The Ocean and What Lives in It

**Chapter Introduction:**

The ocean is a huge part of our environment, in fact, it makes up around seventy percent of the world! One of the most fascinating parts of the ocean is the vast range of animals that live within it. There are animals that live near underwater volcanoes and then on the other end of the spectrum there are animals that live around icebergs. Within this chapter, we will look at the range of temperature, salinity, and sunlight that these animals need to survive within their environment.

**Temperature:**

The ocean can acquire a vast range of temperatures depending on the region of the world the water is within. Starting at the north pole (also known as the Artic), ocean water is extremely cold. So cold in fact that the water begins to freeze and form icebergs. If we navigate south, we will reach the equator. The Equator is the equal most point between the north and south poles. This is the hottest part of the earth, and therefore, has the warmest waters. If we continue to move south, we will reach the south pole (also known as the Antarctic). Now you may think that since the north and south poles are proportionally apart that they will be the same temperatures, however this is wrong. The south pole is actually colder! Why? Well there are multiple reasons for this. One main reason is that the Artic (north pole) is water enclosed by land. While the Antarctic is land surrounded by water. The ocean water is cold, but still warmer than ice on land, therefore heating its surrounding. Another reason is that Antarctica has mountains, the higher the elevation the lower the temperatures.

You may ask, how much colder is Antarctica than the Artic? Well, during the summer the average temperature of the north pole is thirty-two degrees Fahrenheit, while the south pole is negative eighteen degrees Fahrenheit. During the winter, the average temperature of the north pole is negative forty degrees Fahrenheit, while the average temperature of the south pole is negative seventy-six degrees Fahrenheit. These are massive differences!

**Salinity:**

 If you have ever tasted ocean water, your first response might be to spit it out. This is because we are not use to how salty the water is. Ocean water has normally thirty-five grams of ocean water in every one thousand grams of water. Science Learning Hub states that it would take around “two shipping containers full of salt to make an Olympic sized swimming pool as salty as the sea”. When salt is added to water, it changes it in different ways. One way is that salt water is denser than freshwater. This means that it weighs more than freshwater. Another way salt changes water is that when salt is added to water, it freezes at a colder temperature than freshwater. This means that in order for ocean water to freeze, the water needs to be colder. The water in your refrigerator freezes at a higher temperature than the water in the ocean.

 While the entire ocean has salt in it, there are different areas in the ocean that have less, or more salt than other places. These changes are caused by a multitude of different reasons, these being evaporation, rain, rivers, and icebergs.

In places of high salinity, there might be warm temperatures. Warm temperatures will cause water to evaporate. Evaporation is when water vapor rises into air. Salt is heavier than water vapor, therefore when the vapor rises into the atmosphere, the salt is left behind. This makes the salinity of the ocean rise.

In low places of salinity, there might be rainfall, ending rivers, or icebergs. We already learned that salt is too heavy to rise with the water vapor, this means that rainwater is freshwater. Therefore, in areas where there is an abundance of rainfall, the ocean water will have a lighter salinity because the rain water will add freshwater into the ocean. Freshwater rivers are the exact same way. Where rivers dump into the ocean, there will be less salt compared to water in that area of the ocean. When icebergs melt, they also add freshwater into the ocean.

**Sunlight:**

 The ocean has three main light zones. These are categorized based upon how far light travels into the ocean, and the depth of the ocean. The three main zones are the Euphotic zone, Dysphotic zone, and the Aphotic zone.

 **The Euphotic zone:**

 The Euphotic zone, also known as the sunlight zone, is the top layer of the ocean. This zone is where many marine animals live, as well as many fisheries cast their nets. Photosynthesis also occurs within this zone. This zone starts at the ocean surface and ends around two hundred meters, or six hundred and fifty-six feet.

 **The Dysphotic zone:**

 The Dysphotic zone is the zone that is normally referred to as the twilight zone. After two hundred meters into the ocean, light starts to rapidly decrease. There is so little light in this zone that photosynthesis is no longer able to occur. This zone starts at two hundred meters and ends at one thousand meters, or three thousand, two hundred eighty feet!

 **The Aphotic Zone:**

 The Aphotic zone, also known as the midnight zone, is the deepest part of the ocean. This is the area that contains absolutely no sunlight, and therefore cannot withhold many forms of life. This zone starts at one thousand meters and ends at the ocean floor. The deepest part of the ocean is known as “challenger deep” and is approximately thirty-six thousand, two hundred feet deep!

**Animals:**

Now that we have learned some of the main properties of the ocean, let’s talk about who lives in the ocean based upon the things we have learned.

**Animals vs. Temperature**

Different species of animals are specifically designed to thrive and live within their habitat and surroundings. Some animals have a large amount of blubber to keep them warm in cold temperatures, whereas others reduce blood flow to some organs.

 Arctic and Antarctic animals have much of the same adaptations. Because of how cold the waters are at the poles, ocean mammals need blubber to be able to keep their body temperature above the water temperature. A few of these animals include the narwhal, walrus, elephant seal, and leopard seal.

 In warmer waters you will find most other ocean mammals. Specifically, tiger sharks need to live near tropical waters. The fish tiger sharks eat also need to live near tropical waters.

**Animals vs. Salinity**

The red sea is one of the saltiest bodies of water in the world. While all marine animals can live in saltwater, there are a few species that live in the red sea. Some of species are sharks including the Oceanic White Tip, Hammerhead, Tiger, Grey reef, Thresher, Silky, Nurse, Black Tip Reef, White Tip Reef, and the Whale shark. There are eight species of dolphins that are common in the Red Sea, Bottlenose, Indopacific, Spinner, Spotted, Longbeaked, Risso’s Humpack, and Bryde’s dolphin. Along with four species of turtles, Green Sea, Hawksbill, Leatherback, and Olive-Ridley turtles.

**Animals vs. Light**

Almost all species of marine animals live within the Euphotic zone, however some species can live in deeper depths. Such as the shrimp, swordfish, and hatchet fish who live in the Dysphotic zone, and the angler fish, giant squid, and tripod fish that live in the Aphotic zone.

**Chapter Conclusion**

The ocean is an amazing and mysterious place. Scientist have only researched a small piece of the ocean, however, understanding the ocean and the animals that live within it can help scientist try and understand the secrets the ocean still withholds.

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