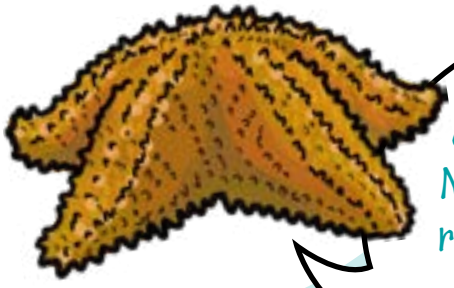
Activity 3: Stars of a marine reserve



Let's learn about biodiversity in New Zealand marine reserves and start to build a learning inquiry

CURRICULUM LINKS

Learning areas	Learning intention	Success criteria
Science: Levels 1–4: ▪ Living World: Life processes ▪ Nature of Science: Investigating in science **Science capabilities:** Gather and interpret data, Use evidence, Interpret representations **English: Levels 3 and 4:** Listening, Reading, and Viewing: Processes and strategies **Te Marautanga o Aotearoa: Pūtaiao:** Pūtaiao: The natural world	**Students are learning to:** ▪ Explore what lives in New Zealand's marine reserves and start a learning inquiry to find out more about a species they are interested in.	**Students can:** ▪ Complete an inquiry plan about a chosen species (e.g. plant or animal) that lives in New Zealand marine reserves.

CONTENTS

BACKGROUND NOTES

WHAT KINDS OF LIVING THINGS ARE FOUND IN NEW ZEALAND'S MARINE RESERVES?

Life in New Zealand marine reserves is incredibly varied and diverse. New Zealand is home to many species of fishes, sponges, sea stars, seaweeds, and many other living things.

The climate, geology, history, land-use and temperatures in a habitat affect which living things can live there. For examples of animals that live in different habitats in New Zealand, see *Activity 2: Marine habitats of New Zealand*.

WHAT IS BIODIVERSITY?

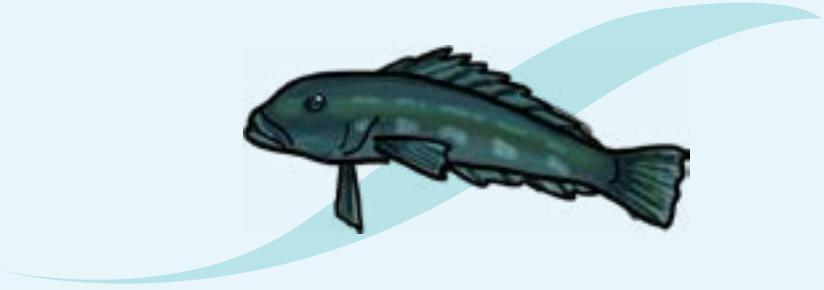
Biodiversity is the variety of living things within an environment.

HOW DO LIVING THINGS SURVIVE IN MARINE ENVIRONMENTS?

Marine biodiversity is adapted for life in a marine (saltwater) environment. Animals have special adaptations to cope with the conditions. For example, they may have scales, webbed feet, shells or waterproof feathers. These adaptations suit their specific habitat (see Activity 2). Their body systems are different from land animals, for example they may have gills to breathe in the water.

RESEARCH AND INFORMATION LITERACY

This learning experience is designed to encourage the skills of sorting, finding and recording relevant information. Students take the lead in their learning journey, starting to ask their own questions and extend their learning in directions appropriate to their ability and interests. They are encouraged to look for information from a variety of sources: books, web-based material and journals.



LEARNING EXPERIENCE 3:

STARS OF A MARINE RESERVE

Resources for this activity

Focus question: Which stars of marine reserves are we curious to learn more about?

Videos showing life in marine reserves:

- Young Ocean Explorer's video clip: *Riley searches for crayfish* (03:27 min): https://www.youngoceanexplorers.com/yoe/video/220194893152#cplayer.
- Experiencing marine reserve's (EMR's) *Snorkelling with sharks, sea turtle, lion fish and spotted black grouper at the Kermadec Islands* (06:00 min): https://www.youtube.com/watch?v=8klYhlJWsCk.
- *Port Pegasus Marine Reserve* by DOC (01:53 min): https://www.youtube.com/watch?v=Qqywc6CgKbk
- *Goat Island Marine Reserve: Meet the locals* (04:04 min): https://www.youtube.com/watch?v=5rtH9qzlO9U
- *Snorkelling at Goat Island marine reserve* from LEARNZ field trip (02:36 min): https://vimeo.com/216428277
- ScubaZoo: SCTV's *Scuba Diving Poor Knights Island Marine Reserve* in 60secs (01:17 min): https://www.youtube.com/watch?v=0br0pl7Wl4o

Other resources:

- Shells, seaweeds and collections from marine environment (teacher to collect).
- Student inquiry plan example (page 11) Google Docs version: *My learning inquiry*: https://goo.gl/raurwN.
- Padlet pages (see pages 7–9).
- Marine Life Database: link www.marinelife.ac.nz.

Books

- Carson, S,; Morris, R. 2017: *Collins field guide to the New Zealand seashore*. Harper Collins Publishers, (New Zealand) Limited, Auckland.

Vocabulary

Species, diversity, biodiversity, research, inquiry, sponge/kōpūpūtai, seagrass/karepō, snapper/tāmure, kelp/rimurapa, sea urchin/kina, orca/maki, stingray/whai, eagle ray/whai repo, blue cod/pākirikiri, crayfish/kōura, eel/tuna, cockle/tuangi, oystercatcher /tōrea.

INTRODUCING STUDENTS TO LIFE IN MARINE ENVIRONMENTS

Note: These are suggestions only. Teachers are encouraged to adapt and change material to suit their students.

What does it take to live in a marine environment?

- Discuss with students how land and water animals are different. Students can consider breathing, moving and other life processes.
  - How do marine animals breathe? Try this Young Ocean Explorers quiz to find out how fish and rays breathe under water (00:45 min): www.youngoceanexplorers.com/yoe/quiz/213452665369#cplayer.
  - How do marine animals move? Find out how dolphins move in this video quiz about how dolphins move by Young Ocean Explorers (00:45 min): www.youngoceanexplorers.com/yoe/video/235268530371#cplayer.

Meet the stars of our marine reserves

- Explore which plants, animals and other living things live in New Zealand's marine reserves using one of these resources (see *Resources* for links and details):
  - Experiencing marine reserves (EMR's) Snorkelling with sharks, sea turtle, lion fish and spotted black grouper at the Kermadecs (Kermadec Island marine reserve species).
  - Diving video by DOC *Port Pegasus Marine Reserve*.
  - Video *Goat Island Marine Reserve: Meet the locals*.
- While viewing these clips, ask students to identify what living things they can see in these New Zealand marine reserves.
  - How are the living things they have seen suited to living in a marine environment?
  - How are they similar or different?
  - How do these living things survive in a marine environment?
- View Young Ocean Explorer's video clip: *Riley searches for crayfish*: (03:27 min): https://www.youngoceanexplorers.com/yoe/video/220194893152#cplayer.

  How does a crayfish/lobster survive in a marine underwater environment? How has protection helped the crayfish population at Cape Rodney-Okakari Point Marine Reserve (Goat Island)?
- Students can also explore posters from *Activity 2: Marine habitats of New Zealand* to examine what living things can be found in marine reserves.

Diversity and biodiversity

- Discuss students' understanding of the words: diversity and biodiversity. Create definitions for these words.
- Try this biodiversity activity from the DOC website, to find out more about diversity and biodiversity: www.doc.govt.nz/biodiversity-activity.
- Why do the reserves viewed in the clips above contain such diverse, different living things?

  Port Pegasus is in Stewart Island/Rakiura (the southern tip of New Zealand), one of the colder places in New Zealand. Poor Knights is at the top of the North Island – a warmer area that is

subtropical. Their climates and temperatures are very different so what will grow and thrive there will be varied. Port Pegasus is home to New Zealand fur seals/kekeno, New Zealand sea lions/whakahao, seabirds and great white sharks!

Up close and personal with marine biodiversity

- Show students some examples of real-life shells, seaweeds or other living things from the marine environment (remember to collect these from outside a marine reserve and put them back afterwards).
- Explain that shells and seaweeds washed up on the beach are often the remains of marine animals and living things.
- Encourage students to touch, look at and engage with the objects. They could observe and draw them or tell a buddy what they notice about them and what questions they have about the objects.

Inquiry stage 2: Ask; Inquiry stage 3: Investigate

Students as investigators

- Which species from the videos and observations captured the students' imaginations? Do the students have any questions?
- Encourage students to take on the role of an investigator. Each student or group could research a species of animal or plant and then share their information to become 'experts' on their species.
- Students could investigate a living thing from the marine environment. Looks at its habitat as well as life processes:
  - feeding relationships
  - movement
  - breathing
  - behaviour or
  - migration
  - life cycle.
- Depending on students' curiosity and questions, they may choose to investigate an aspect not listed here, or they may have a question that relates to human impacts or another aspect of the species. Innovative inquiry and curiosity is to be encouraged. Other activities in the resource may support different lines of inquiry.

Starting or continuing a learning inquiry

- Students could use *Student inquiry plan example worksheet* (page 11) as a guide to begin planning their inquiry about a species of their choice. Record ideas about student topics, questions and how students might find answers to their questions, for example looking at appropriate websites (see *Resources* on page 4 and videos on pages 4 and 5), books and journals (see literacy links throughout this activity and the integrated literacy sheets in *Activity 4*) or other materials.
- Students could also use the *padlet pages* (pages 7–9) as a starting point to kick off their research or inquiry. These padlet pages are a good start for research or inquiry into marine species. The padlet webpages contain links to websites that are appropriate for year 2–13 students to read, view and understand.
- For more information about padlet, see https://padlet.com where you can create your own padlet pages about a subject of your choice.

Padlet pages: webpages for students about marine species

These are suggested species; however students may have local or familiar species they would rather investigate. The padlet webpages have links to student-oriented web content about each species.

Snapper/tāmure

Photo: Lorna Doogan, EMR

https://padlet.com/conserved/5n1qzrctk7mz

Kelp/rimurapa

Photo: Kristina D.C. Hoeppner (CC BY-SA 2.0)

https://padlet.com/conserved/ct1vdh5alrhc

Sea urchin/kina

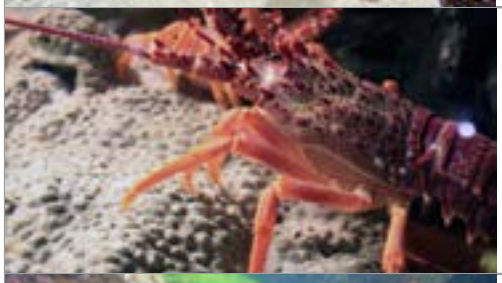
Photo: Ariel Ophelia (CC BY-NC-ND 2.0)

https://padlet.com/conserved/iihe9ohcyq1v

Blue cod/pākirikiri

Photo: Lorna Doogan, EMR

https://padlet.com/conserved/rfwcxcxp4kn7



Crayfish/kōura

Photo: Rexness (CC BY-SA 2.0)

https://padlet.com/conserved/mqvgk9z78m36

Stingray/whai and eagle ray/whai keo

Eagle ray. *Photo: Lorna Doogan, EMR*

https://padlet.com/conserved/5j3uda1qgn0h

Orca/maki

Photo: Victoria Hoete-Dodd (CC BY-NC-ND 2.0)

https://padlet.com/conserved/gbk863hkfusl

Eel/tuna

Longfin eel. *Photo: Lorna Doogan, EMR*

https://padlet.com/conserved/3ekf7scqm6cr

Seagrass/karepō

Dwarf eel-grass. *Photo: Hyun-tae Kim, Nature Watch NZ (CC BY 4.0)*

https://padlet.com/conserved/eiofc0afthty

Cockle/tuangi

Cockle. *Photo: Shona Treanor (CC-BY-NC)*

https://padlet.com/conserved/r5j8nceikgry

Oystercatcher/tōrea

Photo: Fritz Schouten NatureWatch NZ photo 8438008 (CC BY-NC 4.0)

https://padlet.com/conserved/lsbmkd4c7xth

Sponge/kōpūpūtai

Photo: Karen Pratt NatureWatch NZ photo 8438008 (CC BY-NC 4.0)

https://padlet.com/conserved/zc6fg4w5rbjr

REFLECTING ON LEARNING

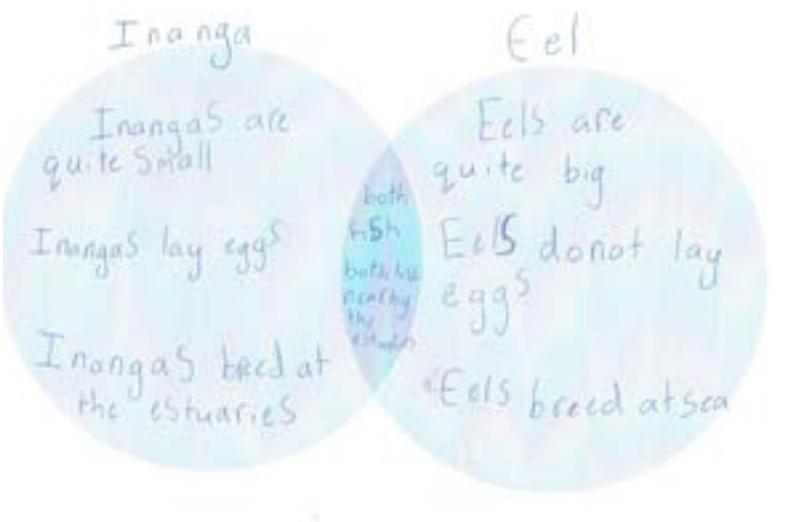
Students can share their inquiry and learning with others.

- Reflect on how a living thing is similar or different to other species. Use a Venn diagram to record ideas about similarities and differences.

  A blank Venn diagram is available at Google Docs: https://goo.gl/Cx2Uag.

  For more information on how to use a Venn diagram, see: https://study.com/academy/lesson/what-is-a-venn-diagram-lesson-for-kids.html.

- Make your own blog or webpage about the species you are investigating to record and organise the relevant information you have gathered.



Long Bay student's comparison of species. *Photo: Shanthie Walker*

EXTENDING LEARNING

- Explore the world of sharks at Kelly Tarlton's *The Blue Project: Explore ocean ecosystems* https://www.theblueproject.org.nz/Ocean-Ecosystems.
- Watch NZ Marine Studies Centre's *What makes a fish a fish?* to learn more about the special features and characteristics of fish (2:26 min): https://www.youtube.com/watch?v=PoND3a-afJw.

OTHER RESOURCES ABOUT ANIMALS OF MARINE RESERVES

- Use these student-friendly books to find out more about some of our most fascinating New Zealand species: Māui dolphins, penguins and New Zealand sea lions. These books are available at DOC visitor centres at: www.doc.govt.nz/visitorcentres throughout the country. For more information about these books, see https://blog.doc.govt.nz/meet-the-maui-dolphin.
- New Zealand Marine Studies Centre resources: www.otago.ac.nz/marine-studies/resources/otago057314.html.
- New Zealand Rocky Seashore Activities: www.otago.ac.nz/marine-studies/resources/download/otago062826.pdf.
- Marine life database: www.marinelife.ac.nz.
- EMR southern coastal rocky reef fish and other species ID chart: http://emr.org.nz/images/emr/pdf/educators/EMR_ID_Chart_2017.pdf.

Inquiry plan example

My inquiry is about:	
I am interested in: (circle which ones)	Habitat Feeding Movement Breathing Migration Life cycle Behaviour Other
What is my driving question?	
How will I answer my question?	
What is my learning goal?	
What help will I need?	
How will I record my learning?	
What are my next steps for learning?	

For a Google Docs version, see: https://goo.gl/raurwN