PEER Life Science Water’s the Matter Measuring Oxygen Notes Outline

**Introduction**

* Oxygen in water is one of the most important factors in an aquatic environment.

**Lesson**

* Dissolved Oxygen is the amount of oxygen that is present in water.
* Molecules of Water trap molecules of oxygen to keep it in a dissolved form.
* Gills allow fish and some aquatic insects to remove some of the dissolved oxygen from the water.
* While organisms must have a maximum/minimum amount of oxygen to survive, there is no maximum/minimum amount for dissolved oxygen in the water supply.
* Air consists of about 78% nitrogen and about 21% oxygen.
* Attractive forces suspend the oxygen molecules between the water molecules when oxygen is dissolved in water.
* Because the oxygen content in water is 0.001%, gills must be more/less efficient than lungs in extracting oxygen.
* Diffusion is the movement of substance from an area of higher/lower concentration to an area of higher/lower concentration.
* Atmospheric or barometric pressure is measured in units of inches of mercury
* A more turbulent body of water will have a larger surface area that will allow more/less oxygen to diffuse into the body of water.
* Aquatic plants and algae use carbon dioxide as fuel and generate oxygen as a waste product, which will be dissolved into water. This process will be reversed at night.
* Dissolved Oxygen is measured in mg/L or parts per million (ppm).
* The highest amount of oxygen that can be dissolved in water under standard barometric pressure, otherwise known as the saturation point, is 12 mg/L.
* Cold water organisms require a minimum dissolved oxygen level of at least 6.0 mg/L while warm water organisms require a minimum dissolved oxygen level that is higher/lower than that required of the cold water organisms, but will become stressed if the dissolved oxygen levels drop below 4.0-5.0 mg/L.
* The higher the temperature, the higher/lower the amount of dissolved oxygen.
* As altitude increases, the atmospheric (barometric) pressure increases/decreases, which causes the amount of oxygen diffused into the water to increase/decrease.
* Organic material, like parts of trees and plants, do not directly remove dissolved oxygen, but create conditions where large amounts of bacteria accumulate that will drive the overall oxygen level down.
* Freshwater can hold more/less dissolved oxygen than saltwater.
* Dams slow the flow of water, increase/decrease the amount of aeration, and increase/decrease the temperature. These effects will increase/decease the dissolved oxygen level.
* Human waste carries large amounts of oxygen-consuming bacteria that will increase/decrease the amount of dissolved oxygen.
* Nitrates and Phosphates in fertilizers will increase/decrease the rate of plant growth. This will increase/decrease the amount of organic materials and allow algae to grow faster/slower, which will lead to a(n) stable/unstable dissolved oxygen level.
  + These processes together are called eutrophication.