottle caps, straws, toothbrushed, plastics, breadtags,
- Carton
- Paint
- Glue gun



ACTIVITY 9: TAKE A PLEDGE FOR THE REEF

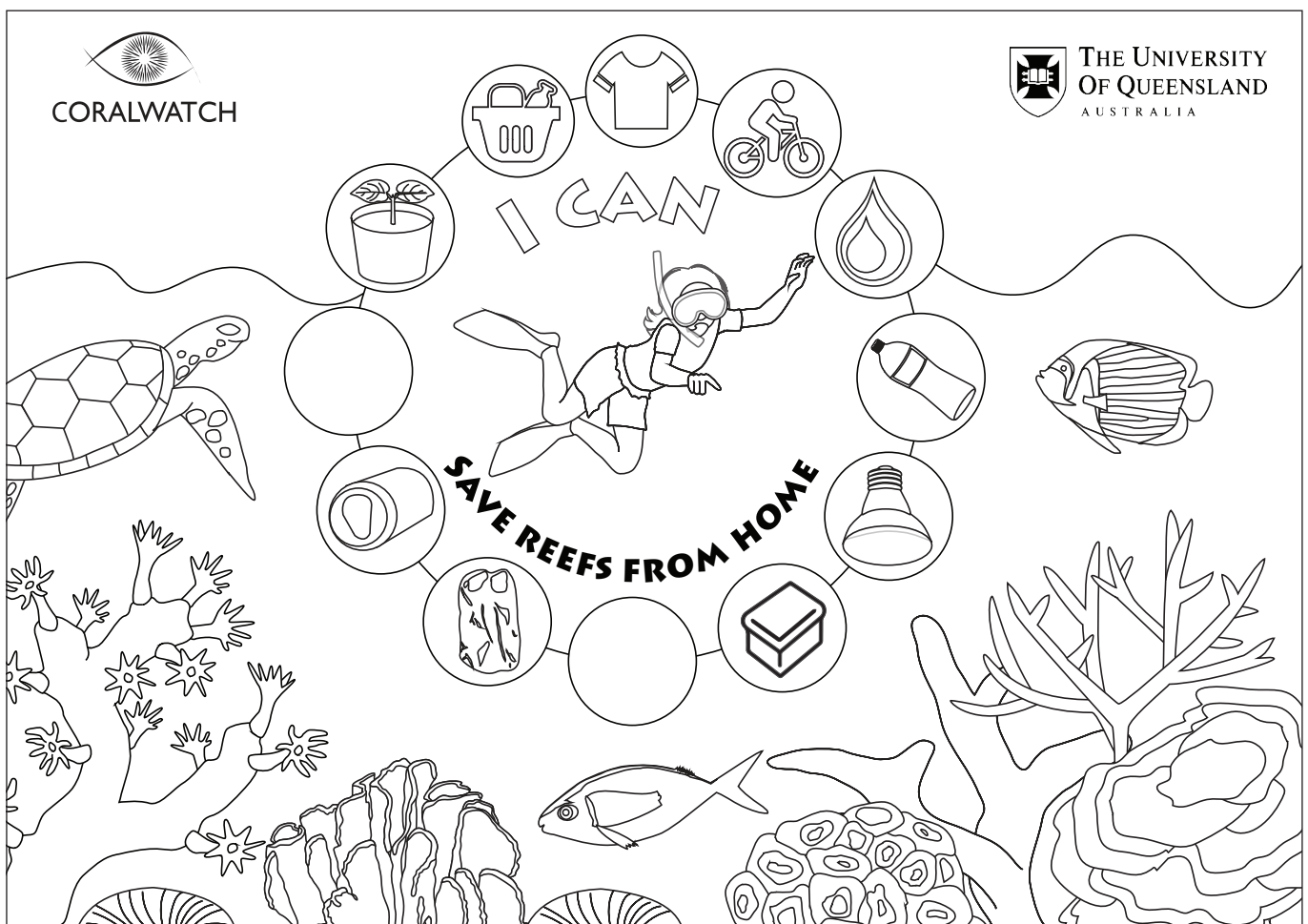
There are many things you can do at home to help save reefs.

Teacher Instructions

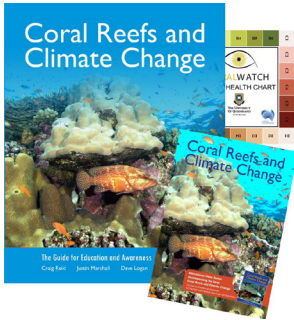
1. Start with a brainstorm session with the students to collect actions you can do to save reefs from home.
2. Students decide individually what they want to do at home and create a pledge, using the colouring-in sheet provided with suggestions for actions.
3. Students choose 2 personal actions to save reefs from home by colouring-in the corresponding circles.
4. Can you think of other actions? Students use the empty circles to draw their ideas.

Materials

- [Download](#) Colouring-in sheet
- Colouring pencils



CORALWATCH RESOURCES



'Coral Reefs and Climate Change' book and DVD with free Coral Health Chart and monitoring instructions.

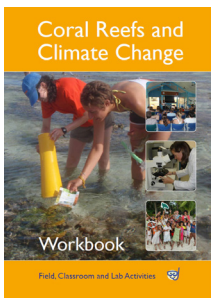
Coral Reefs and Climate Change The Guide for Education and Awareness - Book and DVD

CoralWatch has published the 2nd edition of the book 'Coral Reefs and Climate Change'. Beautifully illustrated, this book is targeted at students, reef enthusiasts and the general public. Chapters cover oceanography, coral reef ecology, climate change and conservation. This 2nd edition has been fully updated and includes the latest scientific findings. All books come with a Coral Health Chart and Do It Yourself instructions. Our educational DVD series with short movies complement the book.

Published by CoralWatch, The University of Queensland - 2012

ISBN: 978-0-646-59085-1. Paperback, 264 pages

Authors: Craig Reid, Justin Marshall, Dave Logan and Diana Kleine. Edited by Angela Dean



'Coral Reefs and Climate Change' workbook

Coral Reefs and Climate Change - Workbook

The individual, classroom, lab and field activities are designed for high school and early tertiary level students, and anyone interested in exploring coral reefs, climate change and sustainable living in more detail. Some activities make use of the Coral Health Chart. Additional virtual tools provide an opportunity to learn more about coral bleaching and active monitoring. Virtual tools can be used to prepare for a field trip or as a valuable alternative to a field trip. Away from the reef you can engage in activities in the classroom and your local environment and access recommended DVDs, books, articles and websites.



'DIY Kit' with monitoring instructions.

Do It Yourself Coral Health Monitoring Kit

Includes Coral Health Chart, underwater data recording slate with pencil, instructions and information brochures, sticker and postcard. All packed in waterproof folder.

CORALWATCH PACKAGES - available from our [online shop](#)

Whether you are an individual or an educator, our education materials provide you with everything you need to get involved in protecting reefs.



Power of one package

Includes: book and DVD, Do It Yourself (DIY) monitoring instructions and reading materials packed in CoralWatch bag.



Raising awareness package

Includes: book and DVD, Coral Health Charts and slates, DIY monitoring instructions, promotional materials. Check our online shop for full contents.

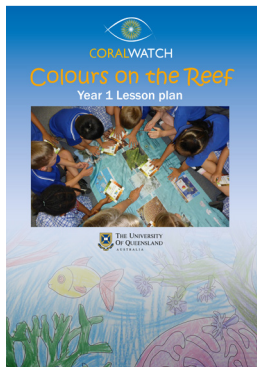


Ultimate teaching package

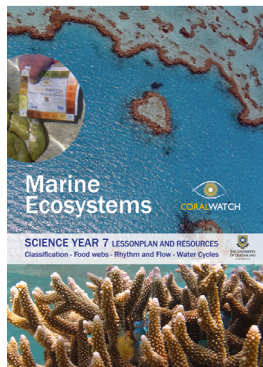
Includes: book and DVD, workbook, class set of Coral Health Charts and slates, DIY monitoring instructions, virtual reef materials, posters and booklets. Check our online shop for full contents.

CORALWATCH RESOURCES

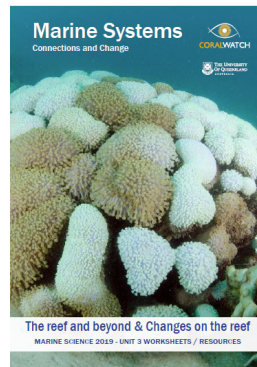
Australian curriculum linked lessons



'Colours on the Reef'
Year 1 Science
Lesson plan ([download](#))



'Marine Ecosystems'
Year 7 Science
Lessons and resources
([download](#))



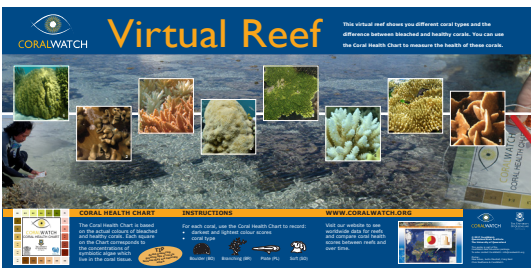
'Marine Systems -
Connections and Change'
Year 11-12 Marine Science
Lessons ([download](#))

Monitoring materials

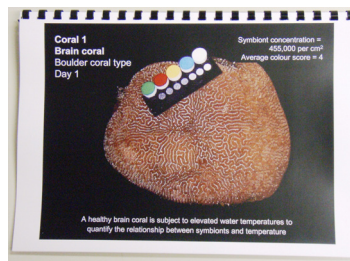


Coral Health Charts
CoralWatch data slates
[CoralWatch DIY instructions leaflet](#)

Virtual reef materials



Virtual reef poster - 3 versions
Tropical Reef / Moreton Bay / Capricorn Coast



Virtual lab booklet



Virtual reef booklet:
Bleaching event Lizard Island 2002



CoralWatch virtual reality (6 min) on
[YouTube](#)

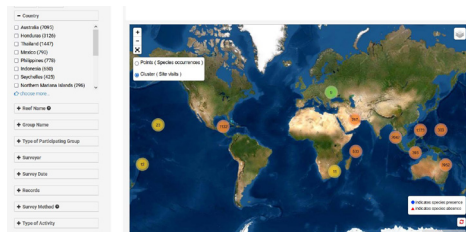


CoralWatch instructional video (2.5 min)
[YouTube](#)

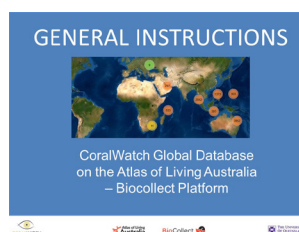


Photo series: Bleaching event Lizard
Island 2016

CoralWatch data



[CoralWatch global database](#) powered by Atlas of Living Australia, Biocollect platform.
Data freely available from 80 countries, >2,231 reefs and >17,154 surveys



'Data entry'
Guide to entering
CoralWatch data on the
Atlas of Living Australia
Biocollect platform



Community report cards
- Great Barrier Reef
- Lady Musgrave Island
- Keppel Islands
- Fitzroy Island

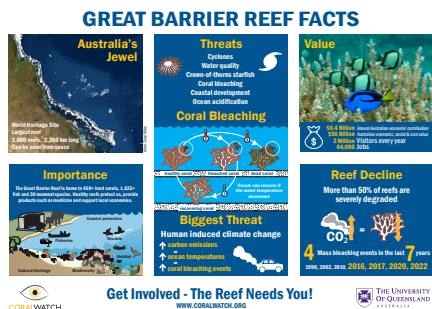
All available to download or order online www.coralwatch.org

CORALWATCH RESOURCES

Great Barrier Reef info



'Great Barrier Reef': importance, threats, coral bleaching, CoralWatch



'Great Barrier Reef' Factsheet



'What Can I Do?' Factsheet

CORALS AT YOUR DOORSTEP EDUCATION PACKAGES

Moreton Bay - Corals at Your Doorstep



Includes: Moreton Bay (MB) virtual reef, MB Coral ID sheet, year 1 and/or year 7 lessons and resources, MB postcard, MB and GBR info flyers, factsheet 'GBR & What Can I Do?', Coral Health Chart with slate and Do It Yourself monitoring instructions.

Available for downloading: <https://coralwatch.org/index.php/ambassadors/corals-at-your-doorstep/>
Hard copies available upon request.

First edition 2016, Second edition 2020.
Supported by Port of Brisbane.



Capricorn Coast - Corals at Your Doorstep



Includes: Capricorn Coast (CC) virtual reef, CC Coral ID sheet, year 7 lessons and resources, CC and GBR info flyers, CoralWatch Keppel Islands report card, factsheet 'GBR & What Can I Do?', Coral Health Chart with slate and Do It Yourself monitoring instructions.

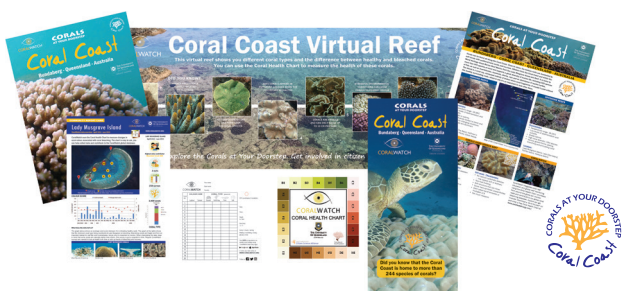
Available for downloading: <https://coralwatch.org/index.php/ambassadors/corals-at-your-doorstep/>
Hard copies available upon request.

First edition 2020. This package is printed by the Fitzroy Basin Association Inc., through funding from the Australian Government's National Landcare Program. Additional support has been provided by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Great Barrier Reef Foundation

Coral Coast - Corals at Your Doorstep



Includes: Coral Coast (CC) virtual reef, CC Coral ID sheet, year 7 lessons and resources, CC and GBR info flyers, factsheet 'GBR & What Can I Do?', Coral Health Chart with slate and Do It Yourself monitoring instructions.

Available for downloading: <https://coralwatch.org/index.php/ambassadors/corals-at-your-doorstep/>
Hard copies available upon request.

First edition 2020. Supported by the partnership between the Australian Government's Reef Trust and the Great Barrier Reef Foundation.



Great Barrier Reef Foundation

The aim of CoralWatch 'Corals at Your Doorstep' education packages is to showcase local marine environments and their importance, promote everyday actions improving the coastal & marine environment, and provide opportunities for people to participate in local environmental monitoring and education activities.

GLOSSARY

Algae	simple aquatic organisms capable of producing oxygen through photosynthesis.
Barrier Reef	a coral reef running parallel to the shore but separated by a channel of deep water e.g. the Great Barrier Reef.
Carbon Emissions	carbon compounds released into the atmosphere, often from human activity such as burning fossil fuels.
Climate change	long term shifts in temperatures and weather patterns.
Commensalism	an association between two organisms in which one benefits and the other derives neither benefit nor harm.
Coral bleaching	when corals expel the symbiotic algae living in their tissue due to stress, causing them to turn white.
Coral polyp	tiny animals that are related to anemones and jellyfish. They can live individually or form a large colony to make a coral reef.
Coral reef	an underwater structure formed by the growth and deposit of coral.
Life cycle	the sequence of stages through which an individual organism passes from birth to death.
Mutualism	an association between two organisms where both benefit.
Sustainability	small changes we can make to help look after the planet.
Symbiosis	interactions between two different organisms living close together (see mutualism and commensalism).
Zooxanthellae	tiny algae that live inside corals that photosynthesize and provide food to the coral.
Zygote	a fertilised egg that results from the union between a female and male gamete (egg and sperm).

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Photography and illustrations: Acknowledged per image

All resources for this year 4 science lessonplan can be downloaded from WWW.CORALWATCH.ORG



CORALWATCH

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Lesson Outline

Coral are Cool and Crucial
 Hear 4 Lesson plan

- Australian Curriculum v8.5
- Includes: teacher guide, 9 classroom activities and 3 teacher presentation

Lesson plan sequence
 There are three presentations with teacher notes available for this lesson series.
 Each presentation suggests related activities.

What are Corals?
 Hear 4 Lesson plan

Presentation Part 1. What are Corals?
 Coral Biology and coral lifecycle
 Activities:
 1. Activity 1. Coral reef lifecycle game
 2. Activity 2. Symbiosis game
 Under review - Available for downloading soon



Activity 1
 Coral Lifecycle

Students learn about 4 different stages in the coral lifecycle but cutting stages and creating their own reef picture.
 Download
 Handout: Coral life stage icons, descriptions and headers (link Coral lifecycle icons and descriptions June 2023.pdf)
 Background template: Coral life cycle diagram/background (link background for lifecycle.pdf)

Activity 2
 Symbiosis game

Corals live in symbiosis with a tiny plant called zooxanthellae. Learn about other interactions between two dissimilar organisms. The most common types of symbiosis found in the ocean are mutualism and commensalism.
 Download
 Download this game and create your own.

Activity 3
 Ozbot

Ozbot presents a fun, easy way to get kids comfortable with robotics and programming. Ozbots use downward facing cameras to detect the color of the line and coloured blocks under it. Students use a sheet of codes and can draw designs on a piece of paper with colored markers. Help the little fish swim from the mangrove to the reef with the ozbot.
 Download

Activity 4
 Coral Reef Game

Learn about the Great Barrier Reef and discover what you can do at home to help save the reef!

Activity 7
 Do's and Don'ts for the reef

There are many factors that determine whether a coral reef is healthy or unhealthy. A healthy reef has high cover of colourful corals. Those corals appear in shades of olive green, brown, tan and pale yellow and there are lots of fish! There are not many threats such as Crown of Thorn starfish, sediment runoff, coral bleaching, pollution, storms present. An unhealthy reef has low coral cover, corals might be covered with algae or are bleached. There are many threats to this reef.
 You can run this activity in 2 different ways
 • Download Template Do and dont for the reef.pdf and ask students to draw and write an positive and negative message to help protect reefs.
 • Download Printouts for whiteboard Laminate this and cut out individual icons, to be use on a white board build a healthy and an unhealthy reef.

Activity 5
 Art activity

Create your own reef from recycled materials.
 Instructions
 • Ask students to bring in recycled materials or organise a clean-up and collect them together.
 • Use cardboard for fish and coral shapes. You can paint them and decorate with elastic items

