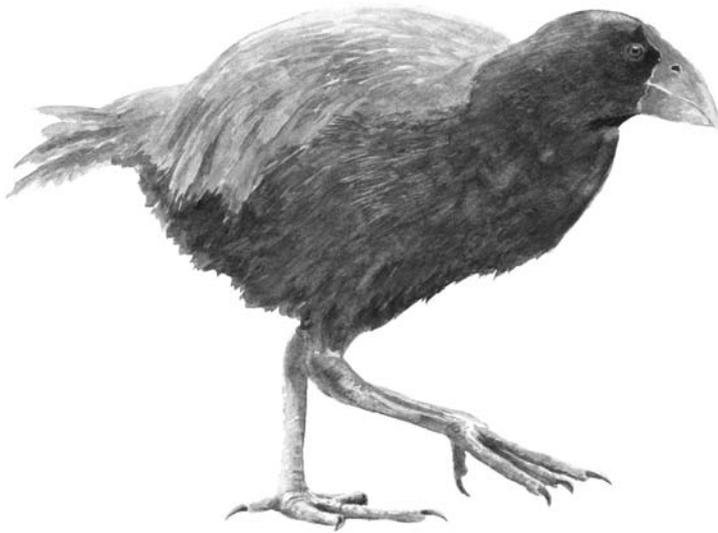


Part five: the New Zealand Curriculum and teaching resources

Curriculum



Overview of the New Zealand Curriculum

Education Programmes on Tiritiri Matangi support the New Zealand Curriculum.



Reference: Overview of The New Zealand Curriculum, pg 7, 2007

Suggested general educational aims and learning outcomes of this programme

Education programmes

Suggested broad aims

- Students to experience New Zealand's rare, endangered and unique flora and fauna within a natural setting of significant cultural heritage.
- Students to experience conservation in action: to understand how the island operates as a scientific reserve and open sanctuary in partnership with the community, and how they can become involved and contribute to the programme.

Suggested specific learning outcomes

Students will have the opportunity to:

- Observe and identify rare and endangered birds and wildlife in an authentic natural setting.
- Observe and identify rare and endangered plants within both regenerating and coastal forest.
- Experience the cultural heritage of Tiritiri Matangi Island.
- Gain an increased awareness of 'conservation in action'.
- Understand the role people have in protecting our environment and that we all have a part to play in it.
- Develop an awareness of how the conservation efforts on Tiritiri Matangi Island can be translated to other restoration projects.
- Understand interdependence of species, habitats and their link to ecosystems.
- To evaluate the impact of humans on an environment.



Achievable key competencies

Our programme supports key competencies as follows:

Thinking

The programme enables students to make connections to their prior knowledge. Thinking is a critical part of the programme. Students can reflect on their own experience on Tiritiri Matangi and develop their own key questions that they will investigate to shape future environmental actions.

Using language, symbols and text

Students to learn the place names, plants and birds of Tiritiri Matangi, and Maori legends and stories.

Descriptive language of wildlife behaviour and habitats.

Scientific language – data collection.

Communication – letters, newspaper articles, scientific reports, ICT presentations, nature journaling and reflections.

Relating to others

Opportunity to relate to a diverse range of people (ferry crew, rangers, volunteers, other members of the public including tourists, researchers, educators and volunteer guides).

Many students re-visit the island often bringing family members to share the experience, others return later as adults and often become involved as supporters.

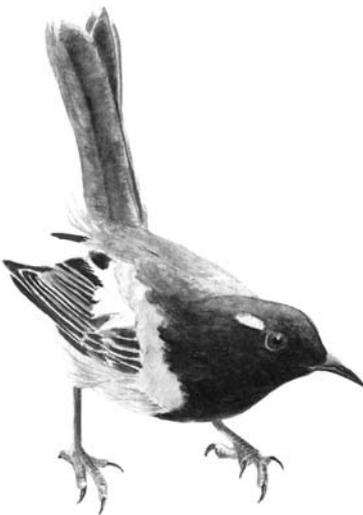
Students can explore different values through the historical account of the island.

Managing self

Students can develop their own environmental action plans to implement restoration projects within their school community. Students who set goals, make plans and see them through to completion, demonstrate self-management.

Participating and contributing

Schools have become involved in their own right, providing funding to the island in all sorts of ways including multi-days and colouring books sales. Others have participated and contributed to island projects, for example, Glenfield College undertook the successful translocation of hihi (stitchbird) to the island in 1995, and St Cuthbert's School and their conservation group built tracks and supported a number of projects on the island.



Science learning area

Science as key learning area

(adapted from The New Zealand Curriculum pages 17, 18, 28 and fold out charts)

In science, students explore the natural and physical world. Science exploration helps them to participate as critical, informed and responsible citizens in a society.

What is science about?

Science is a way of investigating, understanding and explaining our natural, physical world and the wider universe. It involves generating and testing ideas, gathering evidence – including by making observations, carrying out investigations and modelling, and communicating and debating with others – in order to develop scientific knowledge, understanding, and explanations. Scientific progress comes from logical, systematic work and from creative insight, built on a foundation of respect for evidence. Different cultures and periods of history have contributed to the development of science.

The achievement aims of the nature of science and the living world are addressed by our programme as follows.

Levels 1 and 2 Science Achievement Objectives

- Appreciate that scientists ask questions about our world.
- Investigate the natural world through exploration, play and asking questions (use all of your senses to explore the environment at school – plus your brain – observation exercises, and come to the island with your own questions to be answered).
- Build language about how the natural world can be represented (pre-visit mapping exercise – draw an imaginary island and discuss what you would need to survive on it).
- Explore issues linking their science learning to their daily living (e.g. why do we not have endangered birds in our suburbs?).
- Recognise that all living things have certain requirements to stay alive (what do humans, plants, and animals need to survive?).
- Recognise that living things are suited to their particular habitat (what do the individual bird species need e.g. could the takahe use the robin's nest?).



- Recognise there are lots of different living things in the world and that they can be grouped differently (use resources on bird, plant and other animal life).
- Explain how we know some living things in the world are now extinct (historical data) and also see pages 41 – 43.
- Explore and describe natural features and resources (all life needs water - what kinds of water are on Tiritiri Matangi, what about nests and shelter?).
- Describe how natural features are changed and resources affected by natural events and human actions (see island history pages 24–30, also evidence of storms in tree fall).

Levels 3 and 4 Science Achievement Objectives

- Appreciate that science is a way of explaining the world and that science knowledge changes with time e.g. in New Zealand we now have mainland conservation islands with predator-proof fences and controls e.g. Ark in The Park.
- Identify ways in which scientists work together and provide evidence to support their ideas – during trip to the island students could be ornithologists, rangers and reporters, or practise being scientists – see pages 18, 28 – 30.
- Build on prior experiences working together to share and examine knowledge e.g. sharing between groups after trip to island – different groups will see and hear different things.
- Ask questions, find evidence to carry out simple explanations (measure birds' behaviour page 227 or page 11 student activities).
- Develop scientific symbols, conventions and vocabulary e.g. see page 13 of student activities booklet, also glossary page 238–240; learn about bird banding from the display on Tiritiri Matangi.
- Explore various aspects of an issue of concern and make decisions about possible actions e.g. a dog or kiore is found on Tiritiri Matangi, what must be done?
- Recognise life processes common to all living things and how they differ – obtaining food, shelter, nest, camouflage etc.
- Explain how living things are suited to their particular habitat (adaptations) and how they respond to environmental changes both natural and human-induced (think about takahe and their food source on the island, also the nectar-feeding birds – are they using the sugar water feeding stations, and regulation of populations through breeding).
- Group plants, animals and other living things in science-based classification (students to produce a checklist from school environment and then repeat for Tiritiri Matangi).



- Begin to explore how groups of living things have changed through time and the uniqueness of different countries' flora and fauna (a good reference book here is Ronald Cometti's new book: 'New Zealand Through Time').
- Earth's resources consist of water, air, rocks, soil and life forms – how are these used by species found on Tiritiri Matangi?
- Depict the water cycles on Tiritiri Matangi.

Levels 5 and 6 Science Achievement Objectives

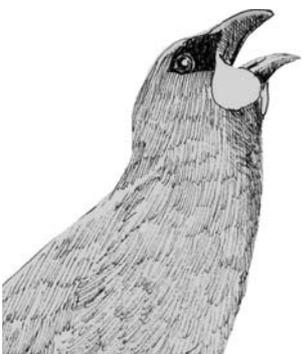
- Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through logical processes (could refer to brown quail, pukeko and other research on Tiritiri Matangi).
- Investigating through development and carrying out complex investigations using models (e.g. transect studies) and working scientifically using multiple variables, plus evaluation of such methodology. Culminating activity, report on findings e.g. the translocations on and off the island.
- Use of a wider range of science vocabulary, symbols, conventions, and evaluations of popular and scientific texts (see reference/resource lists).

Level 5

- Identify key structural features and functions involved in the life processes of plants and animals: organisation at the cellular level, and how genetic information is passed on (e.g. breeding programmes, New Zealand birds and flight, tuatara, etc).
- Investigate the interdependence of living things in an ecosystem (food webs and cycles, co-evolution page 19).

Level 6

- Investigate the impact of natural events and human actions on a New Zealand ecosystem (Tiritiri Matangi through history – discuss storms and droughts).
- Explore patterns in the inheritance of genetically controlled characteristics and explain the importance of variation within a changing environment (kokako translocations – birds with rare genes, and the other rare and endangered species translocations, also the black robin story).



Level 7 and Level 8 Science Achievement Objectives

- Understand that scientists have an obligation to connect their new ideas to current and historical scientific knowledge and present their findings for peer review and debate (peer review and debate could be incorporated into their report findings from Tiritiri Matangi).
- Develop and carry out investigations that extend their science knowledge and the relationship between investigations, theories and models.
- Evaluate accounts of the natural world using appropriate scientific conventions and methodologies – biodiversity of Tiritiri Matangi; light pools needed in the vegetation and the story of tuatara.
- To identify possible personal and socio-scientific responses to issues that concern them.

Level 7

- Explore diverse ways in which plants and animals carry out life processes - sharing of nesting sites between tuatara and grey faced petrels.
- Explore ecological distribution patterns and explain possible causes for these patterns (look at endangered and rare New Zealand birds).
- Understand that DNA and the environment interact in gene expression – e.g. kokako translocations on and off the island and takahe poor breeding rate on Tiritiri Matangi compared to Mt Bruce.
- Explain how the interactions between ecological factors and natural selection leads to genetic changes within populations.

Level 8

- Understand the relationship between organisms and their environment e.g. modified behaviour of takahe.
- Appreciate the place and impact of humans within evolutionary processes that have resulted in the diversity of life on earth (e.g. stories of scientists bringing back species from the brink of extinction).
- Understand how humans manipulate the transfer of genetic information and make informed judgements of the social, ethical, and biological implications.



Tiritiri Matangi integrated curriculum

(with reference to The New Zealand Curriculum, page 17).

English

Students study use and enjoy language and literature communicated orally, visually or in writing. Emphasis on:

- Listening
- Reading
- Viewing
- Speaking
- Writing
- Presenting

Use of references including websites and children's nature books pages 231 – 237.



Arts

Students explore, refine and communicate ideas as they connect thinking, imagination, senses and feelings, to create works and respond to the works of others.

- Includes: dance; drama; music (sound arts) and visual arts.
- Use of CD – bird calls on Tiritiri Matangi.

Health and physical education

Students learn about their own well-being, and that of others and society in health related and movement areas. A day on the island provides students with an:

- Enjoyable physical walk; and
- An opportunity to relate and respect other people.

Learning languages

Students learn to communicate in an additional language, develop their capacity to learn further languages and explore different world views in relation to their own.

- Opportunity to use te reo Maori in a setting that has strong connections to Maori cultural inheritance and identity.

Mathematics and statistics

Students explore relationships in quantities, space and data, and learn to express these relationships in ways that help them make sense of the world around them.

- Scientific use of statistics and problem solving.
- Recording data (simple counting to transect studies).
- Using data e.g. number of eggs and predation.
- Population graphs e.g. little spotted kiwi numbers have doubled since 2002, to 60 birds in 2008.
- Patterns in nature (e.g. insects and birds eating leaves, koru spirals, cats eye spirals, Fibonacci number series and fern spores).
- Estimating (e.g. canopy height, territory size, distances and tree age).

Social sciences

Students to explore how societies work and how they themselves can participate and take action as critical, informed and responsible citizens.

- Experience first hand a special place and relationship between a place and people.
- Understand how the island has changed over time and to imagine possible futures.
- Learn about diverse cultures and identities.

Technology

Students learn to be innovative developers of products and systems and discerning consumers who will make a difference in this world.

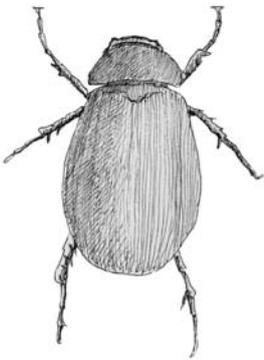
- Create or design an action plan or product to support a species e.g. nesting box or weta hotel.
- Develop a website or dvd to present to their school.
- Design and plan their trip to Tiritiri Matangi - how to make it economically viable for the school and options as to how they will get additional funding.



Further learning activities for Tiritiri Matangi (levels 1–4)

Teachers choose according to ages, levels, interests or needs.
(See also Curriculum Integration Chart.)

Pre-visit



1. Brainstorm ideas students already have about the site.
 2. Classification: living/non-living captioned collage.
 3. List all the life that exists in a home, including people, pets and pests. What do they need to live? What different places do they prefer to live in?
 4. Prior experience with creatures and/or plants, and their habitats at home/school (attributes).
 5. 'I know' chart about habitats in general.
 6. 'I wonder' chart of questions (specific to the area to be visited).
 7. Practice in the use of any equipment to be taken on a field trip e.g. for sampling water quality, using binoculars, studying a transect etc.
 8. Observation practice with playground or other local trees, insects and birds.
 9. Practice observational drawing and sketches.
 10. Discussion of conservation-wise behaviour: caution, care, quiet in areas of sensitive/rare plant and animal life.
 11. Consider the area being visited and design an appropriate risk management plan.
 12. Students list clothing and other gear they might need on the trip.
 13. Locate the site on a map, work out its distance from school and estimate how long it will take to travel there.
 14. Prepare charts of trees, ferns, other plants, birds, insects etc for students to tick off while on their visit.
 15. Prepare a storyboard for a video presentation.
 16. Prepare a calendar. List own daily and seasonal routines. Compare with plants and animals.
 17. What can you do to care for the environment during your visit?
-

During visit

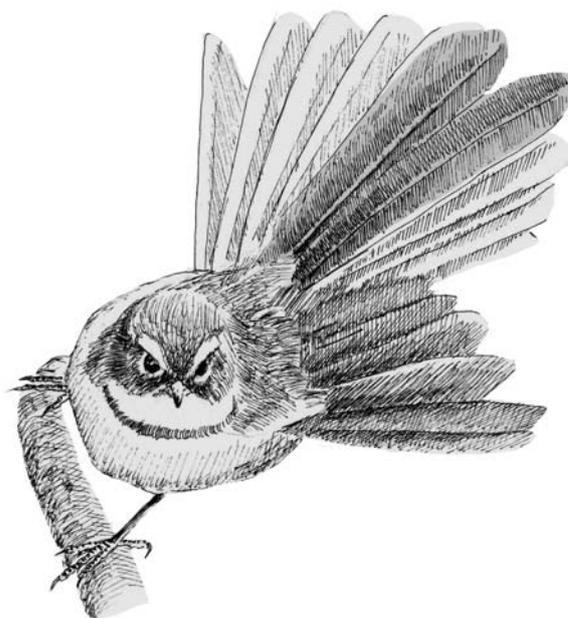
1. On arrival at the site: listen carefully to the sounds around you. How are they different/similar to what you usually hear at home or school? Watch carefully and listen for birds or other sounds.
2. Depending on whether you are visiting bush or wetland, look at the specialized plants growing in wet or marshy places, on tree trunks (epiphytes and parasites), on forest floor, sub-canopy or canopy. What conditions do they have to cope with?
3. When you are in the forest or beside the wetland, stand, sit or lie with your eyes closed. Be quiet and still. Try to identify all the sounds and smells. What can you hear/smell that belongs to this particular environment? What does not belong here?
4. Do an overall observational sketch of the area being visited. Try to name some of the plants, trees, etc.
5. Or make an observational sketch of a particular plant/tree.

6. As you walk, use a check sheet to mark each time you hear or see a bird. If possible, name the bird.
 7. Describe all the different birds you can see, and then try to discover their names back at school.
 8. Do the same for trees or other plants.
 7. Consider the value of the wetland (e.g. the kidneys of the land!) or the native bush (e.g. prevention of erosion and attraction of rain clouds).
-

Post-visit

1. Class chart or book of one or more of the most commonly seen birds and their habitat. List reasons for why there are not more to be seen.
 2. Revise pre-visit activities 5 and 6.
 3. A mural of the area visited. Draw plants and animals that make up the food chain and arrange them in order (or build up a food web).
 4. Make a 'wanted' poster for a predator or a noxious weed. Describe the damage it does and ways to eliminate it.
 5. Arrange a clean-up day of a nearby area.
 6. Choose one of the most common creatures or trees or bushes (e.g. flax, tawa, fantail or sparrow) for an in-depth study. Label adaptations of the subject being studied and say how each adaptation helps survival.
 7. Consider the impact of human settlement and activities such as farming, mining, etc on natural areas such as that which has just been visited and create an environment board, devising ways to help keep such environments healthy.
 8. Write a report on the dumping of kittens in the area. Include issues such as: cruelty to the kittens, responsibilities of their owners, potential of grown wild cats to devastate the bird population, etc.
 9. As above, but a report on the dumping of garden waste, or car bodies, fridges, etc.
 10. Refer to 'Guidelines for Environmental Education' p21 regarding environmental issues, for further ideas.
-

Think globally, act locally

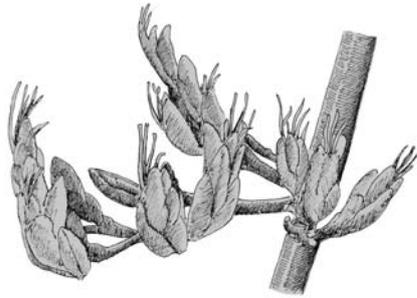


English

1. Write facts in codes and ciphers.
 2. Poetry about habitat protection, renewal or destruction.
 3. Poems (esp. haiku) or stories, written on appropriate shapes e.g. tree, raupo, eel
 4. Write facts or questions in rebus form.
 5. Class debate on conservation issues: the value of wetlands, human impact on habitat and fauna, effect of predators (esp. pets), the benefits/dangers of farming, exploitation of natural resources, etc.
 6. 'A day in the life of...' (e.g. an eel, fantail, the island of Tiritiri Matangi ...).
 7. Myths and legends: share existing ones, create new ones.
 8. 'Just so' stories (e.g. why the fernbird's tail is scruffy).
 9. Letters to local and/or national politicians explaining the value and needs of a local natural area and seeking support for its conservation or restoration. Or praising the work being done by volunteers on Tiritiri Matangi.
-

Maths

1. Estimation of (for example) numbers of insects in a study plot.
 2. Explore a variety of shapes and objects found in nature by touching, observing and talking.
 3. Identify symmetries in the natural world.
 4. Use the concepts of 'greater than' and 'less than' to describe the numbers of different kinds of birds, trees, insects, activities etc in a given area.
 5. Add together subsets of different kinds of birds, insects or leaves in order to reach a total (e.g. fantails, sparrows and hawks; caterpillars, beetles and ants).
 6. Collect and display environmental data in stem and leaf graphs, dot plots, etc.
 7. Classify environmental events as certain, possible or impossible.
 8. Sorting fact from opinion.
-



The arts

1. Dramatise: such as the loss of forest and creation of farmland or silting of waterways.
 2. Create puppets. Write and perform plays using them. Suggestions: kiwi fending off stoats, bellbirds searching for nectar or Dr Orbell rediscovering takahe.
 3. A frieze of birds, or plants or other native creatures found around your area.
 4. Make mobiles of creatures as in #3.
 5. Potato prints.
 6. Model of a native bird or reptile and its habitat: shadow box, papier mache, clay, etc.
 7. Stained glass pictures on windows (tracing paper, crayons or vegetable oil).
 8. Rap, song, jingle, about Tiritiri Matangi or caring for our local environment.
 9. Compose a song using voice, recorder, xylophone, keyboard or found sounds expressing the idea of flight, swimming or the joys of working together to restore a habitat or create a new one.
 10. Design and produce a poster which gives a clear conservation message about an endangered bird, reptile, insect or habitat.
-

Technology

1. Find and study as many internet sites as possible which deal with New Zealand creatures and their habitats.
 2. Investigate the wings of planes, bats and birds – similarities and differences. Design a wing, and make discoveries about the effect shape has on flight in nature.
 3. Discuss why some of our birds can no longer fly.
 4. Research breeding requirements for one of our native birds, insects or reptiles, then design and make a suitable enclosure for captive breeding. Consider predator-protection, comfort and ease of access for helpers, etc.
-

Social studies/Maori

1. Discover Maori names for as many of our indigenous flora and fauna as possible.
 2. Research the distribution of an indigenous creature now and 100 or 150 years ago.
 3. Time, continuity and change – how the ideas and actions of people in the past have changed the lives of others: e.g. individuals and groups who have worked to preserve the environment such as the Supporters of Tiritiri Matangi.
 4. Resources and economic activities – the different types of work people do which help or hinder protection of species.
 5. Social organisation – why people belong to groups: DOC workers and supporters, local Iwi, groups such as SOTM, or groups restoring other areas, including wetlands and beach reserves.
 6. Why and how people make and implement laws, etc.
-

Health and P.E.

1. Identify safe practices and basic risk management strategies.
 2. Demonstrate sharing and cooperative skills in groups.
 3. Share ideas and beliefs about ways in which the environment contributes to wellbeing, and work with other people to make improvements. This could be either in their own homes, the school or in the wider environment.
 4. Help prepare a Risk Management document for the visit to Tiritiri Matangi.
-

