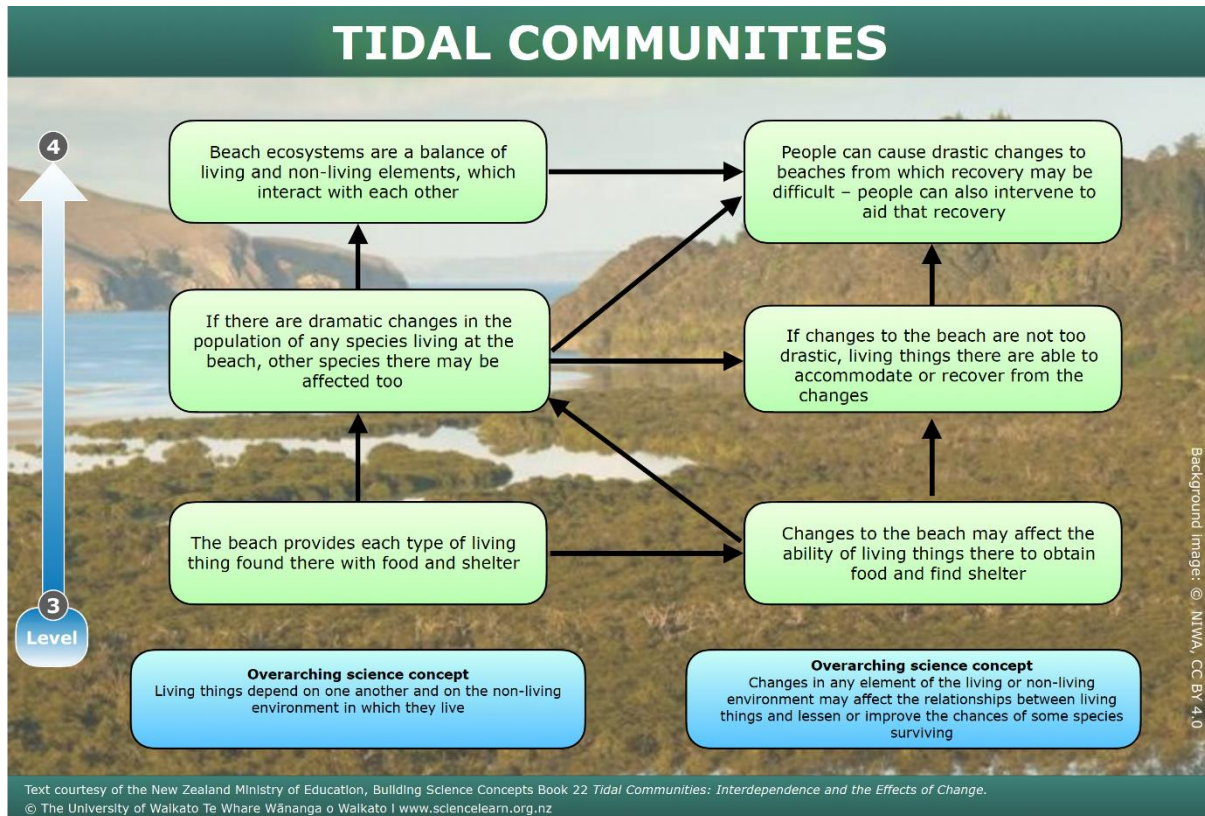


Tidal communities

This [interactive diagram](#) explores the sequential and interlinking science concepts that underpin knowledge and understanding about food webs, interdependence and change in Aotearoa's tidal communities.



The concepts in the green boxes listed just above the overarching concepts reflect learning at New Zealand Curriculum level 2 and show how they may build in sequence to level 4. The overarching science concepts are fully developed concepts and might not be achieved until level 7 or 8.

The text is courtesy of the New Zealand Ministry of Education's Building Science Concepts Book 22 [Tidal Communities: Interdependence and the Effects of Change](#).

The links to Hub resources provide additional background information and classroom activities that will support teachers to scaffold the development of their students' conceptual understanding about food webs, energy flow and interdependence. The images provide a means to initiate discussions, check student thinking and consolidate student understanding.

The article [Building Science Concepts: Tidal communities](#) provides additional science and pedagogical information.

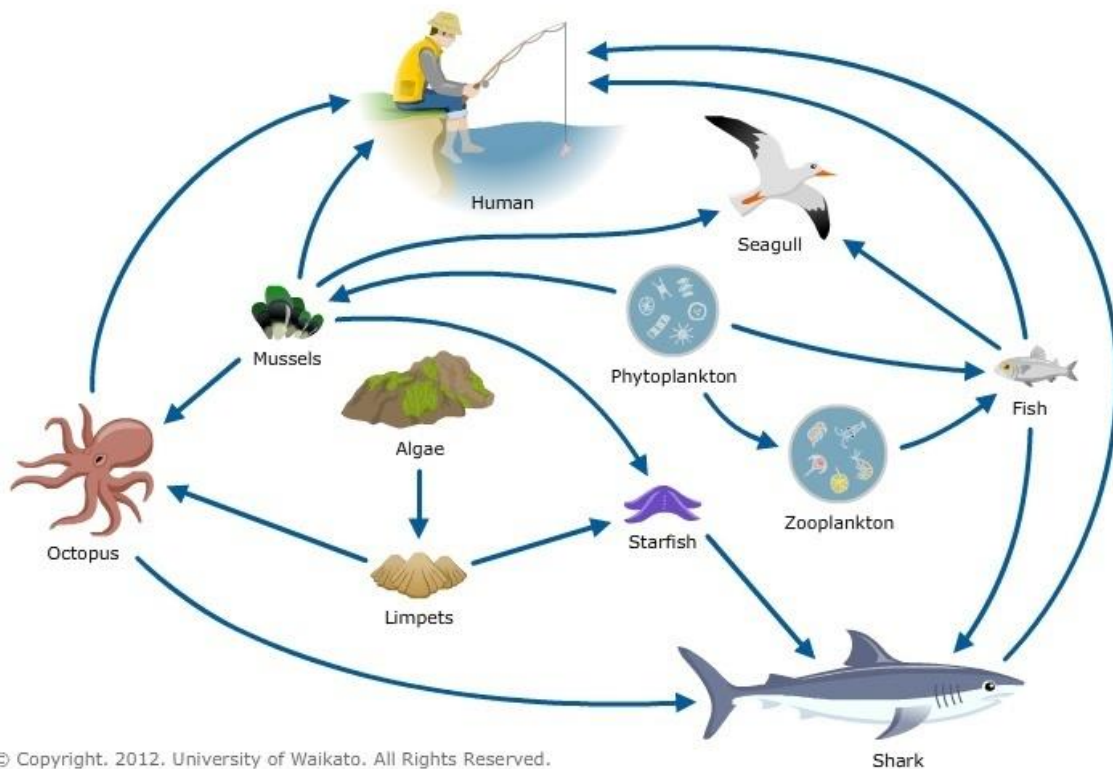
[Building Science Concepts: Life between the tides](#) explores the overarching concepts for New Zealand Curriculum levels 1 and 2.

Interactive background image courtesy of NIWA, [CC BY 4.0](#)

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- [Beach ecosystems are a balance of living and non-living elements, which interact with each other](#)
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- [If changes to the beach are not too drastic, living things there are able to accommodate or recover from the changes](#)
- [Changes to the beach may affect the ability of living things there to obtain food and find shelter](#)

Beach ecosystems are a balance of living and non-living elements, which interact with each other



A beach ecosystem is a living community of plants and animals sharing an environment with non-living elements, such as water, sand and rocks.

Within the beach ecosystem, there are mutual dependence relationships across the whole system. All of the living things in the ecosystem rely on other things, both living and non-living, for their survival.

Food webs are one example of the interconnected nature of marine ecosystems.

Related articles

- [Marine food webs](#)
- [Life in the estuary](#)
- [Understanding food webs in Fiordland](#)

- [Antarctic marine ecosystem](#)

Related activities

- [Build a marine food web](#)
- [Making a food web](#)
- [Beach visits – habitats and food webs](#)

Related images

- [Food web of rocky shore](#)
- [Food web of sandy shore](#)
- [Food web of mudflats](#)
- [Pyramid diagram](#) showing flow of energy through trophic levels
- [Marine food web](#)
- [The food web in the Ross Sea](#)
- [Estuarine food web](#)

Image acknowledgement: The University of Waikato Te Whare Wānanga o Waikato

If there are dramatic changes in the population of any species living at the beach, other species there may be affected too



Ra Boe, [CC BY-SA 2.5](#)

Changes in species populations may be the result of natural activities such as the [Kaikōura earthquake](#) in 2016 or human activities such as overharvesting.

Related articles

- [Kelp forests after the Kaikōura earthquake](#)
- [Adapting to marine habitats](#)

- [Ecosystem tipping points and stressors](#)
- [Investigating marine and coastal tipping points](#)
- [Pollution from *Rena*](#)

Related activities

- [Identifying marine stressors](#)
- [Modelling marine stressors and tipping points](#)

Related images

- [Dying kelp](#)
- [Ecosystem overfishing](#)

Image acknowledgement: Ra Boe, [CC BY-SA 2.5](#)

The beach provides each type of living thing found there with food and shelter



Dr Rebecca McLeod

All the living things that make their homes at the beach rely on that environment for their basic needs – food and shelter.

Plants and their food

Through the process of photosynthesis, plants in the water, as on land, produce their own food (in the form of starches and sugars), so they are called producers. They can access carbon dioxide for photosynthesis and oxygen for respiration from the water.

Animals and their food

Herbivorous and carnivorous animals are part of a group of animals known as consumers. Their food webs begin with the plants of the ocean – microscopic algae such as phytoplankton. Zooplankton graze on this 'pasture of the sea'. These two forms of plankton form the basic food for all beach community animals.

A place to live

Plants and animals at the beach, like living things everywhere, need shelter to survive. A range of environmental factors make life at the beach challenging – wave action, tide, drying effects of Sun, wind, particles of salt, periodic covering and uncovering by water and changing salinity levels, not to mention predators. Their shelter is a combination of their physical surroundings and the protective mechanisms they have developed that suit these conditions. Their shelter must be located near their food, so each type of living thing tends to live in a defined habitat in a specific zone on the beach.

Related articles

- [Marine habitats](#)
- [Habitats in the Bay of Plenty](#)
- [Life on a reef](#)
- [Adapting to marine habitats](#)
- [Catch my drift](#)

Related activities

- [Where do I live?](#)
- [Estuary metaphors](#)
- [Beach visits – habitats and food webs](#)

Related interactives

- [Marine diversity in Aotearoa New Zealand](#)
- [Marine ecosystem](#)

Related images

- [Physical marine habitats](#)
- [Relying on dissolved gases](#)
- [Phytoplankton](#)
- [Biological productivity](#)

Image acknowledgement: Dr Rebecca McLeod

People can cause drastic changes to beaches from which recovery may be difficult – people can also intervene to aid that recovery



Kevin Krejci, [CC BY 2.0](#)

Humans and their activities can cause many negative impacts on environments but they can also take action to help heal this damage. [Kaitiakitanga](#) is about conservation, replenishment and sustainability of the environment so as to safeguard the future. Humans have an important role in caring for these populations and environments.

There are groups, organisations and laws designed to help protect these precious environments.

Related articles

- [Reviving toheroa](#)
- [Fisheries in New Zealand – timeline](#)
- [Rena bird recovery](#)
- [Iwi and kaimoana](#)
- [Sustainable Seas National Science Challenge](#)
- [Tracking plastics in our oceans](#)

Connected articles

- [Trees, seas, and soil](#)
- [After the spill](#)
- [Sea science](#)
- [Down the drain](#)
- [Ra’ui: Giving it back to the gods](#)

Related activities

- [Litter Intelligence](#)
- [Identifying marine stressors](#)
- [Modelling marine stressors and tipping points](#)

Related images

- [What do you find at a beach clean-up?](#)
- [Bay of Plenty beach clean-up](#)

Related video

- [Farmland run-off into estuaries](#)

Image acknowledgement: Kevin Krejci, CC BY 2.0

If changes to the beach are not too drastic, living things there are able to accommodate or recover from the changes



Maritime New Zealand

Storms can destroy complex ecosystems in rock pools, but they can be recolonised from the free-swimming juveniles and seaweed spores amongst the drifting plankton.

Related articles

- [Kelp forests after the Kaikōura earthquake](#)
- [Fisheries in New Zealand – timeline](#)
- [Adapting to marine habitats](#)
- [Estuary formation](#)
- [Rena wrecked on reef: oil clean-up on-going](#)

Related activities

- [Cleaning up oil in water](#)
- [Responding to Rena](#)
- [Identifying marine stressors](#)

- [Modelling marine stressors and tipping points](#)

Related images

- [Beach clean-up after oil spill](#)
- [De-oiled penguin](#)

Image acknowledgement: Maritime New Zealand

Changes to the beach may affect the ability of living things there to obtain food and find shelter



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The beach environment undergoes not only the diverse, regular daily and seasonal changes of conditions but also the unpredictable changes due to extreme weather, unusual tides and the impact of people.

Water and wind are two of the most powerful agents of change in nature. Waves can move great quantities of beach material, sand and shingle and wear away cliffs and rock. Wind can create and reshape sand dunes (tāhuahua). Like waves, wind can also wear away cliffs and rock and even uproot seaside plants.

River flood events can send huge amounts of water down rivers, carrying debris such as trees, branches and silt downstream. This debris can change the river's course leaving tidal mudflats high and dry. The debris left over from logging operations known as slash can smother beaches and river banks causing problems for the inhabitants of river valleys and the seashore.

Related articles

- [Estuary formation](#)



Tidal communities

Related activities

- [Changes on the beach](#)
- [Marine Metre Squared](#)
- [Identifying marine stressors](#)
- [Hubbub Estuary](#)

Related images

- [South Westland landfill breach](#)
- [Storm surge](#)

Image acknowledgement: DOC. [CC BY 4.0](#)