Inquiry: Can we make New Zealand pest-free?

ZEALANDIA™
TE MĀRA A TĀNE

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Overview of Unit:

Environmental Technology in New Zealand
Inquiry: Can we make NZ pest-free?

Year(s)	Level(s)	Duration	Teacher	Classroom
4-8	2-3 Note: can be used through Levels 1-4	Five core sessions with two additional sessions to be integrated as appropriate.		

Unit Vision:	**Can we make New Zealand pest-free?** New Zealand conservation efforts are leading the world in restoring our unique and treasured taonga species through the actions of ordinary New Zealanders using citizen science. Using new technology, this inquiry journey will allow your students to be actively involved in this action. Their participation will have a real impact on improving New Zealand's biodiversity through such actions as data collection, introduced predator management, wildlife monitoring and community engagement.
Key Competencies:	**Thinking; Using language, symbols, and texts;** Managing self; **Relating to others; Participating and contributing.**
Values:	Excellence**; Innovation, inquiry,** curiosity; **Diversity;** Equity; **Community and participation; Ecological sustainability;** Integrity; **Respect.**
Setting:	• New Zealand • Local community and school setting • Local special place e.g. ZEALANDIA, Brook Waimarama Sanctuary, Riccarton Bush
Perspective:	• Multicultural • History • Indigenous people • Current issues • Future facing • Action based
Technology Strands:	**Nature of Technology** **Technological Knowledge**

Achievement Objectives: **Nature of Technology**	*Students will:* **Characteristics of technology (Level 2):** • Understand that technology both reflects and changes society and the environment and increases people's capability. OR **Characteristics of technology (Level 3):** • Understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function. **Characteristics of technological outcomes (Level 2):** • Understand that technological outcomes are developed through technological practice and have related physical and functional natures. OR **Characteristics of technological outcomes (Level 3):** • Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.
Achievement Objectives: **Technological Knowledge**	*Students will:* **Technological systems (Level 2):** • Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems OR **Technological systems (Level 3):** • Understand that technological systems are represented by symbolic language tools and understand the role played by the "black box" in technological systems.
Science Strands:	**Nature of Science** **Living World**
Science Strand: **Nature of Science**	*Students will:* **Understanding about science:** • Appreciate that science is a way of explaining the world and that science knowledge changes over time. • Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science:** • Build on prior experiences, and work together to share and

<table>
<tr><td></td><td>examine their own and others' knowledge.
• Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations.
Participating and contributing:
• Explore various aspects of an issue and make decisions about possible actions.</td></tr>
<tr><td>Science Strand:
Living World</td><td>Students will:
Ecology:
• Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.
Evolution:
• Begin to group plants, animals, and other living things into science-based classifications.</td></tr>
<tr><td colspan="2">Additional curriculum areas:
☐ Mathematics
• Statistics – Statistical investigation
• Statistics – Statistical literacy
☐ Learning Languages
• Communication – Language
• Communication – Culture
☐ Te Reo: Kōrero (Speaking: Level 1)</td><td>Other additional curriculum areas you may incorporate:
☐ English
☐ Social Science
☐ Health and P.E.
☐ Art</td></tr>
<tr><td colspan="2">Specific Learning Outcomes for Unit:
By the end of this unit, students will be able to:
• Use technology to gather data about and make connections between the extent of biodiversity in an area and the presence of introduced predators in that same area (using iNaturalist, tracking tunnels and chew cards).
• Use technology to gather data about and take action to protect and improve biodiversity (using tracking tunnels, chew cards and traps).
• Understand the action that individuals, groups (schools) and communities can take to work towards restoring our native species (ongoing programme).</td></tr>
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iNaturalist

The application used in this unit is **iNaturalist** (https://inaturalist.nz/).

Vision: To build a living record of life in New Zealand that scientists and environmental managers can use to monitor changes in biodiversity, and that anyone can use to learn more about New Zealand's amazing natural history.

Its aims are:

- To increase knowledge, understanding and appreciation of New Zealand's natural history.
- To engage and assist New Zealanders in observing and recording biological information.
- To develop and support online tools to assist individuals and groups to record, view, share and use biological information.
- To collaborate with people and groups interested in bio-recording.
- To promote and provide secure, open and ethical sources of biological information for the public.

iNaturalist has been selected for use in this unit due to its ease of use in uploading observations and accessing data and its excellent coverage of a range of flora and fauna nationally, and it's fun!

Tim Park, Environmental Partnership Leader from Wellington City Council, a conservationist with a strong interest in the use of technology and citizen science says:

"Connecting growing minds with nature is increasingly important. I am sure you will discover that iNaturalist is a superb place for sharing and learning about our natural world. We need a good understanding of the life which surrounds us if we want to look after it well. iNaturalist is simplex – it presents complex information simply. But this powerful technology is nothing without the wide community of volunteers – professional and amateur enthusiasts who curate the information as it pours in. Every contribution to iNaturalist is valuable so get your team out there and observe!"

Barrie Matthews, Programme Manager from LEARNNZ, wrote in his blog about: *"the many diverse applications of iNaturalist to the learning process, skill development, literacy – across Māori, Latin and English, numeracy, communication, right through to nationhood building – environmental education writ large - in the deepest and broadest sense"*[1].

http://blog.core-ed.org/blog/2016/03/using-naturewatch-to-build-21st-century-capabilities-in-students.html

[1] Colin Meurk, Research Associate, Landcare Research Manaaki Whenua. Date accessed 14.04.16

Trap.NZ

Another application you may be interested in using is Trap.NZ, particularly if you are setting up a larger trapping programme. Trap.NZ is an application for recording data relating to the trapping of introduced predators. You can set up trapping projects, map your trap lines and traps, and enter your trapping results (via web or a mobile app). It allows you to interactively display maps and tables of results, including heat maps of where your catches are occurring, timing of peaks in predator catches etc., enabling you to examine and understand the results of your trapping.

If you wish to use Trap.NZ for this unit, you can use it alongside iNaturalist. iNaturalist is well-suited for identifying animal tracks, as well as the native or introduced species within your local area. Trap.NZ is useful for recording more complex data, and for evaluating the effectiveness of your trapping project. See www.trap.nz for more information.

Please ensure you read carefully the attached RAMs Health and Safety guidelines and the Trap Setting guidelines.

Teaching Support Materials:

A list of all resources needed for each lesson is found at the start of each lesson template. This includes:

- iPads and/or tablets with a pre-installed iNaturalist app, and an account set up.
    - You can set up a log-in name for the class at https://inaturalist.nz/ (follow the log-in instructions on the home page, or navigate to the help page for more information).
- Laptop to connect to projector.
- Pre and post unit assessment test of knowledge (supplied in the Lesson One folder).
- Vocabulary list in English and Māori (Conservation Kupu and He Manu lists supplied in the He Tikanga folder).
- Information about native bird species: http://nzbirdsonline.org.nz/
- Science Concepts Series:
    - #3 Birds: Structure, Function and Adaptation (Level 1-4).
    - #39 Is This an Animal?: Introducing the Animal Kingdom (Level 1-4).
    - #7 The Bush: Classifying Forest Plants (Level 3-4).
- An Excel spreadsheet where you can record information from your tracking tunnels, chew cards and traps (see the “Victoria University Trapping Results” resource in the Numbers and Patterns folder for an example of how this can be set up).
- Tracking tunnel and inkpads.

- "What Made These Tracks?" printed resource (supplied in the Lesson Two folder).
- Corflute (lightweight material that can be used to construct tracking tunnels and chew cards, and may be available free through your local real estate agent).
- Duct tape.
- A selection of traps (contact your local conservation group, DOC office or council for advice on sourcing these, or or buy directly from https://shop.predatorfreenz.org/).
- You can also make your own wooden trapping tunnel to house your trap: http://predatorfreenz.org/wp-content/uploads/2019/01/Rat-Tunnel-Weka-proof-length-template.pdf
- Laminates of New Zealand fauna and introduced predators (examples of photographs of New Zealand fauna are supplied for printing and laminating in the Lesson One folder). For more bird identification resources, see the Manaaki Whenua website for documents on identifying common garden birds: https://www.landcareresearch.co.nz/__data/assets/pdf_file/0005/29597/nzgbs-bird-guide.pdf
- A3 laminates of your 'place' map with up-to-date class data.

Unit Outline:

A. Preparatory Lesson: Inspire your students with the amazing endemic species present in New Zealand

This is your opportunity to inspire your students by taking them on a site visit to a special area they can identify with. Ideally this would be an area of native bush which is protected. It may have a trapping programme, a restoration planting programme or have a number of plant and animal species present which you would not normally see around your school community. Examples of areas that could be used to inspire students include: ZEALANDIA, Kaitoke Regional Park, Rainbow Fairy Springs, Riccarton Bush, Sandfly Bay, Brook Waimarama Sanctuary, Orokonui Ecosanctuary and Wainuiomata Water Catchment.

The purpose of this trip is to begin the inquiry process.

Please note that in the unit folder there are two sessions which are additional to the core sessions. The content of these two lessons is designed to be used throughout the other five sessions as suggested. These are:

1. Mathematics – Statistics
2. He tikanga mō te tiaki ō ngā taonga ake ō Aotearoa

B. Core Sessions:

Lesson 1. Investigate: Why do we need to help?

- Pre unit assessment test.
- Introduce the global iNaturalist data collecting and citizen science platform.
- Endemic animal group research activity using the resources available on the iNaturalist site.
- 'Biodiversity - what species do we have at our 'place'?'

Lesson 2. Investigate: What is present? Part 1

- Introduced predator species.
- Make and use tracking tunnels or chew cards.
- 'How do we use these prints to map what introduced predators are affecting our area?'

Lesson 3. Investigate: What is present? Part 2

- Use your iNaturalist project to collect and record data on species around us. Alternatively, if you are in the Wellington region you may wish to use our 'ZEALANDIA WWF Outreach' project to record observations:
  https://inaturalist.nz/projects/zealandia-kaitiaki-schools-towards-a-pest-free-wellington
  See the following projects as examples:
  - Kelburn Restoration
    https://www.inaturalist.nz/projects/kelburn-restoration
  - Travis Wetland Nature Heritage Park
    https://www.inaturalist.nz/projects/travis-wetland-nature-heritage-park
  - Aramoana Biodiversity
    https://www.inaturalist.nz/projects/aramoana-biodiversity
- Upload photos of our prints to the iNaturalist site to check identification of them and share this data with others in our community.
- 'How do we make a scientific observation?'

Lesson 4: Instigate: What's the solution?

- Analyse the data we've collected to inform our next steps.
- Use available, safe and humane traps.
- Learn how to select and set effective traps in our school area.
- 'How can we help our unique endemic and native species?

Lesson 5: Evaluate: So what?

- Make connections by mapping biodiversity and its relationship to tracking tunnels/chew cards and traps.
- Post-unit assessment test.
- 'What future ongoing actions can we take based on what we have learnt through our investigation?'

Lesson Structure:

Each one-hour lesson is action focussed and is set up with:

- **Introduction and overview**
- **Theme and content**
- **Wrap**

Unit Evaluation:

The unit evaluation comprises of several areas:

- Pre and post unit assessment test. The assessment test and marking schedule rubric are attached to Lesson One and Lesson Five.
- Species group task.
- Student has made and used an effective tracking tunnel and/or chew card.
- Student has been able to successfully log and identify prints.
- Student can make connections between biodiversity and introduced predators. This can be done through written or oral presentations.

Note: There is also space on each lesson plan for teacher reflection.

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Karori Normal School

Te Aro School

Makara Model School

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