

The Deep Sea

Global Citizenship Marine Environment

Lesson Plan



Learning Objectives:
Understand the Deep Sea, its environmental conditions and the life that exists there

Learning Methodology:
Art, audio visual presentation, discussions

Curriculum Links:
Language, Art, Physical Education, Social Environmental and Scientific Education

Preparation:
Download associated PowerPoint presentation

Materials:
Black card, chalk

Target Age:
4th-6th Class

Time:
One hour

Introduction

The Deep Sea

Over 70% of the Earth's surface is covered by the ocean. Oceans range from coastal habitats to shallow water, down to great depths. The Deep Sea typically describes the bottom layers of the ocean, that are about 2000m below the ocean surface. This is the largest marine habitat, and the most unexplored!

For a long time, people didn't believe that anything could survive in these depths. Between 1872 and 1876, the H.M.S. Challenger was commissioned for an around the world expedition and it succeeded in finding diverse animal life down to 5,500 meters, as well as making other important discoveries. It took nearly 100 years for life to be discovered at 10,000 metres!

Deep sea exploration is a relatively new type of scientific investigation that involves the study of the physical, chemical and biological conditions of the seabed and deep water for scientific and commercial purposes. It has only become possible recently due to advances in underwater technology which can withstand the extreme pressure and temperature. Most of the deep sea is still yet to be explored and there is still a great deal to be understood about the life that exists there. However, deep sea exploration has already led to many discoveries that have revealed important aspects of earth's history. The seabed provides numerous details of geographical events that have occurred in the past. It can also help scientists to make more accurate assessments on the future of Earth's climate. Samples taken from deep beneath the ocean floor contain clues not only about conditions on Earth millions of years ago but also hint at what the future climate might be like.

Energiser Activity

Over, under, around and through

This is a fun activity that gives the students a chance to move around and get energised! It also introduces the idea of size and elements of the Deep Sea that will be discussed in the lesson.

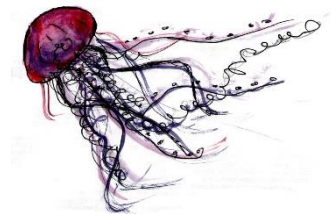
Methodology:

1. Ask the students to line up around the perimeter of the room.
2. Decide on a direction to travel around the room (clockwise or anticlockwise).
3. Teacher calls out a pattern where students move around the perimeter of the room, going over, under, around and through imaginary ocean objects.

Example 1 – Over a wobbly boat, through a bed of crabs, under a blue whale, around an underwater volcano, and through a sea of Jellyfish.

Example 2 – Over a turtle, through a deep, dark cave, around a pile of marine litter and through an underwater forest of seaweed.

Examples: Over a wobbly bridge, through the Atlantic Ocean, over a coral reef and around a sleeping shark.



Part One: Video

Watch the Video: The Five Layers of the Ocean

<https://www.youtube.com/watch?v=cE3ALHYoeYg>

After watching the video, ask your students the following questions:

1. What are the names of the zones of the ocean? *The sunlight zone, the twilight zone, the midnight zone, the abyss and the trenches.*
2. True or false: The Mariana Trench is the deepest point in the whole ocean? *True, it is the deepest point in the whole ocean, and a few people have now explored it, using specialised*
3. What is marine snow? *Small bits of organic matter, like pieces of plants and animals that are floating in the water.*
4. What do oceanographers do? *Study the science of the oceans*
5. True or false: volcanoes can be found underwater. *True, underwater volcanoes exist, and occur all over the world!*

Now that you have learned about the layers of the ocean, lets take a closer look at some animals that live there

Part Two: Animal Adaptation

The deep sea is a very harsh habitat for plants and animals to live in.

With temperatures below freezing, extreme pressure, and no sunlight, it is a very unusual habitat. Deep-sea animals have had to evolve, often through unusual and unique adaptations, to live, reproduce, and thrive in these unique conditions.

- As a class, discuss what items you might need if you were to go and explore the Deep Sea? (Hint: A light and/or large eyes as it would help improve vision in the dark, something to keep you warm, something to protect yourself from the pressure)

Did you know: Lots of deep-sea creatures have evolved a red colour because red wavelengths of light do not penetrate into the deep ocean. This means that red animals appear black because there is no red light to reflect back toward potential predators, working as a type of camouflage!

Open up the PowerPoint presentation. Look at each animal, and discuss what features (adaptations) these animals have that helps them to survive in the Deep Sea.

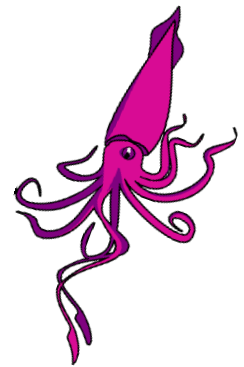
Discussion points:

1. **Angler Fish**- The glowing light that hangs from the top of its head is probably its most obvious adaptation. Due to the lack of food that is readily available in the dark deep sea the anglerfish has evolved a light to attract animals, and then eat them. The anglerfish also can eat a wide variety of prey species, so having a huge stretchable jaw helps to eat larger prey.
2. **Blobfish**- Its body is squishy, with soft bones and very little muscle, and this allows the blobfish to survive the pressure in the deep sea. When underwater, the blobfish looks more like a fish/tadpole, but when it's removed from water, its' muscles relax and it looks more like a blob of jelly!
3. **Barrel Head Fish**- This unusual looking fish has a transparent head and tube-shaped eyes. Its eyes are believed to be this shape and able to move around in its head to give it a wider range of view. These unusual eyes also help the fish to spot the bioluminescent glow of jellies or other animals in the water. It also has a protective fluid-filled shield in its head which enables it to survive the enormous pressure in the Deep Sea.
4. **Bioluminescent Comb Jelly**- Bioluminescence is light produced by a chemical reaction within a living organism. Comb Jellies are carnivores, and they use the light to attract animals so they can eat them. They also have a jelly like body which helps them survive the pressure in the deep.
5. **Yeti Crab**- These recently discovered crabs are still a bit of a mystery to scientists! Some might think that their hairy claws are keeping them warm. However, the crabs have been seen to hold their claws over hydrothermal vents (underwater plumes of hot, mineral rich fluid that sprays out of the sea bed). Because the crab's arm hairs support large colonies of filamentous bacteria, the scientists speculated that the crabs might be "farming" the bacteria, perhaps as a source of food.

6. **Cockatoo Squid**- Its balloon like shape helps it to float, rather than using lots of energy to swim all the time. It has large eyes, which help it to see in the dark, and pigment-filled cells, or chromatophores, that look like polka dots and serve as camouflage.
7. **Whale Fish**- It is red in colour, which as previously mentioned, can act as camouflage in the dark water. It also has very small eyes, which means it can't see well in the dark. Instead, it has lines of sensory pores along its body, and this helps it to detect any movement in the water.
8. **Deep Sea Lizard Fish**- Its super sharp teeth, which are also found on its jaws and tongue allows this creepy fish to eat anything it meets, including individuals of its own kind. It also has large eyes to help it see in the dark.
9. **Dumbo Octopus**- These unusual creatures have adapted to such a high pressure environment by having soft, jelly-like bodies that easily change shape and easily float.

Extra Discussion points:

- Has anyone ever heard of these animals before?
- How would you feel if you were swimming in the sea and one of these creatures was in the water too?
- Do you think it would be nice to live in the deep sea?
- Can marine litter affect these animals? How? (*Note: Marine Litter is unfortunately found in the deep sea, and can harm animals here, just like it can in other parts of the ocean*)



Activity:

Create your own deep sea creature

For this activity you will need:

- Black paper
- Chalk

Using their imaginations, ask the students to design their own deep sea creature. The students should think about what adaptations would be useful to have underwater. They should also think about the colour of the animal. Have a group discussion about the animals when they class are finished.

Interesting websites to check out:

The Deep Sea <https://neal.fun/deep-sea/>

Deep Ocean Education Project <https://deepoceaneducation.org/>