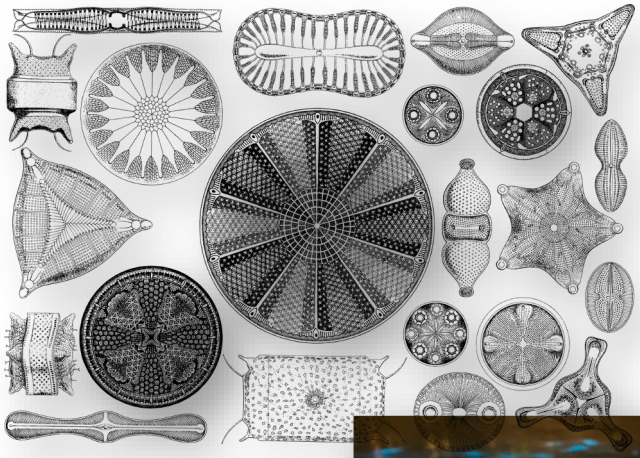
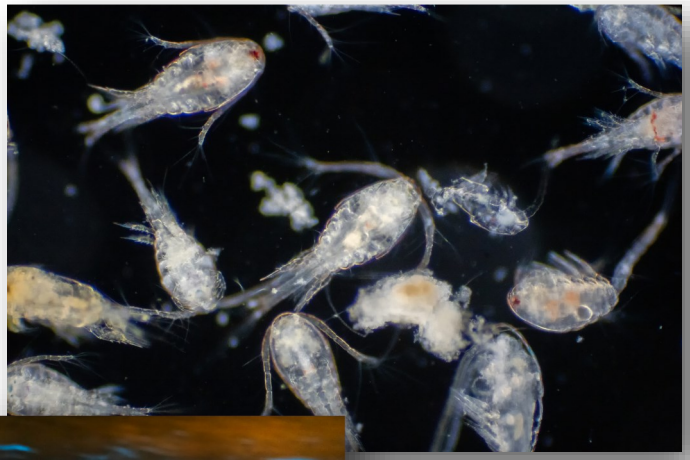
Scottish Seabird Centre

SSC Dive In!

PLANKTON





WELCOME!

Scottish Seabird Centre

Hello, and welcome to "SSC Dive In!". Packs of resources providing some seaside fun directly into family homes and classrooms.

This pack's theme: Plankton

In this pack we turn the spotlight onto the tiniest sea life in the ocean. Although mostly very small, plankton is of huge importance. In fact plankton is a broad term for many different types of organisms, including jellyfish.

Dive into this pack to discover more about why plankton is vital to the health of our seas.

Inside this pack:

- **Overview: What is plankton? Where does it live?**
- **Discovery sheets: Different types of plankton**
- **Activity: Larvae matching game**
- **Fact file: Why is plankton important?**
- **Craft: Finger paint plankton**
- **Blog: Zippy Zooplankton**
- **Fact file: Harmful algal blooms**
- **Experiment: Plankton filter feeding**
- **Glossary**
- **Curriculum links for teachers**

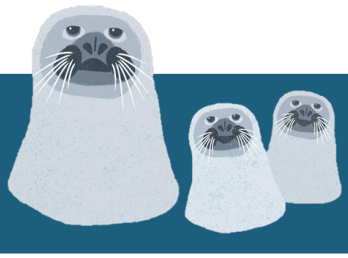
We'd love to hear from you! If you've had fun having a go at activities, experiments and crafts, let us know. Any comments or pictures can be sent to marineengagement@seabird.org. More resources are available on our website.

Teachers: we've added a few reference pages at the end of this pack to highlight how content relates to the Curriculum for Excellence.

Enjoy using our packs and want to see more? The Scottish Seabird Centre is an environmental conservation and education charity. Every penny we raise helps us deliver our important education and conservation work. If you enjoy using our resources and would like to support our work, please consider making a donation to our JustGiving page. Thank you.

We hope you enjoy diving in to the pack!

Scottish Seabird Centre Learning Team



Hint: The meaning of words in **purple** can be found in the Glossary at the end of the pack. Words in blue contain links to websites.

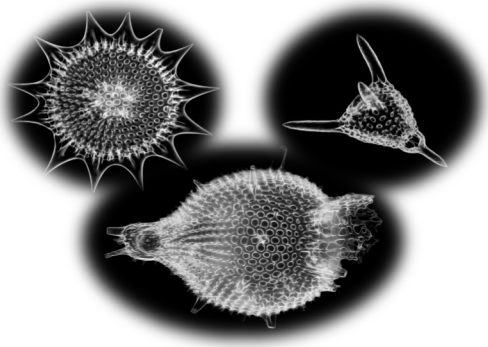
Overview

What is plankton?

What is plankton?

Plankton are organisms that float within sea and freshwater and cannot actively swim against tides and currents.

Plankton comes from the Greek word 'planktos' which means 'wandering' or 'drifter'.



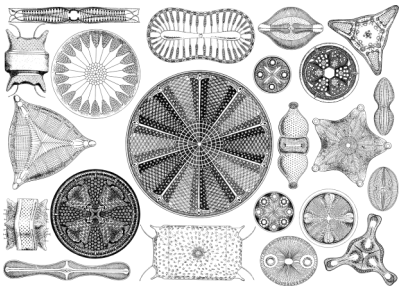
Plankton is the collective name for a group of plankton but individual plankton are called plankters.

Plankton is usually so tiny that they are invisible to the naked eye but, if you look through a microscope, the world of plankton becomes visible.

What are the different groups of plankton?

There are 5 groups of plankton, including **bacteria** and **viruses,** however in this pack we will focus on the 2 main plankton groups; **phytoplankton** and **zooplankton**.

Diatoms: types of phytoplankton



Phytoplankton

Phytoplankton (pronounced "f-eye-to-plank-ton") are single-celled plants. Like other plants they **photosynthesise** and are therefore found near the surface of the water to access sunlight.

Copepod: a type of zooplankton.

Zooplankton

Zooplankton are animals and therefore do not photosynthesise but instead eat phytoplankton or smaller zooplankton.

Overview

Where does plankton live?

Where can you find plankton?

Plankton live in saltwater (e.g. in the ocean) and freshwater (e.g. rivers).

In freshwater, plankton is more abundant in ponds and lakes compared to the moving waters of rivers and streams.

Sea foam which is washed up along the coast is often a sign of a recent **algal bloom** which has died and started to **decay**.

What does plankton need to survive?

Phytoplankton require carbon dioxide, **nutrients** and sunlight to survive. Zooplankton rely on the abundance of phytoplankton for energy. Therefore, they are usually found together but zooplankton can survive in deeper waters since they do not need sunlight for photosynthesis. Find out more about how deep plankton can live and their movement in our blog.

In Spring, when temperatures rise, Arctic sea ice begins to melt. As the ice melts, melted water flows into the sea and carries nutrients with it. This increase in sunlight and nutrients causes a rise in the amount of plankton in the North Sea.

Did you know?

1 teaspoon of seawater can hold more than **1 million** plankters!

DISCOVER

Types of Plankton

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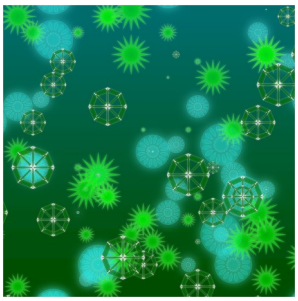
There are many different types of plankton. Take a look at the next few pages to learn about a few of the most common and fascinating ones.

PHYTOPLANKTON

1. Algae

Some types of phytoplankton are related to seaweeds, known as algae. Large algae are called **macroalgae**, whereas the tiny plankton algae are called **microalgae**. This algae grows in abundance when there is a lot of nutrients in the water and so large **colonies** of phytoplankton grow near coasts. However, when **fertilisers** have been washed off the land there can be too many nutrients causing uncontrolled growth or a harmful algal blooms (HABs). To read more about HABs go to page 19.

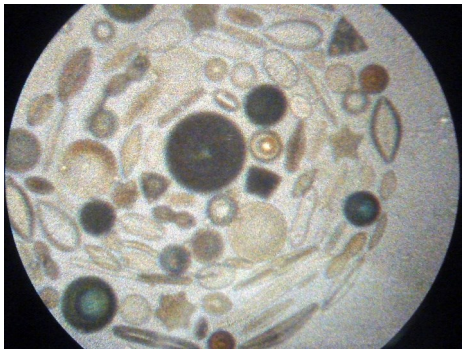


2. Cyanobacteria

Cyanobacteria (pronounced “sigh-a-no-bacteria”) are a type of bacteria that has existed for around 3.5 billion years. Cyanobacteria were one of the first organisms to produce oxygen. This meant that this special phytoplankton helped create the environment that was needed for life on Earth. However, this form of phytoplankton produces **toxins** which can make animals and humans very ill if it is consumed.

3. Diatoms

Another important phytoplankton for oxygen production are diatoms. These organisms are responsible for around 20% of the oxygen which the Earth produces, often being referred to as “the grass of the sea”. Diatoms are made of glass and are fascinating to look at, coming in all kinds of shapes. Click here to find out more about diatoms.

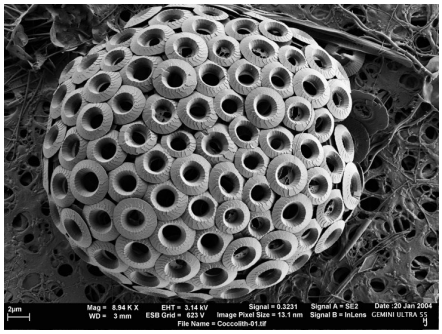


DISCOVER

Types of Plankton

4. Coccolithophores

Coccolithophores (pronounced like “chocco” with a “k” sound instead of a “ch” sound at the start, then “lith-o-four”) is a type of phytoplankton that forms **calcium carbonate** (chalk-like) plates which create a shell around its body called a ‘coccosphere’. These plates may be used to protect the coccolithophore from being eaten by zooplankton.

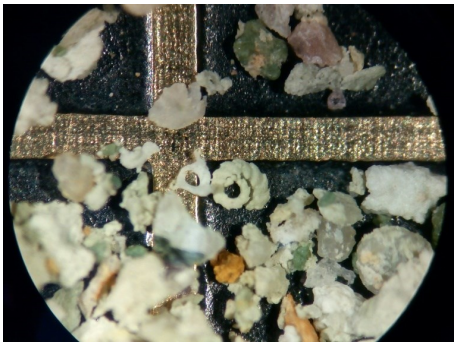


© Ziess Microscopy Flickr

When lots of coccolithophores appear at once it’s called a ‘bloom’. When this happens, the chalky shells of so many individuals reflects sunlight and creates a milky effect in the sea. As blooms occur, the shells of dead coccolithophores fall to the bottom of the sea and become buried. Over time, more and more individuals fall, creating a deep layer of shells on the seafloor. As the layer builds up, the pressure increases, and eventually the layers are squeezed into a white rock called chalk. The White Cliffs of Dover in the south-east of England are a famous example of this process. This iconic site began to form around 100 million years ago, at a time when the sea was much higher than it is now. Eventually, sea levels dropped, revealing the 100m high cliffs we see today. So, the next time you see chalk, remember you’re actually looking at the remains of trillions of tiny coccolithophores!

5. Foraminifera

Another phytoplankton which has a calcium carbonate shell is the foraminifera (pronounced “four-a-mini-fair-a”). They live near the seafloor and can grow to a relatively big size for phytoplankton, up to 20cm. Foraminifera can form very complicated shapes such as spirals and can also be found as simple tube structures. What makes the foraminifera distinct is the long, jelly-like strands which grow out from the body to help with movement and feeding.



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DISCOVER

Types of Plankton

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Zooplankton

1. Copepods

Copepods (pronounced “co-pee-pods”) are shrimp-like zooplankton that are so tiny they are smaller than rice. Copepods have rounded heads, a tail, two large antennae and one red eye. There are over 12,500 species of copepods.

© Pitschuni Flickr

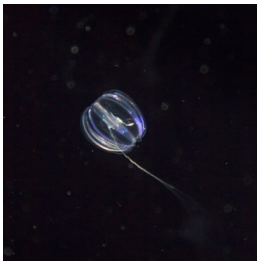
2. Krill

Another shrimp-like zooplankton is the krill. They are decapods (pronounced “deck-a-pods”) meaning they have 10 legs, which they use for swimming. Krill are very important for marine food chains, being an important food source for fish all the way up to large whales and sharks (discover more about food chains in our Fact File on page 14).

3. Sea Angels

Probably one of the prettiest groups of zooplankton are the sea angels. They have two structures on either side of their bodies which look like wings, helping the sea angel move. Despite this graceful appearance, sea angels are actually sea snails that lose their shells after hatching. Sea angels prey on other sea snails by using tentacles that reach out from their heads and suck out other sea snails from their shells.

4. Sea Gooseberries



Have you ever noticed balls of jelly washed up on the beach? If you have, these were probably sea gooseberries. This group of zooplankton have rows of **cilia** (hair-like structures that move back and forth) along their bodies that help them move. The cilia also reflect light as they move, creating a rainbow effect. Sea gooseberries also have two long tentacles which are used to capture other zooplankton prey.

© Jill Dryburgh

DISCOVER

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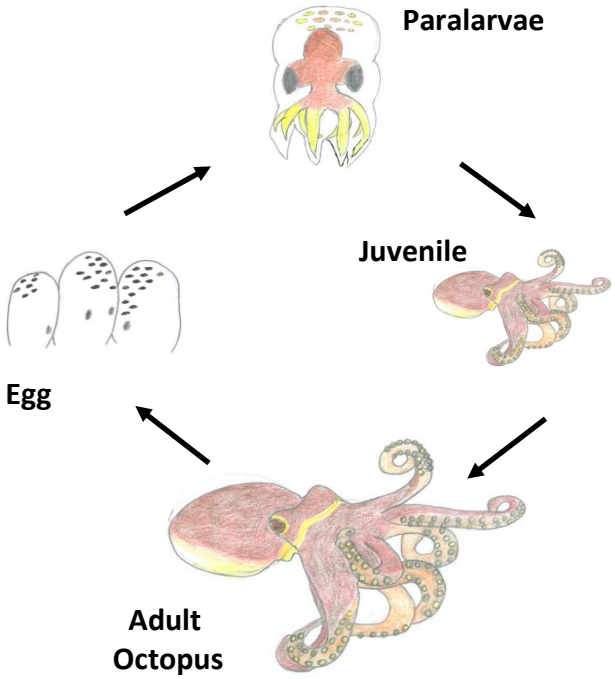
TYPES OF PLANKTON

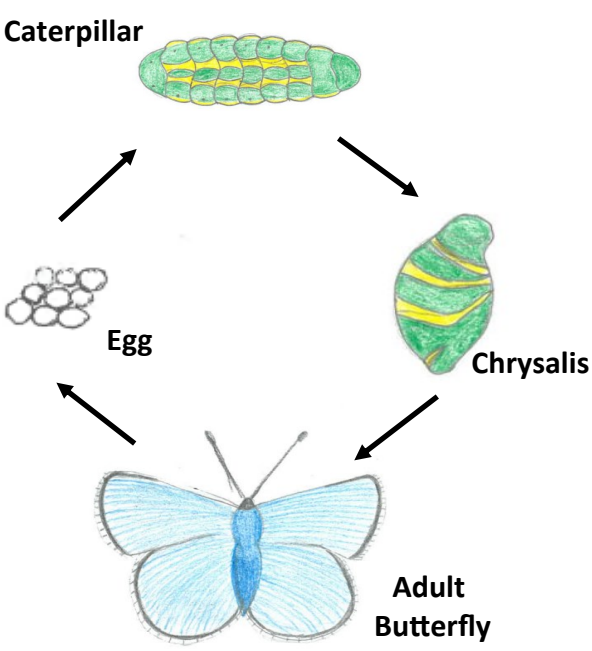
MEROPLANKTON–THE SHAPE SHIFTERS

The plankton we have discussed so far remain plankton for their whole lives. However, a special group of plankton called the meroplankton (pronounced “mee-ro-plank-ton”) are sea creatures that are plankton for only a part of their lives, then transform into something else!

Most meroplankton species are **larvae** (a young stage) of well known sea animals. These animals, such as octopus, start life as tiny plankton but change into bigger adults that can swim against currents. The process when an organism changes from one form to another is called **metamorphosis** (pronounced “met-a-more-fo-sis”). The word used to describe all the changes an animal undergoes across its lifetime is **lifecycle**.

Octopus have a lifecycle that consists of 4 stages—it starts as an egg, then transforms into a larvae (the meroplankton stage), then develops into a juvenile, before completing its cycle by becoming an adult. Butterflies also have 4 stages in their lifecycle (see diagrams below).





For meroplankton species who settle, being able to move as larvae allows them to **disperse** and find a suitable home. Meroplankton often appear at the same time as algal blooms since phytoplankton provides the meroplankton with food.

DISCOVER

TYPES OF PLANKTON

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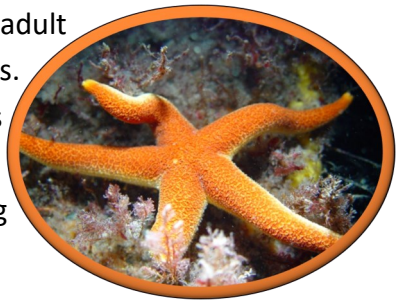
MEROPLANKTON

1. ECHINODERMS

Echinoderms (pronounced “eek-eye-no-derms”) include starfish, brittle stars, sea urchins and sea cucumbers. All of these animals start of life as plankton and go through **metamorphosis** to become the body forms we recognise.

STARFISH

The development of a starfish from an egg to an adult takes several weeks. The starfish larvae has a mouth, stomach and several arms, allowing it to feed and move.



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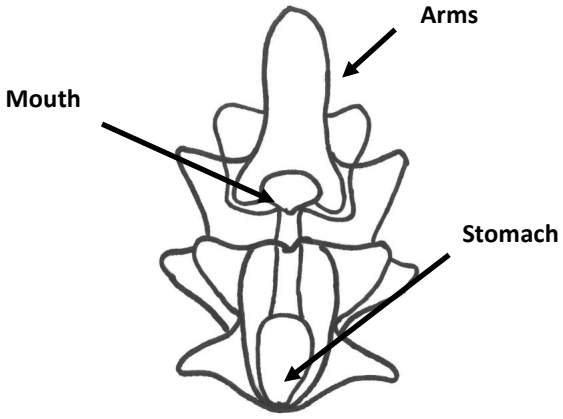
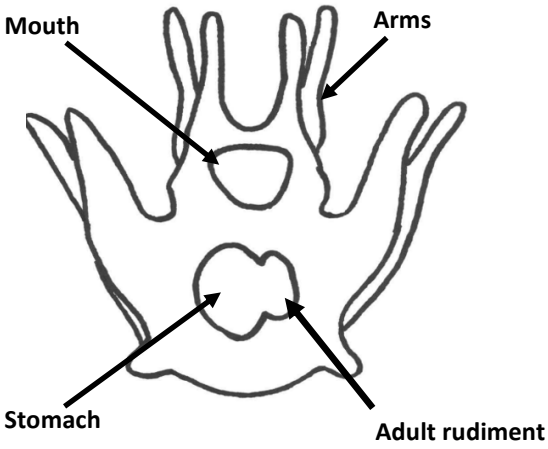


SEA URCHIN

The sea urchin larvae has 8 arms covered in cilia which it can use to move and direct prey to its mouth. An **adult rudiment** develops, this is the part of the larvae which then becomes the adult sea urchin.

You can watch a video showing development of sea urchin larvae here.

© Ben James, Naturescot



DISCOVER

Types of Plankton

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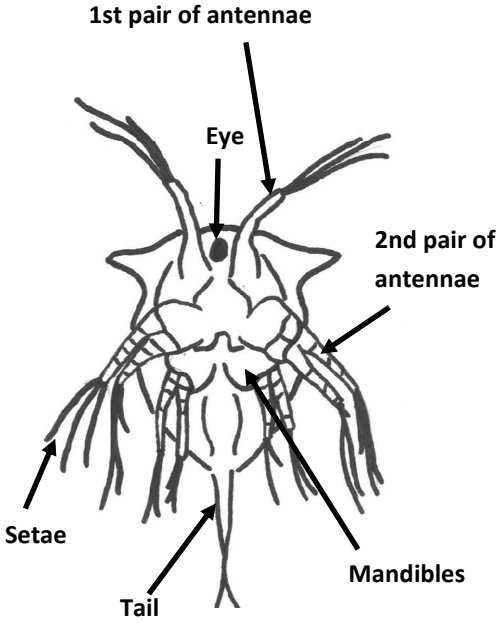
2. Crustaceans

Crustaceans (animals including crabs, lobsters and shrimp) go through several stages of growth before they become adults. During each stage they shed their **exoskeletons** (external skeletons) allowing them to grow bigger. The discovery of crustacean plankton was made by Antonie van Leeuwenhoek in 1699.



Barnacles

© pixabay

The development of larval barnacles to adults can take around 6 months. During this time they form one eye, 2 pairs of **antennae**, a tail and **setae** (hair-like structures) for swimming. They also have **mandibles**—mouthparts they use for grasping prey.

Whilst they are plankton they search for a place to settle, usually amongst other barnacles.

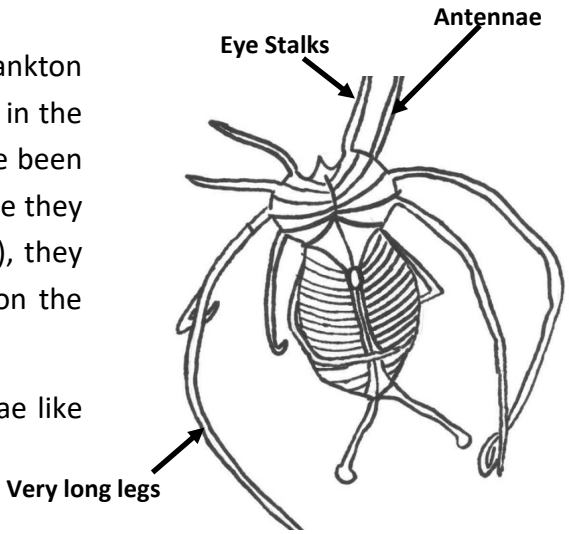
This video shows a group of barnacle larvae.

© Lisa Kamphausen Naturescot

Spiny Lobster

Whilst the spiny lobster is in plankton form they travel large distances in the sea, however some species have been found to return back to the place they were born. As the larvae get older (up to 1 year old), they move down to deeper waters getting ready to live on the seafloor.

Check out this video which shows a phyllosoma larvae like the one pictured here.



DISCOVER

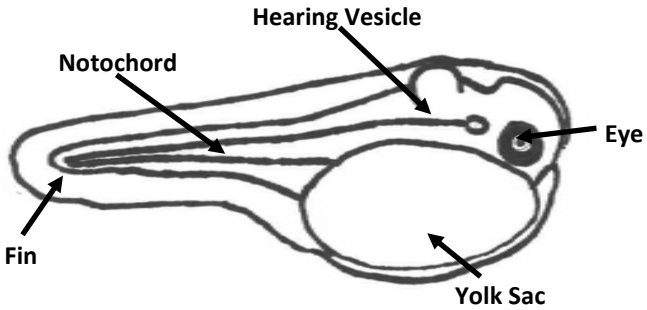
Types of Plankton

3. Ichthyoplankton

Ichthyoplankton (pronounced “ick-thee-o-plank-ton”) is the name given to the plankton form of fish, including eggs and larvae. Research on ichthyoplankton began in 1864 and since then has proven important for humans. Understanding the development of fish helps the success of commercial fisheries and monitoring of fish populations.

Cod

Cod is one of the most widely used fish for fish and chips. The cod you eat though was not always a big meal but in fact a tiny, microscopic plankter. Each year between January and April, cod plankton can be found in large numbers within the ocean. During the plankton stage, the baby cod absorb nutrients from a **yolk sac** in their bodies. They also have a small sac of fluid called a **vesicle** which they use to hear. Cod will remain plankton for around 10 weeks before becoming swimming juvenile cod. During this time they feed on copepods.



Jellyfish–A surprising addition to the plankton family!

Though jellyfish are large and can move, their soft bodies are not able to swim with any force against tides and currents, which officially qualifies them as plankton. These predators use their stinging tentacles to catch the wide variety of prey they eat, including smaller plankton and even other jellyfish.

The moon jellyfish is the most common jellyfish found in UK seas. It can be found swimming close to the surface of the water and often washes up on the beach. You will know if you have spotted one by the 4 circles on the top of its body.

Activity

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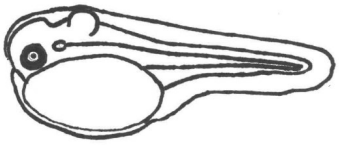
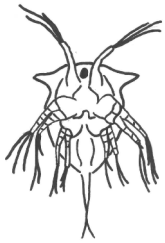
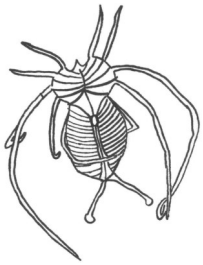
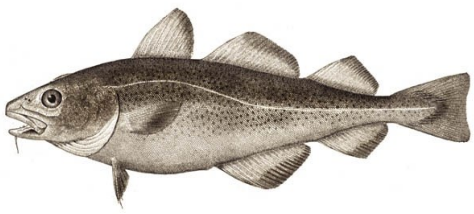
Match the Larvae Game

Plankton larvae can look very different to the marine adults they become. Have a go at matching the larvae below to their adult life forms using the information you have read earlier in this pack.

Fact File

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Why is plankton important?

Oxygen

Phytoplankton are responsible for introducing oxygen to our atmosphere through photosynthesis. They appeared 3.5 billion years ago, many years before plants existed on the planet. Therefore phytoplankton were the first organisms to photosynthesise. Today, phytoplankton produce around 50% of the oxygen we breathe.

Marc Sendra Martorell © unsplash

Carbon & Climate Change

Phytoplankton photosynthesis is also very important for reducing the amount of carbon dioxide in the atmosphere.

Carbon dioxide is a greenhouse gas, meaning it is very good at absorbing heat from the sun. The more carbon dioxide there is in the atmosphere, the more heat gets trapped and the more the Earth warms up, leading to climate change. This warming can have severe impacts. For example, animals within the ocean may have to move to cooler waters. This means that the predators of these animals will experience a loss of food or also have to move to different areas of the ocean.

© Ben James, Naturescot

Another impact of increased carbon dioxide is **ocean acidification**. Carbon dioxide reacts with the ocean water and makes the water more acidic. In acidic waters, chalk-like structures, such as shells or the bodies of sponges as well as the phytoplankton mentioned on page 6, can **dissolve**.

Try our ocean acidification experiment.

However, phytoplankton take in carbon dioxide during photosynthesis (just like land plants), so reduce the amount of carbon dioxide in the atmosphere. Thanks to phytoplankton, less carbon ends up in the atmosphere and instead moves through the food chain in the bodies of animals or sinks to the ocean floor in animal remains. This helps reduce the amount of warming and acidification that takes place in the ocean.

Follow this link to find out more about the importance of plankton.

Fact File

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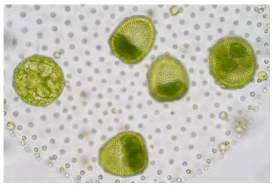
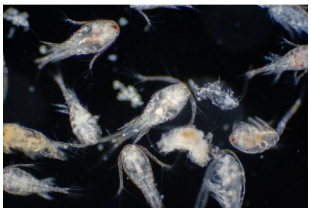
Why is plankton important?

Food Chains – Plankton is at the base (near the start) of marine food chains—they are eaten by animals, which are eaten by other animals, and so on. This means without plankton, lots of animals wouldn't be able to survive.

Sun



Phytoplankton



Zooplankton

Fish

Seal

Orca

Food chains, like the one in the diagram, occur when energy moves from one living thing to another (shown by the arrows). Energy moves this way when an animal eats another animal or a plant.

If plankton did not exist, the food chain would break and the fish, seals and orcas would struggle to find food.

Land animals that feed on marine animals or plants, like humans who eat fish, would also struggle to get enough energy. Watch this video to find out about marine snow, an important source of energy and carbon storage.

Did you know?

Some of the biggest sea creatures in Scotland's waters eat plankton as their main source of food. Tiny copepods give the massive basking shark all of its energy for survival.

Copepods are around 1.5mm long—the thickness of a 5p coin

Basking sharks can be 12m long—the length of a bus!

CRAFT

PLANKTON PAINTING

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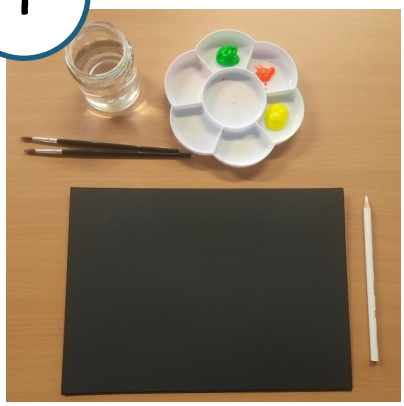
Now that you have explored the wonderful world of plankton and the many different forms they take, why not try and create your own plankton community. Use your hands to paint plankton that you have read about in the pack or make up your own creations.

WHAT DO I NEED?

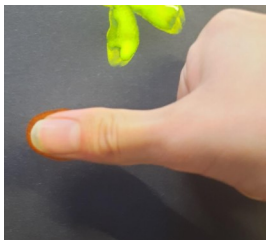
Paint	**Glass with water**	**Paint brush**	**White pencil**
Paint palette	**Black paper**	**Googly eyes (optional)**	

1

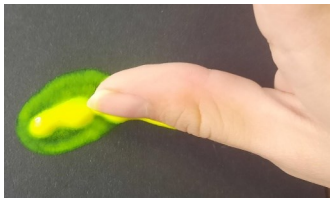


Protect your work surface and select your paint colours.

2



Try out different fingers to see what shapes you can make.

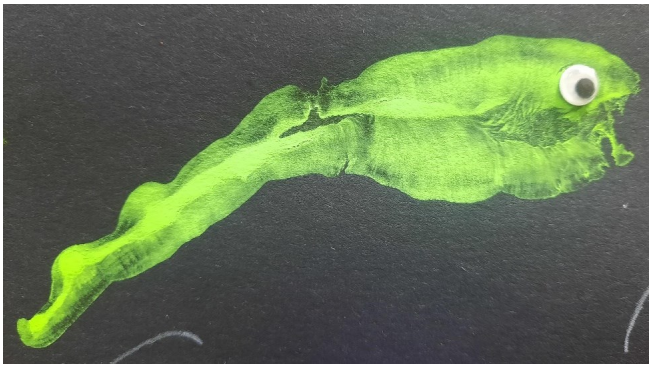


3

This copepod was painted using three thumb prints.

4

The fish larvae can be made using the side of your hand.



CRAFT

PLANKTON PAINTING

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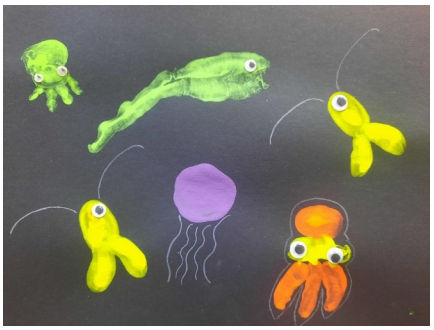
5

Using two thumb prints for the head and then your little finger for the tentacles, try to create an octopus.

6

Now you have created a plankton community.



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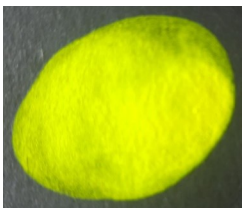


A thumb print makes the perfect jellyfish planula larvae. Using the length of a finger you can create a polyp.

8

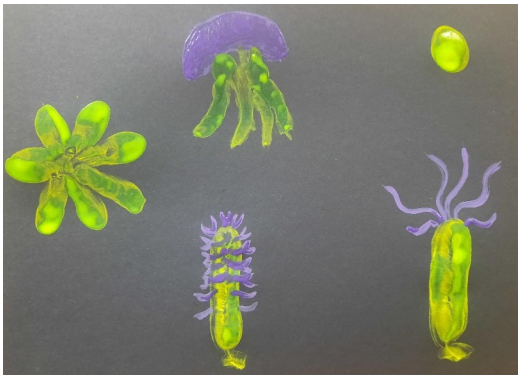
Using a paint brush you can add buds to the polyp. The next stage in the jellyfish lifecycle is the ephyra, make multiple finger prints to create this.

9

Finally, create your jellyfish. The bell (top of the jellyfish) can be painted using your thumb and then the tentacles can be painted using your fingers.

10

Now you have a jellyfish lifecycle.



BLOG

Scottish Seabird Centre

Zippy Zooplankton

Have you ever thought about your own daily migration? How far do you travel to get food? And do you avoid any places so you are not eaten by a predator?

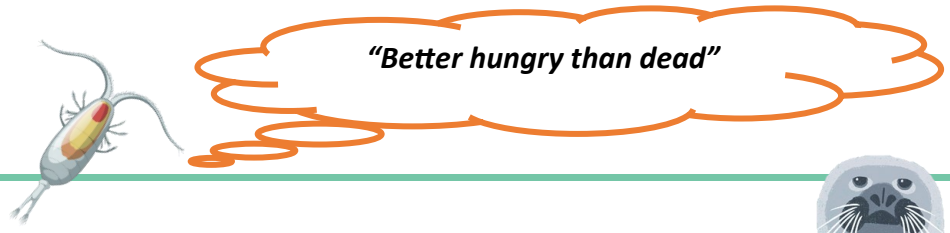
Migration is the movement from one place to another. In the animal kingdom this movement often occurs when animals are looking for food or a place to breed. Some of the most famous migrations happen on land and in the air. The Arctic tern pictured below has the longest migration of all. This small bird completes a 35,000 km round trip each year as it moves between the Arctic and Antarctic summers.

© Greg Macvean

However, the largest migration, in terms of **biomass** actually happens in the water, in both fresh and saltwater habitats. It is so large that it can be observed from space.

This record breaking migration is called the Diel Vertical Migration (DVM). It is called this because the animals involved move up and down the water column in a vertical direction. “Diel” means a 24 hour cycle, referring to the fact that this migration takes place over a full day. Many different organisms perform this migration, from tiny zooplankton to big sharks.

The migration can be described as a game of hide and seek. Zooplankton try not to be eaten by bigger zooplankton who themselves are hiding from fish. Zooplankton spend the night by the water’s surface to feed on phytoplankton, hiding in the dark of the night when most predators are sleeping or cannot see well. In the morning the zooplankton migrate down to the darkness of the deep waters. They have developed this “perfect balance” where it is worth starving during the day, being safely hidden and eating all of their food during the night.



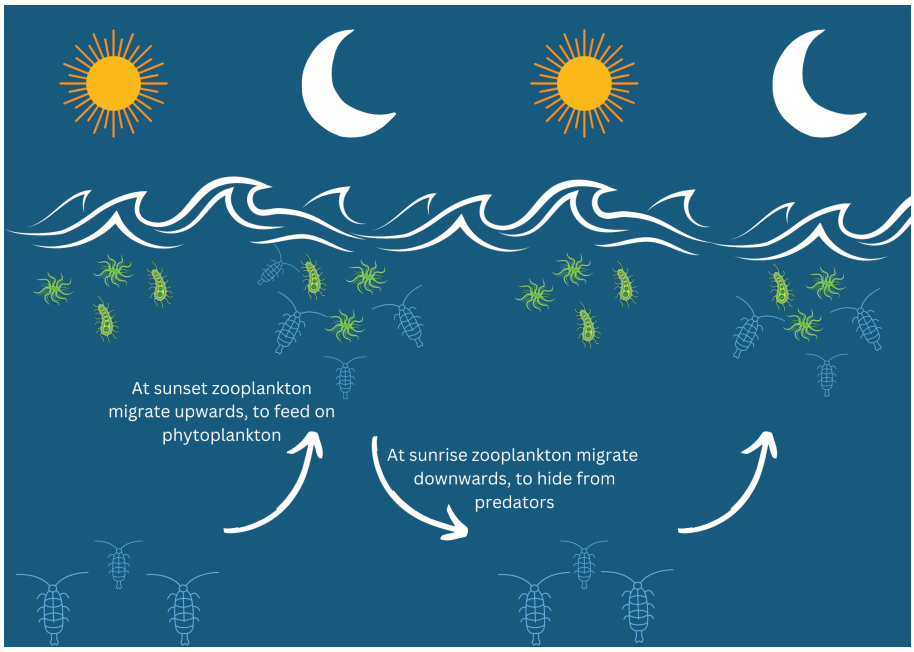
BLOG

Scottish Seabird Centre

Zippy Zooplankton

But why is it important to understand the movement of zooplankton?

Since zooplankton eat phytoplankton and are themselves eaten by many predators from fish all the way through to whales—the movement of zooplankton affects the whole food chain. This game of hide and seek has many players, with the predators of zooplankton also migrating up and down the water column each day.



Scientists are still trying to figure out all the factors involved in controlling diel vertical migration. Light levels from the sun and the moon have been found to help drive this movement. The temperature of the water may also affect how deep the zooplankton travel and for how long. However, with climate change, the world's waterbodies are warming.

This may not only affect diel vertical migration through temperature changes but also through a change in light levels, as **glaciers** melt and more light reaches the water surface. Therefore, it is crucial to understand how zooplankton will change their migration behaviours and how these changes could impact the rest of the food chain.

Quiz

Find out how much you have learned by answering the following questions:

1. Name 2 reasons why animals might migrate.
2. What does the word 'diel' mean?
3. Why is the moon important for DVM?
4. How might climate change impact DVM?

Learn more about DVM by watching this video.

Fact File

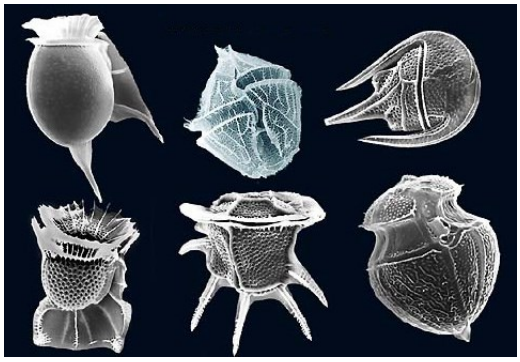
Scottish Seabird Centre

Harmful Algal Blooms

Dinoflagellate

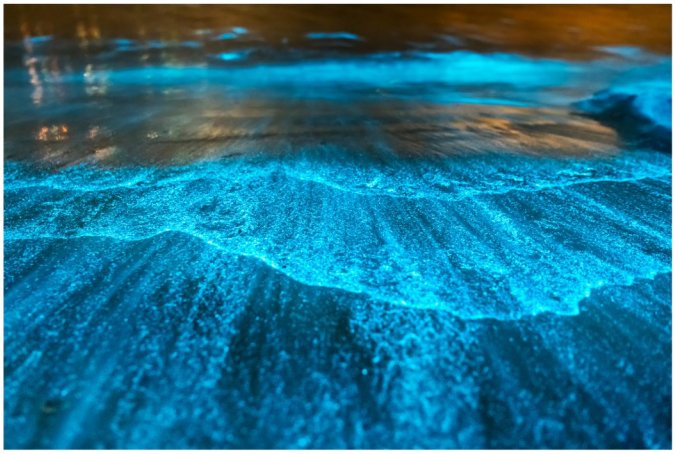
Dinoflagellates (pronounced “die-no-flaj-eh-lates”) are a special group of plankton which do not truly fall into the phytoplankton or zooplankton groupings. Instead, dinoflagellates are able to photosynthesise like plants but also eat plankton. This makes dinoflagellates **mixotrophs** (pronounced “mix-o-tro-fs”)—living things that get their energy from the sun and eating other living organisms.

Dinoflagellates can sometimes be seen within the ocean water without using a microscope. This is because they glow or flash blue at night due to their **bioluminescence**. Bioluminescence is when an animal can produce its own light.



Dinoflagellates can be identified by their two tail-like structures which are used for movement.

Image from flickr © fickleandfreckled https://flic.kr/p/bzdak4



Harmful Algal Blooms (HABs)

Unfortunately, though this spectacle can be very pretty, sometimes it looks red and is a sign of a harmful algal bloom (HAB). Due to its colouration it can also be called a “red tide”. HABs occur when large numbers of plankters come together in the water.

Harmful algal blooms can be toxic and can make marine animals very sick. When this plankton then dies it can also reduce the oxygen available in the water. These HABs often occur in polluted waters.

If a harmful algal bloom is present in the water it will be signposted to warn people not to go into the water. The HAB will also clear with time and then the water will be safe to go into again.

EXPERIMENT

BRILLIANT BALEENS

Some of the biggest creatures in our seas rely on plankton for their food and energy. Baleen whales, which include blue whales, humpback whales and minke whales, have special hair-like structures, called baleen plates, in their mouths. These help them separate the plankton from the sea-water which is a feeding method called filter feeding.

The following experiment will help you learn how these structures work (click on the image below to follow the link to our step-by-step video).

Humpback whale

Scottish Seabird Centre

Seaside Science

Plankton filter feeding

Blue whale

Right whale

Minke whale

DISCOVER

GLOSSARY

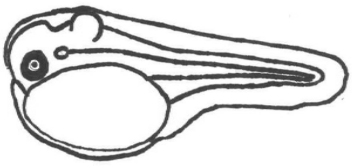
ALGAL BLOOM	A quick increase in phytoplankton.
BACTERIA	Single-celled organisms that can spread disease.
BIOMASS	The total weight or number of organisms within a defined area.
CLIMATE CHANGE	A change in the world's climate caused by changes to the atmosphere. Climate change is leading to more extreme temperatures and severe weather around the world.
COLONIES	When a single species of animal or plant live together in a group.
DECAY	When organic matter rots or breaks down.
DISPERSE	To move out in all directions over a large space.
DISSOLVE	To become part of a liquid. When a substance dissolves, it seems to disappear, but it has actually mixed with the liquid to make a transparent (clear) liquid called a solution.
FERTILISERS	Chemicals or natural material which is added to the ground typically used to help crops grow.
GLACIER	A thick mass of ice that covers a large area of land.
NUTRIENTS	The materials that organisms need to survive and grow.
PHOTOSYNTHESISE	The process in which plants use sunlight, water and carbon dioxide to make their own food.
TOXINS	A poisonous substance produced by plants, animals and bacteria.
VIRUSES	A germ that infects and causes disease in living organisms.

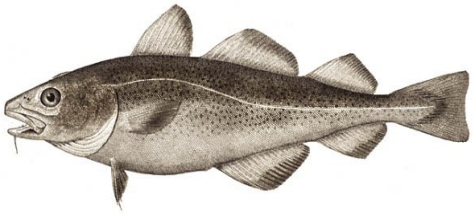
ACTIVITY

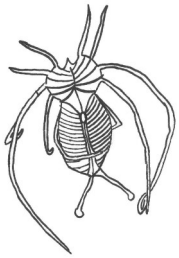
ANSWERS

Scottish Seabird Centre

Did you manage to match up all the larvae?





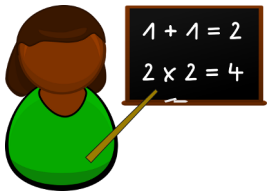


CURRICULUM

Scottish Seabird Centre

Red curriculum points are covered by all Dive In Packs when questions and discussions are encouraged alongside the packs and their activities.

Languages				
Early	**Level 1**	**Level 2**	**Level 3**	**Level 4**
LIT 0-01a/LIT 0-11a/ LIT 0-20a	**LIT 1-07a**			
LIT 0-04a	**LIT 1-16a**			
LIT 0-07a/LIT 0-16a/ENG 0-17a				
ENG 0-12a/LIT 0-13a/LIT 0-21a				
Develop by using the pack and videos to inform other writing activities, encourage questions and note taking.				
	LIT 1-04a	**LIT 2-04a**	**LIT 3-05a**	**LIT 4-05a**
	LIT 1-05a	**LIT 2-05a**	**LIT 3-15a**	**LIT 4-15a**
	LIT 1-15a	**LIT 2-15a**		
	LIT 1-25a			
	ENG 1-17a			



Numeracy				
Early	**Level 1**	**Level 2**	**Level 3**	**Level 4**
MNU 0-01a				
Develop by encouraging the student to compare the size of plankton to everyday objects.				
MNU 0-11a				
Develop further by using a tape measure to accurately show the size of organisms discussed in the pack. Also discuss hypotheses and predictions when conducting the experiment.				
	MNU 1-11a	**MNU 2-11a**		
	MNU 1-22a	**MNU 2-22a**		

CURRICULUM

Scottish Seabird Centre

Expressive Arts				
Early	**Level 1**	**Level 2**	**Level 3**	**Level 4**
EXA 0-02a	**EXA 1-03a**			
Develop by using the craft to discuss what the student thinks and feels about plankton. Also consider introducing constructive criticism to the activity (e.g. how could the student improve the example craft?)				
EXA 0-05a	**EXA 1-05a**	**EXA 2-05a**	**EXA 3-07a**	
EXA 0-07a	**EXA 1-07a**	**EXA 2-07a**	**EXA 3-07a**	
Further development can be introduced if the student is provided with materials to make a 3D model.				
				EXA 4-05a

Social Studies				
Early	**Level 1**	**Level 2**	**Level 3**	**Level 4**
SOC 0-07a			**SOC 3-10a**	**SOC 4-10a**
Develop by considering how we can combat climate change and encourage others to take steps in reducing our impact on the environment (please refer to our Sustainability Dive In Pack, Climate Change Dive In Pack and our Marine Renewable Energy Dive In pack here).				
SOC 0-08a	**SOC 1-08a**	**TCH 2-06a**	**SOC 3-08a**	**SOC 4-08a**
		SOC 2-08a		

CURRICULUM

Scottish Seabird Centre

Sciences				
Early	**Level 1**	**Level 2**	**Level 3**	**Level 4**
SCN 0-06a (consider daily light cycles and connect to Diel Vertical Migration)	**SCN 1-02a**			
Develop by combining alongside a plant investigation (e.g. growing a plant in different conditions) - learning the lifecycle of a plant and the factors needed to survive/photosynthesise.				
		SCN 2-02b	**SCN 3-02a**	**SCN 4-14a**
		SCN 2-14a		
Further development can be introduced by delving into climate change, atmospheric carbon dioxide and fossil fuels (please refer to our Climate Change Dive In Pack and our Marine Renewable Energy Dive In Pack here).				
	TCH 1-02a	**SCN 2-02b**	**SCN 3-05b**	**EXA 4-05a**
				SCN 4-17a