

Oceanography

I. Physical Properties of Water

a. Heat Capacity

- i. The ability of a liquid to absorb and release heat without a major change in temperature.
- ii. Water has a HIGH heat capacity
- iii. This is essential for sustaining life on earth because water's heat capacity helps to maintain a consistent environment.
- iv. Air temperature fluctuates much faster than water; without water the air temperature would have a much greater range resulting in unsuitable conditions for life on Earth.

b. Density

- i. Density = (mass/volume)
- ii. Density is responsible for SINKING and FLOATING
- iii. Higher density objects SINK
- iv. Fresh-water's density is 1.00 g/ml
- v. Saltwater's density is 1.020 g/ml
- vi. Things That Effect Density
 1. Temperature
 2. Salinity
 - a. Increasing amount of salt dissolved in water also increases the density.
 - b. Creation of a salt wedge is based on this because the denser saltwater will sink, the less dense freshwater will float

c. Salinity

- i. The amount of dissolved particles (ions, minerals) in water
- ii. Water's ability to dissolve, or act as a solvent, is based on its partial polarity in its molecules
- iii. This partial polarity is also responsible for COHESION
- iv. Things than can affect salinity
 1. Evaporation means less water, so salt concentration increases
 2. Freezing means less water, so salt concentration increases
 3. Precipitation means more water, so salt concentration decreases
 4. Thawing (melting) means more water, so salt conc. decreases

d. Viscosity

- i. The "thickness" of a liquid
- ii. The tendency of a liquid to resist the separation of its molecules
- iii. Viscosity directly effects marine organisms because it will effect swimming (movement) efficiency

e. Pressure

- i. The force applied uniformly over a surface
- ii. Increasing the amount of water, increases the force pressing down on an object; THEREFORE, with increasing depth, you increase the pressure.

You should also know this diagram. Remember that most fish live in the **epipelagic zone** (same area of the ocean as the **photic zone**) and that light does not penetrate the entirety of the

ocean. Different wavelengths of light penetrate with different efficacy (refer to the charts in your notes).

