

Cleaning up the Ocean

A teaching and learning resource
for Years 3-4



To support the film
Sea Lions: Life by a Whisker



Government
of South Australia

Department for
Environment and Water

Acknowledgements

This online curriculum-linked resource was produced by Angela Colliver Consulting Services for the National Parks and Wildlife Service, Department for Environment and Water, South Australia.

The curriculum-linked resource is designed to introduce young people to the management and protection of the Australian sea lion and the marine environment.

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Learning Experiences for Year 3 and Year 4

Activity 1: Cleaning up the ocean

Overview: Explain to the class that their task is to help others understand the effects of pollution and waste in our oceans, and on Australian sea lions, and empower them to know what they can do to help the oceans.

Background Science for Students: Water pollution

Pollution is the introduction of harmful materials into the environment. Water pollution is when waste, chemicals, or other particles cause a body of water (ie. oceans, rivers, lakes, wetlands, etc) to become harmful to the fish, animals, reefs, and plants that need the water to survive. Water pollution can also have damaging, and disruptive impacts on the natural water cycle.

Most people are affected in some way by water pollution in oceans and beaches. However, fewer people are aware of the many sources of water pollution.

Human causes of water pollution

A lot of water pollution comes from human activity. Some human causes include that which is washed into stormwater drains that lead to rivers and the sea. Other causes include pesticides, insecticides, herbicides and fertilisers from farms, wastewater and poisonous chemicals from factories, schools and offices, silt from construction sites, and rubbish from people littering which gets washed into dams, rivers, and the sea after rain.

In the oceans, a lot of pollution comes from things that are thrown overboard from boats and by rubbish that washes into the ocean from the land and from rivers. Plastics, fishing line, fishing nets, waste from aquaculture (plastic, rubber, biological & chemical) and other wastes can affect the creatures living in our oceans.

Plastic pollution is considered in the top three dangers to a continuing healthy ocean.

The thoughtless disposal of manures, fertilisers, and toxic or hazardous waste is a serious problem because these chemicals can cause pollution, even if they are in small quantities in waterways or stormwater drains that feed into our oceans.

Industry is not permitted by law to discharge materials or chemicals directly into waterways, the stormwater system, or the oceans. However, many industries are allowed to dispose of materials or chemicals into the wastewater system. They must do so under strict guidelines.

Natural causes of water pollution

Sometimes water pollution can occur through natural causes, like volcanoes, algal blooms, animal waste, and silt from storms and floods.

The essential question:

What happens when we understand that are our oceans are under stress from pollution?

The scenario:

Our Marine Park Rangers are looking for innovative ideas to help others understand the effects of pollution and waste in our oceans, and on Australian sea lions, and empower others to know what they can do to counter those effects.

What science investigations can assist you in your mission to leave our ocean waters in a better condition than we find them today?

Your challenge is to help others understand the effects of pollution and waste in our oceans and empower others to know what they can do to help. Will you design an experiment, animation, or digital science presentation? Are you up for the challenge?

A suggested learning process:

Define:

Share the essential question with the class and talk about the need to have clean, healthy water in our oceans.

Present the scenario, assign pairs or small groups if appropriate, and ask students to define the task they have been set.

Discover:

Capture student's interest and read 'Alba the One Hundred Year Old Fish' by Libby Hawthorne. It tells the story of a beautiful coral reef that becomes a littered graveyard. Alba the fish becomes stuck in a plastic bottle and is saved by a little girl who recruits her community to clean up the ocean and release Alba.

View the movie trailer for 'Sea Lions. Life by a Whisker' and look for evidence of pollution in the ocean.

Locate where water can be found in the classroom area. Talk about what it is used for, e.g., washing hands, cleaning paint brushes and paint containers, making glue, cooking, watering plants, watering classroom animals, etc. Talk about how water is used outdoors e.g., washing cars, watering lawns and gardens, washing windows, etc.

Go on a drain hunt. Find drains that take water into the stormwater system and out to the ocean. Talk about the water that goes down the drain in and around the school grounds and local area. Discuss how water pollution here affects others downstream, and how pollution upstream affects you.

In pairs or small groups, talk about the ways the class can be more careful of what can be washed down outside drains and care for their oceans. Encourage pairs or small groups to report back their ideas.

Collate ideas. For example:

Ways we can care for the ocean and Australian sea lions include:

- *Scraping left-over paint back into paint pots and not wash paint brushes near drains.*
- *Washing cars on lawns.*
- *Sweeping leaves away from gutters and use them as mulch.*
- *Putting litter in a bin.*
- *Picking up after our dogs and compost doggy poo.*
- *Reusing plastics.*
- *Stop releasing balloons.*
- *Stop using plastic drinking straws*

- *Never dispose of oil or chemicals down the gutter or into a drain.*

Identify areas in and around the school and children's homes where water is found.

Discuss any environmental issues connected with those areas.

Draw cause and effect charts to show the issue and the problem. For example: drains (insert arrow) blocked with leaves and litter (insert arrow) polluted water that can flow to the ocean.

Download the [AUSMEPA PowerPoint presentation](#) about pollution in the ocean and discover more about stormwater discharges with litter, plastics, oil, chemicals, fertilisers and dog poo and their effects on marine animals and birds. Ask students to imagine the effects of these pollutants on Australian sea lions.

Talk with students about what happens to leaves, plastics, and other types of litter that are washed into drains. Follow their path to the ocean. Simulate what happens and immerse leaves, plastics, paper, aluminium, bread, fruit peel and litter in buckets of water. Leave them outside in the sun and overnight for a week or so and observe what happens. Download the [AUSMEPA 'My Stinking Experiment'](#) file and record observations and findings.

Brainstorm ways the class could get involved in activities for the protection of the ocean environment and Australian sea lions, e.g., sweep gutters and asphalt, collect leaf litter, compost leaf litter, collect litter and recycle.

Set up teams of Gutter-Guardians and Litter-Busters to ensure all street gutters near the school and drains in the school grounds are cleared and litter is collected, sorted, and disposed of wisely during and after play periods.

Think of ways to refuse using plastics at school, for example, plastic free lunches.

Discuss the environmental issues affecting the ocean and possible ways to solve the problems.

Talk more about how plastics are affecting the oceans and Australian sea lions.

Introduce students to [Molly Steer](#), a Year 4 student from Cairns in North Queensland who has started a campaign called 'Molly's Straws No More'. It all began when Molly and her mother saw a film [Plastic Ocean](#) (1.05 mins).

View a [video](#) on YouTube (1.26 mins) and discover nine ways we can all help reduce plastic pollution.

Introduce a range of innovations that are currently helping to clean up our oceans and make them more sustainable. Introduce the [Seabin Project](#), where two Australian surfers have designed and engineered a floating bin that can capture thousands of pieces of floating debris and plastics.

Introduce [Boyan Slat](#), a young innovator, and discover his Ocean Cleanup prototype that promises to clean up the ocean.

Learn about what we can all do to reduce micro-plastics from the ocean. Watch a [video](#) (3:10 mins) and hear from high school students who won the 2019 Eureka prize.

Introduce Jane Goodall's "Roots and Shoots" youth-led campaign called [Thumbs up for Turtles](#) that aims to raise awareness about the impact of our waste footprint and

promote solutions to minimise our impact on the oceans. Read about the things we can do to reduce plastic and protect our oceans.

Dream:

In pairs or small groups, envision or dream about the many possible solutions to pollution problems in our oceans and its harmful effects on Australian sea lions.

Further develop ideas for possible solutions using sketches and labels.

Ask students to visualise their most creative solution.

Invite students to think about what materials, tools, equipment, and ingredients they will need to make their solution a reality.

Remind students that their solution needs to explain the effects of pollution and waste in our oceans and on Australian sea lions, as well as empower others to know what they can do to help them.

Record a video, sing a song, or read an announcement to explain this.

Design:

Invite students, in pairs or small groups, to begin drafting their designs for their solutions.

Ask students to draft the steps involved in making their design item.

Ask students to gather the materials, tools, and equipment needed and then design and create the solution.

Invite a peer class group to the class to find out more about the effects of pollution and waste in our oceans, and on Australian sea lions, and know what they can do.

Deliver:

In pairs or small groups, showcase the creations and associated messages explaining the effects of pollution and waste in our oceans, on Australian sea lions, and what others can do to ensure clean and sustainable oceans.

Debrief:

Ask students to reflect on their learning and something they learnt that was new.

Ask students to describe what worked well and not so well in their efforts to create a solution to pollution problems in our oceans which also affect Australian sea lions.

Curriculum Connections

Australian Curriculum (ACARA, 2022)

Technologies

Design and Technologies: Knowledge and understanding

Examine design and technology occupations and factors including sustainability that impact on the design of products, services, and environments to meet community needs AC9TDE4K01

Design and Technologies: Processes and Production Skills

Explore opportunities for designing and test materials, components, tools, equipment and processes needed to create designed solutions AC9TDE4P01

Generate and communicate design ideas and decisions using appropriate attributions, technical terms and graphical representation techniques, including using digital tools AC9TDE4P02

Select and use materials, components, tools, equipment and techniques to safely make designed solutions AC9TDE4P03

Use given or co-developed design criteria including sustainability to evaluate design ideas and solutions AC9TDE4P04

Sequence steps to individually and collaboratively make designed solutions AC9TDE4P04

Year 3 and Year 4

Science

Science as a human endeavour – Nature and development of science

Examine how people use data to develop scientific explanations AC9S3H01
AC9S4H01

Science as a human endeavour – Use and influence of science

Consider how people use scientific explanations to meet a need or solve a problem
AC9S3H02 AC9S4H02

General Capabilities: Literacy; Digital literacy, Critical and Creative thinking, Ethical Understanding and Personal and Social Capability.

Cross Curriculum Priority: Sustainability

Organising Ideas

SS1: All life forms, including human life, are connected through Earth's systems (geosphere, biosphere, hydrosphere and atmosphere) on which they depend for their wellbeing and survival.

SS2: Sustainable patterns of living require the responsible use of resources, maintenance of clean air, water, and soils, and preservation or restoration of healthy environments.

SD1: Sustainably designed products, environments and services aim to minimise the impact on or restore the quality and diversity of environmental, social and economic systems.

SD2: Creative and innovative design is integral to the identification of new ways of sustainable living.

SD3: Sustainable design requires an awareness of place, past practices, research and technological developments, and balanced judgements based on projected environmental, social and economic impacts.

SF1: Sustainable futures are achieved through informed individual, community, business and political action that values local, national and global equity and fairness across generations into the future.

SF2: Sustainable futures require individuals to seek information, identify solutions, reflect on and evaluate past actions, and collaborate with and influence others as they work towards a desired change.

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