# Layers of the Ocean

Oceans cover two thirds of our Earth, making up 362 million km$^2$ of the Earth's surface. There are five oceans (the Pacific Ocean, the Atlantic Ocean, the Indian Ocean, the Antarctic or Southern Ocean and the Arctic Ocean) but they are not separated; they all flow into each other. The Pacific Ocean is the largest and deepest of all the oceans. It is so deep in places that the world's tallest mountain, Everest, would sink without a trace!

Oceans should not be confused with seas. Seas are smaller than oceans and are usually located where the land and ocean meet as seen on this map of the United Kingdom:

## What Are the Layers of the Ocean?

Oceans are made of five distinct layers which all have their own characteristics, including temperature, light and the creatures living within them.

# Layers of the Ocean

## Epipelagic Zone (Sunlight Zone)

This layer is from the surface to around 200m below the surface of the ocean so sunlight is able to reach it. There is plenty of light and heat in this zone although they both decrease the deeper you go. Due to the light and warmth, this is the layer with the most life, including:

- seaweed which plant feeders eat;
- fast swimming hunters, such as dolphins (mammals which breathe air) and salmon;
- coral reefs.

Humans enjoy this layer for activities such as swimming, fishing and sea transport.

## Mesopelagic Zone (Twilight Zone)

This layer reaches to 1000m below the surface of the ocean so only faint sun rays reach it. It is home to some of the strangest sea animals, which often have large eyes to help them see, including the sea cucumber, swordfish, wolf eel and octopus.

No plants grow within this layer so creatures either feed by filtering the water or hunting other creatures at speed. Humans can dive to this layer but have to wear protective suits due to the extreme pressure and lack of warmth.

## Bathypelagic Zone (Midnight Zone)

The Midnight Zone, which makes up 90% of the ocean, is up to 4000m below the surface of the ocean. It gets its name from the fact that sunlight cannot reach this layer. Some plants and creatures such as, the anglerfish, the viperfish and the jellyfish produce their own light (bioluminescent). This light is used to hunt their prey.

Although the pressure in this layer is high, there are large numbers of creatures living within it. Many of the animals are red or black due to the low light levels. Some creatures, such as the sperm whale, dive to these depths to hunt for food.

## Layers of the Ocean

### Abyssopelagic Zone (Abyss)

This layer is up to 6000m below the surface of the ocean and contains 75% of the ocean bed, which is covered with thick mud made from the remains of dead animals. The sunlight cannot reach this layer at all so it is pitch-black and near freezing. Very few creatures live here but those that do are mainly transparent, blind invertebrates, such as sea stars, amphipods (shrimps) and squid.

### Hadalpelagic Zone (The Trenches)

The Trench is up to 11,000m below the surface of the ocean and is also known as the ocean floor. It is actually a series of underwater canyons (or narrow valleys) which can only be explored using specialist scientific equipment. This is due to the high pressure and near freezing temperatures. There is no natural light in this zone but unique creatures can be found, including some sea stars.

**Did you know...?**

The deepest part of the ocean ever to be explored by man is in the Mariana Trench. It is almost 11,000m deep!

The ocean is an incredible part of our world and oceanographers (sea scientists) hope that it will be explored more thoroughly as technology advances to increase our knowledge and enable us to protect the oceans for future generations.

# Questions

1. Which of these are true facts about oceans? Tick **two**.

   - ○ Oceans cover two thirds of the Earth's surface.
   - ○ The five oceans are all separate.
   - ○ The Atlantic Ocean is the deepest ocean.
   - ○ Oceans are made of five distinct layers.

2. Which of these is another name for the Mesopelagic Zone? Tick **one**.

   - ○ Sunlight Zone
   - ○ Twilight Zone
   - ○ Midnight Zone
   - ○ Abyss

3. Due to the **absence** of plants growing within this layer...

   What does **absence** mean?

   _____

4. What is the depth of the Abyss?

   _____

5. **Find** and **copy** a word from the text which shows that creatures found in the Trenches are one of a kind.

   _____

6. In your own words, explain why the Midnight Zone was given that name.

   _____

   _____

7. Summarise what you have read about the Epipelagic Zone in 40 words or less.

   _____

   _____

8. Why do you think that the creatures in the Abyss are usually blind?

   _____

   _____

9. Why do plants not grow in the Twilight Zone?

_____

_____

10. Why is it important to protect the oceans for future generations? Give evidence to support your answer.

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# Answers

1. Which of these are true facts about oceans? Tick **two**.

   - ✓ **Oceans cover two thirds of the Earth's surface.**
   - ○ The five oceans are all separate.
   - ○ The Atlantic Ocean is the deepest ocean.
   - ✓ **Oceans are made of five distinct layers.**

2. Which of these is another name for the Mesopelagic Zone? Tick **one**.

   - ○ Sunlight Zone
   - ✓ **Twilight Zone**
   - ○ Midnight Zone
   - ○ Abyss

3. Due to the absence of plants growing within this layer...
   What does absence mean?
   **Absence means non-existence or lack of.**

4. What is the depth of the Abyss?
   **The Abyss is up to 6000m below the surface of the ocean.**

5. **Find** and **copy** a word from the text which shows that creatures found in the Trenches are one of a kind.
   **unique**

6. In your own words, explain why the Midnight Zone was given that name.
   **Pupils' own responses, such as: The Midnight Zone was given that name because it is (almost) totally dark as it would be at midnight due to a total lack of sunlight.**

7. Summarise what you have read about the Epipelagic Zone in 40 words or less.
   **Pupils' own responses, such as: From the surface to 200m below there is plenty of light and heat (which decrease with depth) so much life in this layer; humans also use this layer for leisure activities and travel.**

8. Why do you think that the creatures in the Abyss are usually blind?
   **Pupils' own responses, such as: There is no light at all in this layer so even if creatures had eyes, it would be impossible to see.**

9. Why do plants not grow in the Twilight Zone?
   **Pupils' own responses, such as: Only faint rays of sunlight penetrate the Twilight Zone and as plants need sunlight to grow, they will be unable to do so within this layer.**

10. Why is it important to protect the oceans for future generations? Give evidence to support your answer.
    **Pupils' own responses, such as: It is important to protect the oceans for future generations because they make up two thirds of our Earth and contain myriad plants and animals (some of which are yet to be discovered!). Humans also enjoy using the oceans for pleasure and to make travel easier.**