



SSC DIVE IN! CNIDARIANS









WELCOME!

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

This pack's theme: Cnidarians

Have you heard the word 'cnidarians' before? It's a strange word for a very unusual group of animals. The 'c' at the start of the word is silent so the word is pronounced "nigh-dare-ee-ans". Cnidarians are water animals that have jelly-like, squishy bodies. There are about 10,000 species around the world, including jellyfish, and many species are found right here in Scotland's seas. Though many may appear as simple blobs at first glance, they are actually fascinating animals that have lots of incredible and surprising adaptations for life in the sea. Dive into this pack to discover more about the amazing lives of these creatures and reveal their hidden secrets.

Inside this pack:

Fact file: Cnidarians

Discovery sheets: Species Spotlights

Puzzle: Wordsearch

Fun Facts

Craft: Wax Resist Anemone Art

Glossary

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 <u>website</u>.

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 the our <u>JustGiving page</u>. Thank you.

We hope you enjoy diving in to the pack!

Scottish Seabird Centre Learning Team



Words in purple can be found in the Glossary at the end of the pack.

Words in blue contain links to websites.

FACTFILE



CNIDARIANS

WHAT ARE CNIDARIANS?

Cnidarians are water animals that can be described as 'squishy stinging creatures'. You will probably recognise some of the animals in this group, such as jellyfish, but the group also includes **anemones** (pronounced "a-ne-mo-knees"), **corals** and other lesser known creatures.

Cnidarians come in all sorts of shapes, sizes and colours, making them look very different to each other. Though they may look different, they all have the same the same characteristics, including:

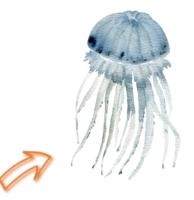
- They are **invertebrates**, meaning they don't have a backbone.
- They are predators, meaning they eat animals, or omnivores, meaning they eat animals and plants.
- They all have mouths surrounded by rings of **tentacles** used for catching food and defence.
- They all have the ability to sting using specialised stinging cells.

WHAT DO THEY LOOK LIKE?

Their bodies come in two different shapes—they can be 'polyps' (pronounced "poll-ip") or 'medusa' (pronounced "meh-doo-sa").



Polyps are sac or tube-shaped. They are attached to a hard surface at their base with their mouths and tentacles facing up from the seafloor. Polyps often form **colonies** where lots of individuals work together to survive.



Medusa are more like jellyfish. They have a bell or umbrella -shaped body and live freely in the ocean. Their mouth and tentacles point downwards as they drift through the water. Medusa can survive alone without other individuals.







CNIDARIANS

WHAT ARE THE DIFFERENT TYPES OF CNIDARIANS?

Jellyfish



- Mostly live by themselves but can group together to form large swarms.
- Move by pulsing their large dome, called a 'bell', which pushes them through the water.
- Have tentacles that hang beneath their bodies.
- Live freely in the open ocean, though can be found washed-up on beaches after strong winds and currents (though most don't survive unless they quickly get back into the sea).

Anemones



- Pronounced "a-ne-mo-knees"
- Are sessile, meaning they are attached to something,
 i.e. rocks or seaweed.
- Have tentacles that point upwards from their bodies.
- Tend to stay in one place but can slowly move around using a muscle on their base called a 'foot'.
- Live by themselves but can be found close together.
- Found at various depths. Some species can be found in or near rockpools when the tide goes out.

DID YOU KNOW?

One species of anemone, called the 'beadlet anemone', can bring its tentacles inside its body. This clever **adaptation** allows them to keep their tentacles wet and safe from predators when the tide is out. Look out for them appearing as strange red blobs when you go rockpooling!



Tentacles out

Tentacles in



CNIDARIANS

Corals



- Live in colonies where lots of tiny individual polyps make up one large structure. (Find out more on page 9).
- Structures can be hard or soft depending on the species
 of coral. Hard corals live inside a hard structure, whilst
 others live inside a softer structure that is more delicate and
 bendy.
- Are sessile and can't move from the spot. They can only bring their bodies and tentacles in and out of their structures.
- Can form reefs where lots of corals live close together. Reefs are an important habitat for other species.

Sea pens



Look like plants but are **colonies** of **polyps**, just like corals. The central part of their body –the part that looks like a trunk of a tree—is in fact one tall polyp that supports the rest of the colony.



- Are **sessile**, often growing from sand or mud on the sea floor.
- Can slowly move by inflating and deflating their bodies. Can also bury themselves in the sand.
- Live by themselves but can be found close together.
- Get their name from their resemblance to feather writing quills.

Hydrozoans



- Pronounced "high-dro-zo-ans"
- Come in a variety of different shapes, sizes and forms. Some float freely in the sea and look like jellyfish, like the 'Portuguese man-o-war' (see picture), whilst others are sessile and look like corals.



 Though many look like one large individual, they are actually a collection of lots of smaller individuals all working together as a colony. Their complicated structure and the fact they can look so different has confused scientists for centuries!



CNIDARIANS

HOW DO CNIDARIANS STING?

All cnidarians have special stinging cells in their tentacles. Each cell contains **nematocysts** (pronounced "ne-ma-toe-sis-ts") - special structures that contain tiny spear-like objects that the animal fires when a tentacle is touched. Many species will release a **toxin** at the same time as firing their nematocysts, which causes a painful sting to be injected into their prey or attacker.

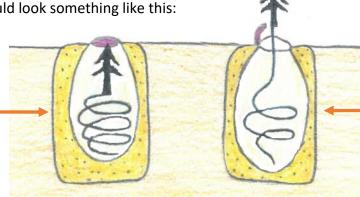
The severity of the sting depends on a few things:

- 1. How powerful the nematocysts are—if they aren't powerful enough to pierce the skin of an animal, they won't be able to inject the toxin and cause a sting.
- 2. The type of toxin they inject— some toxins are stronger than others, causing a much more painful sting.

A CLOSE-UP LOOK AT THE STRUCTURE OF A NEMATOCYST

If you were to look at nematocysts under a microscope, they would look something like this:

The drawing on the left shows a nematocyst that hasn't fired yet.
Notice the spear structure is coiledup inside.



The drawing on the right shows the nematocyst after it has fired. The spear has been released through an opening at the top of the capsule and will shoot towards the attacker or prey.

DID YOU KNOW?

The word 'cnidarian' comes from the Greek word 'cnid' which means 'nettle' - the plant which can give you an irritating sting if you brush past it!



Cnidarians use their sting for defence and to capture food.



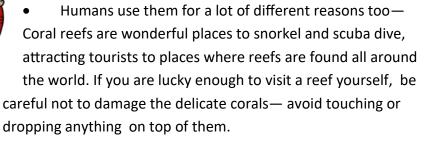


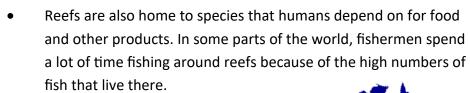
CNIDARIANS

WHY ARE CNIDARIANS IMPORTANT?

Cnidarians play an important role in the sea.

- They are predators. Jellyfish, for example, eat the eggs and young of other species, keeping their numbers under control.
- Certain cnidarians provide habitats for other species. A famous example is a type of anemone that provides a home to a fish called the 'clown fish' (like in the film 'Finding Nemo'!).
- Some are food for other animals. Certain species of turtle, for example, rely on moon jellyfish for food; starfish enjoy feeding on sea pens on the seafloor; and corals feed on plankton that float past.















DID YOU KNOW?

The Great Barrier Reef, off the West coast of Australia, is so big it can be seen from space!

It covers **344,400** square kilometres and is officially recognised as the world's largest living structure.





CNIDARIANS

WHAT THREATS DO CNIDARIANS FACE?

Cnidarians are very sensitive to changes in the environment. Unfortunately, humans are causing big changes to the ocean that are having negative impacts on cnidarians around the world.

Pollution

Different types of **pollution**, such as plastic and harmful chemicals, can spill into the sea and harm chidarians.

Building by the sea

Building on the coast leads to more pollution in the sea, corals can also be smothered by sand disturbed by construction, and habitats can be destroyed.

Climate change

Rising sea temperatures, melting ice caps, more acidity, stronger storms and less oxygen are all things that are caused by climate change and negatively impact chidarians.

Fishing

Some types of fishing can be harmful to marine life. Jellyfish are at risk of getting caught in nets, whilst corals can be destroyed when equipment is dragged along the sea floor.

When corals experience bad conditions, they 'bleach', a process where they lose their colour and turn white (discover why on the next page). When corals are bleached, they can't make as much food and are more at risk of starvation and disease. Corals can survive small periods of bleaching, but if they stay bleached for too long, they may not recover. Sadly, climate change and other threats are making bleaching events more widespread and more common.

Colourful coral is healthy, happy coral.







White coral is **bleached**, meaning it is stressed and unhealthy.

SPOTLIGHT



CORALS-BUILDERS OF THE SEA

Swim over a coral reef and you will see what looks like large plants and rocks on the sea floor. These are, in fact, large structures containing colonies of animals!

These amazing animals, called polyps, work together to catch food, defend themselves and even build the homes they are living inside.

Each polyp looks like a tiny anemone— a sac-like body with a mouth at the top surrounded by tentacles. To feed, each polyp reaches its tentacles outside its structure to catch prey passing by. Incredibly, most species also have microscopic plants living inside their bodies. These plants help the polyps survive by turning sunlight into food and also give the coral their colour.

Some corals create hard structures, known as 'skeletons', using calcium carbonate—the same material other animals use to make shells. The photos below show the empty skeletons of different species of coral.







Bleached coral appears white because the polyps have lost the colourful plants inside their bodies, revealing the white skeleton beneath.



Many people will have heard about the coral reefs in hot, tropical, countries. However, we have species of coral in Scotland too! Some are found in shallow waters, like the soft coral 'dead man's fingers' (see page 16), whilst others live in the deep ocean. Just like coral reefs in warmer seas, Scotland's corals are an important habitat for lots of other species.



CRAFT

Seabird Centre

WAX RESIST ANEMONE ART

The 'wax resist' technique can create some interesting artistic effects, as the paint clings to your paper but not to the wax crayon lines that you draw. The watery world of sea anemones looks great using this style of art.



WHAT DO I NEED?

- Paper or card
- Wax crayons
- Paints and palette
- Paint brushes

- Reference images
- Pencil
- Jar of water
- Coloured pens and pencils



Decide which type of anemones you are going to draw and how many. Using a pencil, very lightly outline your design.



2

Go over the outlines of your anemones with a white or light-coloured wax crayon. If you press hard and make the lines quite thick the wax resist effect will be stronger.



3

Next, using colours of your choice, make some watery paint and brush this over your crayon drawing. Use as many different colours are you like. Darker colours will give more dramatic effects.







Allow the paint to dry. Once dry, you can add in some more detail using paint, pens or pencils. We added in some seaweed and bubbles.

CRAFT



WAX RESIST ANEMONE ART





Question: Why do you think the paint 'resists' the crayon lines?

Clue: Using a wax candle instead of a crayon would have the same effect.

Answer at foot of page.

The 'wax resist' technique is also brilliant for making secret messages. Write your message with a white crayon on white paper and then ask your friend to read it by painting over the paper with some coloured paint.

Answer: Both crayons and candles are made from a waxy substance (such as paraffin or beeswax) and this type of material does not allow water to pass through it.



You could try using the wax resist art technique to create a jellyfish scene too.





SPOTLIGHT



JELLYFISH AWARENESS

Several species of jellyfish are regularly spotted in UK waters. Species vary in size, colour, bell shape and number of tentacles.

You will come across most jellyfish in warmer waters during the summer months. Species can range from small species such as the 'mauve stinger jellyfish' to the bright orange 'lion's mane jellyfish', which can grow to 2m!

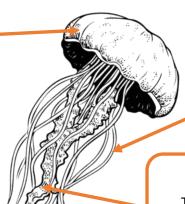
A handy guide to different species can be found on the Marine Conservation Society's website $\underline{\text{here}}$ or

the Wildlife Trust's website <u>here</u>. You can also download a handy Wildlife Trust cheat sheet by clicking the 'Jellies and their lookalikes' image at the top of the page.



Bell

The umbrella-like part at the top of the body.
Contains the mouth and has a series of muscles around the bottom that are used to move through the water.



Tentacles

Long structures that trail down from the underside of the **bell**. Lined with stinging **nematocysts** for catching prey and defence.

Oral arms

Thicker tentacles that bring captured food up to the mouth.

WARNING -DO NOT TOUCH!

Whilst some jellyfish species around the UK don't cause bad stings, there are plenty that do—species such as the 'lion's mane jellyfish', for example, can give really painful stings. So, to be on the safe side, don't touch any jellyfish



you see. Even those that are washed-up on beaches can sting as, amazingly, jellyfish can still fire their nematocysts even when they are dead! If you do get stung, tell a grown-up and follow the NHS guidance on treating a jellyfish sting.



DISCOVER



SPECIES PROFILE



By-the-wind-sailor

VELELLA VELELLA

TYPE: Hydrozoan

SIZE: Up to 10cm long

Young fish and other small

animals.

Photo: By-the-Wind-sailor that has blown-up on a beach.

WHAT DOES IT LOOK LIKE?

A jellyfish look-alike. By-the-wind-sailors aren't jellyfish but a colonial hydroid (pronounced "hi-droid"). This means they're not one creature, but a colony of tiny individual animals.

The body is made-up of an oval-shaped float with short tentacles hanging down from the bottom and a raised fin, called a 'sail', sticking up on top. Like jellyfish, the tentacles have special stinging cells for catching prey. Unlike jellyfish, they are moved by the wind when it pushes on their sails.

Their floats are generally dark-blue in colour, most likely for camouflage and sun protection.

WHERE DOES IT LIVE?

By-the-wind-sailors are typically found floating on the surface of the open ocean in warmer waters but are pushed towards British shores in stormy weather. Keep a sharp-eye on beaches in autumn and winter time, especially along south and west coasts, as rough weather can blow them ashore (like the photo above).

FACTS:

By-the-wind-sailors can be "right-handed" or "left-handed" depending on which way the sail is orientated. Most are "left-handed" with their sails going from the top left of the float to the bottom right. The orientation of the sail determines whether the animal travels left or right of the wind direction. Click here to watch a video and find out more about these mysterious creatures.







Tall sea pen

FUNICULINA QUADRANGULARIS

TYPF: Sea pen

Can grow higher than 2 metres SI7F:

Plankton, small pieces of dead plant DIET:

and animal.

WHAT DOES IT LOOK LIKE?

A tall and narrow species of sea pen, which is usually white or light pink in colour. The stalk is square shaped and the polyps grow outwards from it, giving a feathery appearance. The sea pen curves towards the top of its stalk. Sea pens often live in groups, creating a forest-like habitat.

WHERE DOES IT LIVE?

North and West coast of Scotland. Deep waters and sea lochs.

FACTS:

- Sea pens are related to corals and sea anemones.
- The deep-sea brittlestar is a common resident of tall sea pens. They hang from the stalks and catch food which passes in the water.
- Sea pens are named after old writing quills, due to their resemblance to a feather.
- Sea pens are **sessile** but can move to new locations if they need to.
- Burrowed mud in sheltered deep sea or sea lochs is the key habitat where sea pens are found.

Click this link to see a video showing a dive to see all three British sea pens.







Plumose Anemone

METRIDIUM SENILE

TYPE: Anemone

SIZE: Up to 30cm tall

Animal and plant plankton

WHAT DOES IT LOOK LIKE?

These anemones look a little bit like an underwater cauliflower. They are usually pale white/cream in colour but occasionally red or yellow varieties occur. It has a tall, stalk-like column to hold itself upright in the best position to catch passing food. They are easily recognised by the several thousand tentacles which creates a "feathery" (plumose) effect.

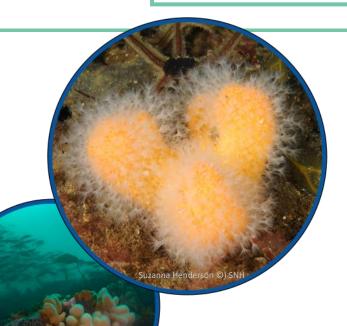
WHERE DOES IT LIVE?

Plumose anemones grow on rocks, boulders, pebbles and shells and prefer to live in fast moving water where the currents bring an endless supply of tiny **plankton**. They are common on rocky shorelines all around the coasts of Britain and Ireland.

- Plumose anemones start their life as males and change into a female when it gets older.
- Sea anemones don't have eyes and ears like we do. They rely on their tentacles to sense and detect prey.
- Most of the time, sea anemones remain in one place. But if it is continually attacked by predators or disturbed, it can detach itself and swim to a new location.







Dead Man's Fingers

ALCYONIUM DIGITATUM

TYPE: Coral

SIZE: Up to 20cm

Animal and plant plankton

WHAT DOES IT LOOK LIKE?

A yellow, orange or brown coloured soft coral with branching, thick, fleshy, finger-like structures (giving it its gruesome name).

All corals are made-up of thousands of individual polyps stick out their tentacles to feed on passing plankton. When polyps are feeding, their exposed tentacles give the corals a fluffy appearance (as seen in the first photo).

WHERE DOES IT LIVE?

Dead man's fingers grow on rocks, shells and stones on the lower shore down to depths of about 50m. They can either grow by themselves or lots can grow together, covering large areas of seafloor.

Found all along the British coastline, this is a common species to see when diving.

- Dead man's fingers are sometimes seen growing on living crabs and sea snails.
- In preparation for spawning (release of larvae) in winter months, the polyps remain inside the coral's soft body and don't eat all autumn.







Beadlet anemone

ACTINIA EQUINA

TYPE: Anemone

SIZE: Diameter: 5cm

Crabs, small fish and shrimp

WHAT DOES IT LOOK LIKE?

These anemones are usually red but their colour can sometimes vary to be green or orange. The true form of this fascinating creature is revealed when the tide comes in and it reveals thick short tentacles. Up to 192 tentacles are arranged into 6 circles. When the tide goes out the tentacles are moved inside the body of the anemone, leaving what resembles a blob of jelly. It can survive out of water for several days.

WHERE DOES IT LIVE?

Beadlet anemones are a common sight all around Scotland's coasts. They can be found in rock pools, attached to rocks normally on the middle to lower shore. Their body acts as a sucker to keep them in one place while the tide goes in and out.

- Beadlet anemones are one of the most aggressive anemone species and are highly territorial. If
 their tentacles encounter other individuals that aren't related, they will fight them. They do this
 with a ring of bright blue beads beneath their tentacles that are packed full of stinging cells. Over
 the course of a few days the victim will be slowly nudged and stung until they crawl away or drop
 off the rock.
- This anemone is known to eat almost anything it can catch, using its tentacles to stun and catch prey. This mostly consists of mussels, crabs, sea shrimps, sea snails and sea slugs. Occasionally it will take in a particularly large piece of food which it can't digest. When an anemone realises this it will spit it back up, which can be up to two hours later.

DISCOVER



SPECIES PROFILE



Dahlia anemone

URTICINA FELINA

TYPE: Anemone

SIZE: Diameter: up to 15 cm

Small fish and crustaceans

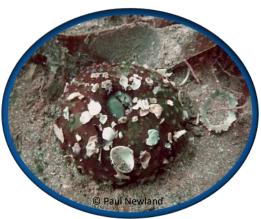
WHAT DOES IT LOOK LIKE?

These beautiful anemones are named after Dahlia flowers and come in a wide range of colours such as pinks, purples, oranges and yellows, but more commonly a reddish brown. Dahlia anemones are bigger than most other anemones with a diameter of up to 15cm. It has up to 160 short striped tentacles arranged around the mouth and are used to catch relatively large prey like shrimps and small fish.

WHERE DOES IT LIVE?

Dahlia anemones can be found all around the British coastline. They live attached to rocks on the seabed, normally low down the shore, but can also be found offshore to depths of up to 100m.

- Dahlia anemones can form dense carpets on the seabed.
- Its body is covered in warts, when the tentacles are pulled in, it is camouflaged by pieces of sand and shell stuck to the warts.



DISCOVER



SPECIES PROFILE



Moon jellyfish

AURELIA AURITA

TYPE: Jellyfish

SI7F: Diameter: 25 - 40cm

Mostly molluscs, shrimp and

plankton.

WHAT DOES IT LOOK LIKE?

The moon jellyfish is almost entirely see-through and is easily recognisable by the four purple circles which are visible through the top of their body (bell). These circles are reproductive organs. Unlike most other jellyfish their tentacles are thin and short and appear all around the circumference of its body.

WHERE DOES IT LIVE?

Moon jellyfish are the most common jellyfish found in UK seas and are often found washed up on shore. They are often found floating just below the surface of the water. Although they do sting, moon jellyfish venom is mild.

- Moon jellyfish are short-lived, with few living for longer than six months. They have two main stages to their lifecycle: polyp and medusa. The former is a small stalk that attaches to a rock and divides into buds that break free to become adults.
- Although this is a species that lives in the open seas, it may be found
 washed up on the shore and can occur up estuaries and into harbours and is
 common in Scottish sea lochs.
- A big swarm of moon jellyfish was spotted in the Firth of Forth recently and you can watch
 a short video clip of this here.









Stalked jellyfish

CALVADOSIA SPECIES

TYPE: Jellyfish

SIZE: Up to 5 cm tall

Plankton, larvae and tiny

crustaceans

WHAT DOES IT LOOK LIKE?

Stalked jellyfish are funnel shaped and can be brown, green or red in colour. Unlike true jellyfish, stalked jellyfish are stationary their entire lives. They do however have the same stinging cells in their tentacles know as nematocysts. These sting unsuspecting prey which are stunned and reeled back into the mouth of the jellyfish.

WHERE DOES IT LIVE?:

Various stalked jellyfish species can be seen around UK coasts. They are usually found in shallow coastal waters with good currents that bring lots of tiny floating food. They often attach to seaweed or seagrass.

- Stalked jellyfish larvae will crawl along the sea floor looking for a suitable place to attach and morph into an adult.
- One species of stalked jellyfish is covered in turquoise coloured warts where stinging cells are stored.
- Stalked jellyfish have 8 arms, each with approximately 45 tentacles.



PUZZLE



CNIDARIAN WORDSEARCH

1	Н	ı	E	S	Α	٧	C	K	Z	F	X	W	Q
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Α	Q	Y	Н	Y	D	R	0	Z	0	Α	N	Α	R
G	N	T	E	N	T	Α	C	L	E	S	F	R	T
X	Q	Е	J	G	0	В	X	F	R	Р	W	1	E
U	Z	E	M	E	E	R	W	С	Y	G	J	Α	В
T	Н	U	X	0	D	N	M	R	В	В	M	N	R
F	Z	N	M	٧	N	X	Н	Н	W	U	T	V	Α
T	P	0	X	X	Z	E	W	K	В	Α	K	0	T
X	S	E	Α	Р	Е	N	D	P	Е	W	G	W	E

Can you find the words below in the word search?

SEAPEN STING JELLYFISH ANEMONE INVERTEBRATE

TENTACLES CNIDARIAN HYDROZOAN POLYPS CORAL



FUN FACTS



MORE ABOUT CNIDARIANS

There are so many incredible things to say about cnidarians. Here are a few more fun facts that we couldn't squeeze into the other sections.

Jellyfish are **95% water** and have no brain, blood or heart.

Cnidarians have the incredible ability to regrow damaged or lost body parts, such as tentacles. A small piece of detached body tissue may even grow into an entirely new individual!

Jellyfish do not have gills like fish or lungs like humans. They breathe by taking in oxygen from the sea through their top layer of skin.

Some cnidarians can generate their own light through a process called **bioluminescence**.

Coral have growth rings that you can use to tell how old they are, just like trees. Some coral can live up to **5,000 years old** making them some of the longest living animals on earth!





Jellyfish have been on the planet for over **500 million years**, making them more ancient than the dinosaurs!

Nematocysts only fire when they receive the right touch and chemical signal from a **predator** or **prey**. This means species don't accidentally sting themselves or each other!

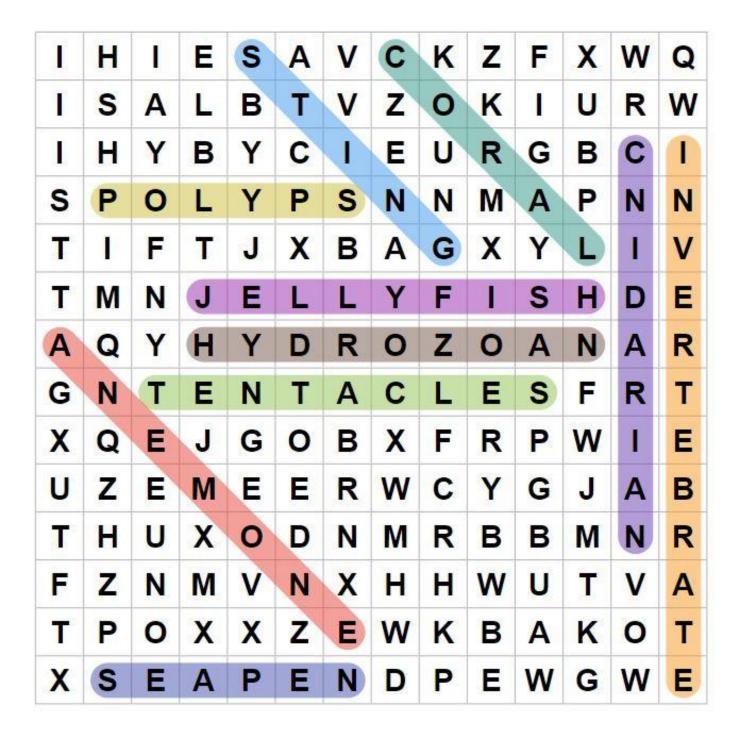


PUZZLE



WORDSEARCH SOLUTION

How many words did you find? Check your answers with the solution below.



DISCOVER



GLOSSARY

Something that makes a species well suited to the environment it is living in. **ADAPTATION**

Can be a part of the body or behaviour.

When living things create light from a chemical reaction in their bodies. BIOLUMINESCENCE

CAMOUFLAGE When something blends in with the environment around it.

Changes including temperature, rainfall and wind patterns across the Earth that CLIMATE CHANGE

can be natural or caused by human activity.

COLONY A large group of animals living close together.

HABITAT Where an animal or plant lives.

LARVAE A young form of an animal before it develops into an adult.

PLANKTON Plants or animals unable to swim against a current, meaning they have no

> control over where they are taken around the world. Plankton are mostly microscopic in size but some larger animals, such as jellyfish, are classed as

plankton too.

POLLUTION Something harmful that gets into the air, a water source or soil.

An animal that hunts and eats other animals. **PREDATOR**

PREY An animal that is eaten by another animal.

SESSILE When something is attached to a surface and never or rarely moves.

A tentacle is a part of the body of an animal or plant that can move freely **TENTACLES**

and act like an arm. As well as cephalopods, sea anemones and some

meat-eating plants have them.

TERRITORIAL When an animal is very defensive of the area around its home.

A naturally occurring poison produced by living things. TOXIN