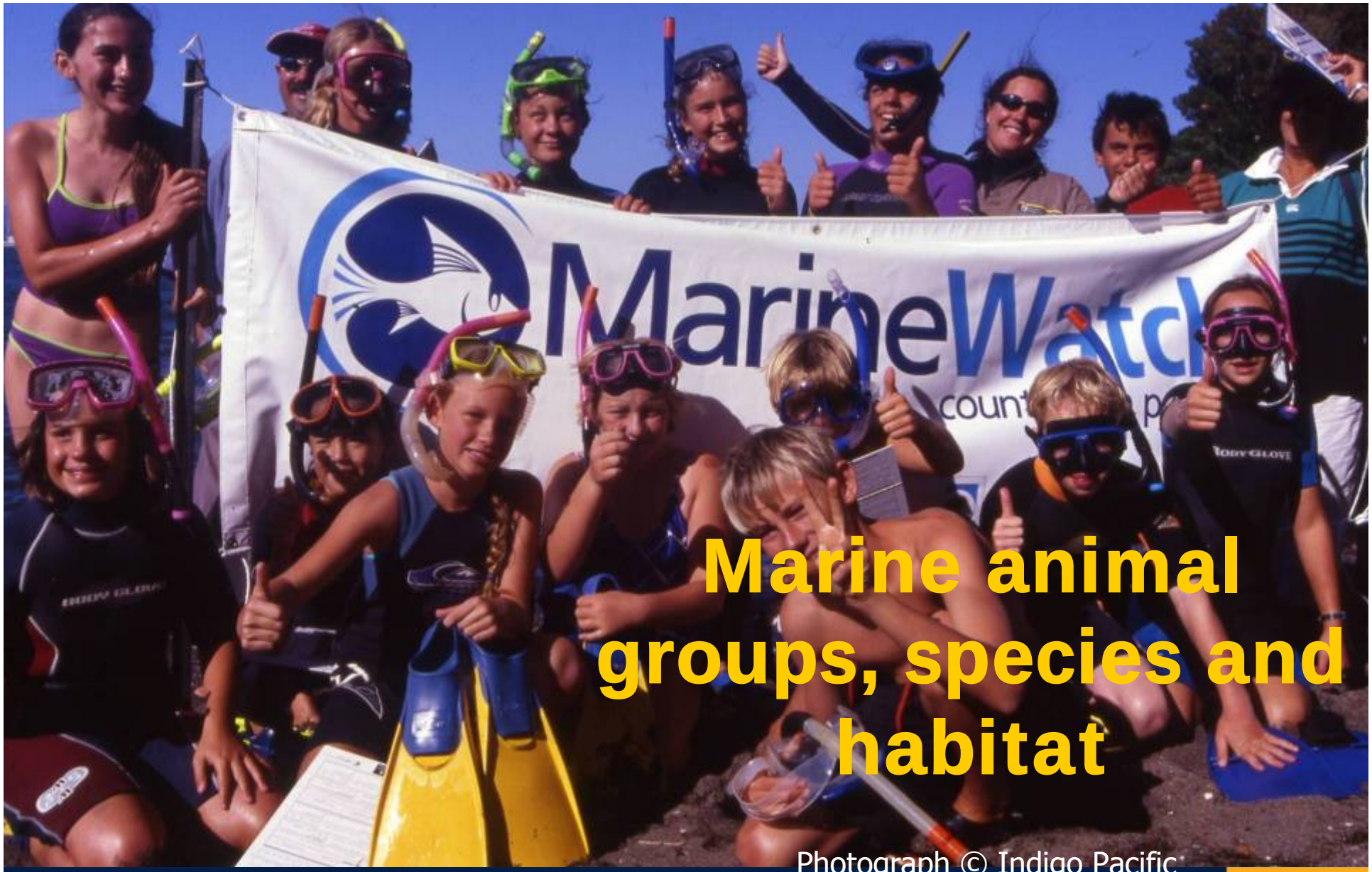

Marine animal groups, species and habitat

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Karakia

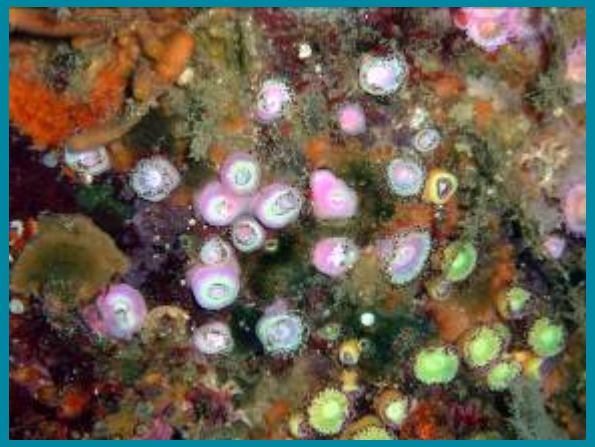
- Ko Rangi
- Ko Papa
- Ka Puta ko Rongo
- Ko Tanemahuta
- Ko Tāwhirimātea
- Ko Tangaroa
- Ko Haumietiketike
- Ko Tumatauenga
- Ko te Rangi ki runga
- Ko te Papa ki raro
- Ka Puta te ira tangata
- Ki te whaiao, ki te ao marama
- Tīhei mauri ora

Marine animals

- Marine animals come in all different shapes and sizes
- There are different groups of marine animals
- Each group has a different name – such as sea anemones, sponges, shellfish

Sea Anemones

- These animals are shaped like a flower
- Some are the size of your thumbnail and others the size of your hand
- These animals live attached to rocks
- How would you describe the shape of these animals?



Photos © Indigo Pacific

Sea Anemones

Photo © Indigo Pacific

- "A sea anemone is a simple, soft bodied, tube shaped animal with a crown of tentacles around the mouth at the top of the body. It is a predator but seldom moves far. It traps passing food with its sticky tentacles and pushes it down through the mouth into the bag-like gut for digestion. Sea anemones are attached or very slow moving animals. There is a 'wandering sea anemone found in New Zealand waters" Dr John Walsby

Reflection and discussion questions

•How would you describe the shape of these animals?

•Have you ever seen a sea anemone?

•Are these animals are generally free swimming or permanently attached to rocks?

Shellfish

- These pictures are both of shellfish.
- Because there is so much variety amongst shellfish and because there are lots of different types of shellfish
- Shellfish are broken into smaller groups again – such as snails, slugs, bivalves and cephalopods

Photos © Indigo Pacific

Shellfish - chitons

- These animals have a rough armor like skin and are always this shape
- Some are the size of your thumbnail and others the size of your hand
- They have eight valves
- They are expert at squeezing onto uneven surfaces and into narrow crevices

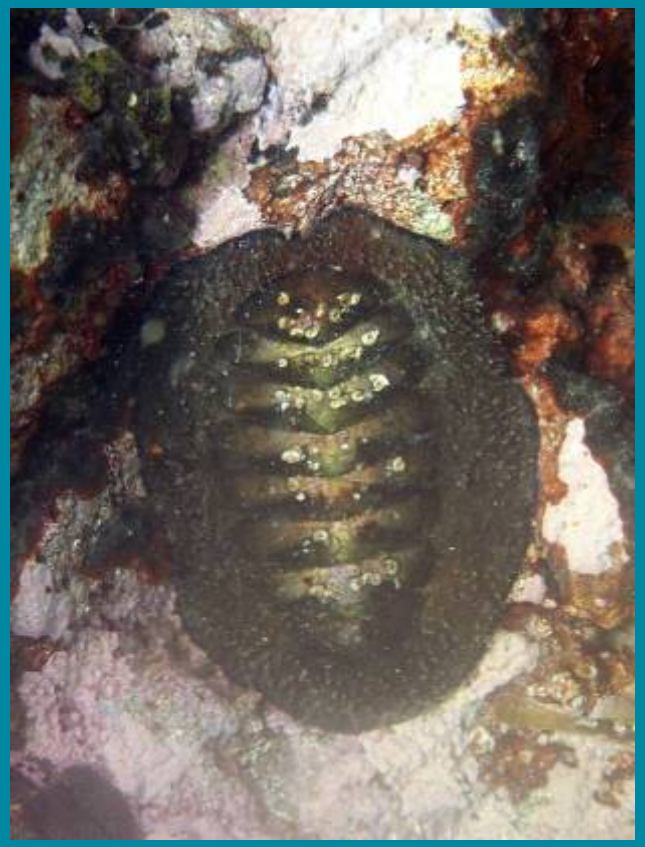


Photo © Indigo Pacific

Shellfish - chitons

Photo © Indigo Pacific

- Pronounced Kiton (like Kite-on), chitons are primitive grazing molluscs that have changed little in 500 million years!
- They have shell eyes that respond to light.
- They breathe will gills and rasp food with tiny hard teeth.
- They are slow moving and feed on algae.

Reflection and discussion questions

Have you ever seen a chiton?

Are these animals are generally free swimming, slow or fast moving or permanently attached to rocks?

Shellfish - snails

- Some sea snails are herbivorous and others are carnivorous
- There are lots of different shapes and sizes of sea snails
- Most of these animals live attached to rocks or seaweeds

- What can you say about the shape of sea snails?
- Do you know what each of the sea snails here are called or what they eat or where they might live? (answers on later slide)

Shellfish - snails

Photo © Indigo Pacific

- "A seashore snail is a soft bodied animal that lives inside a hard, chalky, protective shell that is usually coiled. It crawls on a flat soled foot and has sensory tentacles and eyes on its head for finding its way. Some are herbivores scraping up algal films or browsing seaweeds. Others are carnivores :- either predators (that eat living animals) or scavengers (that eat dead or dying animals) and some, called deposit feeders, sort and eat nutritious fragments on the sea floor or in sandy or muddy sediments" – John Walsby.

Shellfish - snails

- **From top to bottom**
- White rock snail (top) – lives amongst rocks (carnivorous) and preys on barnacles and other shellfish
- Janthina (or violet shells) – lives out at sea on the surface where it creates a bubble raft to float and drifts in the plankton feeding on jellyfish (carnivorous)
- Arabic volute – lives on the sandy beach and comes out at night to feed on other shellfish which it will take below the water to smother and eat! (carnivorous
- Paua (bottom) - (herbivorous) – likes to eat pink algae that grows on rocks called coraline turf and lives in shallow 0-10m water often in surf or swash zones

Shellfish - snails

Photo © Indigo Pacific

Reflection and discussion questions

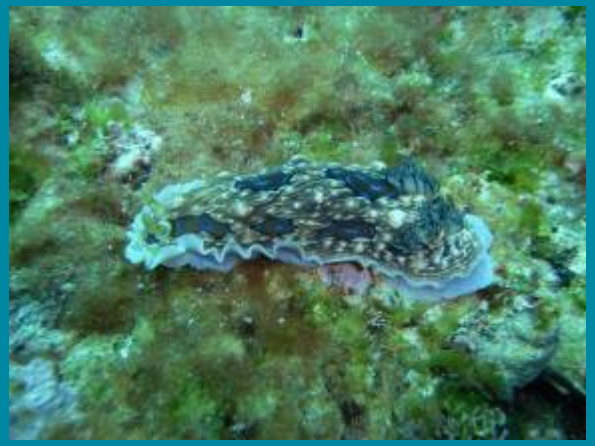
Have you ever seen a sea snails in the water or found their shells when walking on the beach?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

What other examples of sea snails do you know of?

Shell fish – sea slugs

- Some shellfish don't have shell any more – like these sea slugs
- Some sea slugs are called 'nudibranchs' which means naked gill (the gill is feathery rosette at the end of the animal)
- They move but only slowly
- The sea slugs pictured here are a clown nudibranch (top) and a gem nudibranch and were photographed at the Poor Knights Islands
- Both the nudibranchs pictured here feed on sponges
- Sea slugs can be as small as your fingernail or as large as your hand



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Shellfish – sea slugs

Photo © Indigo Pacific

- Most of these animals live amongst other marine animals, sponges, seaweeds etc amongst rocks and boulders. Some live on the sand. They are hermaphroditic (which means they are male and female in one animal). Most are carnivores. They don't taste good to fish which is probably why they are bright coloured – as a warning.

Reflection and discussion questions

Have you ever seen a sea slugs in the water?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

What do you think the gill is used for?

Shell fish – bivalves

- 'bi' means two and bivalves are shellfish that have two shells hinged together
- Some bivalves can be the size of your little finger or bigger than your hand
- The two shells are normally the same shape.
- Can you think of a bivalve where the two shells are different shapes? (answer on next slide)

Photos © Indigo Pacific

Shellfish – bivalves

Photo © Indigo Pacific

- Unlike some of the sea slugs and sea snails bivalves have no head, tentacles, eyes or radula (used by herbivorous sea snails to feed).
- The sexes are separate so they aren't hermaphrodites.
- There are about 370 bivalves that are known to live in NZ waters.
- Scallops are unusual in that the two shells are not the same shape

Reflection and discussion questions

Have you ever eaten a bivalve?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

What other examples of bivalves do you know?

Shell fish – cephalopods

- Cephalopods are shellfish too
- This group of animals includes octopus and cuttlefish and squid
- These vary in size from the size of your hand to the giant squid found down around Kaikoura
- Have you ever found the spirula spirula (white rams horn shell pictured above) on the beach? – This is the internal buoyancy device of a squid!

Shellfish – cephalopods

Photo © Indigo Pacific

- Cephalopods are the most 'evolved' class of molluscs.
- Cephalopod means head-foot. Because the eight or ten sucker bearing tentacles appear to arise from the head.
- They have gills and radula like other molluscs.
- They have well developed eyes that have some of the features of human eyes – an iris and retina for example.
- The octopus has an efficient pumping heart to maintain good circulation for its active life.

Reflection and discussion questions

Have you ever seen an octopus in the water?

Have you ever eaten a cephalopod? What did it taste like?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

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Crustacea

- Crustaceans include crabs, shrimps, crayfish, barnacles, sea lice and sand hoppers
- Crustaceans vary in size from tiny barnacles smaller than your thumb nail to huge crayfish
- Crustaceans have a hard external skeleton which many of them will shed and re-grow to enable them to grow in size
- **Have you ever seen a hermit crab? (like the one pictured here?)**
- **Or had your toe bittern by a paddle or swimming crab when at the beach (like the one pictured here (below))**

Crustacea

Photo © Indigo Pacific

- Gills are used to obtain oxygen.
- They have appendages specially designed for swimming or crawling or attaching to other animals or rocks or feeding.
- They have antennae which help them to sense their surroundings.

Reflection and discussion questions

Have you ever seen a crustacean in the water?

Have you ever found the moult or outer shell of a crustacean?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

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Echinoderms (spiny skins)

- Echinoderms are spiny skinned animals
- They include starfish, cushion stars, sea cucumbers, feather stars and sea urchin like kina
- Some echinoderm are round and others have long arms
- They have tube feet to help them get around
- Have you ever found the test or shell skeleton of a kina (top right photo) on the beach?

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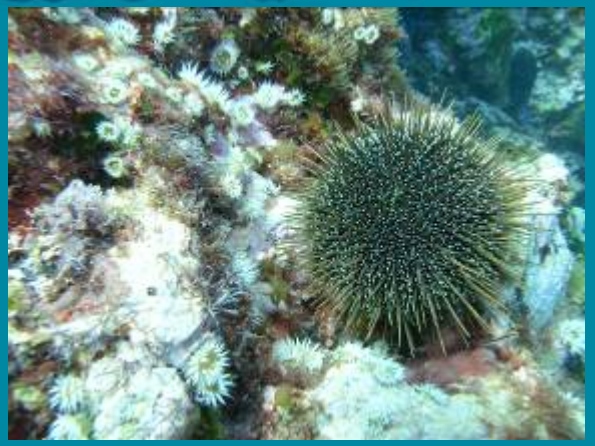
Echinoderms

- Echinoderms often have a five segmented body plan.
- This might be in the form of arms or less obvious such as in the segments of a kina.
- Some echinoderms have more than five arms or segments but they always radiate from a central disc.
- These animals have tube feet that protrude from the 'mouth or ventral side' of the animal.
- They can move in any direction.
- They are generally spiny and predators feeding on molluscs, crustacea and other attached or slow moving animals.

Photo © Indigo Pacific

Echinoderms

Photo © Indigo Pacific



Reflection and discussion questions

Have you ever seen an echinoderm in the water?

Have you ever touched or eaten a kina? What did it feel like or taste like?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

Seasquirts

- Sea squirts come in a range of colours, shapes and sizes
- They often look a bit shriveled up like old leather and always have holes in them – one to inhale and one to exhale water

Photo © Indigo Pacific

Seasquirts

Photo © Indigo Pacific

- Sea squirts attach to hard surfaces or anchor themselves in soft sediments.
- Sometimes they might look like sponges. The body is however protected by a tunic or leathery outer that has a different texture to sponges.
- They have a very different internal structure that is more complex than a sponge.
- They are filter feeders and water flows through the mouth or inhalant siphon and is filtered then expelled through the exhalant syphon.

Reflection and discussion questions

Have you ever seen an sea squirt in the water?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

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Sponges

- Some are round, others are long and spindly and others are flat and spread over rocks
- Sponges have no organs (no heart or eyes for example)
- Sponges are the simplest type of all marine animals
- They don't move around
- The sponge in the top image is a flask sponge and the ones in the bottom are orange golf ball sponges.

Sponges

Photo © Indigo Pacific

- Sponges are the simplest of all marine animals.
- They have no true tissues or organs. Nearly all sponges are marine.
- They are all sessile or stationary.
- They have a number of pores on the surface that allows water to enter and circulate where plankton and organic particles are filtered out and eaten.

Reflection and discussion questions

Have you ever seen a sponge in the water or lying on the beach?

Do you think these animals are generally free swimming or permanently attached to rocks or slow or fast moving?

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Fish – bony fish

- Bony fish have skeletons and spines made of bone.
- They breathe through gills
- They control their buoyancy to stop themselves from sinking or floating with an 'internal swim bladder'
- There are 26,000 species of bony fish in the world!
- What are these bony fish? (answers on next slide)

Photos © Indigo Pacific

Fish – bony fish

Photo © Indigo Pacific

- Bony fish make up 96% of all fish. They have scales which are thin, flexible and overlapping (and more obvious in some species than others).
- They have an operculum or gill cover that protects the breathing apparatus or gills.
- They have a swim bladder which is a gas filled sac that enables them to adjust their buoyancy.
- They study of fish is called ichthyology
- The bony fish on the previous slide are: top – spotties, middle – puffer fish or porcupine fish, bottom – snapper

Reflection and discussion questions

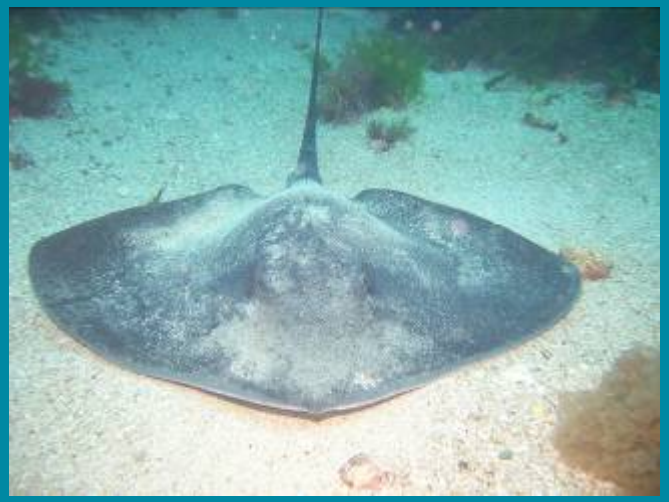
Why do you think they might need a swim bladder?

Have you ever seen an bony fish in the water?

Have you ever eaten a bony fish or caught a bony fish?

Fish – cartilaginous

- Cartilaginous fish have cartilaginous skeletons rather than bony skeletons – that are lighter and more flexible than bone.
- These fish come in a variety of shapes and sizes!
- They have rough sandpaper like skin because of tiny sharp placoid scales.
- What are these cartilaginous fish? (Answers on next slide)



Photos © Indigo Pacific

Fish – cartilaginous

Photo © Indigo Pacific

- The mouth of these fish is nearly always on the underside of the animal.
- They have movable jaws and well developed teeth!
- On the previous slide were: top – sting ray, and; bottom – shark (grey reef)

Reflection and discussion questions

Do you think these fish are herbivorous or carnivorous?

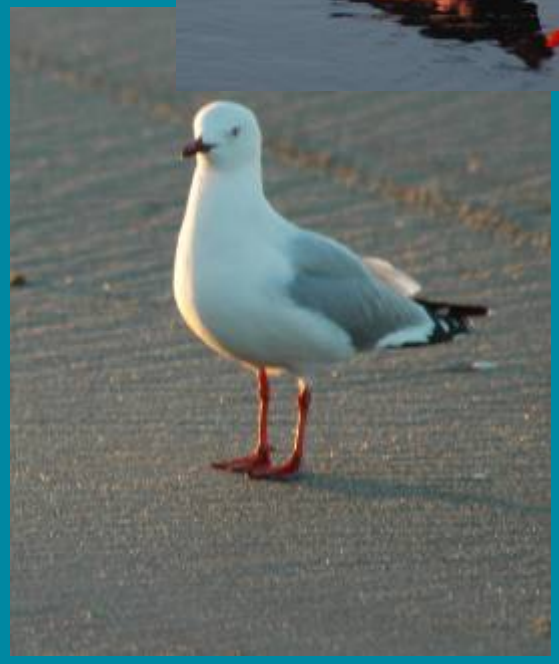
What physical characteristics do they have that make you think this?

Have you ever seen an cartilaginous fish in the water?

Have you ever eaten a cartilaginous fish or caught a cartilaginous fish ?

Sea & Shore birds

- Seabirds have feathers and wings but can't always fly.
- Some seabirds are huge – like the albatross and others very small like terns and dotterels.
- What are these two seabirds? (answers on next slide)



Photos © Indigo Pacific

Sea & Shore birds

Photo © Indigo Pacific

- Birds are warm blooded and their feathers help them to retain body heat.
- They excrete oil to help make their feathers water proof!
- Seabirds are those that spend a significant amount of time at sea (eg. albatross).
- Shore birds are those that spend most of their time living on the seas edge (such as oyster catchers and dotterels).
- Penguins are one example of a bird that has adapted well to the marine environment.
- They are flightless but have flippers or wings that allow them to fly underwater.
- Penguins have a good layer of fat under their skin to prevent them from getting too cold!
- Birds on last slide were: Top – oyster catcher. Bottom – sea gull

Reflection and discussion questions

What sea birds do you know?

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Marine Mammals

- Marine mammals come in a range of shapes and sizes.
- Marine mammals breathe air and have to come to the surface to breathe.
- They are warm blooded and kept warm by a layer of fat or blubber.
- They have developed amazing capacity for breath-holding – sperm whales are believed to be able to dive to 3000m for 75 minutes!
- Breathe holding is due to a range of physiological adaptations including – slowing the heart rate, reduced circulation, efficient use of oxygen...

Marine Mammals

Photo © Indigo Pacific

- Blue whales can be 26m in length and porpoises just 1.4m!
- Common dolphins are 1.4 – 2.6m in length and can hold their breath for around 8 minutes diving to 300m.
- Marine mammals give birth to live young.
- They breast feed and are warm blooded.
- They have adapted from land mammals and their closest living land relative is the cow!

Reflection and discussion questions

How do marine mammals hold their breath for so long?

What marine mammals do you know?

What marine mammals have you seen?

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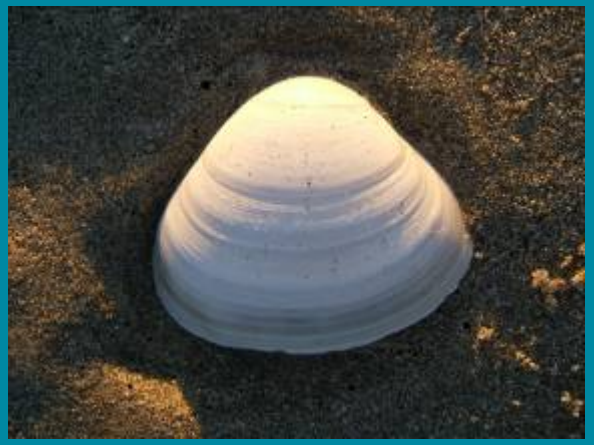
Species

- Within each group of marine animals there are different species
- For example: whilst both of these pictures are of bivalves, each is different species
- Do you know what species they are?



Photos © Indigo Pacific

Marine Species

- MarineWatch is about surveying marine **SPECIES**
- What is a **SPECIES**?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Photographs: www.indigopacific.co.nz

•Are Pākirikiri (Spotties) & Pupu (Cats Eye) the same species?

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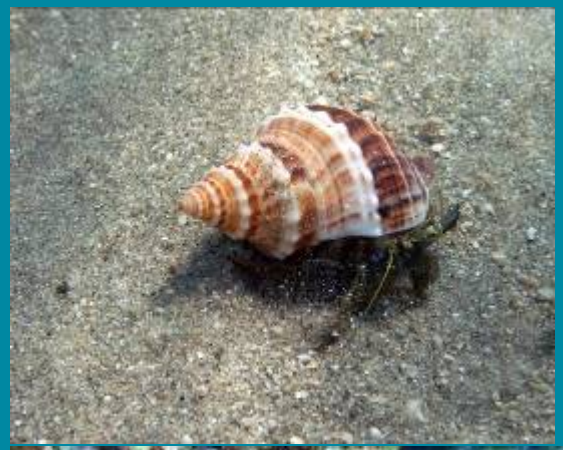
Marine Species

- There are lots of different species of animals and plants in the ocean.
- Species is the scientific term for a group of animals or plants that normally breed together.
- For example, pākirikiri (Spotties) & Pupu (Cats Eye) wouldn't normally breed together. They are two different species.

Species Habitat

- Every species has a preferred place to live
- Where an animal usually lives is called it's
  - **HABITAT**
- What can you say about the habitat of the animals in these pictures?



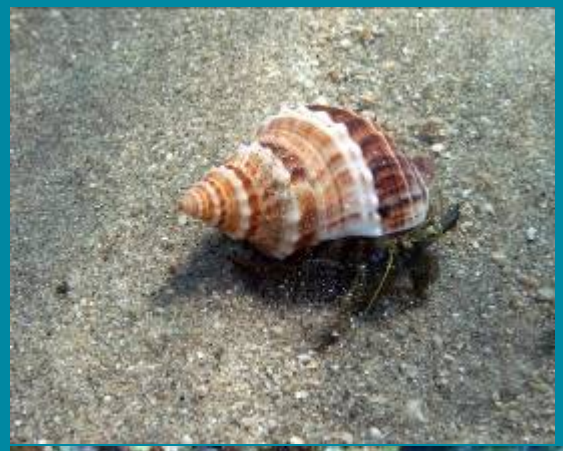
Photographs: www.indigopacific.co.nz

Species and their habitat

- Species diversity is affected by the type of environment.
- The number and diversity of animals and plants living in a place is influenced by the type of home they have.
- Just like we can be affected by our home environment, the air we breathe, the food we eat, the water we drink, so too are marine animals and plants.
- Protecting marine animals and plants often means looking after their home or "habitat".
- Habitat is the word used by scientists to describe the natural environment where an animal or plant lives.
- Can you think of some examples of different types of habitats?

Species Habitat

- Reflection and discussion questions
- Look at these photographs - What could you say about the habitat of the animal in each photo? (answers on next slide)



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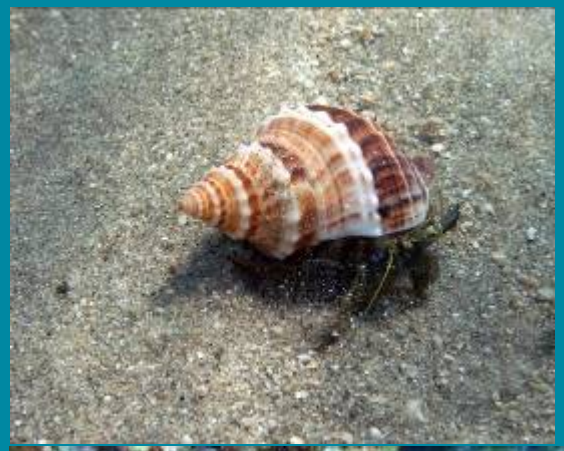
Species Habitat

- starting top left:
- the hermit crab often hangs out in a sandy habitat,
- golf ball sponges are found in a rocky habitat and like living under a rocky crevice or overhang in strong current,
- kina are generally found on rock or boulders devoid of large kelp (known as kina barren habitat) and
- cushion stars like to live in a sandy habitat



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Species Habitat

- **Reflection and discussion questions**
- **Why do you think kina might be found in places where there is not a lot of big kelp or seaweed?**
- **Think of some of the marine animals that you know of: what is their habitat?**

Photograph: www.indigopacific.co.nz