| **SCIENCE EDUCATION PLANNER: CONSERVING NATIVE BIRDS** |
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| **SCIENCE STRANDS:**Living WorldMaterial World | Physical World Plant Earth and Beyond | **MACRO TASK:** Understand reasons why certain birds in New Zealand have a threatened status or have become extinct. Investigate various conservation methods to protect New Zealand native birds and discuss the merits of these. | **LEVEL:** 1 2 3 4**YEAR:** 5 & 6**TEACHER:** Kim Oliver |
| Nature of Science – understanding, investigating, communicating, participating and contributing. |
| **STRANDS/AOs:** | * Ecology – explain how different species of birds are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.
* Evolution – explore how birds in New Zealand have changed over long periods of time and appreciate that some birds in New Zealand are quite different to birds in other areas of the world.
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| **KEY COMPETENCIES:** * Thinking – use knowledge gained during the unit to discuss the merits of conservation in New Zealand.
* Relating to others – listen, discuss, debate ideas and work cooperatively while appreciating others’ viewpoints within groups and in class.
* Using language, symbols and texts – use scientific language and read articles relating to birds and conservation.
* Managing self – complete set tasks and undertake a research project relating to monitoring methods used.
* Participating and contributing – working cooperatively in investigative activities and discussions.
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| **INTENDED LEARNING OUTCOMES:** The students will: |
| **Conceptual LOs** | **Procedural LOs** | **Nature of science** | **Technical LOs** |
| * Understand that living things evolve and adapt over many generations, which allows them to become increasingly well suited to their environment.
* Understand that predation and loss of habitat are the biggest causes of native bird decline in New Zealand.
* Gain an understanding of the merits of various conservation methods used in New Zealand.
* Understand how an ecosystem works.
* Understand that genetic variation in a species is important for the survival of the species.
 | * Research/locate information using the Science Learning Hub, other internet resources, people and books.
* Develop investigative skills by carrying out various practical activities and experiments.
* Participate in an ethical debate on the ethics of conservation methods.
 | * Learn about science as a knowledge system and how science has informed conservation efforts.
* Carry out investigations using a variety of approaches: observing and fair testing.
* Communicate ideas using scientific language when presenting results and debating ethical issues.
* Justify opinions by using science to inform ethical decisions and possible future actions.
 | * Make detailed observations.
* Carry out investigations and follow instructions accurately.
* Discuss scientific issues in small groups and present arguments (debating skills).
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| **MANAGEMENT/MATERIALS:*** **Resources:** [www.sciencelearn.org.nz/resources/1158-conserving-native-birds-introduction](https://www.sciencelearn.org.nz/resources/1158-conserving-native-birds-introduction), internet, National Library and school library books.
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| **ASSESSMENT ACTIVITY EXAMPLES:*** Classify various adaptations of New Zealand native birds as structural, behavioural or physiological.
* Justify why a particular conservation method should or should not be used.
* Create a tracking tunnel to monitor the local environment. If evidence of predators is found, decide on a plan of action.
* Explain reasons why the kererū is known as a keystone species in the native bush ecosystem. Describe effects of the removal or increase of a particular species within the native bush ecosystem in New Zealand.
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| **SCIENCE: PLANNING FOR TEACHING AND LEARNING: CONSERVING NATIVE BIRDS** |
| **MACRO TASK:** Understand reasons why certain birds in New Zealand have a threatened status or have become extinct. Investigate various conservation methods to protect New Zealand native birds and discuss the merits of these. |

| **Micro task** | **Resources** | **Planned****interactions** | **Intended learning****outcomes** | **Reflections** |
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| **MESO TASK:** Understand that living things (organisms) evolve and adapt over many generations. This enables them to become increasingly well suited to their environment. |
| Understand that adaptation occurs over many generations. This can take hundreds of years. | * Non-fiction books
* Internet access

**Teacher reference:*** [Native bird adaptations article](https://www.sciencelearn.org.nz/resources/1162-native-bird-adaptations)
 | Encourage students to locate information on animal adaptations in response to the questions below:* What is adaptation?
* How long does it take for adaptation to occur?
* How does adaptation benefit the organism?
 | Students will understand that adaptation * is not a quick process and takes many generations to occur
* can benefit the individual in terms of locating food or shelter, providing protection from predators and producing offspring.
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| Develop an understanding of the different types of adaptation: structural, behavioural and physiological. | * [Classifying bird adaptations](https://www.sciencelearn.org.nz/resources/1169-classifying-bird-adaptations)
 | * Follow the instructions in the activity [Classifying bird adaptations](https://www.sciencelearn.org.nz/resources/1169-classifying-bird-adaptations).
 | * Students will gain an understanding of the three different types of adaptation.
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| Understand that, due to a large body size and loss of flight, many native birds are vulnerable to predation.  | * Pictures of moa, kiwi, takahē, kākāpō
 | * What common features do these birds have? (ground dwelling, large body size).
* Why do you think these birds lost the ability to fly?
* Why have these features resulted in birds being vulnerable to predation?
 | Students will conclude that:* these birds all evolved large body size and loss of flight
* flight was not needed as there were no predators when New Zealand split from Gondwana
* adaptation takes many generations and these birds cannot adapt fast enough in a changing environment, so are vulnerable to predation.
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| **MESO TASK:** Understand that predation and loss of habitat are the biggest causes of native bird decline in New Zealand. |
| Understand the impact of habitat loss on native bird populations.  | * Large sheets of paper
* Marker pens

**Teacher reference:*** [Predation of native birds](https://www.sciencelearn.org.nz/resources/1159-predation-of-native-birds)
 | * Brainstorm in small groups what factors have caused birds to lose their native habitat.
 | * Students will understand that human impact has had a detrimental effect on the habitat of native birds through native bush clearance for farming, bush fires and the introduction of possums.
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| Understand the impact of predation on native bird populations.  | * Access to non-fiction books and internet.
* Activity: [Making a tracking tunnel](https://www.sciencelearn.org.nz/resources/1171-making-a-tracking-tunnel)

**Teacher reference:*** [Predation of native birds](https://www.sciencelearn.org.nz/resources/1159-predation-of-native-birds)
 | * Assign small groups of students a pest species each (possum, rat, ferret, stoat, weasel, cat, dog, hedgehog)
* What impact does each pest have on native bird populations?
* Ask students to report their findings back to the class.
* Follow the instructions in the activity [Making a tracking tunnel](https://www.sciencelearn.org.nz/resources/1171-making-a-tracking-tunnel).
 | Students will: * understand the effect of predation on populations of native bird species in New Zealand
* gain knowledge of the wide range of mammalian predators that affect native birds in New Zealand
* decide on a plan of action if presence of pest species is found in their local environment.
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| **MESO TASK:** Gain an understanding of the various conservation methods used in New Zealand and justify their opinion about the merits of a conservation method of choice. |
| Find out about various conservation methods used in New Zealand. | [Methods of predator control](https://www.sciencelearn.org.nz/resources/1157-protecting-native-birds)**Teacher reference:*** [Protecting native birds](https://www.sciencelearn.org.nz/resources/1157-protecting-native-birds)
 | Brainstorm to find out students’ prior knowledge:* What conservation methods are used in New Zealand to protect native birds?
* What are the positive and negative aspects of each of these methods?

This can be used as a bus-stop activity, breaking students into small groups, rotating around the class and adding new ideas (positive and negative aspects) to each conservation method.Keep these brainstorms for the next micro task. | Students will: * retrieve prior knowledge of conservation methods to inform future teaching
* gain knowledge of conservation methods they may not have already been aware of.
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| Participate in an ethical decision-making process, justifying their opinion about conservation. | * Access to the internet
* Data projector
* Access to the [Ethics thinking tool](https://www.sciencelearn.org.nz/resources/2363-ethics-thinking-toolkit)
* [Ethics in bird conservation](https://www.sciencelearn.org.nz/resources/1172-ethics-in-bird-conservation)
* [Ethics and bird conservation – case study](https://www.sciencelearn.org.nz/resources/2154-ethics-and-bird-conservation-case-study)

**Teacher reference:*** [Protecting native birds](https://www.sciencelearn.org.nz/resources/1157-protecting-native-birds)
* [Methods of predator control](https://www.sciencelearn.org.nz/resources/1157-protecting-native-birds)
 | * Follow the instructions in [Ethics in bird conservation](https://www.sciencelearn.org.nz/resources/1172-ethics-in-bird-conservation)
* Share the slideshow [Methods of predator control](https://www.sciencelearn.org.nz/resources/1157-protecting-native-birds). Link these ideas to the brainstorm the students completed in the first micro task and discuss any new ideas.
* Introduce small groups of students (2–3 students per computer) to the [Ethics thinking tool](https://www.sciencelearn.org.nz/resources/2363-ethics-thinking-toolkit).
* Ask students to select the Consequentialism approach, select a method of predator control and use the tool to justify whether they think the method chosen should be used in New Zealand or not.
* Allow students to make informed decisions by allocating some research time.
* Ask each group to share with another group, or if time allows, groups can present back to the class.
 | * Students will learn to justify their opinion with scientific evidence.
* Students will gain confidence in sharing their opinion.
* Students will learn to make informed decisions.
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| **MESO TASK:** Students will gain an understanding of how an ecosystem works. |
| Understand that birds have an important role in New Zealand native bush. | * Images of [tūī](https://www.sciencelearn.org.nz/search?term=t%C5%AB%C4%AB&dFR%5Btype%5D%5B0%5D=Image), [kererū](https://www.sciencelearn.org.nz/search?term=kerer%C5%AB&dFR%5Btype%5D%5B0%5D=Image) and [bellbirds](https://www.sciencelearn.org.nz/images/1328-male-bellbird-feeding)
* [Birds’ role in ecosystems](https://www.sciencelearn.org.nz/resources/1163-birds-roles-in-ecosystems)
 | * Show the students images of tūī, kererū and bellbirds.
* Discuss the role of birds in New Zealand native bush using the following question to facilitate discussion: Why are birds important?
* Find out students’ prior knowledge about pollination and seed dispersal.
* Give pairs of students a copy of the article [Birds’ role in ecosystems](https://www.sciencelearn.org.nz/resources/1163-birds-roles-in-ecosystems) to read through and make notes.
* Ask students to share three interesting pieces of information with another pair after reading.
* Encourage students to find out which birds are important for pollination and seed dispersal in New Zealand.
 | * Students will gain an appreciation of the role birds fulfil in New Zealand native bush (pollination and seed dispersal).
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| Understand that many species are linked together by food webs in an ecosystem. | * [New Zealand bush ecosystems](https://www.sciencelearn.org.nz/resources/1173-new-zealand-bush-ecosystems)
 | * Follow the activity [New Zealand bush ecosystems](https://www.sciencelearn.org.nz/resources/1173-new-zealand-bush-ecosystems).
 | Students will understand that: * an ecosystem is dependent on many organisms interacting with each other
* if there becomes an imbalance within an ecosystem (a significant increase or decrease of a particular species), this will have an effect on other species in the ecosystem.
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| **MESO TASK:** Students will understand that species require genetic variation. |
| Understand that genetic variation within species is vital for the survival of the species. | * [Exploring genetic variation](https://www.sciencelearn.org.nz/resources/1170-exploring-genetic-variation)
 | * Follow the instructions in the activity [Exploring genetic variation](https://www.sciencelearn.org.nz/resources/1170-exploring-genetic-variation).
 | * Students will conclude that species require genetic variation to give them the greatest chance of survival when faced with environmental change and disease.
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