



Habitats and ecosystems

This worksheet will teach you about habitats and ecosystems and why it's so important that they are protected! You can also try out oyster ecosystem activity with family members (double points for trying this virtually with your friends over Zoom!)

What is an organism?

An organism is an animal, plant or single-celled life form.



What is a habitat?

The natural environment of an organism

What is an ecosystem?

An ecosystem includes all of the living things (plants, animals) in a given area and the non-living things (water, soil etc.) they interact with. Each organism has its own role to play within the system.

What is a community?

In biology, a community is a group of organisms that live and interact together within a common location.

Bonus definitions

Living things are called biotic factors. This includes plants, animals, fungi, algae and bacteria.

Non-living things are called abiotic factors. This can include water, sunlight, air, temperature, soil.

Kelp forests are incredible underwater ecosystems – what animals rely on kelp forests for habitat and what is their role within the ecosystem?



What is a producer?

A producer makes their own food. Most producers use a process called photosynthesis to do this, where sunlight, carbon dioxide and water is used to create a nutrient called glucose. Producers can also be called autotrophs (meaning they make their own food) and are the plants we see on land, on the coast and even in the ocean. In a kelp ecosystem, the giant kelp is the producer. Little fish and larger animals like otters and seals may use the kelp to hide and shelter.

What is a primary consumer?

A consumer is an animal that eats producers.

Within the kelp forest, a primary consumer is sea urchins. Sea urchins nibble away at the holdfasts that ensure kelp stay anchored to the ocean floor.

What is a secondary consumer?

A secondary consumer eats herbivores (primary consumers)

Some sea stars and crustaceans, like crabs and lobsters, can consume sea urchins. These are secondary consumers.

What is a tertiary consumer?

A tertiary consumer eats secondary consumers.

Large fish and octopuses can consume crustaceans, among other organisms found within the kelp forest.

What is an apex predator?

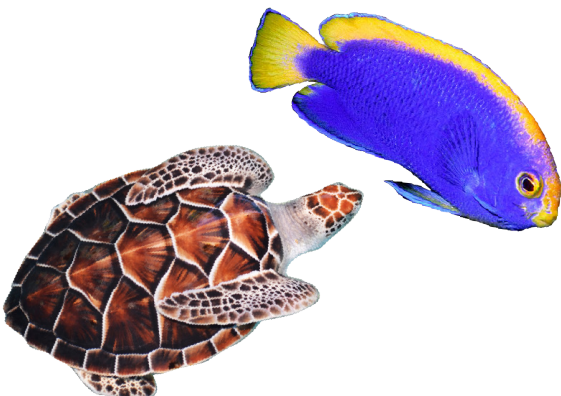
An apex predator, or top predator, eats other consumers. Apex predators don't have any natural predators, apart from humans.

Sea otters consume a number of animals found within kelp forests, including crustaceans and sea urchins. This is very important – if there are too many sea urchins because there are no predators, they will destroy entire kelp forests.

Activity 1

Study the definitions above and try come up with your own examples of organisms; a habitat; an ecosystem; a community; a producer; a primary consumer; a secondary consumer; a tertiary consumer and an apex predator using the list below of marine biotic and abiotic factors:

Seaweed
Juvenile fish
Sunlight
Great white shark
Seal
Water
Crab
Large fish



Then ask someone to quiz you on the definitions again!

What do habitats provide?

Habitats provide several critical things. Imagine you're a small fish on a coral reef – the coral (which is also an animal) provides shelter and helps you hide from predators. Now imagine you're a green sea turtle, where one of your natural habitats is a seagrass

meadow. That seagrass is providing you with plenty of food! For baby sharks, mangrove forests act as a safe nursery ground for them to thrive and grow. A habitat provides the things organisms need to survive.

Activity 2: Re-create an oyster ecosystem

Let's recreate an oyster ecosystem in the Blackwater Estuary, Essex, where BLUE is helping to restore native oysters. Remember, an ecosystem includes all of the living and non-living things and each organism has its own role to play within the system.

But first, what roles do oysters play in an ecosystem?

- An oyster can help keep water clean – they can filter up to 200L of water a day!
- They form reefs, just like coral. This provides shelter and a nursery habitat for many different animals, like eels, fish, crabs and even seahorses. They can even help stabilise shorelines.

Humans benefit from these services too! An ecosystem service is something we benefit from that was provided by the natural environment, or one of its components.

Setting up the ecosystem – group activity

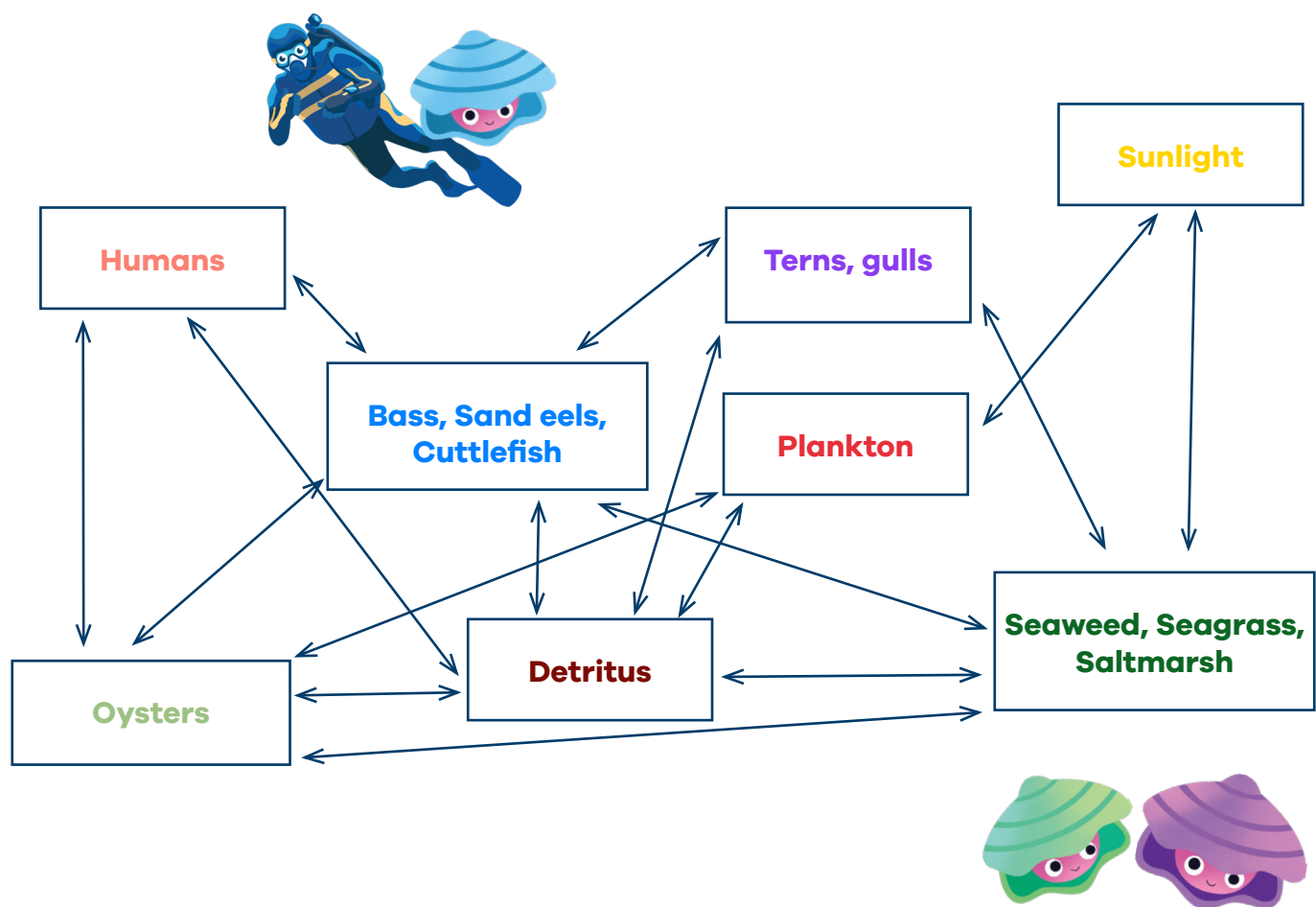
1. With family members or friends, each pick a biotic or abiotic factor from the list below. Next, think about how your factor links with your friends. Are you a primary producer, an apex predator, a secondary consumer? Who do you eat and who can eat you? Are you a non-living but vital element? Use the food web below for help!
2. To represent these links you can use pieces of string. There are a total of 16 ways the eight factors link up in this game, so you need 16 pieces of string.
3. For example, if you are marine flora, sea birds will depend on you for food and habitat. Hold onto one end of the string and pass it to your friend or family member who represents seabirds. Seabirds also depend on bass, sand eels and cuttlefish as a food source. Seabirds should also be holding the end of the string that is connected to this group.
4. Follow the steps below, which remove certain elements of the ecosystem. If you're removed, drop the end of the string you are holding.

Note: due to social distancing, why not try a virtual game on Zoom? Instead of string to represent the links you have with each element, work with your family and friends and write down a list of all the abiotic and biotic elements that you depend on, or those that depend on you. For example: if you are marine flora, write down that you depend on sunlight and oyster reefs. This is because you need photosynthesis to survive and oysters help filter water and stabilise sediment, which benefits marine flora. You also provide habitat and food for seabirds

Abiotic and biotic factors

1. **Sunlight**
2. **Seaweed/Seagrass/Saltmarsh** (marine flora, primary producer)
3. **Oysters** (ecosystem engineer, primary consumer)
4. **Detritus** (dead, organic material)
5. **Plankton** (can be producers or consumers)
6. **Bass, sand eels, cuttlefish** (consumers)
7. **Terns, gulls** (seabirds, consumers)
8. **Humans** (consumers, apex predators)





What are the effects of removing factors from the ecosystem?

Step 1: Remove marine flora (seaweed, seagrass, saltmarsh). This person should drop the string they're holding. Who's on the end of that string? How are they impacted?

Bass, sand eels and cuttlefish lose some of their habitat. How might this impact humans?

Step 2: Remove bass, sand eels and cuttlefish. What happens?

Terns and gulls lose their food source.

Step 3: Remove oysters. What happens?

There is an increase in detritus due to less filtering. This reduces sunlight within the water column, which can then reduce plankton. This can also negatively impact humans!

This is why oysters are called **ecosystem engineers** – they provide a habitat for many species and can form the foundation of an entire ecosystem!

Animations by:



PLANETARI

