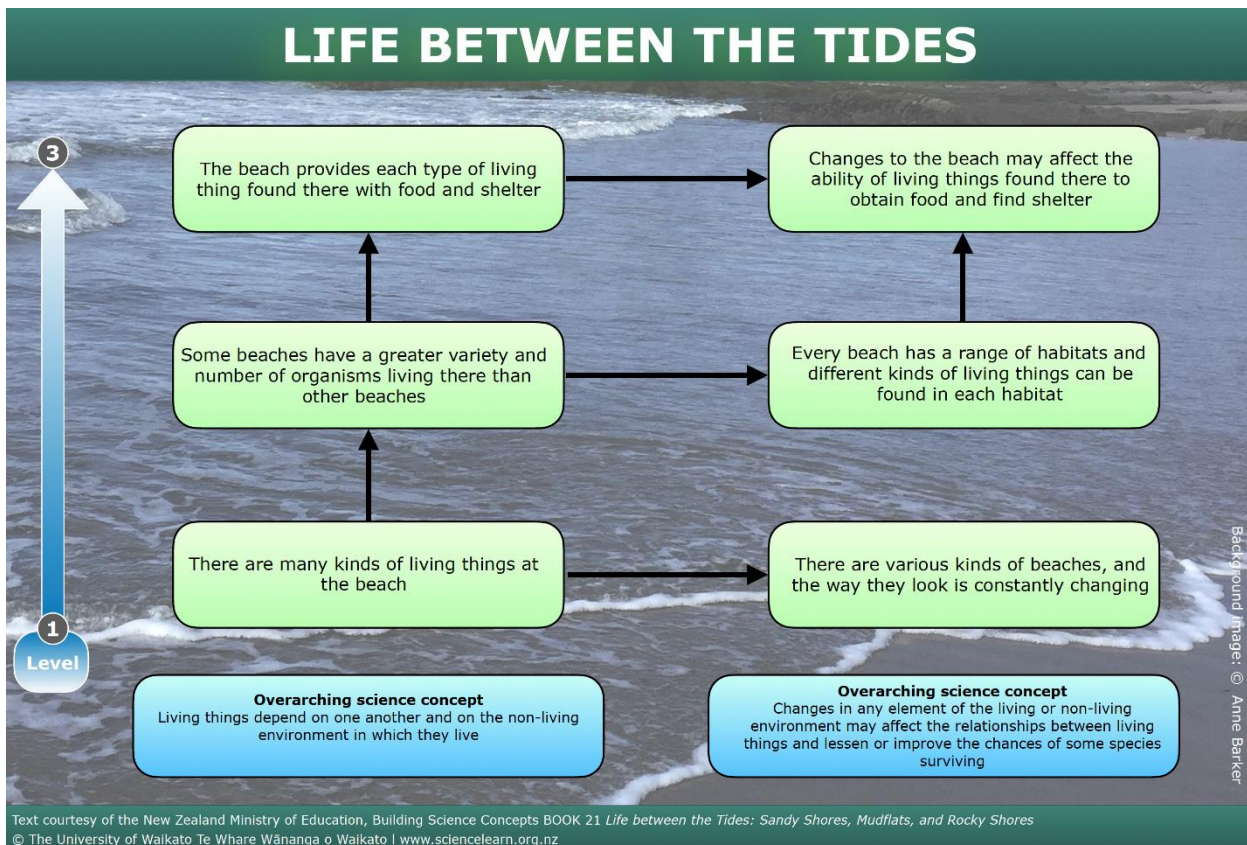


Life between the tides



Interactive background image courtesy of Anne Barker

This [interactive diagram](#) explores the sequential and interlinking science concepts that underpin knowledge and understanding about interactions in Aotearoa's beach environments. The concepts listed just above the overarching concepts reflect learning at New Zealand Curriculum level 1 and show how they may build in sequence to levels 2–3. 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 21 [Life between the Tides: Sandy Shores, Mudflats, and Rocky Shores](#). 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 life between the tides. The images provide a means to initiate discussions, check student thinking and consolidate student understanding.

The article [Building Science Concepts: Life between the tides](#) provides additional science and pedagogical information.

Index

- [The beach provides each type of living thing found there with food and shelter](#)
- [Some beaches have a greater variety and number of organisms living there than other beaches](#)
- [There are many kinds of living things at the beach](#)
- [Changes to the beach may affect the ability of living things found there to obtain food and find shelter](#)
- [Every beach has a range of habitats, and different kinds of living things can be found in each habitat](#)
- [There are various kinds of beaches, and the way they look is constantly changing](#)

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



Intertidal zone, Auckland Island, 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 the 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](#)

Related interactives

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

Related images

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

Some beaches have a greater variety and number of organisms living there than other beaches



Low tide at Twelve Mile Beach near Greymouth, petervick167, 123RF Ltd.

Some beaches offer generally much harsher conditions for plants and animals to live in than others. There tends to be many more different species in a beach with rock pools (hāroto) than on an open sandy beach. All living things found in each of the beach zones have adaptations that enable them to survive in that habitat.

The intertidal zone

All living things found in the area between the tides need to adapt to variations caused by tides, weather, sea conditions and varying degrees of exposure to:

- wind and Sun
- temperature change
- coverage by water
- varying mixtures of freshwater and saltwater
- varying salinity (for example, evaporation in rock pools)
- predators from the sea when the tide is in and from the land when the tide is out
- abrasion from sand moved by wind or water
- the movement of water from waves and tides.

Related articles

- [Life on a reef](#)
- [Adapting to marine habitats](#)

Related interactive



[Life between the tides](#)

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

Related activities

- [Introducing biodiversity](#)
- [Marine Metre Squared](#)

Related images

- [NIWA explores marine biodiversity hotspots](#)
- [Using a quadrat](#)
- [Marine diversity hotspot](#)

There are many kinds of living things at the beach



Public domain

In spite of the range of conditions at beaches, there is an amazing biodiversity present. Living organisms have adapted to and colonised every available ecological niche.

Related articles

- [Adapting to marine habitats](#)
- [Living World – The rocky shore](#)

Related activities

- [Where do I live?](#)
- [Marine Metre Squared](#)

Related images

- [Using a quadrat](#)
- [Beach survey](#)

Image: Stalk-eyed mud crab, Public domain.

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



Pollution from the Fox Glacier landfill being washed down the Fox River and along the coast, DOC, [CC BY 4.0](#).

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, and their effects are readily seen on all beaches. Waves can move great quantities of beach material such as 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.

Change can come from the land as well as the sea. Flood events can send huge amounts of water down rivers, carrying debris such as trees, branches and silt downstream. If this material builds up in estuaries, the river's course can change, leaving tidal mudflats high and dry. The debris left over from logging operations known as slash causes many problems for the inhabitants of river valleys and the seashore.

Related articles

- [Estuary formation](#)

Related activities

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



[Life between the tides](#)

Related images

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

Every beach has a range of habitats, and different kinds of living things can be found in each habitat



Ngarimu Bay, Anne Barker.

New Zealand beaches include a variety of distinct habitats, each supporting a wide range of living things. All beaches share several characteristics:

- Land forming their shores – hard, such as cliffs and rocks, or soft, such as sand or mud.
- Presence of water – saltwater or a combination of saltwater and freshwater in mudflats and estuaries.
- Tides (tai) – regularly fluctuating levels of water.

Within each habitat, there are a range of conditions to be found with specific adaptations needed by the inhabitants in order to survive.

Related articles

- [Marine habitats](#)
- [Habitats in the Bay of Plenty](#)
- [Marine organisms and adaptations](#)
- [Crabs finding home](#)

Related activities

- [Marine Metre Squared](#)
- [Where do I live?](#)



[Life between the tides](#)

Related images

- [Marine Metre Squared survey information record sheet](#)

There are various kinds of beaches, and the way they look is constantly changing



Piha Beach, Aleksei Potov, 123RF Ltd.

The three main types of beach considered here are:

- rocky shores
- flat, sandy (and shingle) beaches
- [mudflats](#) in lagoons and estuaries.

Many of the beaches in Aotearoa New Zealand are made up of more than one of these types or variations of them.

Related articles

- [Estuary formation](#)
- [Habitats in the Bay of Plenty](#)

Related activities

- [Changes on the beach](#)
- [Estuary metaphors](#)
- [Where do I live?](#)

Related images

- [Monitoring rocky shore communities](#)
- [Mt Maunganui surf beach](#)
- [Mangroves act as a buffer](#)(mudflats)
- [Classifying marine habitats](#)