

# Earth's Water

## Section 3: Composition & Characteristics of Oceans

Earth's oceans are all connected; however, scientists separate the ocean waters into five main oceans that we recognize. The **Pacific Ocean** is the largest and deepest of the oceans. It's larger than all of Earth's continental land mass put together, covering about 60 million square miles. The **Atlantic Ocean** is half the size of the Pacific, and it covers about twenty percent of Earth's surface. The **Indian Ocean** is the third largest ocean. It is located between India, Africa, and the Indonesian Islands. Due to its location within the tropics, most of this ocean has warm surface temperatures. The **Southern Ocean** surrounds Antarctica and is covered by ice part of the year. The **Arctic Ocean** is the smallest and shallowest ocean. It is located near the North Pole and is also covered by ice part of the year.

Ocean water covers seventy-five percent of the Earth's surface. The condition of ocean water changes dramatically from the surface to the deep ocean floor. **Salinity** is the measure of the mass of dissolved solids in a mass of water. Seawater has an average salinity of 35 parts per thousand (ppt), so 1 kg of ocean water contains about 35 g of salt. The **salinity** of water is also saltier in warmer water than polar water since it evaporates faster, which leaves behind more salt at the surface. **Temperature** also changes from the surface to about 1000m, depending on whether it is located in polar or tropical regions. Water near the surface is affected by the weather and is typically warmer. In the deep zone of the ocean, the water is extremely cold. The pressure of water also increases as you descend through the water. The **density** of seawater is related to both salinity and temperature. Ocean water is layered, meaning the densest layers are on the bottom and the least dense layers are on the top. Since cold water is denser than warm water, salt water is denser than fresh water. This results in seawater having greater buoyancy.

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## Section 3: Composition & Characteristics of Oceans Continued

Oceans are divided into zones based on physical characteristics that include sunlight, temperature, salinity, and density. The **surface zone** is an area of shallow seawater that receives the most sunlight. Organisms that perform photosynthesis are located here because it's the only part of the open ocean that receives enough sunlight to support growth. Most marine animals, such as whales, sharks, and jellyfish, are found in the surface zone. The **middle zone** receives very little sunlight and only the blue-green wavelengths. The **deep zone** contains no light and becomes darker and colder as you descend. Plants that photosynthesize are not found here because there is no light. Many organisms produce light using chemicals in a process called **bioluminescence**. Animals in this zone must be good hunters to survive because limited resources are found here.



The diversity of wildlife on the oceanic zones

### Review:

1. Identify the five oceans.
2. What does salinity mean?
3. Explain bioluminescence.