PEER Life Science Water’s the Matter Measuring Nitrates Notes Outline KEY

**Introduction**

* The presence of nitrates does not have a direct effect on aquatic insects and fish like there is with temperature and dissolved oxygen.
* Algae and aquatic plants use nitrates as a source of the nutrient nitrogen. Unlimited access to nitrates causes the growth of algae to be unchecked.
* Large amounts of algae can cause extreme fluctuations in the amounts of dissolved oxygen in the water.
* Nitrates can affect human health by interfering with the ability of red blood cells to transport oxygen.

**Lesson**

* Nitrogen forms a part of the proteins, DNA, and RNA that is found in all cells and is essential for all living things. Animals can get nitrogen from eating plants and other animals.
* Plants get nitrogen from water or from the soil by absorbing it in the form of nitrates and ammonium.
* In the Nitrogen cycle, nitrogen is recirculated between the air and soil.
* Ammonia can come from the waste of aquatic organisms and when aquatic plants and organisms die. This is first changed into nitrites by bacteria in the water before being converted by other bacteria into nitrates.
* Nitrates (NO3-) are an oxidized form of nitrogen and are formed by combining oxygen and nitrogen. Nitrates can also come from the earth due to the organic matter in soil that can contain nitrogen compounds.
* Many sources of excess nitrates come from anthropogenic activity, like agricultural activities, stormwater drainage, human wastewater, and industrial pollution.
* The runoff from nitrogen fertilizer that is used to fields to promote growth can cause nitrates to seep into the ground water.
* Untreated human sewage can contribute to nitrate levels in surface and ground water. Poorly functioning septic systems are a source of these nitrates .
* Excess nitrates can also come from natural sources, such as from bird excretions.
* Nitrates are highly soluble, which means that they easily dissolve in water. Nitrates are also colorless and odorless, so their presence cannot be determined without the use of special testing equipment.
* Infants are more at risk for nitrate poisoning and can turn “blue” if there isn’t enough oxygen being transported by their blood. This condition, known as ”blue baby syndrome” can cause brain damage or death.
* Excess nitrates in the water can be a source of fertilizer for aquatic plants and algae. An algal bloom is caused by excessive growth of plants and algae.
* Excess plants in a body of water can create an unstable amount of dissolved oxygen that can create stressful conditions for fish.
* High densities of algae can create conditions where sunlight cannot reach very far into the water, which can cause some plants and algae to die off. The dead organic matter can settle on the bottom and increase the amount of bacteria in the water. This process is called eutrophication.
* Nutrient pollution is one of America’s most widespread, costly, and challenging environmental problems. The Environmental Protection Agency has programs in place to help reduce this problem.