

An underwater scene featuring a diverse coral reef. In the foreground, there are large, brown, brain-like coral structures and a single, reddish-brown, fan-shaped coral. The reef extends into the background with various other coral species. Several fish are visible, including a prominent yellow-striped snapper in the center and a larger, silver fish with a yellow stripe on the left. The water is clear and blue, with light filtering through from above. The text "The Composition of Seawater" is overlaid in white, sans-serif font across the middle of the image.

# The Composition of Seawater

## Chapter 15.1

# Salinity

- **Salinity** is the total amount of solid material dissolved in water
- Oceanographers typically express salinity in *parts per thousands*
- Most of the salt in seawater is sodium chloride, common table salt
- Salt concentration is 3.5% salt (35 ppt)

# Sources of Sea Salt

- ***Chemical weathering*** of rocks on the continents is one source of elements found in seawater
- The second major source of elements found in seawater is from ***Earth's interior***



# Processes Affecting Salinity

- Processes that *decrease* salinity:

- Precipitation
- Sea ice melting
- Runoff from land



- Processes that *increase* salinity:

- Evaporation
- Formation of sea ice



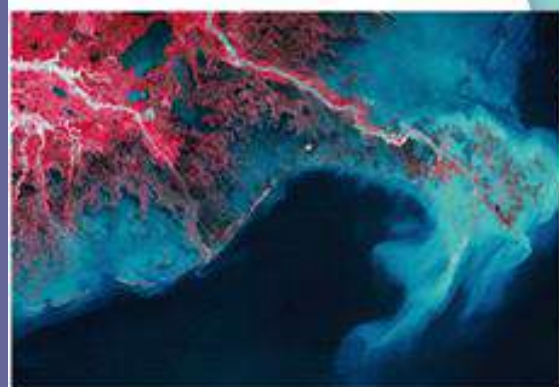
# Processes Affecting Salinity



Icebergs



Sea ice



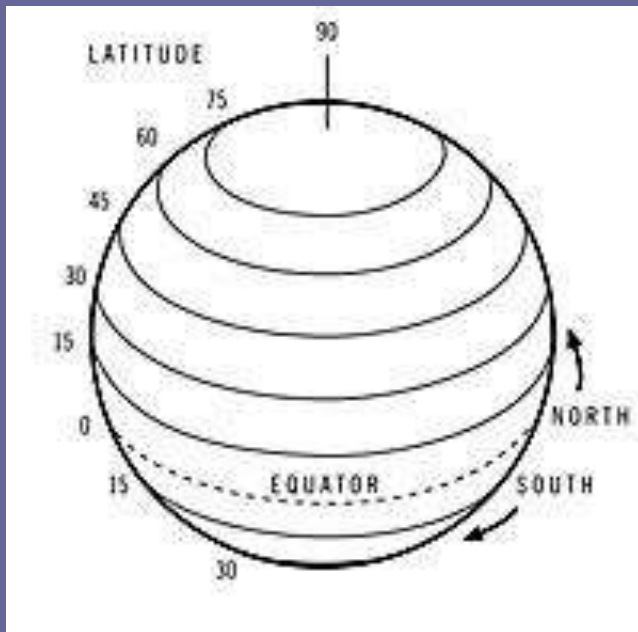
Runoff



Evaporation

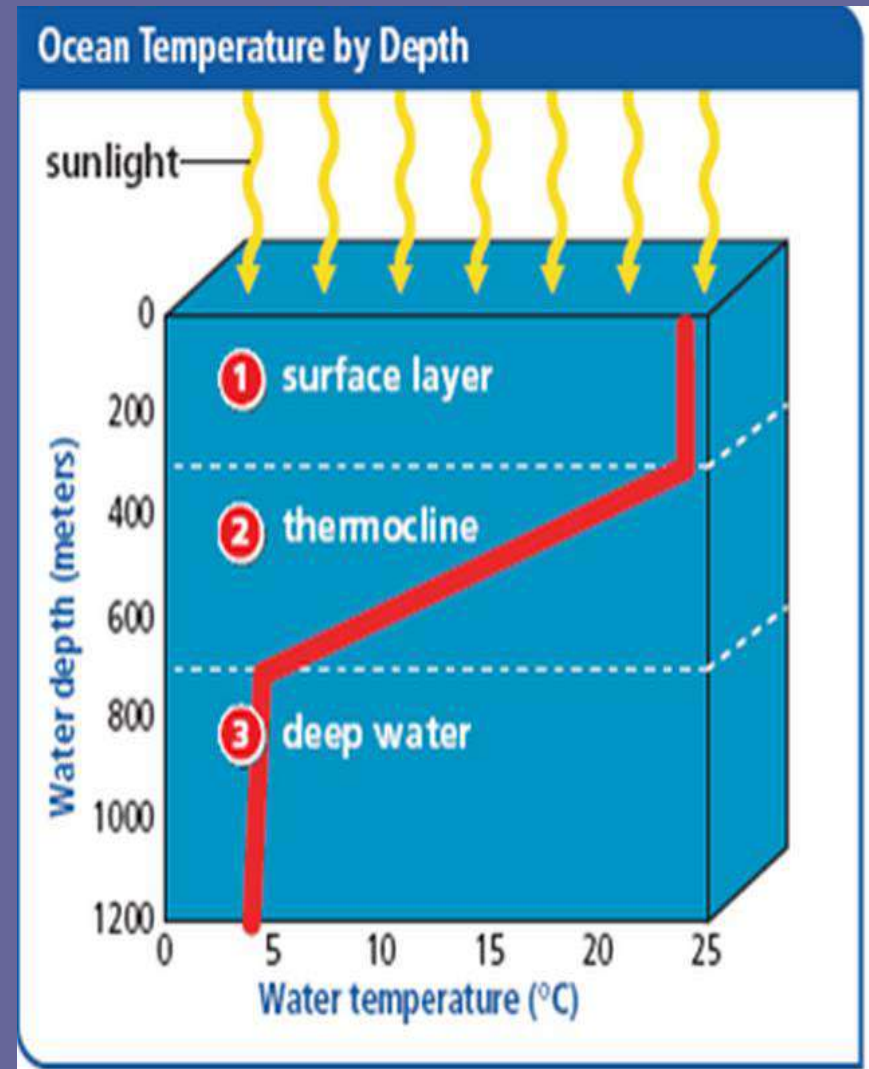
# Ocean Temperature Variation

- The ocean's surface water temperature varies with the amount of solar radiation received, *which is primarily a function of latitude*

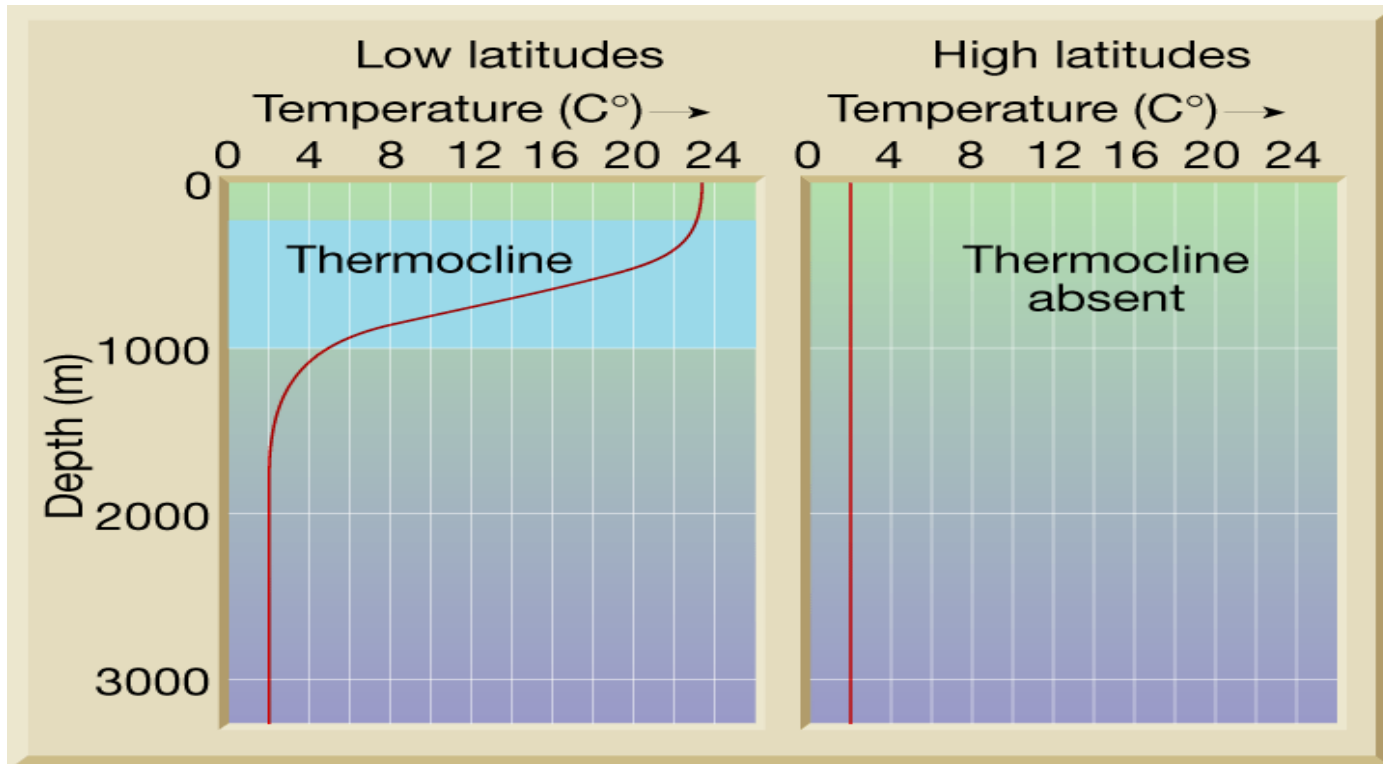


# Temperature Variation with Depth

The thermocline is the layer of ocean water between about 300 meters and 1000 meters where there is a rapid change of temperature with depth.



# Variations in Ocean Water Temperature



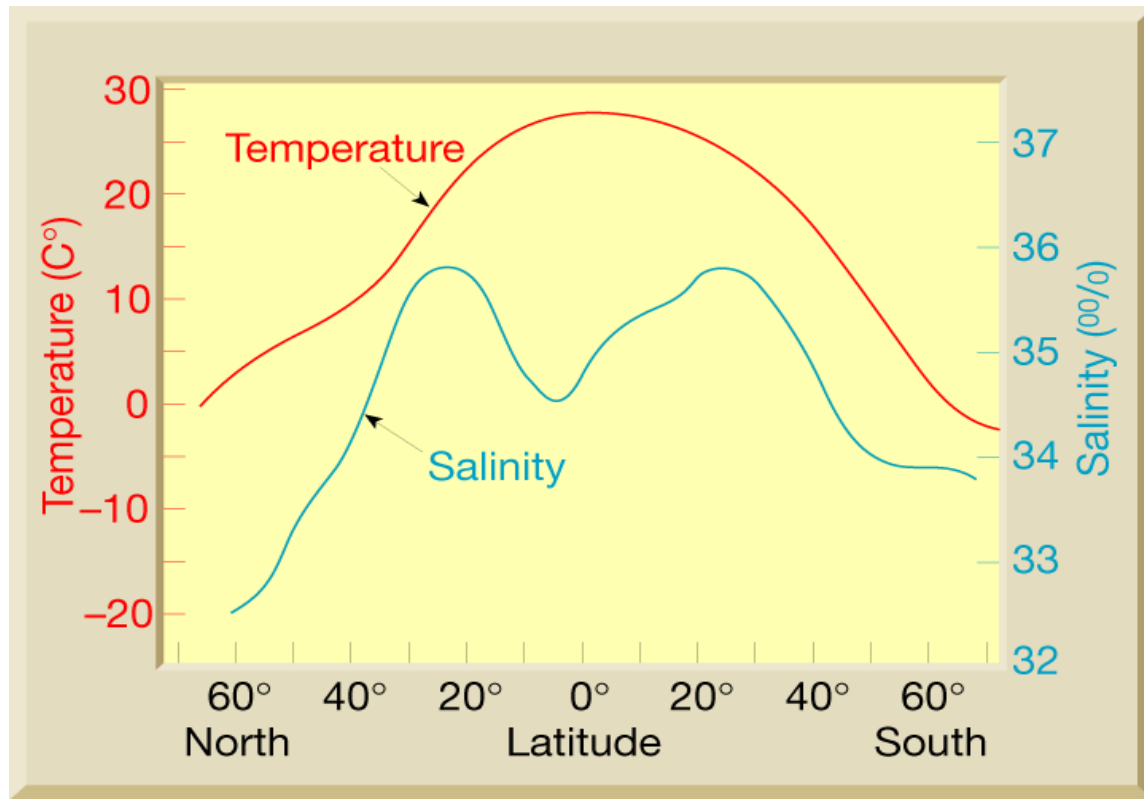
The thermocline is a very important structure because it creates a barrier to marine life.



# Ocean Density Variation

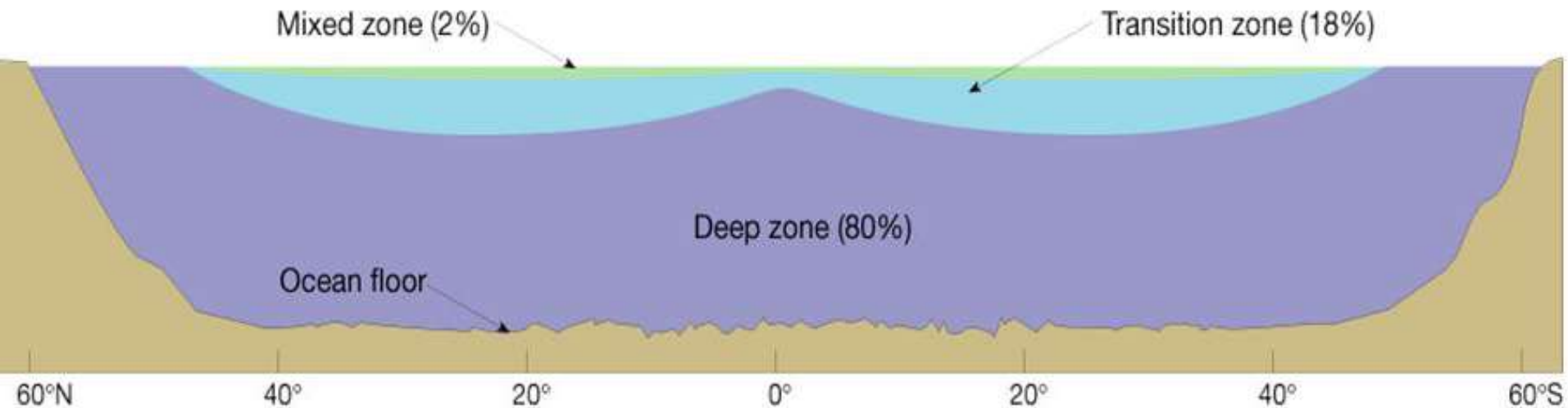
- **Density** is defined as mass per unit volume
  - It can be thought of as a measure of how heavy something is for its size
- Seawater density is influenced by two main factors: ***salinity*** and ***temperature***

# Variations in Ocean Surface Temperature



# Ocean Layering

- Oceanographers generally recognize a three-layered structure in most parts of the open ocean
  - A shallow surface zone (mixed zone)
  - A transition zone (thermocline)
  - A deep zone (constant)



# Ocean Layering

- **Surface Zone**
  - Shallow (300 to 450 meters)
  - Sun-warmed zone
- **Transition Zone**
  - Between surface layer and deep zone
- **Deep Zone**
  - Sunlight never reaches this zone
  - Temperatures are just a few degrees above freezing
  - Constant high-density water

# Group Research

## Text CH 15.2/15.3

- 1) What marine life zones are associated with ocean layering? How did you compare them? Explain your reasoning.
- 2) What types of marine organisms are typically found in these zones? What are the benefits of these areas?
- 3) What factors may affect the depth of the photic zone in any given area of the ocean?