MARINE CONSERVATION SOCIETY

Life in the deep

Subject links:
Science, Maths, Art

Age: 5-7

Curriculum links:
Biodiversity, Adaptations, Habitats, Ecosystems, Oceans, Measure, Creativity

Ocean Literacy Principles:

1. The Earth has one big ocean with many features.
5. The ocean supports a great diversity of life and ecosystems
7. The ocean is largely unexplored.

Learning Objectives:

- To be able to define the term habitat and explore the environment of a key marine habitat
- To name and describe animals living in the deep ocean
- To use imagination and creativity to explore science

Sustainability Goals:

Resources provided:

- Life in the deep Fact File
- Life in the deep image reel
- Giant creatures cards
- Curriculum links

Extra resources required:
Measuring tape per group
Blind folds per group

Step 1 Background

More is known about the moon than about life in the deep ocean. The deepest part of the ocean, the Mariana Trench, is 11,000m deep. If Mount Everest were placed in the trench, it would still sit 1-2 miles below the surface of the water!

Life in the deep is challenging: there's high pressure, no light, little food and cold temperatures. Animals living in the deep have developed fascinating adaptions to survive. More information is provided in the Life in the deep Fact File.

Step 2 Set the Scene

5 minutes – What is it like in the deep ocean?

Introduce the topic by explaining that the deep ocean is a type of marine habitat. Define the term 'habitat'. Ask children why they think it's hard to live in the deep ocean. What are the conditions like? Students should talk in pairs and share their thoughts. Explain that creatures need to have special features to be able to live in this habitat. Explain how these special features are called adaptations.

Step 3 Activities

Activity 1: 15 minutes – Dark waters

One of the biggest challenges facing creatures in the deep is the dark. In an open space (like an assembly hall or outside) split the class into pairs and give a blindfold to each pair. Pairs should take it in turns to explore the area with the blindfold on. Discuss which senses helped students to move around safely, and ask what could have helped them move around more easily. Back in the classroom, show the Life in the deep image reel. Focus on the 'dark waters' section of the presentation and use the notes in the slides to discuss how creatures have adapted to life in the dark.

Activity 2: 20-30 minutes - Deep sea gigantism

Ask children what they think the temperature is like in the deep and why. One adaptation to very cold temperatures seen in animals all over the world is to grow larger. Large animals have greater fat reserves to keep them warm and a lower surface to volume ratio to reduce heat loss. In the ocean, this is called deep sea gigantism. Return to the open space and split the class into three groups. Give

Step 3 Activities (continued)

each group a Giant creatures card and a measuring tape. It would be helpful to have an adult helping in each group. Groups should measure out their species and determine how they can best mark the shape of the species using members of the group. Once everyone has done this, groups should reveal their species' name, its size and one fact. *Note* - two of the cards include sizes for shallower water species for size comparisons. These should also be measured. In the classroom, return to the image reel to look at images of these giant animals.

Activity 3: 5-10 minutes – Finding food in the deep

The deep sea is a vast space and therefore it can be hard to find food. Animals have to eat a variety of food to survive, and eat as much as they can, when they can. In the image reel, watch the video of the gulper eel. Ask students to discuss what the adaptation, or special feature, is of this creature to lack of food in its environment (expandable stomach and huge mouth so they can eat a variety of food and as much as they can). Show the rest of the images and discuss the features of the animals.

Step 4 Extend

30 minutes – Design a deep sea creature

Students could design their own deep sea creature using what they've learnt about the harsh conditions and how animals have adapted to survive there. They could annotate the picture to explain the creature's adaptations or special features.

Step 5 Reflect

5 minutes

Show the video at the end of the image reel to summarise learning. Ask students to explain the word habitat. Why is the deep ocean a hard place to live? Can you give an example of an adaptation of an animal to living in the deep?

Step 6 Follow up

To study another ocean habitat, take a look at our Rockpool explorer lessons. For more on ocean giants, take a look at our Stupendous sharks lesson.

Life in the Deep Fact File

The Deep Sea

More is known about the moon than about life in the deep ocean.

The deepest a human has ever been able to scuba dive is 318m – but this is extremely dangerous! By comparison, the average depth of the ocean is 3700m.

The deepest part of the ocean, the Marina Trench, is 11,000m deep. If Mount Everest were placed in the trench, it would still sit 1-2 miles below the surface of the water.

Even in the deepest part of the ocean, plastic has been found by submarines on the seafloor.

Useful definitions:

Adaptation is a change in body shape and behaviour to enable a creature to live in a particular area or in particular conditions.

Habitat is the natural home or environment in which an animal, plant or organism lives. A habitat contains all an organism needs to survive, like food and shelter.

Living conditions

Life in the deep is hard – there is high pressure, no light, little food and cold temperatures. Animals living in the deep have developed fascinating adaptations to survive.

Ghost fish at around 1853m © NOAA Ocean Exploration & Research

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Life in the Deep Fact File

Dark

Below 200m there's not enough sunlight to allow plants to grow, and below 1000m there's no natural light at all. Some animals have adapted to have huge eyes or produce their own light. At extreme depths, some animals have adapted to have tiny eyes – and even no eyes at all – as there's no need to use them. Instead they use tactile and sensory clues to find food.

Spookfish have highly sensitive, cylindrical eyes to help them look up as well as forward. **Tripod fish** use their long front fins to feel for food. They then use these fins like hands to guide the food to their mouth. **Anglerfish** have bioluminescence on the end of their dorsal spine. This is positioned near their mouth and used to attract prey.

Spookfish
© GreenAnswers.com

Tripod fish © Ocean Exploration Trust

Anglerfish © Superjoseph via Shutterstock

Giant isopod © NOAA Ocean Exploration & Research

Cold temperatures

The lack of sunlight in the deep means the water temperature is very cold. One adaptation to cold temperatures seen in animals all over the world is to grow larger, which is referred to as the Bergmann's rule. Large animals have greater fat reserves to keep them warm and they have a lower surface to volume ratio to reduce heat loss.

Deep sea isopods are crustaceans that look similar to a woodlouse. A typical isopod in shallower waters can measure up to 5cm, whereas a giant deep sea isopod can measure up to 15cm and a supergiant species up to 50cm. Though this might still sound small, it is a huge size difference between shallow and deep water species.

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Life in the Deep Fact File

High pressure

The deeper in the ocean you travel, the greater the pressure becomes because of the weight of the water above. In the Mariana Trench, the pressure is approximately 1000 times greater than at sea level.

The **Blobfish** has been voted the world's ugliest fish. This is totally understandable when you see images of them out of the water! But footage of them swimming in the deep sea shows a very different looking fish. Their bodies are gelatinous to be able to withstand the high pressure. When the pressure compresses their bodies in the deep, they appear quite fish-like in shape. But if brought to the surface for study purposes, their bodies relax without that pressure, and turn into a gelatinous blob.

Blobfish © James Joel via Flickr

Gulper eel © NOAA Photo Library

Little food

The deep is a huge, vast space and therefore it can be hard to find food. Animals have to adapt to eating a variety of food, and eating as much as they can when they have the ability to do so.

The **Gulper eel** has a mouth that can open to 10 times bigger than its own body, which is the biggest mouth to body ratio of any vertebrate. Along with an expandable stomach, this means the gulper eel is able to feed on a range of species and not be restricted by size.

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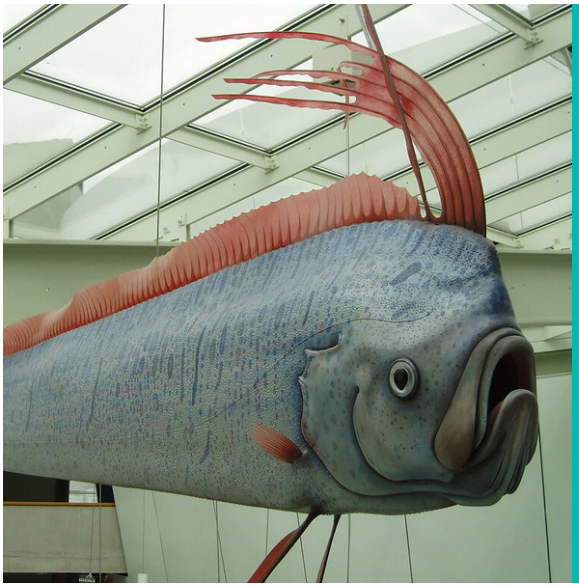
Giant Creatures cards



© Flickr/Udo Schröter

Size: 7 metres

Giant oarfish

Is the longest bony fish in the world. They don't have teeth because they are filter feeders. Their pectoral fins look like oars. They don't have scales like most fish - instead they have a slimy material called guanine.

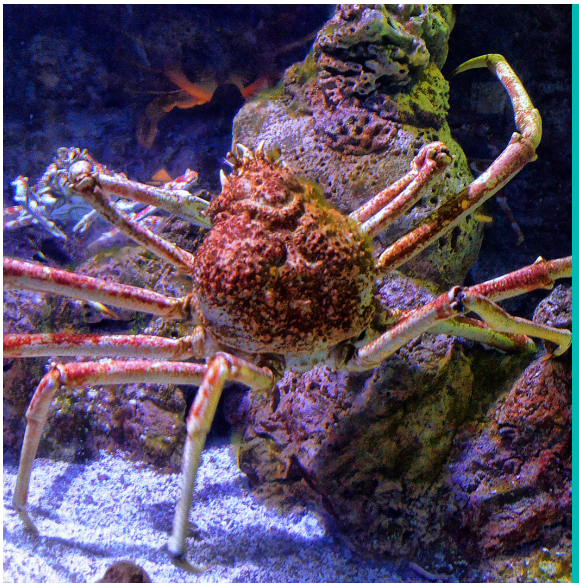
© Flickr/Shih-Pei Chang

Size: 14 metres

Colossal squid

They live in the deep ocean around Antarctica. It is the largest invertebrate on Earth and has the largest eyes in the world! Even though they are huge they still have predators. Colossal squid are the favourite food of sperm whales.

Size comparison: The common squid that lives in the UK can grow up to 40cm in length.



© Flickr/Choo Yut Shing

Size: 3.7 metres

Japanese spider crab

They have 10 legs and live in the Pacific Ocean near Japan. They live in waters up to 200 metres deep, but move to shallower water (around 50 metres deep) to breed. They are scavengers, which means they eat dead animals and plants.

Size comparison: The Spiny spider crab that lives in the UK can grow up to 20cm in length.

Curriculum links

England

Science

- Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.
- Identify and name a variety of plants and animals in their habitats.

Maths

- Pupils should be taught to:
- Compare, describe and solve practical problems for:
- Lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
- Measure and begin to record the following:
- Lengths and heights

Art

- To use drawing, painting and sculpture to develop and share their ideas, experiences and imagination.
- To develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form and space.

Wales

Science

- I can recognise that plants and animals are living things which grow.
- I can explore relationships between living things, their habitats and their life cycles.

Maths

- I have used a variety of objects to measure. I am beginning to understand the need to repeat the same physical unit without any gaps when measuring.

Scotland

Science

- I have observed living things in the environment over time and am becoming aware of how they depend on each other.
- I can distinguish between living and non-living things. I can sort living things into groups and explain my decisions.
- I have explored my senses and can discuss their reliability and limitations in responding to the environment.

Maths

- I can estimate how long or heavy an object is, or what amount it holds, using everyday things as a guide, then measure or weigh it using appropriate instruments and units.