WHIO FOREVER

EDUCATION RESOURCE

YEARS 1–4 (JUNIOR)

Whio Forever

Department of Conservation
Te Papa Atawhai

genesis

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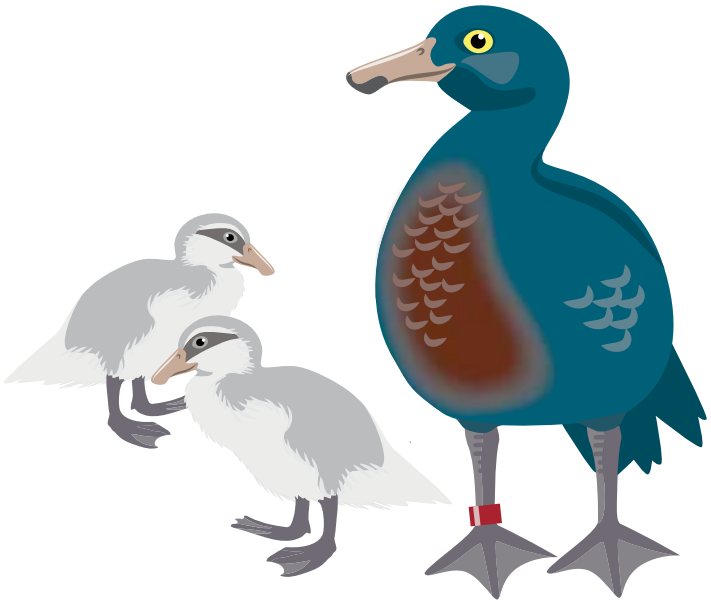

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INTRODUCTION

The whio or blue duck is one of our very special birds only found in New Zealand. It has some amazing unique characteristics and is one of only four ducks in the world living in fast-flowing rivers, surfing the rapids.

Whio is also an indicator species, so if you see it on a river you can be sure the river is clean, clear and healthy.

With fewer than 3000 left in the wild there are so many places throughout Aotearoa where you no longer find whio. So it is important to ensure the waterways where whio live are kept clean, clear and healthy. Making sure those areas are kept pest free to give the whio a fighting chance is also important.

We are all working hard to secure and protect this special duck and the places where you find them so they will be around for future generations.

One of the ways we can help is to make sure more people know and care about this specialist white water duck.

Whio forever, a partnership between the Department of Conservation and Genesis Energy was formed to secure and recover the New Zealand whio/blue duck population. Teaching young people about this amazing duck is one of the ways to achieve this.

ABOUT THE *WHIO FOREVER* TEACHING RESOURCE

Whio Forever is an integrated curriculum teaching resource with the whio/blue duck as the real life context for learning. The resource covers multiple learning areas of the New Zealand Curriculum. It has been developed for primary school (Years 1–8) teachers.

The resource contains teaching and learning material to support a unit of work, grounded in Environmental Education for Sustainability (EEfS) themes and incorporating aspects of Te Ao Māori (a Māori worldview). The unit is based on an inquiry learning process, including student-centred, constructivist pedagogy.

What is a whio/blue duck?

Whio are grey-blue coloured ducks with spotted brown feathers on their chests. Whio live in our healthiest, fast-flowing rivers. Whio is the Te Reo Māori word for whistle. The birds were named after the loud whistling call of the males.

Why teach/learn about whio?

Whio are one of our most vulnerable New Zealand duck species. Without help from people, whio will most likely be extinct within our lifetime. The more people and communities who know about whio and are empowered to help them, the more successful whio can be in retaining and expanding their populations. These ducks are inspiring and provide a real life context for learning.

How do I use this resource?

It is intended for educators to use or adjust material in the resource to best suit their students' and community's needs. The programme can be adapted to suit a school's own inquiry model or teaching

perspectives. Timing will depend on your requirements. The unit plan following on page 9 provides an example of how the resource could be used as the basis of a teaching unit.

What will students understand by the end of the whio inquiry?

By the end of their learning inquiry, students will have a multi-faceted, deep understanding of whio, beyond just facts. They will learn about:

- **Whio ecology**: where they live, what they eat, their adaptations, and how they stay alive
- **How people are involved** with whio
- **Whio challenges:** Whio threats and how people contribute to these
- **Visiting whio:** Where to see whio and what we can learn by observing them
- **How they can act to solve an issue for whio** in their community

Other information depending on where their inquiry leads.

What is Environmental Education for Sustainability? (EEfS)

Environmental Education for Sustainability (EEfS) raises awareness of the connections between people and nature and empowers us all with the common vision, knowledge, values, practical skills and opportunities needed to create a sustainable future.

STRUCTURE OF RESOURCE

SECTION ONE The whio	SECTION TWO Whio and people	SECTION THREE Helping whio
Big idea: Whio are unique New Zealand birds with special features, adaptations and behaviours.	**Big idea:** People influence whio and their habitat.	**Big idea:** We can all contribute to a positive future for whio.
Introducing whio Habitats Adaptations and special features	How people impact on whio and their habitats. Threats to whio Visiting whio	Applying our learning to help make a difference for whio
Inquiry stages 1–3	Inquiry stages 4–5	Inquiry stages 6–9
This section relates to: Environmental Education: Learning ABOUT the environment Major learning area: Science	This section relates to: Environmental Education: Learning ABOUT and IN the environment Major learning area: Science, Social Science, Health and PE	This section relates to: Environmental Education: Learning FOR the environment Major learning area: Science, Technology and Social Science

INQUIRY LEARNING

Inquiry learning is a constructivist approach, where the student is at the centre of learning. Students form and develop a learning inquiry to investigate aspects of the topic and build a depth of understanding through questioning, thinking and research.

This teaching model incorporates a variety of thinking skills, information literacy skills and integrates well with information technology.

Working through your inquiry

NB: The learning experiences within the resource are a guide only. Teachers can adjust the activities and learning sequence to suit the needs and interests of students.

Stages in the inquiry model

Stage 1: Dive in

Introducing the topic and immersing students in the subject/context. Information is gathered about the prior knowledge of students in order to develop a unit plan which will meet their learning needs, prior experiences and interests. Key concepts are introduced to form a foundation of knowledge for a learning inquiry.

Key questions:

What do we know already?
What experiences have we had with whio?

Stage 2: Ask

Students now begin to ask questions about whio and explore their ideas. Questions can be grouped with one main 'big/essential' question and several minor questions. A big/essential question has multiple answers and is an open question, requiring extensive research to answer. This forms the foundation of the inquiry.

Key questions:

What are we wondering?/what do we want to know?
Which questions will we investigate?

Stage 3: Investigate

At this stage of the inquiry, students are investigating their questions and further exploring the topic. Their research should be driven by their interests and inquiry questions. Students can follow lines of further inquiry to find out more information from relevant sources. They begin to organise and filter information.

Key questions:

How will we answer our questions?
Which information is relevant to our inquiry?
How can we organise the information?

Stage 4: Extending thinking

At this stage of the inquiry, students are encouraged to use specific thinking skills to further explore a topic and seek a deeper understanding. Students now take the information they have gathered and begin to compare, contrast and sort. The information connects to what they already know or supports them forming new concepts. At this stage, students also look into aspects of social inquiry: values and perspectives and consider people's responses and decisions.

Key questions:

What does the information tell us?
Can we see any patterns/trends?
Do we need more information?

Stage 5: Coming to conclusions

Next, students take a holistic view of information they have gathered, compared and organised. They begin to draw conclusions. Students make decisions about the current situation for whio and which issue is most engaging and relevant to them.

Key questions:

What did we find out?
What new ideas have come from this information?
What are we going to do with these new ideas?

Stage 6: Sharing our findings

Students can now share their ideas, information, conclusions and observations with a selected audience. This can be a powerful link to community and lead to collaboration and further information sharing. Sharing also helps students to consolidate their learning.

Key questions:

Who do we want to share this information with?
How can we communicate our knowledge and ideas?
What does our audience think?

Stage 7: Planning for action

Students now create a brief, outlining their action and how it will target the focus issue. Now there is a focus for action they can begin to plan how to to take action for whio.

Key questions:

What can we do to help this situation – what action will we take?
What issue will this address?
What will we need?/Who will help us?

Stage 8: Implementing action

Now it's time to have fun for whio. Students do real work to help whio and apply their learning and understanding to take action. The action should target the focus issue and aim to create a positive future for whio.

Key questions:

Are we following our brief and criteria?
Is our action making a difference?

Stage 9: Review and reflect

After carrying out an environmental action students can now reflect on how it went. This may lead to further inquiry.

Key questions:

Did we do what we set out to do?
How did it go? What are the next steps?

Inquiry cycle

1. Dive in

- What do we know already?
- What experiences have we had with whio?
- Introducing knowledge

Reflecting and evaluating

2. Ask

- What are we wondering?
- Which questions will we investigate?

Reflecting and evaluating

3. Investigate

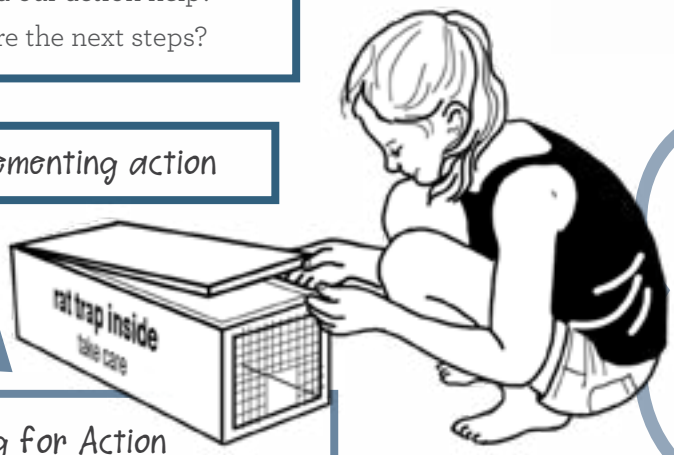
- Finding out more information
- How will we answer our questions?
- Understanding new concepts
- Sorting and organising information

Reflecting and evaluating

9. Review and reflect

- How did it go?
- What did we learn?
- How did our action help?
- What are the next steps?

8. Implementing action



4. Extending thinking

- Exploring values/perspectives
- What does the information tell us?
- Thinking about patterns, trends
- Do we need more information?

Reflecting and evaluating

7. Planning for Action

- What can we do to help?
- What action will we take?
- Which issue will this address?

Reflecting and evaluating

6. Sharing our findings

- Who is our audience?
- Sharing knowledge and experiences
- Obtaining feedback

Reflecting and evaluating

5. Coming to conclusions

- What did we find out?
- Problem solving/creating new ideas
- What are we going to do with this new information?

Reflecting and evaluating

EXAMPLE UNIT PLAN

Main ideas:	**Curriculum areas:**	**Levels:** 1–2 **Years:** 1–4
Whio are amazing and unique NZ ducks. They live on our pristine, fast-flowing rivers and are threatened due to habitat loss and introduced predators.	Science, Social sciences, English, Mathematics, Technology, Health.	

Overarching learning outcomes:

- Build knowledge and understanding of whio
- Raise awareness of the current situation for whio
- Understand how people are involved in whio recovery
- Contribute to a positive future for whio

Values	Ecological sustainability, respect, inquiry and curiosity, innovation, diversity, community and participation
Key competencies	Thinking; Using language, symbols and text; Managing self; Relating to others; Participating and contributing
Principles	Learning to learn • Cultural diversity • Community engagement • Future focus

Learning sequence	Inquiry stage/s	Curriculum links	Key concepts	Description	Suggested timing
1. Meet the whio	*1. Dive in:* What do we already know? What experiences have we had? *2. Ask:* What questions do we have?	Science: (Nature of Science, Living world: Evolution)	**Whio are unique NZ ducks. Introducing the key concepts for the resource**	An overview – introducing key concepts through a slideshow. Students then choose an inquiry question. Concept of whakapapa	Week 1
2. Whio habitats	*3. Investigate:* Finding out more information Understanding new concepts	Integrated curriculum areas	*Additional key concepts will depend on inquiry questions*	Students can work through an inquiry using these suggested lessons or alternative resources (see pages 65–66).	Weeks 2–6
Learning through inquiry Stages 1–9		Science: (Living World: Ecology, Life processes)	**Whio live in clean, healthy, fast-flowing rivers**	Suitable habitat and whio needs. Concept of Mauri (life-force). Looking at photos of various habitats to see which habitats are suitable for whio.	Week 1
3. Whio features	*3. Investigate:* Finding out more information Understanding new concepts	Science: (Living World: Nature of Science: Investigating in Science)	**Whio have special features which help them to survive in their habitat**	Adaptations – examining whio special features. The structure of feathers and looking at camouflage.	Week 2
4. Life as a whio	*3. Investigate:* Sorting and organising information and *4. Extending thinking:* what does the information tell us?	Science (Nature of Science, Living world) English: (Reading, listening and viewing)	**Research activity: finding out information. Whio move, feed and breed to stay alive.**	Whio breeding, feeding, moving and life cycle. Literacy focused research activity using science related texts.	Week 2
5. Whio and people	*4. Extending thinking:* Exploring values and perspectives. What does the information tell us?	Social Sciences, Health	**Groups of people influence whio in different ways**	Different groups of people involved with whio. Exploring values and perspectives. How our actions affect whio – extending inquiry to include human impacts.	Week 3
6. Threats to whio	*4. Extending thinking*: Exploring patterns and trends	Science: Planet Earth and Beyond, Nature of Science), Maths: (Statistics)	**Whio are threatened by introduced predators, changes to their habitat and natural changes**	Whio threats: introduced predators, habitat loss etc.. Introducing the current situation through graphs of predators trapped, pairs and duckling survival in the Whanganui Catchment area.	Week 4
7. Visiting whio	*3. Investigate*: Finding out more information. *5. Coming to conclusions:* What did we find out? Problem solving/creating new ideas	Science: (Nature of science), Health: (Personal Health and Safety Management)	**Experiential learning. We can learn more about whio by observing them**	How scientists find out information. How students can use scientific skills in order to gather information about whio. Health and safety considerations. Planning for a visit and possible focus of visit.	Week 5
8. Whio in the future	*6. Sharing* and *7. Planning for action*	Science: (Nature of Science, Planet Earth and Beyond) Social Sciences	**We can help create a positive future for whio. Sharing what is happening for whio**	Current situation. Future-focused thinking. Identifying a focus issue. Working together for a positive future for whio.	Week 6
9. Let's help whio	*8. Implementing action* *9. Review and reflect*	Science: (Nature of Science) Technology: (Technological practice)	**Action for whio and reflection on action**	Action plan, examples of action. Reflecting on action and criteria.	Weeks 7–10

ACTIVITY 1:
Meet the whio

TEACHER NOTES

This learning experience introduces whio/blue ducks. These special, unique ducks only live in New Zealand.

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Nature of Science: Investigating in Science

Extend their experiences and personal explanations of the natural world through play, asking questions and discussing simple models.

Living World: Evolution

Begin to group plants and animals into science-based classifications

Science capabilities

Interpret representations, Engage with science

Learning intentions

Students are learning to:

Share their prior knowledge and experiences of whio
Begin to ask questions about whio

Success criteria

Students can:

Record prior knowledge about whio
Ask appropriate questions about whio

Minor curriculum links

English: Viewing

Background information: Whio/blue ducks

What are whio/blue ducks?

Whio/blue ducks are endemic ducks: they live only in New Zealand. Whio is the Te Reo Māori word for whistle. The birds were named after the loud whistling calls of the males.

For more information about the difference between endemic, native and introduced animals see: *http://sciencelearn.org.nz/Science-Stories/Conserving-Native-Birds/Endemic-native-or-introduced*

How are whio different from other ducks?

Whio live in our healthy, fast-flowing rivers. They are one of only four ducks in the world living all year round in fast-flowing water. Unlike other duck species, whio need high quality, clean river habitat. They prefer areas where they will not be disturbed by humans.

Whio are grey-blue coloured ducks with spotted brown feathers on their chests. Their bills are white. They have fleshy lips for protection when scraping invertebrates (insect larvae) off rocks.

Most other ducks have hard, dark bills without fleshy membranes/lips. Other ducks do not need fast-flowing, clean, clear water and are able to survive in a range of habitats.

Why are whio important?

Whio are an important 'indicator species': this means that when scientists and others see whio living on a river, they know immediately the river is very healthy and all the plants and animals are functioning well together. These unique ducks are one of the animals at the top of the food chain, playing an important part in keeping other animal and plant species in balance in a river ecosystem. Whio are the only endemic ducks to live all year round on fast-flowing rivers. They are the only living member of their group (genus: *Hymenolaimus*) and are not closely related to other ducks.

What is whakapapa?

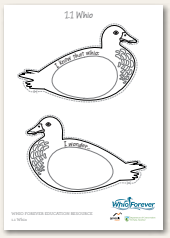
Whakapapa is a foundation or genealogy in Te Ao Māori (a Māori world view). Whakapapa is about the connections of people to other living things and the wider world. Through whakapapa, ancestry (family history) can be traced through the past, right back to the beginning of creation: to Ranginui – the sky father and Papatūānuku – the earth mother. From Ranginui and Papatūānuku came their children (the atua – supernatural beings who existed before humans). Tāne Mahuta was the atua who created trees and animals, before he created people. Animals and plants are also included in whakapapa traditions. In this way of seeing the world, all plants, animals and people are ultimately connected to each other and the environment. Whakapapa is also a way of grouping animals and plants for Māori. When people recite a whakapapa, it includes ideas about their relationships to animals, plants, other living things, and each other.

Photo: Bubs Smith

ACTIVITY 1:
Meet the whio

STUDENT LEARNING EXPERIENCE – MEET THE WHIO

Focus questions:	Resources needed:
What is a whio? What do I already know about whio? What do I want to know next?	Whio slideshow: *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-blue-duck.pptx* Whio information: *http://nzbirdsonline.org.nz/species/blue-duck* *www.kiwihouse.org.nz/Portals/1/SFS06-Blue-Duck.pdf* 1.1 Whio Papa and Rangi (05:28) *https://www.youtube.com/watch?v=8eE8rei9I1U*



Suggested learning sequence:

Introducing whio

- Introduce the whio/blue duck through the *Whio slideshow* (*see resources above*).
- How are whio different to other ducks? Look at pictures in the slideshow and discuss any ideas students have about differences between whio and other ducks. Look at pictures of ducks in books and online to create a venn diagram/compare and contrast chart (*see teaching strategies pages 63–64*) about the similarities and differences between one type of duck (e.g. mallard) and whio (*see teacher notes*).

Sharing prior experiences

- Share experiences of meeting whio and/or other ducks in pairs or small groups. Ask students to use the venn diagram to help them to think about if a duck they met was a whio.
- What can you guess about whio from these experiences/lack of experiences? Whio are endangered (nationally vulnerable) ducks who only live in our cleanest white water rivers. There are not many left in the wild. Depending on your location, students are unlikely to have seen wild whio. Originally, whio lived in rivers throughout New Zealand but have been displaced from much of their natural habitat by humans and introduced predators.

What kind of animals are whio?

- Which group of animals do whio belong to? Whio are birds. View the classification diagram and types of birds slides (5 and 6) in the whio slideshow. Explain whio are a type of waterfowl (birds suited to living in water). They are the only living member of their group (genus: *Hymenolaimus*) and are not closely related to other ducks.
- Why do scientists group or classify animals? Scientists classify/group animals so they can learn more about them and their relationships to each other.

What is whakapapa?

- Māori had their own system of classification called whakapapa. What do students understand by the term whakapapa? How are animals involved in whakapapa? (*see teacher notes*).
- Whio are connected to people and other animals through whakapapa. All living things are connected through ecosystems and whakapapa. Discuss students' whakapapa (if known) and their relationships and connections to whio and other birds.

Recording prior knowledge and questions

- Use *1.1 Whio* to record students' knowledge and questions. Colour the ducks, cut them out and display in the classroom for later reference. The ducks can be glued together (back to back) and hung or pasted onto a chart/wall.
- Bring students together with their "I wonder . . ." questions. Group the questions into similar ideas. Decide as a class what your shared 'big' question might be. This will focus your learning inquiry. The individual questions 'little questions' can also be used along the way to contribute to answering the big question.
- Show students the integrated inquiry cycle and discuss the inquiry process (*see introduction pages 6–8 and* inquiry poster *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-inquiry-cycle-a3-poster.pdf*).

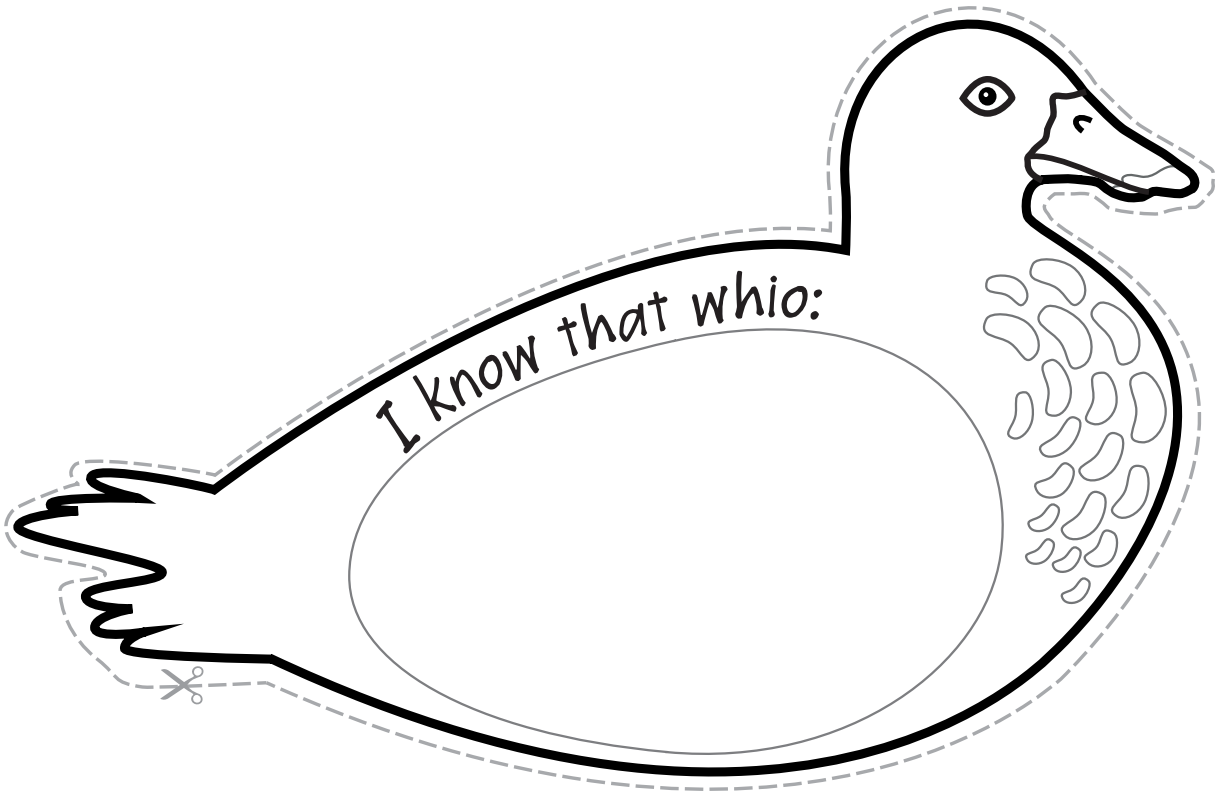
Reflecting on knowledge

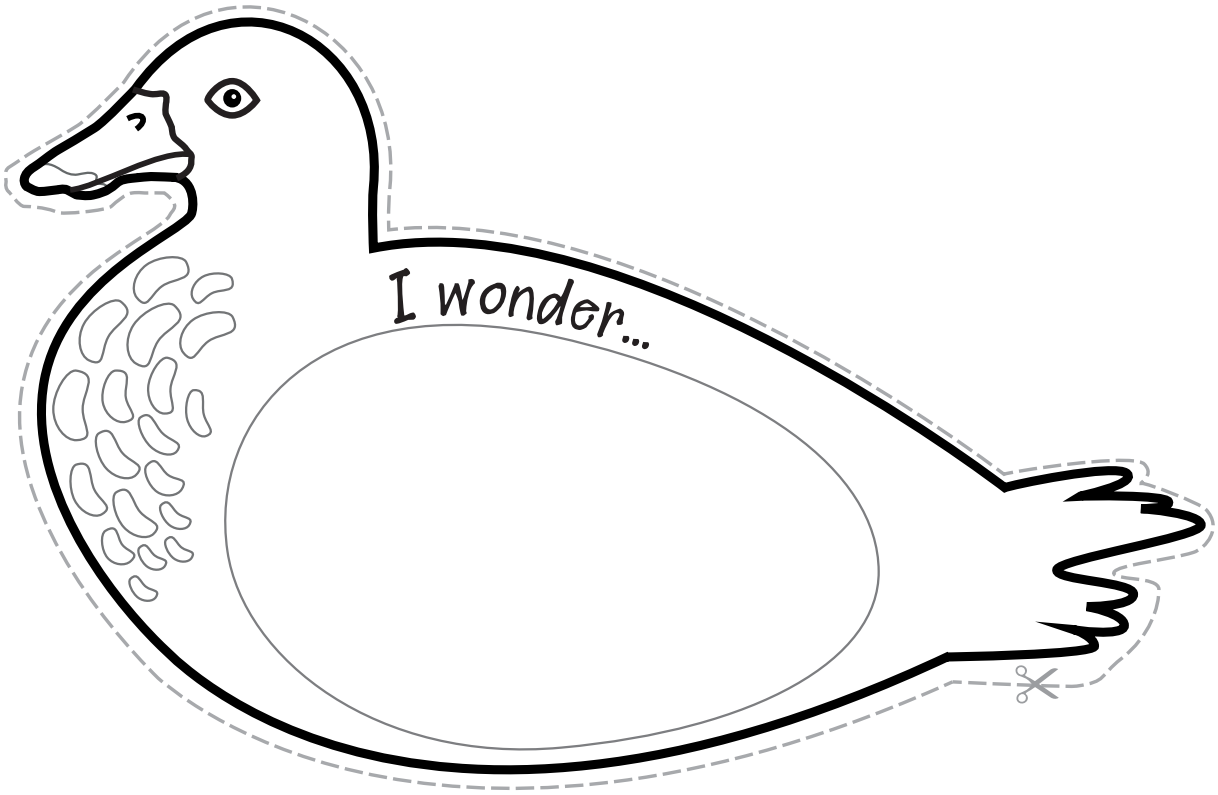
- Reflect on learning by sharing something they have learnt about whio with a partner.

Extending learning

- Create an artwork showing which animals belong with Tane (atua of the forests) and which were created by Tangaroa (atua of the seas). For ideas see:
  Papa and Rangi (05:28) *https://www.youtube.com/watch?v=8eE8rei9I1U*
- Students can colour in the picture with the correct colours of the whio: *http://www.whioforever.co.nz/wp-content/uploads/2015/03/Colouring-Competition-External-2015-with-date.pdf*

1.1 Whio





ACTIVITY 2:
Whio habitats

TEACHER NOTES

This learning experience introduces students to the habitat of whio/blue ducks: clean, healthy fast flowing rivers.

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Nature of Science: Investigating in Science

Extend their experiences and personal explanations of the natural world through exploration, play, asking questions and discussing simple models

Living World: Ecology

Recognise that living things are suited to their particular habitat

Living World: Life processes

Recognise that all living things have certain requirements so they can stay alive

Science capabilities

Use evidence, Interpret representations

Learning intentions

Students are learning to:

Identify habitat where whio can live
Think about how birds are suited to their habitats

Success criteria

Students can:

Choose habitats that will meet the needs of whio
Match birds to the habitat they are best suited to

Minor curriculum links

Science: Living world: life processes, Planet Earth and Beyond,

English: Viewing, The Arts

Background information: Whio habitats

What is habitat?

A habitat is a place where a plant or animal normally lives.

Where do whio live?

Whio live in our cleanest, healthiest rivers and streams. They like fast-flowing water in clear, cool, rocky-bottomed streams. Whio nest near river banks and need rivers lined with forest. These vulnerable ducks can't survive in areas where there is lots of farming or development close to the river because this degrades the water quality. Whio depend on aquatic invertebrates (insect larvae living in the water) for food. These invertebrates are only found in healthy waterways.

Wild whio live in many locations around the central North Island, for example: Tongariro, Whanganui, Taranaki, the Ruahines, Whirinaki and the Te Ureweras. In the South Island they are found in multiple locations, including: Kahurangi National Park, Arthur's Pass, the West Coast and Fiordland.

List of requirements of whio habitat

Whio need:

- Fresh, cool, fast-flowing water
- Food: lots of different aquatic invertebrates (insect larvae) to eat
- Suitable habitat:
- Rocky bottomed rivers/streams
- Rivers/streams lined with forest
- Safe places to nest
- Clean and clear river water (not polluted or muddy)
- Other factors such as clean air to breathe and space to move.

What is mauri?

Mauri is the essence or life-force which is present in all things. Mauri connects the environment, living things and other objects. We cannot see mauri but we can feel it. In an area where the mauri is strong, a place would look and feel vibrant, energised and healthy with plenty of life. When the mauri is weak, a place would have few living things and may look and feel uninviting, unhealthy or dirty.

What are the differences between human and whio needs?

All living things, including humans and whio, need: food, water, space, fresh air, and safe habitat. Humans also need clothing, shelter and other factors such as healthcare and warmth.

Whio have specific needs from their habitat such as fast-flowing water, rocky-bottomed streams and lots of invertebrates to eat.

Why do different birds need different things from their habitats?

Different birds have special features which have evolved over time to suit their own habitats and lifestyles. Each species has its own needs and is suited to its habitat in a unique way. This keeps the balance right in the habitat and helps all the species to survive (because they are not all relying on the same things).

ACTIVITY 2:
Whio habitats

STUDENT LEARNING EXPERIENCE – WHIO HABITATS

Focus questions:	Resources needed:
What is a habitat? What is suitable habitat for whio?	Whio facts poster: Whio surf the rapids *http://www.whioforever.co.nz/wp-content/uploads/2016/01/Whio-Surfing-the-Rapids.pdf* Whio habitat slideshow: *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-habitats.pptx* 2.1. Habitat match Meet the locals: Whio tastic (4:08) *https://www.youtube.com/watch?v=Ho_XXeuux_A* Whio habitats Kahoot!: *https://play.kahoot.it/#/k/bb516705-23ae-46d8-9725-c49105abad3c*

Suggested learning sequence:

Whio habitat and needs

- What is a habitat? Share ideas. Form a definition together after discussion (*see teacher notes*).
- Ask students: What do humans need to survive? Do whio have the same needs as people?
- Make a list together of the needs of a whio (*see teacher notes*).
- Discuss the needs of whio compared to other birds. Do kiwi or seagulls need the same things as whio? Why/why not? Each type of bird (species) has its own food preferences and certain needs, although they all have the same general requirements like all living things: food, water, space, fresh air, safe habitat etc.. (*see teacher notes*).
- View the whio facts poster:
  Whio surf the rapids http://whioforever.co.nz/wp-content/uploads/2013/08/Whio-Facts-Poster-Whio-Surf-the-Rapids.pdf
- What do the pictures on the poster and videos show us about whio habitat? The photos show a white-water river environment with forest next to the rocky-bottomed stream. The water looks fast-flowing, clear and clean. The poster may give students other ideas about how whio meet their needs in their habitats.

Suitable whio habitat

Show students the *Whio habitat slideshow*.

Which habitats in the slideshow would be most suitable for whio?

Show images from the slideshow. Pause at each one, asking students to guess whether whio could or could not live in each pictured habitat.

Ask students to justify their answers using the list of whio needs.

Habitats of other birds

What kinds of habitats would suit each type of bird and meet its needs?

Give students copies of *2.1 Habitat match*.

Ask students to match each bird with the habitat which will best meet its needs.

Record features of each bird which make it suited to its habitat or write sentences with students, describing how they meet their needs in their habitat.

Mauri

What is mauri? (*see teacher notes*).

Is the mauri strong or weak in each photo in the habitat slideshow?

Discuss how students might be able to tell.

Reflecting on knowledge

Watch *Meet the locals: Whio tastic* (4:08) (*see resources above*) and observe the habitat of the whio. Notice what the featured whio rivers and streams look, sound and feel like.
After viewing, brainstorm adjectives to describe whio habitat.

Try the *Whio habitats Kahoot!* (an online facilitated quiz):
https://play.kahoot.it/#/k/bb516705-23ae-46d8-9725-c49105abad3c to assess student learning.

Extending learning

Students can create a dance, artwork or play about whio meeting their needs in their habitat.

Look at the website *Whio Forever: find a whio http://www.whioforever.co.nz/about-the-whio/find-a-whio* or the poster (*see resources*) to find your nearest **wild** whio population.

Why is this location suitable for wild whio?

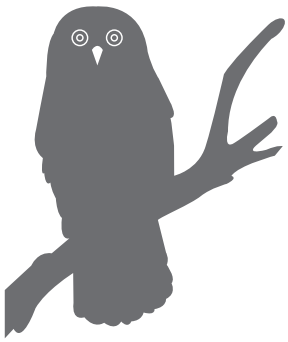
Why would whio live here and not closer to your school?

Photo: Bubs Smith

2.1 Habitat match

Match the birds to the habitat which suits them.

Write a sentence to explain why the habitat will meet their needs.

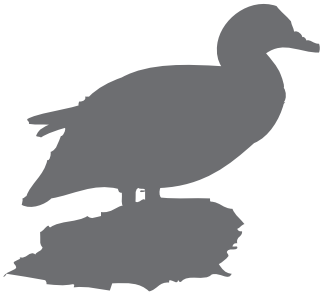


Moreporks

Beach

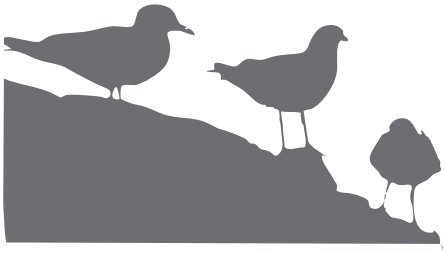
Kiwi

Fast flowing river Photo: Alan Cressler

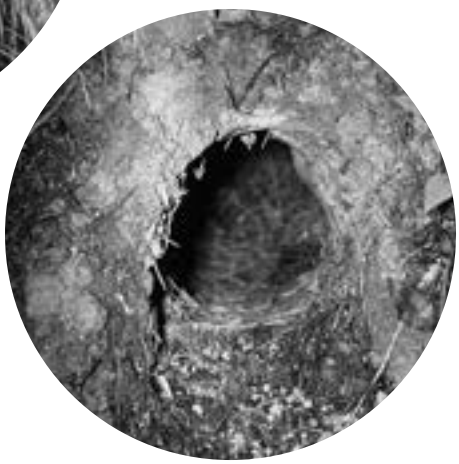


Whio

Forest trees



Seagulls



Forest burrow

ACTIVITY 3:
Whio features

TEACHER NOTES

This learning experience explores the special features which help whio live in fast flowing rivers.

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Nature of Science: Investigating in Science

Extend their experiences and personal explanations of the natural world through exploration, play, asking questions and discussing simple models

Living World: Ecology

Recognise that living things are suited to their particular habitat

Science capabilities

Gather and interpret data, Interpret representations

Learning intentions

Students are learning to:

Identify special features of whio
Understand how special features make whio suited to their habitat

Success criteria

Students can:

Label the special features of a whio
Explain how special features make whio suited to their habitat

Minor curriculum links

English: Viewing, Reading

Background information: Whio features

What are special features?

Special features are body parts animals or plants have to help them live in a particular habitat. Animals have evolved different features over time to live in all sorts of habitats – on land, in rivers and at sea. Whio have evolved special features (adaptations) to cope with the fast-flowing water in rivers/streams.

Why do whio need special features?

Special features help animals to cope with the conditions of their habitat. Whio are suited to life in fast-flowing rivers. Their special features/adaptations help them to thrive in the strong currents and unpredictable flows of rivers.

What special features do whio have?

- Large webbed feet: for easy swimming
- Waterproof feathers: to keep warm and dry
- Blue-grey colour: for camouflage among the river rocks and water
- Thick designer lips/soft bill flaps: to withstand scraping insects off rocks
- Streamlined body: so water runs easily off whio and they can swim and dive well

- Downy feathers underneath outside feathers: for warmth
- Forward facing eyes for hunting aquatic insects/bugs.

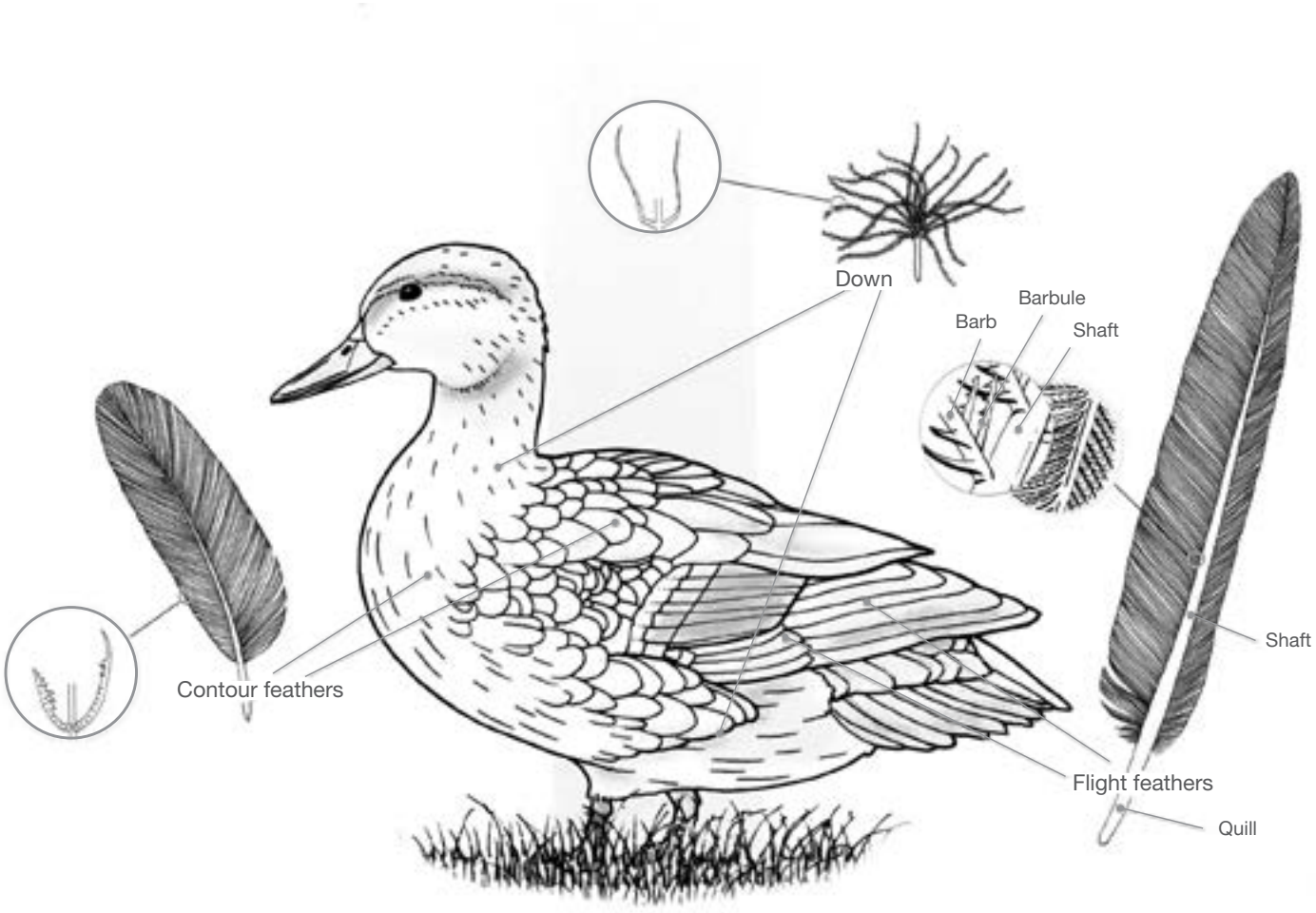
What is camouflage?

Animal camouflage is when the body of an animal blends into its background.

Whio feathers

Ducks have three main types of feathers: flight, contour and down feathers. Feathers are unique to birds. Flight feathers are long and strong. Their barbs lock together like velcro, helping to hold feathers securely during flight. Contour feathers provide the bird's shape and colour. They also have barbs. Down feathers are fluffy and soft for warmth. Downy feathers have no barbs.

The diagram below shows the main types of feathers in ducks.



Contour, down and flight feathers of a duck

Diagram from *Building Science Concepts 3: Birds: Structure, function and adaptation published by* Ministry of Education, copyright © Crown, (2000)

ACTIVITY 3:
Whio features

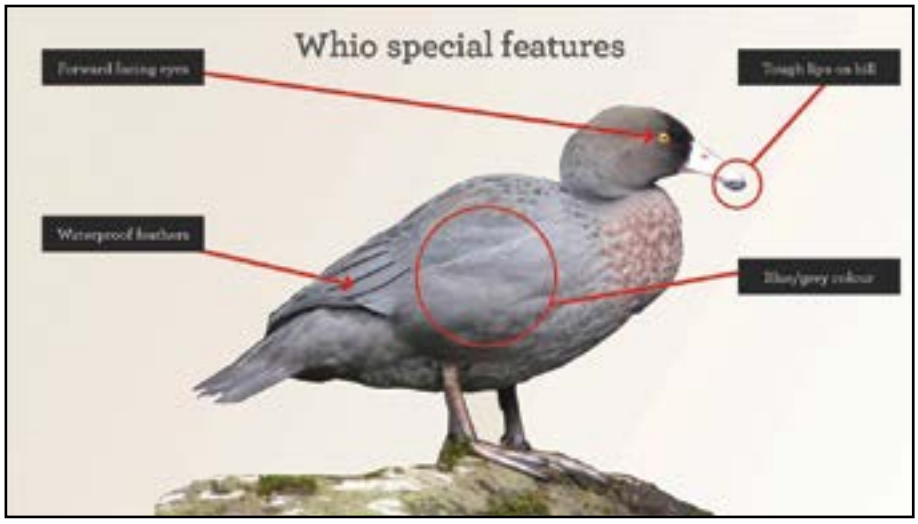
STUDENT LEARNING EXPERIENCE – WHIO FEATURES

Focus questions:	Resources needed:
What special features do whio have? How are they suited to their habitat?	Meet the locals: Whio tastic (4:08) *https://www.youtube.com/watch?v=Ho_XXeuux_A* Special features slideshow *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-special-features.pptx* Whio facts poster 4: Spot the whio *http://www.whioforever.co.nz/wp-content/uploads/2016/01/Spot-the-Whio.pdf* Whio slideshow: *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-blue-duck.pptx*

Suggested learning sequence:

Whio special features

View *Special features – http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-special-features.pptx*

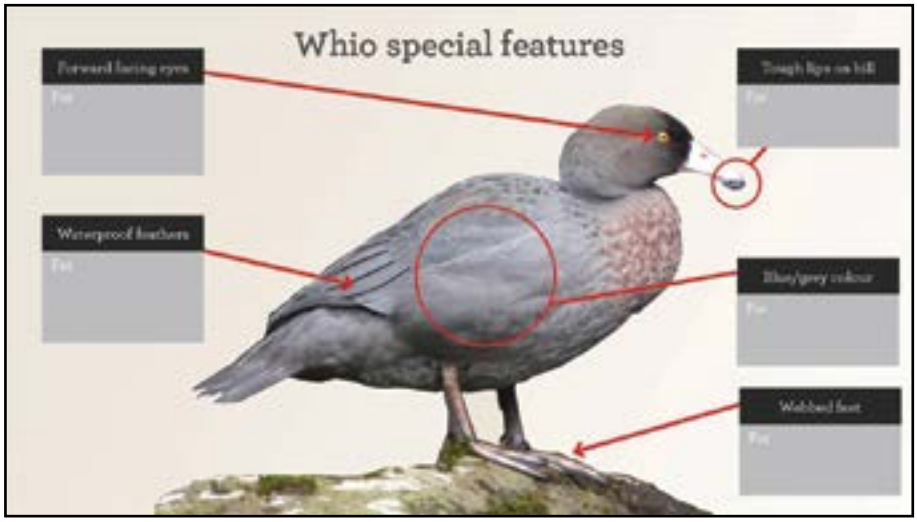


Slide 1: Ask students what body parts whio have. List the different body parts. Discuss the names of bird body parts – e.g. head, bill, body, feet, eye, wing, tail. What are each of these parts for?

Slide 2–11: The slideshow points to one special feature at a time. Ask students to guess which of the listed features at the bottom of the slide describes the feature being pointed to. Click the mouse to reveal the answer. Click again to get the next arrow or circle pointing to the next feature. As you discuss the features, ask students to think about, and share, how each feature might help the whio survive in a fast-flowing river (*see teacher notes*).

Camouflage

- Show students *Whio facts poster 4: Spot the whio* – (see link in resources).
- Discuss camouflage (as seen in the poster) and how this special feature also helps the whio to survive in its environment. Ask students to guess how many whio are pictured in this poster (there are six – two adults and four ducklings).



Action game about special features of whio

- After viewing *Meet the locals: Whio tastic* (4:08), review the special features of whio. Make a list of features (*see teacher notes*).
- Ask students to make up actions representing each special feature. For example:

  Strong wings (for flying): flapping arms

  Thick lips (for scraping insect larvae/invertebrates off rocks): hands by cheeks

  Forward facing eyes so that they can find their prey: circle fingers over eyes

  Webbed feet (for swimming): one foot in the air
- Students make a circle. They can take turns standing in the middle to call out one of the features. The students on the outside of the circle copy the student in the middle. The middle student chooses a student who was quick to copy them or is expressing the action well to come into the middle to call out the next action. Repeat until all students have had a turn in the middle.

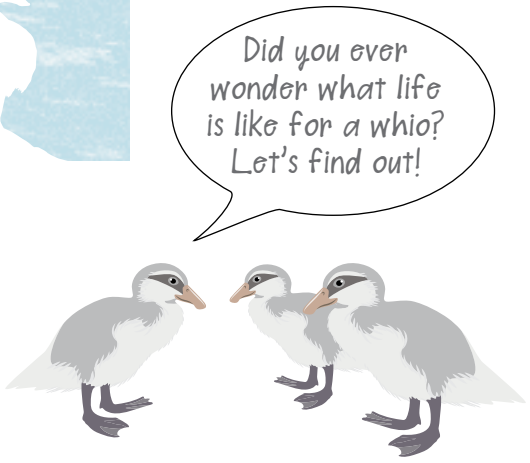
Reflecting on knowledge

- What have students discovered about how whio are suited to their environment? Why do whio need special features?
- Students can record their ideas about how these special features make whio suited to their habitat on copies of *Slide 12: Special features of the whio* – (from the special features slideshow) to assess their learning.

Extending learning

- View slide 13 (whio feathers) from *Special features – Google slides*. Discuss the differences between contour, flight and down feathers (*see teacher notes*).
- Investigate how different feathers behave in water. Use a cup of water and different feathers or other objects such as wool and paper to dip into water. Students can observe the results. How do the different feathers behave in water? Why are some more water resistant than others? How do other materials compare to feathers? Encourage looking for patterns and creative thinking.

ACTIVITY 4:
Life as a whio



TEACHER NOTES

This learning experience explores the things whio need to stay alive, including clean water, food, safe habitat and space to move.

Curriculum links

Achievement objectives

Science: Levels 1 and 4

Nature of Science: communicating in Science

Build their language and develop their understandings of the many ways the natural world can be represented

Living World: Life processes

Recognise that all living things have certain requirements so they can stay alive

Science capabilities

Use evidence, Interpret representations

Learning intentions

Students are learning to:

Find information about how whio stay alive: how they feed, breed, and move

Success criteria

Students can:

Find and record information about how whio eat, move and breed from texts

Minor curriculum links

English: Writing and presenting

Background information: Life as a whio

What do whio need to survive?

All living things need food, water, air, shelter, and space to survive.
Whio also need a healthy, fast-flowing river or stream with undisturbed places to nest (see *Activity 2 for more information*).

Where do whio nest?

You can find whio nests high on river banks, on river islands, in caves, and under bushes. While nesting they need a fast-flowing river nearby, as a source of food and water.

Breeding

Breeding is reproducing or having babies. For a whio, life starts as an egg. The egg hatches after about 24–35 days. The female whio sits on the eggs until they hatch. The male stands guard. Usually between 4–6 chicks will hatch. The parents work hard to look after the chicks for about 80 days, when they are ready to fledge (leave their parents).

Moulting

Moulting is when birds lose a lot of feathers and then replace them with new ones. Every year, when breeding

has finished, adult whio moult. During this time, whio are vulnerable because they cannot fly. They hide away in small side streams or in caves, only coming out to feed at sunrise or sunset.

Growing up

Chicks must leave their parents at about 11–12 weeks old. The young whio often flock together at this stage. Then males start to find their own territories and find a mate. They will defend their territory and breed there. There are fewer female whio than male whio, because females are especially vulnerable to predators when nesting.

Feeding

Whio like to eat mayfly, stonefly, and caddisfly larvae. They scrape these off rocks using their rubbery lips. They also eat biofilm (their greens) and freshwater snails.

Research and information literacy

This learning experience is designed to encourage the skills of sorting, finding and recording relevant information. Students need to begin to ask their own questions and extend their own learning. They are encouraged to look for information from a variety of sources: books, web-based material and journals.

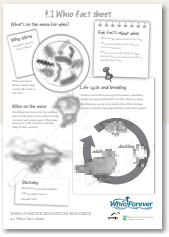
The whio year poster (right) may also be helpful for students when completing this lesson.

Example of a mind map of whio needs

ACTIVITY 4:
Life as a whio

STUDENT LEARNING EXPERIENCE – LIFE AS A WHIO

Focus questions:	Resources needed:
What is life like for a whio?	The whio year poster *http://www.whioforever.co.nz/wp-content/uploads/2016/01/The-Whio-Year.pdf* 4.1 Whio fact sheet 4.2 Life as a whio Meet the locals: whio/blue duck video clip: *http://www.whioforever.co.nz/world-of-whio/videos?page=1#1* Scroll to the 'Meet the locals' video clip Mind map tool e.g: *http://mindmapfree.com/*



Suggested learning sequence:

Learning review

- Review your inquiry question(s). Which questions/parts of the question have you answered? Have other questions come up during your investigating?
- Look at the information students have gathered so far and find the next steps for teaching and learning. Part of the next steps for learning might be this lesson or one of the following lessons.

Life as a whio

- 'What would it be like to be a whio'? Ask students to share their ideas.
- After re-viewing *Meet the locals: whio/blue duck* video clip (*see resources above*), ask students to act out what they have observed about whio life.

Survival

- Revise what a whio needs to stay alive (*see Activity 2*). What have students learned so far about how whio live in their habitat?
- What special features help with their survival? (*see Activity 3*)
- Create a mind map about needs of whio using an application such as *http://mindmapfree.com/* (*see example on previous page*).

Moving, feeding and breeding

- To stay alive whio must eat, drink, move and have a safe place to live. To keep a whio population secure, whio also need to breed (have ducklings). Revise the vocabulary: breeding, feeding and moving.
- Students can work in groups to find information about the life processes of whio: how they move, breed,

eat and live using the resources provided (e.g. *4.1 Whio fact sheet* and appropriate video clips, books and websites on resources page 65). For younger students enlarge the fact sheet and cut into four parts to complete separately.

- Alternatively, view the *Meet the locals: whio/blue duck* video clip and look at one aspect of whio life at a time.
- Students can record their information on *4.2 Life as a whio*. This could be part of a guided reading session or literacy activity.

Reflecting on knowledge

Make a book, artwork or write a story about what life might be like for a whio.

Extending learning

Students could contact/interview a local person who works with whio to find out more about what life is like for wild or captive whio.

Further investigate whio life processes using the Year 5–8 Activity 4.

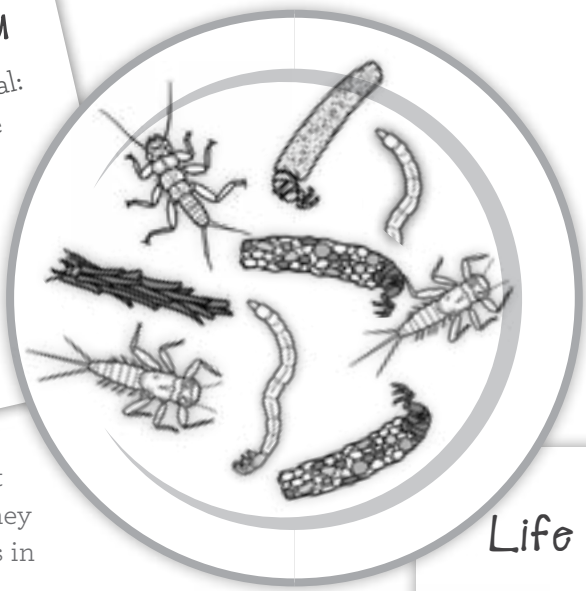
Photo: Bubs Smith

4.1 Whio fact sheet

What's on the menu for whio?

Whio Menu

Tonight's special: insect larvae



Whio eat insect larvae, which they scrape off rocks in the river

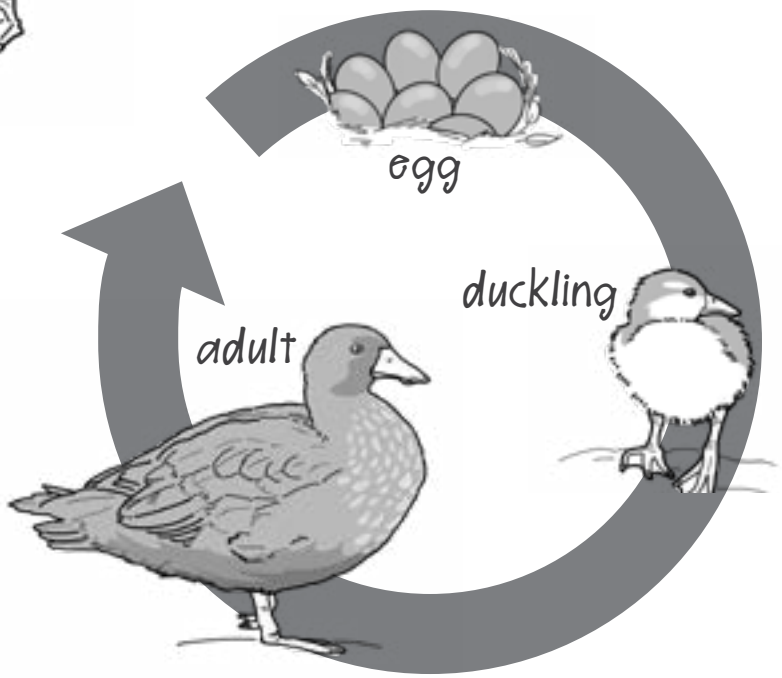
Fun facts about whio

- Blue ducks/whio moult every year
- They need fresh, clean water to live in and drink
- Whio are the only ducks in New Zealand that live all year round on fast-flowing rivers

Life cycle and breeding

A whio starts life as an egg. It becomes a duckling inside the egg and hatches out after about 35 days.

Ducklings grow up to be adult whio. After finding partners, females lay eggs and the cycle starts again!



Whio on the move

Ducklings are born with big webbed feet to help them swim well in strong currents and rough water. They also learn how to fly and dive with the help of their parents.

Glossary

Moult: Lose all their feathers

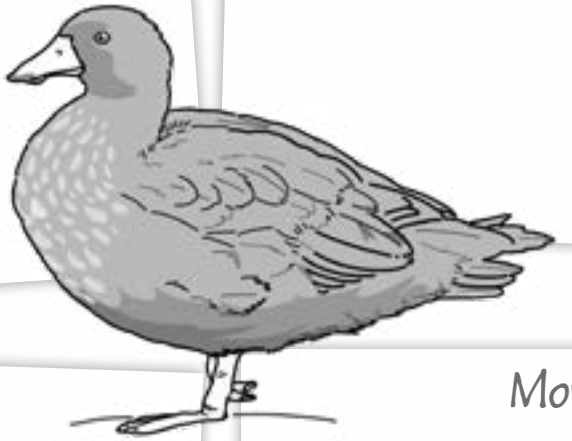
Larvae: Baby insects

Female: Girl

4.2 Life as a whio

What does a whio need to stay alive?

Feeding



Breeding

Moving

ACTIVITY 5:
Whio and people

TEACHER NOTES

This learning experience investigates how different groups of people help whio in different ways.

Curriculum links

Achievement objectives

Social Sciences: Levels 1 and 2

Understand that people have different roles and responsibilities as part of their participation in groups (L1)

Understand that people have social, cultural, and economic roles, rights and responsibilities (L2)

Health and Physical Education: Levels 1 and 2

Healthy communities and environments: Societal attitudes and values
Explore how people's attitudes, values and actions contribute to healthy physical and social environments

Science capabilities

Use evidence, Interpret representations, Engage with science

Learning intentions

Students are learning to:

Investigate the roles of people who are helping whio
Explore how people are making a difference for whio

Success criteria

Students can:

Describe the roles of people who are helping whio
Describe the actions of people and explain how they are making a difference for whio

Minor curriculum links

Science: Planet Earth and Beyond – Interacting systems,
English: Viewing

Background information: Whio and people

How are people involved with whio?

Many groups of people are involved in helping and protecting our unique whio in New Zealand. Trampers, kayakers, recreational fishers, rafters and other river users sometimes see whio in the wild. DOC (the Department of Conservation), Genesis Energy, zoos and wildlife sanctuaries, kayaking/rafting companies, tangata whenua and environmental groups are helping whio to survive and thrive in the wild.

Why do people need to help whio?

Without help from people whio could easily become extinct: probably within our lifetimes. There are fewer than 3000 whio left in the wild and they are vulnerable to many threats, especially introduced predators. The habitats available to whio have decreased as time goes on and they have been forced to move to less accessible rivers, often high in the mountains.

What is a role?

A role is the part or function of people in a situation.

What are values?

Values are deeply held beliefs about what is important to people. We can tell a lot about the values of people by the way they speak, behave and act.

The key values identified in the NZ Curriculum are: excellence, innovation, curiosity and inquiry, diversity, equity, community and participation, ecological sustainability, integrity, and respect. For more information about values in schools see: *http://nzcurriculum.tki.org.nz/Curriculum-stories/Media-gallery/Vision-and-values*.

Te Ao Māori and whio

Māori are regarded as tangata whenua: this can be loosely translated to 'people of the land'. Tangata whenua are tied to the land in many ways: through birth, whakapapa and ancestral links, spirituality and other relationships.

In Te Ao Māori (a Māori worldview) all of the natural world is seen as being connected. People, animals, plants and the environment are connected through mauri – a life force that exists in all living things. These things are also interconnected through whakapapa (geneology/ancestry). In whakapapa traditions even natural features such as rivers are tūpuna/ancestors. Whio are part of this web of connections to the river and to people.

Early Māori named places after whio – e.g. Te Kapou Whio. Traditionally some tribes harvested the first clutch of whio eggs at certain times. In the past, during hard times some tribes would take adults for food and use their feathers as swabs and skin for bandages.

Whio are children of Tāne Mahuta (Atua of the forest). For more information see: *www.teara.govt.nz/en/papatuanuku-the-land*

Making a difference for whio: What roles do different groups of people have for whio?

Examples of possible roles/responsibilities/actions of different groups are described below:

DOC Rangers: To protect and restore New Zealand's unique biodiversity and environment.

Genesis Energy: To supply renewable electricity to the community, while balancing the needs of the environment.

Volunteers/environmental groups: To carry out monitoring and pest control to help whio and support the work that other groups are doing.

Tangata whenua: To care for and protect ancestral land, water and living things for people now and in the future.

ACTIVITY 5:
Whio and people

STUDENT LEARNING EXPERIENCE – WHIO AND PEOPLE

Focus questions:	Resources needed:
How do groups of people help whio?	Whio and people slideshow: *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-and-people.pptx* (and printed out images of slides) 5.1 Roles and actions of people The whio forever project (3:12) *https://www.youtube.com/watch?t=4&v=imYPkK6mWMQ* A copy of your school's value statements (if applicable)

Suggested learning sequence:

People, rivers and whio

- Re-visit your inquiry question(s). If relevant to your inquiry, use this learning experience to further investigate how people are involved with whio.
- What activities do students enjoy doing in or around rivers? Students can share their ideas through 3-2-1 sharing strategy – *see pages 63–64 teaching strategies*

  Each student shares with a partner:

  3 things they like doing around or in rivers and streams

  2 ideas about how being close to rivers and streams makes them feel, and then . . .

  1 idea about how these activities could affect whio (if they lived there)?
- Discuss as a class which activities are most popular around local rivers or streams.
- Watch *The Whio Forever project* (3:12). Explain that this video clip shows some of the people who are involved in helping whio.
- During viewing, ask students to listen for information about which groups of people are involved with whio and what they are doing to make a difference for whio (*see teacher notes*).

Roles and values

- What are values? Talk about any values you have as a school and relate these to the values of other groups of people.
- What is a role? (*see teacher notes*)
- Discuss the role of the teacher and the role of the student in a classroom. Talk about the roles of brothers, sisters, grandparents and parents.
- Now think about helping whio: what kinds of roles do groups of people have for helping whio?

Thinking about how people help whio

- How are other people involved with whio? (*see teacher notes*).
- Print out photos from *Whio and people* onto A4/A3 paper: *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-and-people.pptx*
- Small groups or pairs of students can each take one photo to view in detail. Give a set time for them to discuss which people, objects and/or actions they can see represented in the picture.
- Ask students to look at the picture and talk about/record:
  - Who the people might be
  - What they might be doing
  - What objects/tools/special equipment are they using?
  - How are they helping whio? What do you think their role is?
- Students could also complete the table *5.1 Thinking about roles and actions of people* about their image, in groups or individually. For younger students, the questions could be discussed one at a time, as a whole class, focusing on one or two images.
- View the slideshow *People and whio* (*see resources*) to show each image as the groups share their ideas with the rest of the class.
- After sharing, ask students which groups of people were shown in the photos? Are any photos of the same group of people? Record ideas.

Reflecting on knowledge

- Review the roles of each group discussed. How are the roles and/or values of groups (e.g. DOC, Genesis Energy, volunteers, environmental groups) similar?

Extending learning

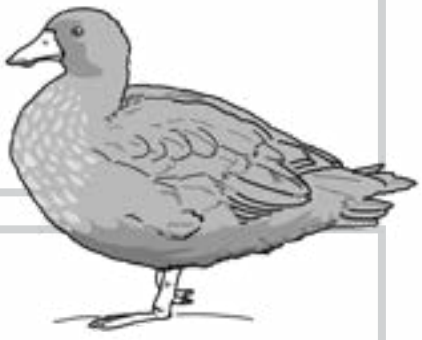
- Further investigate how people help whio (when working together) using resources and PDFs from the Year 5–8 Whio and people activity.

5.1 Thinking about roles and actions of people

Our photo is:

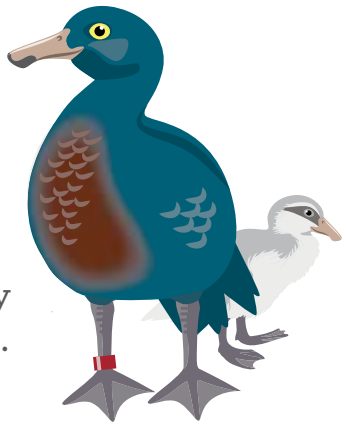
People in photo	Objects in photo	Ideas about actions

How are these people making a difference for whio?



What is their role?

ACTIVITY 6:
Threats to whio



TEACHER NOTES

This learning experience investigates how whio are threatened by introduced predators, changes to their habitat and natural events.

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Planet Earth and Beyond: Interacting systems

Describe how natural features are changed and resources affected by natural events and human actions

Nature of Science: Communicating in science

Build their language and develop their understandings of the many ways the natural world can be represented

Mathematics: Levels 1 and 2

Statistics: Statistical Investigation

Conduct investigations using the statistical inquiry cycle: posing and answering questions, communicating findings based on the data

Science capabilities

Gather and interpret data, Engage with science

Learning intentions

Students are learning to:

Explain how whio are affected by threats
Find information about whio threats using graphs

Success criteria

Students can:

Write a story or make a book about a threat to whio
Ask and answer questions about whio threats using graphs

Minor curriculum links

Social Sciences, English: Writing, Reading and Viewing

Background information: Threats to whio

Natural threats to whio

Whio have always had to cope with natural threats such as extreme weather and natural disasters in their river habitats. Volcanic eruptions and floods can be harmful to whio. Natural predators of whio chicks include eels and large birds e.g: falcons and black-backed gulls. These predators take only the occasional whio. Even bigger extinct native birds like the Haast eagle would have once also been natural predators of whio.

The moult (when whio lose lots of feathers and replace them with new ones) is a vulnerable time when whio are not able to fly as well as they usually can.

Human-induced threats to whio

Other threats to whio have been caused by human behaviour. The main human-induced threats are:

Introduced predators – Stoats are the number one threat for most whio populations. They often take eggs,

ducklings and female adults on nests. Rats, weasels, ferrets, cats and dogs can also prey on whio and their eggs and ducklings. Unfortunately these animals are also drastically affecting many of our other native birds.

Habitat loss – Loss of suitable habitat is another major threat to whio. Whio need high quality, fast-flowing rivers to survive, but the health of many New Zealand rivers is being affected by urbanisation, deforestation, agriculture and development.

Climate change – The release of greenhouse gases like carbon dioxide, nitrous oxide and methane by people have caused changes to our climate over time. In the future these changes will also influence whio habitats and cause more flooding, droughts and extreme weather.

How have people changed whio habitat?

Before Europeans came to New Zealand, whio lived in rivers throughout the North and South Islands. Since people arrived, many forests have been cut down and replaced by farms, towns, houses and other development. There have been other changes to waterways such as draining for irrigation, damming and river diversion. Changes to wild rivers over the years have made less habitat available for whio.

How do whio protect themselves against threats?

Whio are hard to spot on the river, they are very well camouflaged against river rocks and water. This prevents them from being easily seen by possible predators. They are very good at flying, diving and swimming away from trouble. They also have a spur on their wing which helps them to fight other whio if necessary, but is not effective against other enemies.

Why be concerned about whio threats?

These unique ducks are one of the top predators in a river ecosystem and therefore play an important part in keeping the food web in balance. Whio are the only New Zealand ducks to live all year round on fast-flowing rivers and are one of the most ancient and endangered species of duck in the world.

In around 2003, whio were on a path to extinction within 20 years. Populations were getting smaller every year because there were so many whio threats around rivers, particularly introduced predators. In the last 12 years, with lots of help from other agencies and groups, including Genesis Energy, the Department of Conservation have increased many whio populations.

What can we do about whio threats?

People can't control the natural threats to whio, however threats brought about by humans can usually be solved by us. Introduced predators can be trapped/poisoned. We can limit the changes to rivers and landscapes and help restore past habitats. We can slow down climate change by making good choices about how we travel, how we dispose of waste and how we use electricity to minimise the production of greenhouse gases. For more information about climate change see: *https://www.niwa.co.nz/education-and-training/schools/students/climate-change-global-warming-and-greenhouse-gases.*

Reference chart: Major events in Whanganui River catchment 2003–2014

2004 Intensive pest control started: 1080 drop, trapping systems set up

2006 1080 pest control

2009 New whio recovery plan published

2010 Severe floods

2011 1080 pest control

2013 Two large floods about 6 weeks apart

2014 1080 pest control

ACTIVITY 6:
Threats to whio

STUDENT LEARNING EXPERIENCE – THREATS TO WHIO

Focus questions:	Resources needed:
What are the main threats to whio?	Whio mountain book *http://www.doc.govt.nz/documents/conservation/native-animals/birds/whio/whio-mountain.pdf* 6.1 Whio graphs Whenua finds a future (4:53) *https://www.youtube.com/watch?v=gmY5Zf0MOIQ* Under threat: Whio foes poster *http://www.whioforever.co.nz/wp-content/uploads/2016/01/Under-Threat-Whio-Foes.pdf* DOC website: Methods of pest control *http://www.doc.govt.nz/nature/pests-and-threats/animal-pests/methods-of-control/* Didymo resources: Didymo brochure *http://mpi.govt.nz/funding-and-programmes/other-programmes/campaigns/check-clean-dry/* Check, clean and dry song by Sarah Ridsdale *https://www.youtube.com/watch?v=pPIzJs6ZHWQ*

Suggested learning sequence:

Introducing threats to whio

What is a threat? What kinds of things could harm or kill a whio? Students can Think, Pair Share or Walk and Talk to discuss (*see teacher notes and teaching strategies p 63*)

As a starter for discussion about whio threats:

- Read the *Whio mountain book*: as a class or in groups. This mentions natural and introduced threats to whio.
- View *Whenua finds a future: https://www.youtube.com/watch?v=gmY5Zf0MOIQ* By Sarah Ridsdale (age 14). This clip mentions other whio threats such as didymo and habitat loss.
- Record the threats to whio mentioned in the Whio mountain book and Whenua finds a future. How do these threats harm or kill whio? What can we do about them? (*see resources above and teaching notes*)

Whenua finds a future

Threats to whio in Whanganui River catchment

- Show students the graphs on *6.1 Whio graphs*. These graphs are for the Whanganui River catchment – the western rivers of Tongariro forest: the Whakapapa, Mangatepopo and Whanganui.
- What statements can students make about whio threats based on these graphs? (e.g. numbers of pairs of whio and ducklings have increased over time).
- Why have the number of pairs increased over time? Which threats could have been dealt with? (Over this time there have been many traps laid out in a network – particularly for stoats and there have also been 1080 drops). *For more detailed information see reference table in teacher notes and Activity 6 :Year 5–8 and resources.*
- Why were chick numbers so low in 2010 and 2013? Which threat could be responsible? In these years there were several floods which washed away many ducklings and nests.
- Ask students to ask each other further questions about the graphs.
- Create pictograms or line graphs of the information in pairs or individually.

Identifying threats in your local community

- How could you find out about threats to your local streams/rivers and any whio living there?
- Which of the threats you identified in the book and video above are an issue for whio near you?
- Which threats can you do something about? Which are out of your control?

Why should we be concerned?

Why be concerned about whio threats? What would happen if whio became extinct because of the threats in their environment? (*see teacher notes*).

Reflecting on knowledge

- Review the *Whio mountain book* and *Whenua finds a future* (*see resources*).
- Students can then write their own story or book about a threat to whio. Use other whio resources to support students (*see whio resources pages 65–66*).
- What do we now know about threats to whio and how people are involved?
- Do you have any further questions? How could you find answers to these questions?

Extending learning

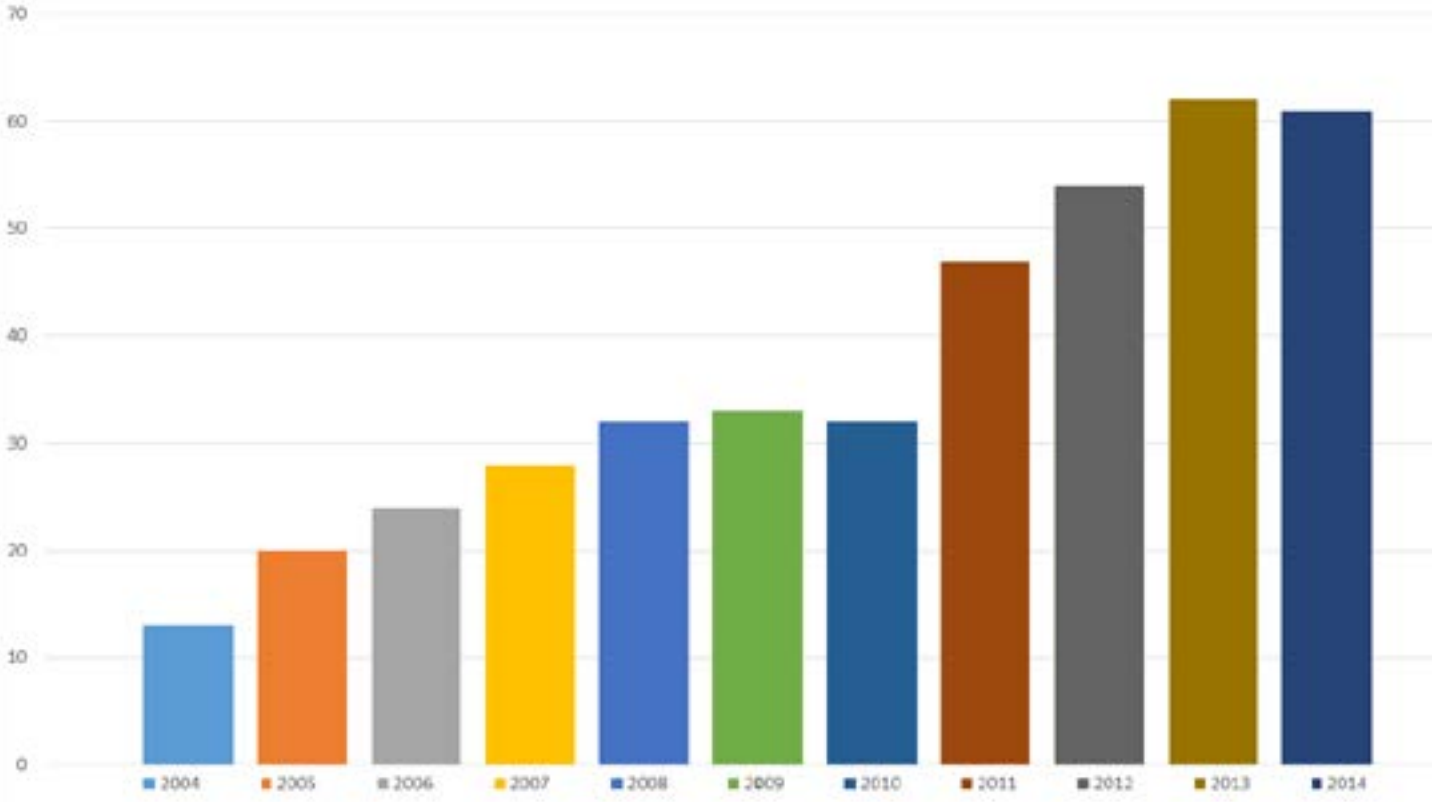
View the poster: *Under threat: Whio foes* to learn more about threats to whio. Capable readers could investigate one of the threats to whio using the poster and report back to the class about their findings.

Use ideas from the poster, start to monitor what is happening in your local environment (e.g. set out trakka tunnels to monitor which pests are present near your stream, keep a record of flooding or extreme weather etc.).

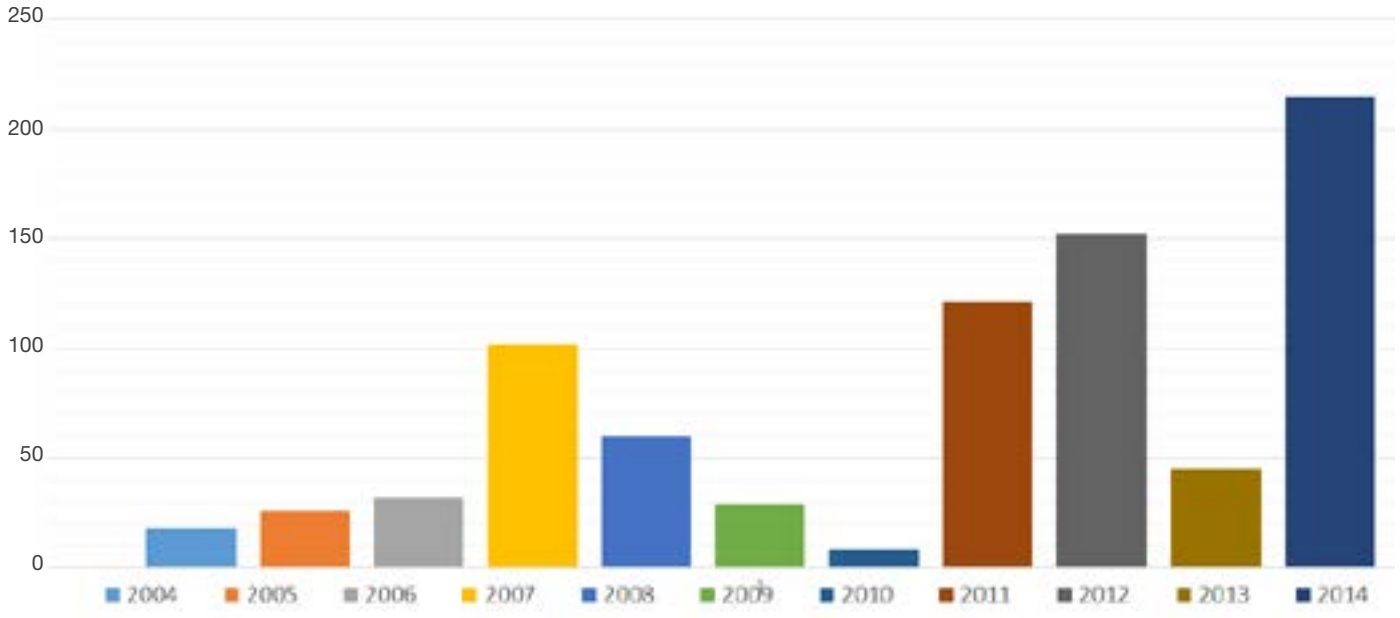
Find out more about a very serious threat to whio – didymo: (*see resources: didymo resources*)

6.1 Whio graphs

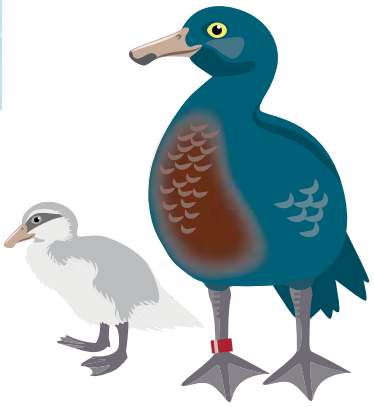
Adult whio pairs in Whanganui River catchment (2004–2014)



Number of chicks in Whanganui River catchment (2004–2014)



ACTIVITY 7:
Visiting whio



TEACHER NOTES

This learning experience investigates how whio are threatened by introduced predators, changes to their habitat and natural events.

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Nature of Science: Understanding about science

Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation

Planet Earth and Beyond: Earth systems

Explore and describe natural features and resources

Health: Levels 1 and 2

Personal Health and physical development: Safety Management

Identify risk and use safe practices in a range of contexts

Science capabilities

Gather and interpret data, Use evidence, Critique evidence, Engage with science

Learning intentions

Students are learning to:

Find evidence to support or challenge their ideas about whio

Identify risks in the outdoors and learn how to manage them

Success criteria

Students can:

Record observations and find evidence to support or challenge their ideas about whio

Describe risks and how to manage them

Minor curriculum links

English: Writing Science: Living world, Nature of science- participating and contributing

Background information: Visiting whio

What can we focus on during a visit to see whio?

The focus of your field trip will depend on the direction of your inquiry. Use your visit to gain more understanding of whio. Students could focus on an aspect of whio behaviour/feeding/breeding/moving or threats to them. Alternatively, they could look at past/potential whio habitat or investigate the health of local rivers and streams. There may be an area of interest for students that has come up during their inquiry that they would like to explore further.

Experiential learning

Experiential learning is a personal experience, exploring a relevant context and then reflecting on the experience. A field trip to see whio is an excellent opportunity for experiential learning in an authentic context.

Seeing real whio and how they live will allow students to gain a deeper understanding of these birds and consolidate and build on their existing knowledge.

What do students and schools need to consider before a field trip?

Staff, students and the BOT will need to consider safety, logistics, special needs, adequate supervision/ratios and equipment needed. Information about safe practice in the outdoors can be found at the EOTC (Education Outside The Classroom) TKI website: *http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines*. This includes information on planning, staffing and supervision, emergency preparedness, legal responsibilities, and accepted best practice for EOTC.

How do scientists form new ideas?

Scientists test their ideas and share them with others. They reflect on what they already know and pose new questions. They make observations and gather data which may support or challenge their ideas. Then they interpret and critique their data and observations. Scientists look for patterns, apply problem solving skills and think creatively to come up with new ideas.

This *Science Learning Hub* link provides an interactive about how science and scientists work: *http://sciencelearn.org.nz/Nature-of-Science/Sci-Media/Interactive/How-science-works*

How do scientists research birds like the whio?

Scientists monitor individuals and groups of whio. Sometimes the birds are captured, banded and/or microchipped to identify individuals. They are often weighed and checked over to get an indication of their health. Sometimes instead of capturing whio, photos are taken and numbers of adults, chicks and eggs are counted. Some birds are closely observed and their behaviour recorded. Using a wide range of tools and techniques, scientists and rangers can find out new information about whio behaviour, feeding, movement, territories, habitats and breeding. This information can be then used to help whio thrive.

ACTIVITY 7:
Visiting whio

STUDENT LEARNING EXPERIENCE – VISITING WHIO

Focus questions:	Resources needed:
What can we find out about whio when we visit them? How can we plan for a safe visit?	Inspired to discover (Te Papa Tongarewa) 04:12 *https://www.youtube.com/watch?v=bq4M2YRDe9c* Find a whio website (showing locations of whio throughout New Zealand) *http://www.whioforever.co.nz/about-the-whio/find-a-whio* NatureWatch NZ website*: http://naturewatch.org.nz/* Meet a scientist (L509) Venom researcher on Digistore *http://digistore.tki.org.nz/*

Suggested learning sequence:

Thinking like a scientist

- How do scientists research birds like the whio? Share ideas. (*see teacher notes*).
- How can you act like a scientist during your visit?
- View *Inspired to discover* (Te Papa Tongarewa) (04:12) about how scientists work: *https://www.youtube.com/watch?v=bq4M2YRDe9c&index=26&list=PL0BDD0D70BC6D94D8*
- or *Meet a scientist (L509): Venom researcher* on Digistore: *http://digistore.tki.org.nz/*
- After viewing the interactive, audio files or video, discuss:

  What do scientists do?

  What are these scientists trying to find out?

  How do they find out information about animals?

  Could any of these ideas be useful for your visit to see whio?

Deciding where to visit whio

- Plan to visit an area where whio live. You may be lucky enough to live near wild whio, but if not, you can visit captive whio in Auckland, Hamilton, Turangi, Rotorua, Otorohanga, Christchurch, Wairarapa, or Queenstown. It may be possible to visit both a captive and a wild population, which would be ideal if you wanted to compare the two. Where you decide to visit whio will influence the focus of your visit.
- Select an appropriate site to visit using one of these tools:

  NatureWatch NZ website: *http://naturewatch.org.nz/*
  A community tool for sharing observations of NZ plants and animals. View sightings of blue duck on *NatureWatch*: *http://naturewatch.org.nz/observations?taxon_id=7183*

  Find a whio (Whio Forever website): *http://www.whioforever.co.nz/about-the-whio/find-a-whio*
  This website shows locations of captive whio, whio security sites and recovery sites. Security sites are more established sites where there will probably be more whio. Recovery sites are lower priority sites that may have less whio and may not have as intensive monitoring or trapping.

Safety considerations

Why is it important to think about safety before a school trip?

Use a scenario (such as the example below) or sharing a personal experience to start a discussion about safety in the outdoors.

> **Example safety scenario:**
>
> Mr Tumble takes his class of 30 students to the local river to try to spot whio. They have one adult helper and a first aid kit. As they walk towards the river it starts to rain heavily. Only a few students have wet weather gear. The others quickly become wet and cold.
> The track is muddy and slippery.
>
> One student loses sight of the group and becomes lost . . .

- Which risks or potential problems are mentioned in the scenario? (Wet weather, lost students, students getting cold and sick, slippery track . . .)
- How could Mr Tumble and his students have planned for and managed these problems/risks? (adequate adult supervision, ensure students have appropriate gear, check the forecast etc . . .).

Teacher safety considerations

- Teachers should consider the needs (medical, behavioural and learning) of students going on the trip.
- Locations where whio are found in the wild are often remote and can be difficult to access. Make sure you (as the teacher) visit the area before taking students into a remote or rugged environment. Take photos during the pre-visit for students' reference. Make a note of any risks.
- Use the appropriate forms from the EOTC Toolkit: *http://eotc.tki.org.nz/EOTC-home/EOTC-Guidelines/Tool-Kit* to work through. Forms 17, 18 and 19 are common for schools to use.
- Ask members of the local community for their advice about locations and access.
- Having an expert or local fisherman/angler who knows the area to guide you would be an ideal scenario. Consider where you could get the best view of whio without unnecessary risks.

Identifying and managing risks

- What will you need to think about to make sure your group are safe in the location you are visiting? What risks could there be? Students could brainstorm possible risks and then the teacher could describe any risks he/she found during the pre-visit.
- Record any risks present at the location you will be visiting.
- Depending on their abilities, students could also contribute to a safety action plan (SAP) which describes how you will manage the identified risks.

Prior to your visit

- Reflect on your whio inquiry. Did students have any questions which could be answered during a visit? Students can think about what they want to know next.
- Decide on a question or idea to investigate during your visit.
- Also decide on a format for collecting data, recording information and making observations.

During your visit

- Collect data and make observations. Record any evidence which supports or challenges your ideas (sketch, photograph, count etc.).
- Follow your Health and Safety plans.

- Use a camera or digital device to take photos and record experiences.

After your visit

- Review the data, observations, images and information you collected during your visit. Share several reflection questions about any evidence you have gathered so far:

  Did students have any similar observations or data?

  What did you learn from what you observed?

  How could you check your results?

  Did your observations/results surprise you?
- Share evidence and let others critique it to make sure it is reliable. Discuss your results with others, including any available experts.
- Encourage students to think creatively to interpret their results. You may need to use problem solving skills to create new ideas about whio.

Coming to conclusions about the situation for whio: Inquiry stage 5

- Using material and learning from previous activities, show students examples of information gathered during the unit, including any data or observations from your visit.
- It may help to display information gathered as a mural, artwork or presentation. Pick out evidence and examples that support each other. Look for other patterns or themes.
- Looking at your information as a whole- think about: What is happening at the moment for whio in your area? Talk about possible conclusions and find supporting information.
- Summarise your findings with a report or recount of your visit and the conclusions you made.

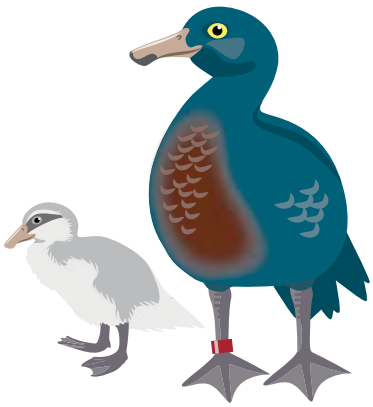
Reflecting on knowledge

- What did we learn about whio from our visit?
- Read each other's reports/recounts and share information.
- Which questions remain unanswered?

Extending learning

- Record any sightings of whio and view other whio sightings on *NatureWatchNZ*: *http://naturewatch.org.nz/*

ACTIVITY 8:
Whio in the future



TEACHER NOTES

This learning experience applies student learning to help create a positive future for whio..

Curriculum links

Achievement objectives

Science: Levels 1 and 2

Nature of Science: Participating and contributing

Explore and act on issues and questions that link their science learning to their daily living

Planet Earth and Beyond: Interacting systems

Explore and act on issues and questions that link their science learning to their daily living

Social Sciences: Level 2

Understand how place influence people and people influence places

Science capabilities

Engage with science, Critique evidence

Learning intentions

Students are learning to:

Use their inquiry information to identify a focus issue
Identify how to solve a focus issue
Express ideas about what could happen to local whio in future

Success criteria

Students can:

Choose a focus issue using information from their inquiry
Share their ideas about solutions for the focus issue
Draw pictures to show what is happening to whio in their area and what could happen in future

Minor curriculum links

Health: Healthy communities and environments, The Arts: visual arts

Background information: Whio in the future

What does the future hold for whio?

The future for whio is still uncertain, but at this stage it is looking bright for most wild populations.

Thanks to the efforts of thousands of New Zealanders, including organisations like DOC (the Department of Conservation) and companies like Genesis Energy, the numbers of whio are gradually increasing. We can all make a difference to help maintain and grow populations of whio and keep them safe.

What is future problem solving/future-focused learning?

Future problem solving is thinking about an issue and looking to the future to imagine what might happen and what could be possible. When participating in future problem solving, students will use a range of thinking skills to solve problems in a future-based context. For more information see: *http://nzcurriculum.tki.org.nz/Principles/Future-focus.*

Contexts for future-focused learning/future problem solving

Sustainability: Environmental Education for Sustainability (EEfS) is about learning to think and act in ways

that will safeguard the future wellbeing of people and our planet. How could the issue have become more/less sustainable? (How could the future wellbeing of people and the planet be affected?)

Globalisation: How could the issue be influenced by people in other countries?

Citizenship: How could people in the future think or behave in relation to this issue?

Enterprise: How could the situation have been changed by businesses and industries?

For more information on future problem solving, see:
http://nzcurriculum.tki.org.nz/Curriculum-stories/Media-gallery/Future-focus/Future-Problem-Solving

What is kaitiakitanga?

Kaitiakitanga is a way of thinking about and looking after the environment in order to help maintain the balance of everything within it. It can be loosely translated into English as protection or guardianship.

In Te Ao Māori, humans have a responsibility to keep the physical and spiritual balance of the environment intact. Traditional ways of managing hunting and fishing were able to ensure enough resources were handed down to the next generation, to maintain the mana and mauri of ancestral land.

Kaitiaki are tangata whenua who hold the responsibility to protect and look after an area's resources. They act to restore ecosystems through a holistic approach, recognising that all things are interconnected.

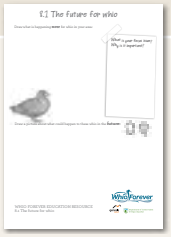
What is guardianship?

In Pākehā terms 'guardianship' is a way of thinking about looking after and protecting the environment.

ACTIVITY 8:
Whio in the future

STUDENT LEARNING EXPERIENCE – WHIO IN THE FUTURE

Focus questions:	Resources needed:
What could the future be like for whio?	8.1 The future for whio A balance between use and conservation (04:24): *https://www.youtube.com/watch?v=bXk16Y96tN8* Kaitiakitanga on Te Ara (NZ Encyclopedia): *http://www.teara.govt.nz/en/kaitiakitanga-guardianship-and-conservation* Art materials for drawing/mural (if desired)



Suggested learning sequence:

Reviewing the situation for whio

- Share your reports/recounts and conclusions from Activity 7 and discuss what is happening right now for whio in your area.
- You have now considered the past and present situation for whio, now you can start to consider the possible futures of whio.

A local context

- What are the issues/concerns for whio in your area? How are people involved in these issues?
- Investigate the issues and their causes.
- Decide which is the most important issue for whio in this area. This should be an issue that students can influence and target at the root of the problem e.g. people don't know about weeds in rivers, there are too many stoats in our local environment or another issue relevant to your community. This is your focus issue.

Kaitiakitanga/Guardianship

- Explore the concept of kaitiakitanga (protection/guardianship) (*see teacher notes*). Kaitiakitanga is a way of thinking about and looking after the environment to maintain balance. Kaitiaki are tangata whenua who have the role of looking after the land and maintaining mauri in their area.
- Think about any local rivers or streams. Do students feel that the mauri of these rivers/streams is strong or weak? Why?
- Find out about any kaitiaki in your local area. Are they involved somehow in restoring mauri or working around rivers? How could you support their work?

Future-focused thinking

- What will the future be like for whio? Students can imagine they are ten years into the future. What does the future look like for whio in your area? Students can record their ideas about what is happening at the

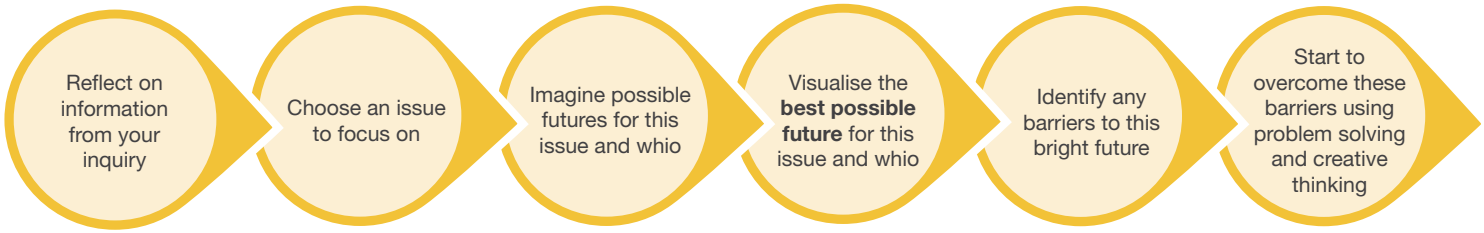
moment (the current situation) and the future for whio on *8.1. The future for whio.*

- Bring student's drawings together to share the different futures they have imagined.
- Compare the possible whio futures and discuss the differences between the positive and negative futures. Which future should we be aiming for?
- Focus on examples of the **best possible future** you can imagine for whio in your local community. Share ideas and form a collective picture of what this future could look like.
- Create a shared drawing, mural or description to show this bright future for whio.

Overcoming an issue for whio

- You now have a shared vision of a bright future for whio. What is standing in the way of this future? How is the focus issue involved?
- How can you use creative thinking to overcome/start to solve this issue?
- Encourage futuristic ways of thinking (with no boundaries). The issue may need breaking down into parts.
- Ask students to consider the following questions:
  What will need to change to solve the focus issue?
  What can we do to help to solve the issue?
  Is there anything else happening that might change things?
- Write the questions on your whiteboard or display them. Students can share ideas using a *Walk and talk strategy* – Students walk around the classroom on their own until you give a signal. On the signal they turn to the nearest person and share ideas on the topic. When you give another signal they swap roles with the other person talking and the first talker listening. They then continue to walk around room and repeat the process. (*see teaching strategies pages 63–64*).

Process for future problem solving



Reflecting on learning

- Brainstorm ideas about what will need to happen in future to help whio.
- Invite guest speakers and interview members of the community who might be able to answer your questions.

Extension

- For capable students: view *A balance between use and conservation* (04:24): *https://www.youtube.com/watch?v=bXk16Y96tN8.*
  This clip describes how Genesis Energy are striking a balance at the Tongariro Power Scheme between producing energy for the community and maintaining the mauri and flow of rivers.
- Citizen Science is becoming a popular way for the whole community to be involved in scientific monitoring. It can include community monitoring and recording of populations of animals.
  See: *http://sciencelearn.org.nz/Science-Stories/Butterflies/Citizen-scientists*. How could citizen science be

used to help whio? If appropriate, plan a project to test how this might work. This could be supported by other organisations such as community or conservation groups.

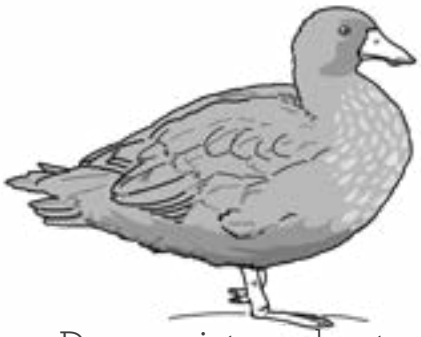
Sharing your findings: Inquiry stage 6

- Share the knowledge you have gained during your inquiry and the conclusions you have come to with your community.
- Find an opportunity to tell others about your experiences and observations from your inquiry and visit. This may be through an assembly, newsletter, blog, website, hui or other public event.
- Invite parents, whānau and/or the wider community to be involved in your action. Consider the following questions:
- Who would you like to share your knowledge and experiences with? Why? Decide on who will be in your audience.
- Which information and understandings will you share? Include problems, issues, and questions. Explain any new information and ideas.
- How will you communicate your ideas? Decide how you will share the information.
- How do you want these people to help? What are the key messages for the audience to take home?
- Ask for feedback from your audience to inform your next steps.

8.1 The future for whio

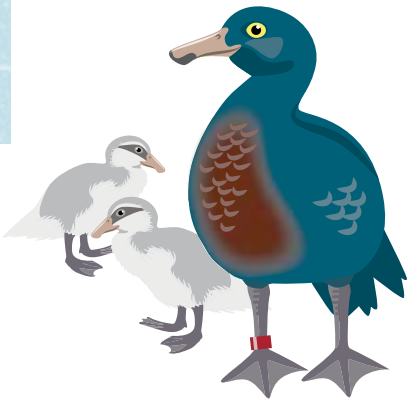
Draw what is happening **now** for whio in your area:

What is your focus issue?
Why is it important?



Draw a picture about what could happen to these whio in the **future:**

ACTIVITY 9:
Let's help whio



TEACHER NOTES

This learning experience applies student learning to help make a difference for whio.

Curriculum links

Achievement objectives

Science: Levels 1 and 1

Nature of Science: Participating and contributing

Explore and act on issues and questions that link their science learning to their daily living

Technology: Levels 1 and 2

Brief development

Describe the outcome they are developing and identify the attributes it should have, taking account of the need or opportunity and the resources availabl

Science capabilities

Engage with science

Learning intentions

Students are learning to:

Choose and plan an action to make a difference for whio
Create a brief to describe the action and what it will do to help whio.
Carry out a real action for whio
Reflect on your action

Success criteria

Students can:

Decide on an action that will make a difference for whio. Describe what you will do, and how and why you will do it, using your brief and action plan
Take part in a real action for whio
Reflect on the brief for action

Minor curriculum links

Technology: Technological Practice: Planning for practice, Outcome development and evaluation

Background information: Let's help whio

How can we help whio?

Every little bit of help for whio counts! Even a small project can make a difference to an issue facing whio and educate, empower and inspire students. Location is not important – if you live far away from wild whio you could concentrate on raising awareness, supporting captive whio or work to solve an issue that whio face which may also affect other birds in your local area.

How do we choose what to do?

The environmental action students choose should be a natural progression from their inquiry. An action should make a difference for the focus issue and contribute to a positive future for that issue. Sharing decision making and leadership with students will increase their enthusiasm and engagement. An aim of Environmental Education for Sustainability is; students are motivated to take action for their own reasons.

Consider the time you have available and the resources required when making decisions. A decision making tool such as a PMI (Plus, Minus, Interesting) (*see teaching strategies pages 63–64*) may also help to select which action will be most effective to address an issue.

Where will we get the resources needed to complete an action?

For ideas about where to get funding see: *http://www.naturespace.org.nz/national-funding*. Your local council may also have funding programmes available to schools.

The school community can also be a valuable source of resources and people power. Advertise in the school newsletter or through home sharing for what you need – you may be surprised what can happen!

Who could be involved?

When planning for action, it is important to consider who could be affected by your choices and also who might be of help and/or want to be involved.

Working with other people outside the school can reduce the load on staff and students and can also make valuable, long-term connections between you and your community. If you are setting up a partnership with an external group or individual, ensure you give clear guidelines and define timelines, roles and responsibilities. Agree on stages of the project and communicate regularly with your community partners.

Monitoring and reflecting on change

Monitoring results and measuring change will be useful for future funding applications, reporting and sharing your success with the wider community. Record any changes which have occurred as part of your project: these can be useful to refer back to when working on future projects. Reflection will allow you to think strategically, avoid repeating mistakes and to learn from your experiences.

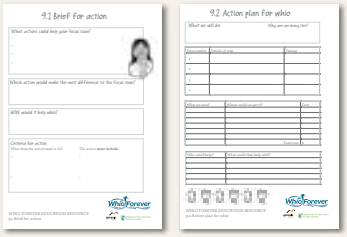
Reflecting on action can also help to steer your next steps.

ACTIVITY 9:
Let's help whio

STUDENT LEARNING EXPERIENCE – LET'S HELP WHIO

NB: This activity will be need to be facilitated over several sessions

Focus questions:	Resources needed:
What can we do to help whio?	Kohanga helping whio example: *http://blog.doc.govt.nz/2015/08/04/kohanga-passion-for-whio/* Protect Blue Ducks (04:22) *https://www.youtube.com/watch?v=KVYTcL8dIIs* 9.1 Brief for action 9.2 Action plan for whio Community restoration information and data: *http://naturespace.org.nz*



Suggested learning sequence:

Planning for successful action

- Now for the logistics for making it all come to life! What resources will you need to complete your action? What steps will be included in the process?
- Who could you work with? During your inquiry, did you come across any groups working for whio in your area? Students could work to support a project that is already going or create something new.
- Plan your action for whio using *9.2. Action plan for whio*. Again, with younger students it may be helpful to complete this as a shared writing experience, as a whole class or in groups.

Carry out your action

- Allow time for completing an action project.
- Keep to the criteria you have set and use the ideas in *9.1. Brief for action* and *9.2. Action plan for whio* to guide you through the process.

Reflecting on action – how did we help whio? Inquiry stage 9

- Students can complete a self or peer assessment to ask themselves or each other:

  How did our action help whio?

  What did we do well?

  What challenged us? What surprised us?

  What didn't we do?

What would we do differently next time?

Did we work well with other people? Why/why not?

- Also discuss what students enjoyed the most and the least.
- Look back at the brief and action plan. Did you do what you set out to do?
- Measuring and monitoring action: Did any change come about from your action? How could you measure this change?

Reflecting on knowledge

- What did you learn from completing this action? Was there a learning gap?

Extending learning

- Work with other schools in your area to share your learning and invite them to work with you to enable wide-reaching actions for whio.
- Spread the word about your action and inspire others. Take time to celebrate your success.

9.1 Brief for action

What actions could help your focus issue?

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.

.

.

Which action would make the most difference to the focus issue?

HOW would it help whio?

Criteria for action

What does the action need to do?

.

.

The action **must include:**

.

.

9.2 Action plan for whio

What we will do:	Why are we doing this?

Step number	Details of step	Timing
1		
2		
3		
4		

What we need	Where could we get it?	Cost
	Total cost	$

Who could help?	What could they help with?

GLOSSARY

Adaptation	Features (traits and characteristics) that animals or plants have evolved, to enable them to live in a particular habitat.
Breeding	To produce offspring/have young (e.g. eggs and ducklings).
Fledge	Leave the nest and find their own way in the world.
Ecosystem	A natural system of complex relationships, including the physical environment, plants, animals and other living things.
Endangered	A plant or animal species that exists in such small numbers that it is in danger of becoming extinct.
Endemic	A living thing that has evolved in New Zealand and breeds and lives naturally, only in this country.
Habitat	A place where a living thing/population naturally lives.
Incubation	Keeping the egg(s) warm and safe.
Introduced	Has been brought to New Zealand by people.
Issue	A problem or difficulty of concern.
Juvenile	A young animal that has not yet reached adulthood and hasn't yet had offspring.
Kaitiaki	Tangata whenua who have been given responsibility to protect and look after an area's resources. They act to restore ecosystems through a holistic approach, recognising that all things are interconnected.
Kaitiakitanga	Kaitiakitanga is a way of thinking about and looking after the environment in order to help maintain the balance of everything within it. It can be loosely translated into English as protection or guardianship.
Life cycle	A series of stages a living thing passes through during its lifetime – from birth to death.
Mauri	The essence or life force present in all living things.
Native	A living thing that has come to New Zealand by themselves and have established populations here. They may also live in other countries.
Predator	An animal that hunts and eats other animals.
Threat	Something that can harm or kill a whio.
Value	A deeply held belief about what is important.
Whio	New Zealand blue duck – a fast-flowing river specialist.

TEACHING STRATEGIES

Walk and talk sharing strategy

Students are given a topic or question. They walk around the classroom (or better still a learning area outside) quietly in their own space, until a signal is given. On the signal they turn to the nearest person and share their ideas. The partner must be actively listening. On another signal they swap roles with the other person talking and the first talker listening. Then students continue to walk around and repeat the process.

3-2-1 sharing strategy

Students pair up and take turns to talk about three subjects. Write the subjects down in a visible place for students to refer to. A signal is given after defined periods of time to change the subject to the next topic.

Each person shares:

3 things about . . . then

2 ideas about . . . then

1 idea/experience.

Think, pair, share

Briefly introduce the question/topic.

Think: Allow students time to think about what they know or have learned about this topic for a set amount of time (around 1–2 minutes).

Pair: Students can then share their ideas with a partner. This could be sitting or standing. You could also allow time for pairs to ask each other questions. Emphasise listening skills.

Share: Once partners have shared and discussed ideas, they can share with another group or the whole class their collective thoughts.

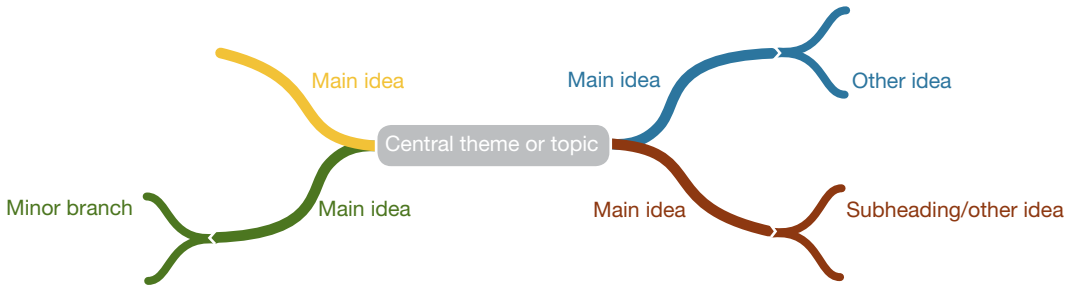
Brainstorm

The brainstorm begins with introducing a topic or question.

The students share ideas, thoughts, relevant words and answers when given an opportunity. The teacher or scribe is responsible for recording the ideas without judgement on an electronic document, whiteboard or paper. The recording should be visible to students. Alternatively students can record their ideas on individual pieces of paper and then these can be displayed and grouped accordingly.

Mind map

A mind map is a diagram which helps to organise information. A central idea or topic is in the centre and the main ideas branch out from this central topic. Other ideas branch off from the main ideas. The mind map below was created using *https://coggle.it*



PMI (Plus, Minus, Interesting)

A PMI graphic organiser is a tool for thinking about positives, negatives and other variables of an idea or option. A table is drawn up of the pluses (P), the minuses (M) and the 'interesting' (I) factors (what could be interesting or is of interest). See *http://www.globaleducation.edu.au/3011.html* for more information.

Plus (P+)	Minus (M-)	Interesting (I)

Compare and contrast chart

A compare and contrast chart is a graphic organiser which is useful to encourage thinking about how two things are alike and different. It lists both similarities and differences. It can be used as an alternative to a venn diagram.

WHIO RESOURCES FOR STUDENTS AND TEACHERS

Websites

General whio information

Whio on the DOC website – *http://www.doc.govt.nz/whio*

Whio Forever website – *http://www.whioforever.co.nz*

NZ Birds Online whio page – *http://nzbirdsonline.org.nz/species/blue-duck*

Posters and education resources by Whio Forever

Whio Forever education resources – *http://www.whioforever.co.nz/about-the-whio/educational-resources*

Poetry and songs – *http://whioforever.co.nz/about-the-whio/whio-poetry*

Where to see whio

NatureWatchNZ website – *http://naturewatch.org.nz/*
A community tool for sharing observations of NZ plants and animals. View sightings of blue duck on NatureWatch: *http://naturewatch.org.nz/observations?taxon_id=7183*

Find a whio (Whio Forever) website – *http://www.whioforever.co.nz/about-the-whio/find-a-whio*
The Whio Forever site shows captive whio, whio security sites and recovery sites. Security sites are more established sites where there will probably be more whio. Recovery sites are lower priority sites that may have less whio and may not have as intensive monitoring or trapping.
http://www.whioforever.co.nz/get-involved/where-to-see-a-whio

Journals

(In approximate order of reading level)

Suitable for Year 1–4

Haast's eagle L2 Junior Journal 51, 2015

Looking after ducklings Children as authors, No. 1, 2001

The prayer of the little ducks (story) Y3: Junior Journal 5 1990

Bully (story) Y3: Junior Journal 13, 1995

Catching sprats Y3: Junior Journal No. 31: 2004

A present from pudding (story) Y4: Part 1: 1: 2001

The ducks dip out (play) Y4: Part 1: 1: 2001

Get your hands dirty! (article) Y4: Part 1: 4: 2009

Going fishing Y4: Part 1: 1: 2008

River bugs (white-water rafting) Y4: Part 1: 2: 2001

Suitable for Year 5–8

Power (hydro) L2 August 2011

Going after Humbug (story) Y6: L3 April 2012

Feathery Friends Connected (CN) 1, 2001

Hinaki (catching eels) SJSL No 4 2000

Testing the north river (article) CN 2 1998

The water cycle CN 2 2002

Feathers (article) Y6: Part 02 No 3 2001

Counting kakahi (article) Y6: CN 3, 2014

The fish highway (article) Y6: CN3 2013

Awa (poem) Y4: L2 August 2012

At the river (poem) Pt 3: No. 2: 1996

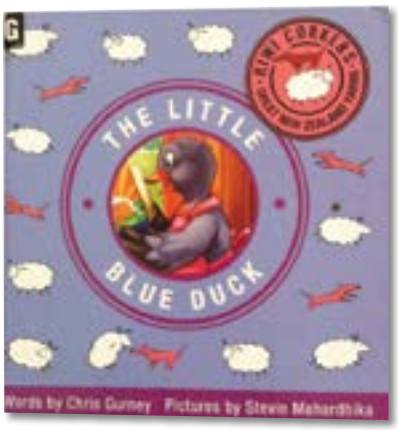
Eel (poem) Pt 3 No. 3: 2009

Other resources

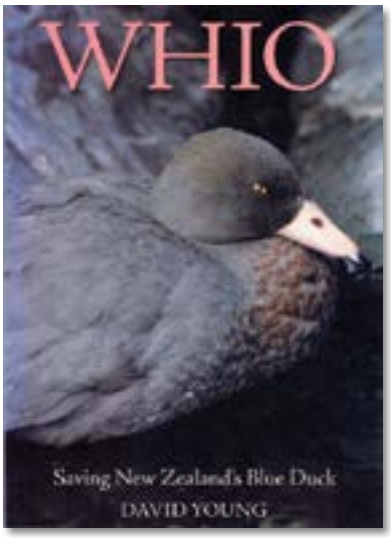
Building Science concepts Book 4: Animal Life Histories: Reproduction, Growth, and Change
Levels: 1–4

Books

Whetu the little blue duck by Jennifer Beck.
A good introduction to people and whio, this book tells the story of a little blue duck and a woman who helps him.
Suitable for Years 1+.
Auckland, N.Z. : Duck Creek Press, 2011.
ISBN: 9781877378522



The little blue duck by Chris Gurney.
Little blue duck decides to make a pavlova but her friends are unwilling to help. A retelling of the little red hen story.
Suitable for Years 1–4.
N.Z. : Scholastic: 2009.
ISBN: 9781869439149



Whio: saving New Zealand's Blue Duck by David Young.
A very thorough account of the recent history and events in the conservation of blue duck around New Zealand.
Suitable for Year 7+.
Nelson, N.Z. : Craig Potton Pub., 2006.
ISBN: 9781877333460
1877333468

Whio by Jenny Jones.
Auckland: Heinemann Education, c1994. WWF.
ISBN: 1869440722.