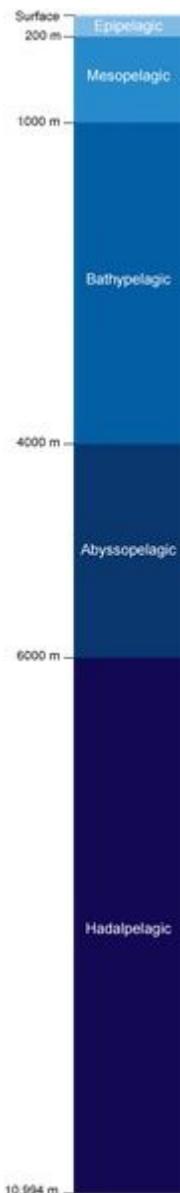


# Layers of the Ocean

This text is adapted from the U.S. National Oceanic and Atmospheric Administration.



The ocean has five layers called zones. From the surface to the deepest part of the ocean, the zones are the epipelagic, mesopelagic, bathypelagic, abyssopelagic, and hadalpelagic zones.

## Epipelagic Zone

This surface layer is also called the **sunlight zone** and extends from the surface to 200 meters (660 feet). It is in this zone that most of the visible light exists. With the light comes heating from [the] sun. This heating is responsible for wide change in temperature that occurs in this zone, both in the latitude and each season.

The sea surface temperatures range from as high as 97°F (36°C) in the Persian Gulf to 28°F (-2°C) near the north pole.

Interaction with the wind keeps this layer mixed and thus allows the heating from the sun to be distributed vertically. At the base of this mixing layer is the beginning of the thermocline.

The thermocline is a region where water temperature decreases rapidly with increasing depth and transition layer between the mixed layer at the surface and deeper water.

The depth and strength of the thermocline varies from season to season and year to year. It is strongest in the tropics and decrease to non-existent in the polar winter season.

## Mesopelagic Zone

Below the epipelagic zone is the mesopelagic zone, extending from 200 meters (660 feet) to 1,000 meters (3,300 feet). The mesopelagic zone is sometimes referred to as the **twilight zone** or the midwater zone as sunlight this deep is very faint. Temperature changes the greatest in this zone as this is the zone [that] contains the thermocline.

Because of the lack of light, it is within this zone that bioluminescence begins to appear on life. The eyes on the fishes are larger and generally upward directed, most likely to see silhouettes of other animals (for food) against the dim light.

## Bathypelagic Zone

The depths from 1,000-4,000 meters (3,300 - 13,100 feet) comprise the bathypelagic zone. Due to its constant darkness, this zone is also called the **midnight zone**. The only light at this depth (and lower) comes from the bioluminescence of the animals themselves.

The temperature in the bathypelagic zone, unlike that of the mesopelagic zone, is constant. The temperature never fluctuates far from a chilling 39°F (4°C). The pressure in the bathypelagic zone is extreme and at depths of 13,100 feet (4,000 meters), reaches over 5850 pounds per square inch! Yet, sperm whales can dive down to this level in search of food.

## Abyssopelagic Zone

The Abyssopelagic Zone (or abyssal zone) extends from 13,100 feet (4,000 meters) to 19,700 feet (6,000 meters). It is the pitch-black bottom layer of the ocean.

The name (abyss) comes from a Greek word meaning "no bottom" because they thought the ocean was bottomless. Three-quarters of the area of the deep-ocean floor lies in this zone.

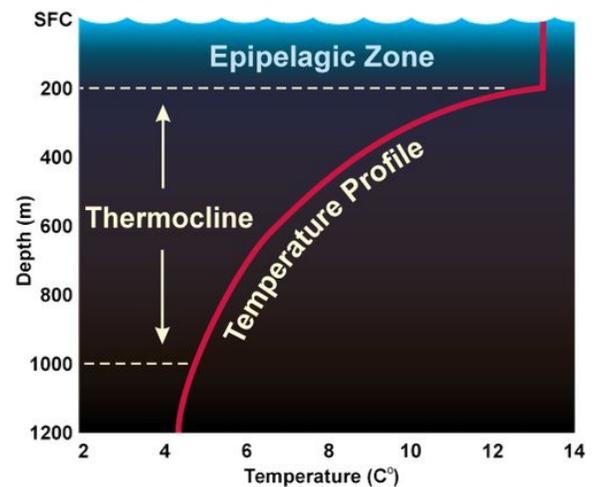
The water temperature is constantly near freezing and only a few creatures can be found at these crushing depths.

## Hadalpelagic Zone

The deepest zone of the ocean, the hadalpelagic zone extends from 19,700 feet (6,000 meters) to the very bottom at 36,070 feet (10,994 meters) in the Mariana Trench off the coast of Japan.

The temperature is constant at just above freezing. The weight of all the water over head in the Mariana Trench is over 8 tons per square inch.

Even at the very bottom life exists. In 2005, tiny single-celled organisms, called foraminifera, a type of plankton, were discovered in the Challenger Deep trench southwest of Guam in the Pacific Ocean. The deepest . . . fish have ever been found, *Abysobrotula galathea*, was in the Puerto Rico Trench at 8,372 meters (27,460 feet).



*Typical seawater temperature profile (red line) with increasing depth*

Name: \_\_\_\_\_ Date: \_\_\_\_\_

1. What is the deepest layer of the ocean?

- A. the bathypelagic zone
- B. the epipelagic zone
- C. the hadalpelagic zone
- D. the mesopelagic zone

2. What does the text list?

- A. the temperature zones of the ocean
- B. the life forms found in the ocean
- C. the places that border the ocean
- D. the layers of the ocean, which are called zones

3. Each layer is characterized by a similar amount of visible light. What evidence from the text best supports this conclusion?

- A. "With the light comes heating from [the] sun. This heating is responsible for wide change in temperature that occurs in this zone, both in the latitude and each season."
- B. "The eyes on the fishes are larger and generally upward directed, most likely to see silhouettes of other animals (for food) against the dim light."
- C. "Due to its constant darkness, this zone is also called the midnight zone. The only light at this depth (and lower) comes from the bioluminescence of the animals themselves."
- D. "The deepest zone of the ocean, the hadalpelagic zone extends from 19,700 feet (6,000 meters) to the very bottom at 36,070 feet (10,994 meters) in the Mariana Trench off the coast of Japan."

**4.** Read these sentences from the text.

The temperature in the bathypelagic zone, unlike that of the mesopelagic zone, is constant. The temperature never fluctuates far from a chilling 39°F (4°C). The pressure in the bathypelagic zone is extreme and at depths of 13,100 feet (4,000 meters), reaches over 5850 pounds per square inch!

[. . .]

The deepest zone of the ocean, the hadalpelagic zone extends from 19,700 feet (6,000 meters) to the very bottom at 36,070 feet (10,994 meters) in the Mariana Trench off the coast of Japan.

The temperature is constant at just above freezing. The weight of all the water over head in the Mariana Trench is over 8 tons per square inch.

What can you infer about how an ocean layer is characterized?

- A. An ocean layer is characterized by similar pressure and similar temperature change.
- B. An ocean layer is characterized by different pressures and temperature changes.
- C. An ocean layer is characterized only by similar pressure.
- D. An ocean layer is characterized only by similar temperature change.

**5.** What is the main idea of this text?

- A. The epipelagic zone is the highest layer of the ocean, and it has the most visible light, with temperatures from 97°F to 28°F.
- B. The ocean has several layers, and each layer is characterized by similar pressure, temperature change, and amount of visible light.
- C. The only light in the bathypelagic, abyssopelagic, and hadalpelagic zones comes from the bioluminescence of animals.
- D. The temperatures in the bathypelagic, abyssopelagic, and hadalpelagic zones are constantly near freezing.