

Ocean Motions ▪ *Section Summary*

Ocean Water Chemistry

Guide for Reading

- How salty is ocean water?
- How do the temperature and gas content of ocean water vary?
- How do conditions in the ocean change with depth?

Ocean water contains dissolved salts. The salt that is most common in ocean water is sodium chloride, also known as table salt. Ocean water also contains smaller amounts of magnesium, calcium, potassium, and several other substances.

The total amount of dissolved salts in a sample of water is the **salinity** of that sample. **On average, one kilogram of ocean water contains about 35 grams of salts—that is, 35 parts per thousand.** Salinity is lower near the surface, where precipitation and melting ice add fresh water to the ocean. It is also lower near the mouths of large rivers that empty large amounts of fresh water into the ocean. Salinity is higher where evaporation is high, such as in hot, dry climates. It is also higher near the poles, where surface water freezes into ice and leaves the salt behind.

The dissolved salts in ocean water give it different properties from those of fresh water. Ocean water is more dense than fresh water. Because of its greater density, ocean water has more buoyancy than fresh water. This means that it lifts, or buoys up, less dense objects floating in it.

Like temperatures on land, temperatures at the surface of the ocean vary with location and the seasons. Gases in ocean water vary as well. Two gases found in ocean water that are necessary for living things are oxygen and carbon dioxide.

The surface of the ocean absorbs energy from the sun and heats up. Because warm water is less dense than cold water, the warm water stays on the surface. Surface water is warmest near the equator and becomes colder as you travel away from the equator. Since cold water can hold more dissolved oxygen than warm water, there is more oxygen in polar waters than in tropical waters.

If you could travel from the surface of the ocean to the ocean floor, you would pass through a vertical section of the ocean called the water column. Conditions change greatly as you travel down through the water column. **Temperature decreases as you descend through the ocean.** It drops to about 4°C at 1 kilometer below the surface. Below that, the temperature stays at about 3.5°C throughout most of the ocean. **Pressure increases continuously with depth in the ocean.** This is an obstacle to underwater exploration. A diver can descend safely to only about 40 meters. To go deeper, scientists must use a **submersible**, an underwater vehicle built of strong materials that resist water pressure.