

Food chains & ecosystems

Self-guided learning

This guide provides you with information linked to key displays throughout the SEA LIFE Center Michigan that can be used to explore food chains & ecosystems during your visit. By drawing out the points included in this guide, you will be able to introduce or recap on the key learning outcomes and provide students with a fantastic real-life context for learning.

Other topics in this series:

- Behavior
- Habitats & Adaptations
- Conservation

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Learning objectives

By completing this tour, students will:

- Understand the terms 'food chain' and 'ecosystem'.
- Learn that animals perform different roles in their specific ecosystems.
- Understand that animals and plants need to remain balanced in their ecosystem and that imbalances can cause problems for all connected organisms.
- Be able to identify the sequence of organisms in the rockpool food chain.



Introduction



Use the questions on this page to introduce the topic to students before starting your tour.

Questions:

What is an ecosystem?

An ecosystem is a group of living things that can all be found in one area.

What types of living things could make up an ecosystem?

An ecosystem is made up of a mixture of plants and animals. These plants and animals normally rely on each other for food, protection or both. If one of the plants or animals starts to die out then this will affect all of the other living things that make up that ecosystem.

During our tour we are going to learn more about the way certain marine creatures depend on each other.

What is a food chain?

A food chain is a way of describing who eats who in a certain environment. For example small insects are eaten by frogs and then frogs are eaten by snakes. Food chains are linked to ecosystems because all the animals have to be found in the same area to interact with each other.

So now we understand a bit more about ecosystems and food chains we can start our trip around SEA LIFE and have a closer look at the different ecosystems in the displays.

Remember to hand out exploration sheets to each student - these will be needed for activities on the tour.



Teacher's map



ROCKPOOL

Visit Area: TOUCHPOOL

Rockpools are very difficult places for creatures to survive - with huge waves, strong currents, changing water temperatures, harsh sunlight and lots of predators! Creatures commonly found in this habitat include sea stars, anemone, crabs, sea toads and grey mullet.



Questions:

Looking at the rockpool ecosystem, which creature is most common?

The most common creature is actually one we can't see without a microscope – plankton. Plankton is made up of the smallest animals and plants in the sea and floats around wherever the current takes it!

Why is something as tiny as plankton so important to the food chain?

Plankton is very important to the food chain because it can turn sunlight into chemical energy (in a process called photosynthesis). Because of this, plankton is known as a primary producer.

What do you think eats plankton?

Mussels eat plankton. They feed by opening their shell a little, sucking in water, filtering out the tiny plankton and then releasing the water again. Their tough shells help mussels to protect themselves from predators, but that doesn't stop all creatures from managing to eat them!

Which animal in the rockpool do you think likes to eat mussels?

Sea stars eat mussels and they do it in an unbelievable way! The sea star uses the suckers under its arms to pull open the mussel's shell. Then it pushes its stomach inside and covers the mussel until it dissolves. If the mussel is diseased or poisonous, the sea star can detach its stomach and grow a new one!

What do you think would happen to this ecosystem if all the mussels were removed?

Without mussels in the food chain, sea star wouldn't have enough food to survive. If the sea star started to die out, this would also affect the amount of food available to the crab. So we can see that each creature in the food chain is crucial to the survival of the whole ecosystem.

FACT
If the Sea Anemone is not eaten or destroyed, it can live for decades.



Activity: Rockpool food chain

Ask students to put the rockpool food chain in the correct order on their exploration sheet. Students can then touch creatures under the guidance of a SEA LIFE expert.

PROTECT

You can help!

We should always take our trash home after we've visited the beach. We should also be respectful of any animals we might find in a rockpool and make sure that they are never disturbed.



CLOWNFISH

Visit Area: CORAL REEF

Clownfish live on sheltered coral reefs found in the warm tropical waters of the Indian and Pacific Oceans. Within their habitat, they find a very unusual place to hide - amongst the venomous tentacles of sea anemones!



Questions:

What do clownfish eat?

Clownfish aren't fussy eaters. They are what's known as omnivores, which means that they will happily eat meat and plants.

Why would a clownfish choose to live among an anemone's tentacles?

As a small fish, clownfish are low on the food chain, meaning there are lots of predators who want to eat them. By hiding in the anemone's venomous tentacles, they have added protection from predators.

What do you think the anemone gets from this relationship?

Clownfish eat the harmful algae and parasites from the anemone's tentacles, helping it to stay healthy.

Some people have even suggested the bright orange color of clownfish helps attract other fish towards the anemone – providing it with a meal in return!

The two animals depend on each other, so what do you think would happen to the clownfish if the number of anemones went down?

If the number of anemones went down, then the number of clownfish would go down too as they would have less food and protection.

FACT

All clownfish are born male!

FACT

If a female dies, a male clownfish in the group can change sex to take her place.



Activity: Colorful clownfish

It is believed that the bright orange and white colors of the clownfish attract prey towards the anemone. Ask students to draw the patterns of two different clownfish they see onto their exploration sheet.

PROTECT

You can help!

Don't touch anything if you go snorkeling and never buy products made from coral or other marine creatures.



RAYS

Visit Area: STINGRAY BAY

Rays are strange, flat-looking creatures that use their wings to glide through the ocean. They live in oceans and seas all over the world, mostly on or near the seabed. Some species choose a habitat close to the shore, while others live over 3,000 yards beneath the surface in the deep ocean!



Questions:

Rays are known as 'consumers', meaning that they can't produce their own food. So what do you think they eat?

Blonde, Thornback and Spotted rays all like to eat small bony fish, squid and crustaceans. Other larger species of ray like the Manta Ray are what's known as 'filter feeders'. This means that they swallow lots of water and then filter out tiny fish and plants known as plankton.

How high up the food chain do you think rays are?

Even the largest species of ray, the Manta Ray, has predators above it in the food chain. Rays are commonly eaten by active predators like the Hammerhead Shark, Great White Shark and Killer Whale.

How do you think the flat shape of rays can help them catch food?

Most rays use their flat bodies to float close to the

sea floor. This means that they can suck their food off the ground. Their flat shape also helps them to avoid predators by burying themselves in the sand.

How do you think the color of their skin helps them to survive in their habitat?

The brown and olive coloring on their skin helps to camouflage them once they settle on the ground. This makes them invisible to predators.

Do you think rays always use their eyes to hunt?

Scientists don't think so. Rays use special sensors called ampullae of Lorenzini, which can detect the tiny electrical charges given off by their prey.

FACT
Rays are a member of the shark family.

FACT
A Manta Ray can weigh up to 2800lbs. That's the same as a young elephant!



Activity: Which ray?

Ask students to look at the information boards around the display and try to identify the different species of rays. Discuss how they differ. There are 5 in total – Spotted, Painted, Thornback, Blonde & Undulate.

PROTECT

You can help!

We can help by supporting campaigns to set-up Marine Conservation Zones across the globe. Try to avoid eating skate as it's an endangered species of ray.



JELLYFISH

Visit Area: JELLYFISH DISCOVERY

Jellyfish are not actually fish - they have no blood, no heart and no brain. In fact, a jellyfish's body is 95% water. Species can be found in every ocean with some living in deep water and others preferring very shallow water.



Questions:

Why are jellyfish so important to many ecosystems?

Lots of animals eat jellyfish, making them an important part of the food chains in many different ecosystems. The Leatherback Sea Turtle survives nearly entirely on jellyfish.

But what do you think jellyfish eat?

Jellyfish can eat small fish and crustaceans, but mostly they eat plankton - tiny plants and animals which drift through the water. They use their long, venomous tentacles to catch and kill their prey.

If the conditions are right, jellyfish can reproduce very quickly, leading to huge groups in one area. Why might this be a problem?

Like all animals, jellyfish live in careful balance with the others in their ecosystem. Too many jellyfish all feeding at once may mean there is less plankton available for the other creatures that rely on it.

Jellyfish also eat fish eggs, so if more are being eaten there is a greater risk that fewer fish will hatch.

Do you think jellyfish pose a danger to humans?

Most jellyfish have very mild stings which are harmless. But some, like the Box Jellyfish from the waters around Australia, have a sting so strong that it can be fatal to humans that come into contact with it!

FACT

There are about 200 species of jellyfish.

FACT

Jellyfish have existed for 650 million years!

FACT

A jellyfish uses its oral arms to sweep food into its mouth.



Activity: Jellyfish anagrams

Ask students to solve the clues and unscramble the words describing how a jellyfish catches and eats its prey. The correct answers are 1. Tentacles 2. Oral arms 3. Mouth.

PROTECT

You can help!

We can help by supporting campaigns to set-up Marine Conservation Zones across the globe.



SHARKS

Visit Area: OCEAN TUNNEL

There are over 350 species of shark in the world, living in all kinds of different habitats from warm tropical waters to icy polar seas. Some live in the deep, dark waters of the ocean, while others prefer sunlit waters close to the surface.



Questions:

The gigantic Whale Shark can grow up to 14 yards long! That's about the same length as a large double decker bus! What do you think a shark as big as this eats?

Bizarrely, this shark eats the oceans smallest animals – plankton (tiny animals and plants that float around in the ocean). Whale Sharks swallow lots of water and then filter all the plankton out before the water passes out through slits on their side called gills.

The Blacktip Reef Shark prefers shallow coastal waters to the deep ocean. What do you think they prefer to eat?

Blacktip Reef Sharks like small bony fish, squid and octopus. Lots of people are scared of sharks attacking them, but only Great White, Bull and Tiger Sharks can be considered actively dangerous. Even attacks by these species are generally thought to be cases of mistaking humans for more common prey like seals.

Where do you think most sharks appear on the food chain?

Most sharks are 'apex predators'. This means that they are at the top of the food chain so they don't have to worry about being eaten by other animals. But believe it or not, even sharks have predators in some waters – like Killer Whales!

Humans have 5 senses - sight, smell, hearing, touch and taste. How many senses does a shark have?

A shark has 7 senses. The small freckles on the end of its nose are called the ampullae of Lorenzini and allow the shark to sense the electrical currents given off by other animals. Like most fish, sharks also have something called a lateral line that helps them detect movement in the water.

FACT

Great White Sharks eat 11 tons of food a year. That's roughly the same weight as a bus!



Activity: Seven senses

Sharks are incredible hunters. Their sense of smell is 10,000 times better than a human's and their other senses are pretty amazing as well. Ask students to link each sense to the relevant organ on their exploration sheet.

PROTECT

You can help!

We can help sharks by supporting campaigns to set-up Marine Conservation Zones across the globe. We should also never buy products made from sharks or eat shark fin soup.








Find out about food chains & ecosystems

Rockpool food chain

Can you place the animals below into the correct order in the food chain?

Who is top of the rockpool food chain?

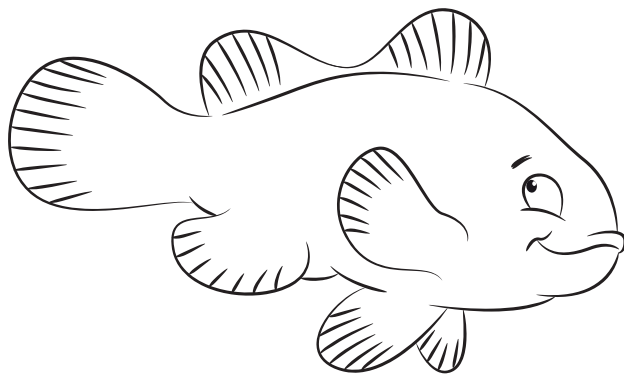


 Mussels  Sun  Plankton  Crab  Sea Star	START - Bottom of food chain	
END - Top of food chain		

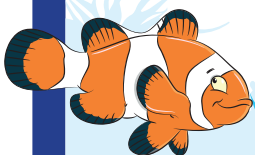
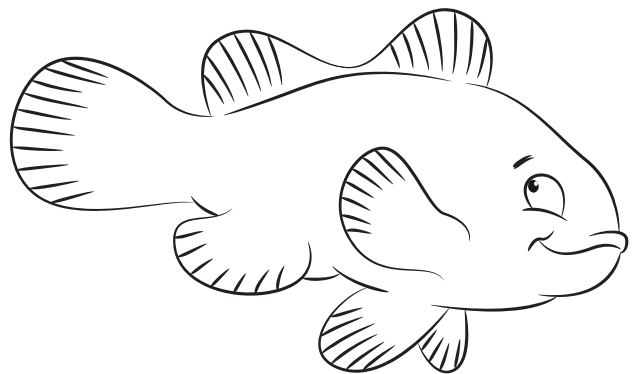
Colorful clownfish

Draw the patterns you see on two different clownfish during your visit.

1



2

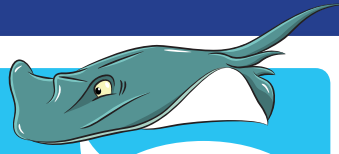


My bright colors attract prey to the anemone.

Find out about food chains & ecosystems

Which ray?

Write down the names of the ray species you found in Stingray Bay.



Which of my friends did you see?

Jellyfish anagrams

Unscramble these words about how jellyfish eat.

1. Jellyfish sting prey with their:



2. They gather up plankton using their:

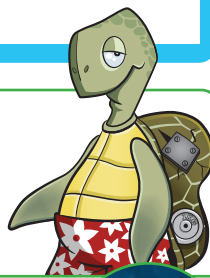


3. Food they catch is put into their:



What's for dinner?

Look at the heads of these different turtles and connect them to what they like to eat.



Loggerhead
A huge head with powerful jaws for crushing food.



Green Sea Turtle
A saw-like beak for scraping food from coral and rocks.



Leatherback
A sharp beak for catching and piercing food.



Hawksbill
A narrow head and long beak for finding food in small gaps.



Jellyfish



Coral covered in algae



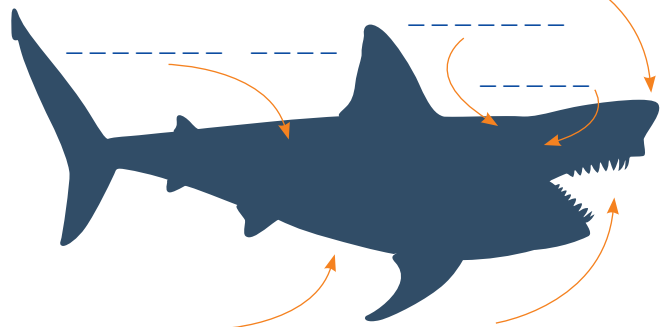
Mussels



Sponges

Seven senses

Sharks have 7 senses!



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Try and match each of the shark's 7 senses to the right part of its body. Some are more difficult than others!

- Sight
- Taste
- Ampullae of Lorenzini
- Touch
- Smell
- Hearing
- Lateral line