

Environmental Issues

Teachers

This unit of work has been designed to support your class visit for the 'Environmental issues' programme at the National Aquarium of New Zealand. Students will participate in a range of level-specific interactive activities.

The primary focus of this programme is the Living World Strand of the Science Curriculum, however when planning your unit of work, links can be made to other essential learning areas. Similarly, different essential skills can be emphasised depending on the needs of your students.

Programme Overview

The Environmental issues programme teaches students about the different types of issues that affect both aquatic and terrestrial environments, with a special emphasis on environmental issues that affect New Zealand.

Students will examine the positive and negative impacts humans have on the environment. They will discover the importance of independence, biodiversity and sustainability as well as what they can do to help the environment.

Essential Learning Area: Science

Strand: Living World

Achievement Aims 1 and 4: Gain an understanding of order and pattern in the diversity of living organisms, including the special characteristics of New Zealand plants and animals. Investigate local ecosystems and understand the interdependence of living organisms, including humans, and their relationship with their physical environment.

Strand: Planet earth and beyond

Achievement Aim 4: Investigate how people's decisions and activities change planet Earth's physical environment, and develop a responsibility for the guardianship of planet Earth and its resources.

Level	Essential Learning Area	Strand	Achievement Aim	Achievement Objective
1	Science	Living World	Understanding order and pattern.	Observe and identify parts of animals and plants.
2	Science	Living World	Understanding the interdependence of living organisms and their relationship to the environment.	Investigate the responses of plants and animals, including people, to environmental changes in their habitats.
3	Science	Living World	Understanding order and pattern.	Investigate special features of common animals and plants. Describe how some species have become extinct or are endangered.
4	Science	Living World	Understanding the interdependence of living organisms and their relationship to the environment.	Use simple food chains to explain the feeding relationships of familiar animals and plants, and investigate effects of human intervention on these relationships.
2	Science	Planet Earth and beyond	Investigate people's decisions and develop a responsibility for the guardianship of the planet.	Investigate easily observable physical features and patterns and consider how the features are affected by people.
3	Science	Planet Earth and beyond	Investigate people's decisions and develop a responsibility for the guardianship of the planet.	Justify their personal involvement in a school or class-initiated local environmental project.
4	Science	Planet Earth and beyond	Investigate people's decisions and develop a responsibility for the guardianship of the planet.	Investigate a local environment issue and explain the reasons for the community's involvement.

Scientific Skills and Attitudes

- Focusing and Planning
- Information Gathering
- Processing and Interpreting
- Reporting

The 'Environmental Issues' programme at the National Aquarium of New Zealand lays the foundation for developing the above investigative skills and attitudes.

Specific Learning Outcomes

- To understand, interdependence, biodiversity and sustainability
- To become aware how humans affect the environment

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Post-Visit Activities

The Food Chain Pollution Game

Did you play the Food Chain Pollution Game at the aquarium? If not, here is a fun game to play. If you did play it at the aquarium, extend on this activity – make it more complex by adding in a few more marine creatures or rules.

The Food chain pollution game...

1. Make 40-50 small green cards, on some of the cards place a black dot on one side.
2. Half of the class can pretend to be barnacles. These crab-like creatures are encased in a hard shell and comb the water column for food using their legs.
3. The rest of the class (a part from three students) can be banded wrasse. Banded wrasses are very good at munching up barnacles with their strong jaws and teeth.
4. Two of the left over students can be seals which eat fish, including banded wrasse.
5. The last student can be a shark which when it gets a chance will eat seals.

To play the game:

Scatter the green cards on the floor (spots facing down). The green cards represent phytoplankton (small microscopic plants). Let the barnacles pick up as many cards as they can within 2-3 minutes. Once the time is up the barnacles must settle somewhere on the classroom floor. The banded wrasses are then allowed to 'eat'/ touch as many barnacles as they can. Once a barnacle is touch, he/she gives up the green cards to the banded wrasse.

The banded wrasses are then chased by the two seals, once caught the banded wrasse give up their cards to the seal. The seals are then chased by the shark and again once caught the seal/seals give up the green cards.

How many cards with black dots does the shark receive?? The black dots represent poison!! Play the game again, but this time record how many black dots one barnacle receives, one banded wrasse receives, one seal receives and one shark receives. Discuss the results with the class. What does it mean? Hint: alter the time the animals are allowed to 'catch' cards. Does this affect the outcome? How easily is pollution accumulated?

Extend on this task:

Pollution can kill smaller sea life. Make a new rule, if a barnacle has 3 pollution cards, it has to leave the game, along with the cards. What effect does this have on pollution accumulation? Add different marine creatures to the food web, for example zooplankton (microscopic animals), crabs that scavenge dead animals and humans. What effect does this have on pollution accumulation?

Telling others about it!

Using activities learnt within the pre – visit activities and at the aquarium, ask the class to display something important that they have learnt during the class sessions. Explore different forms of media to display their findings, for example radio interviews, video, power point displays, role plays and art posters.

Self -evaluation

Ask the children to evaluate themselves. Have they changed the way they look at streams, the beach and forests? Do they look out for pollution? Have they set up a recycling programme at home (even if it is just rubbish in their room – reusing paper)?

What can we do about it?

Identifying and suggesting solutions to real environmental threats

Ask the students to identify an environmental threat in their local community. Discuss with the class how they could improve the environmental conditions. Develop an action plan for solving the environmental problem.

What's HIPPO?

Revise with the class why New Zealand is very vulnerable to HIPPO? What is HIPPO? Also think about New Zealand's origins. HIPPO can be minimised by better education, informing others and taking action.

Make a list of things which the school can do to minimise HIPPO: Make a code of conduct for the school or a school/class room pledge that the school/classroom will do in the short term and in the long term.

Visit a reserve area e.g. White pine bush, Boundary Stream Mainland Island or Te Angiangi Marine Reserve.

Promote an environmental issue that your class/ school feels strongly about – educate others, have a display at the school or invite classes, friends and parents to a class presentation.

The Hawke's Bay Environmental Education Centre

Hawke's Bay has its very own environmental education centre! Visit their premises and find out what courses they have to offer. It could be a very good extension activity leading on from what you have learnt at the aquarium.

(Contact details: 22 Burness Road, Taradale phone 844 9050)

Get into recycling!

Set up a recycling or restoration project at your school.

Make a school composting system. Ask the class to design their own compost bin. Choose the best design and make it for a class project.

Learn to make a worm farm! Visit a worm farm near your school!

Hint: your regional council should have information on composting and worm farms.

Get involved with restoration/ conservation projects in your local area, such as riparian zones, planting a stream bank to stop erosion around stream sides. Contact Regional Councils or Department of Conservation for more information.

Environmental Agencies

Research the role of agencies that are helping marine animals and their environment. Find out what is being done in your local area or internationally, become involved.

- Department of Conservation
- World Wildlife Fund
- Marine Education Society of Australasia
- Local councils
- United Nations Environment programme

Fabulous Facts Do you know?

Some schools in Hawke's Bay are already involved in restoration projects, for example.....

Hastings Central School has done a massive planting of native trees in the school grounds. The school is also involved tree planting at Te Mata peak (in association with Forest and Bird) and propagating and planting wetland plants out at Haumoana river mouth (in association with Hawke's Bay Regional Council).

Fabulous Facts Do you know?

Here are some key things that we can do to stop pollution and minimise our impact on the environment:

Keep rubbish out of water ways.

Not introduce plants or animals where they shouldn't be.

Fish for the future, leave some for the next generation!

Keep pollution such as chemicals out of drains and water ways.

Work how you could do the following at school:

REDUCE

REUSE

RESPECT

RECYCLE

REPAIR

Some useful references:

Atlas of the Environment. Editors, Lean, G., Hinrichsen, D. and Markham, A. (1990). Arrow Books Ltd, London.

Collins field guide, Birds of New Zealand and outlying islands. By Falla, R.A., Sibson, R.B. and Turbott, E.G. Illustrated by Power, E. (1993). Harper Collins Publishers, Auckland.

The incredible kiwi, a wild south book. By Neville Peat (1990). Random Century, Auckland.

Collins guide to the mammals of New Zealand. By M.Daniel and A. Baker (1986). Collins, Auckland.

Handbook of New Zealand Mammals. Edited by King, C.M. (1995). Oxford University Press, Auckland.

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Prehistoric New Zealand. By Graeme Stevens, Matt McGlone and Beverley McCulloch; illustrations by Vivian Ward (1988). Heinemann Reed, Auckland.

Prehistoric animals of New Zealand. By Geoffrey J. Cox (1991). Harper Collins, Auckland.

Collins guide to the sea fishes of New Zealand, Tony Ayling and Geoffrey J.Cox (1982), Collins, Auckland.

Deep sea New Zealand, blue water, black abyss. By Peter Batson (2003). Canterbury University Press, Christchurch.

The National Aquarium Secondary Schools resource booklet.

Web site keywords:

Department of Conservation
Ministry of Fisheries
Ministry for the Environment
Ministry of Agriculture and Forestry
RAMSAR
WWF
CITES
Eco-footprint
Experiencing Marine Reserves
Whitebait connection
Oil spills