



# Black Earth Creek & Limnology Minifacts & Analysis

## Sheet 3

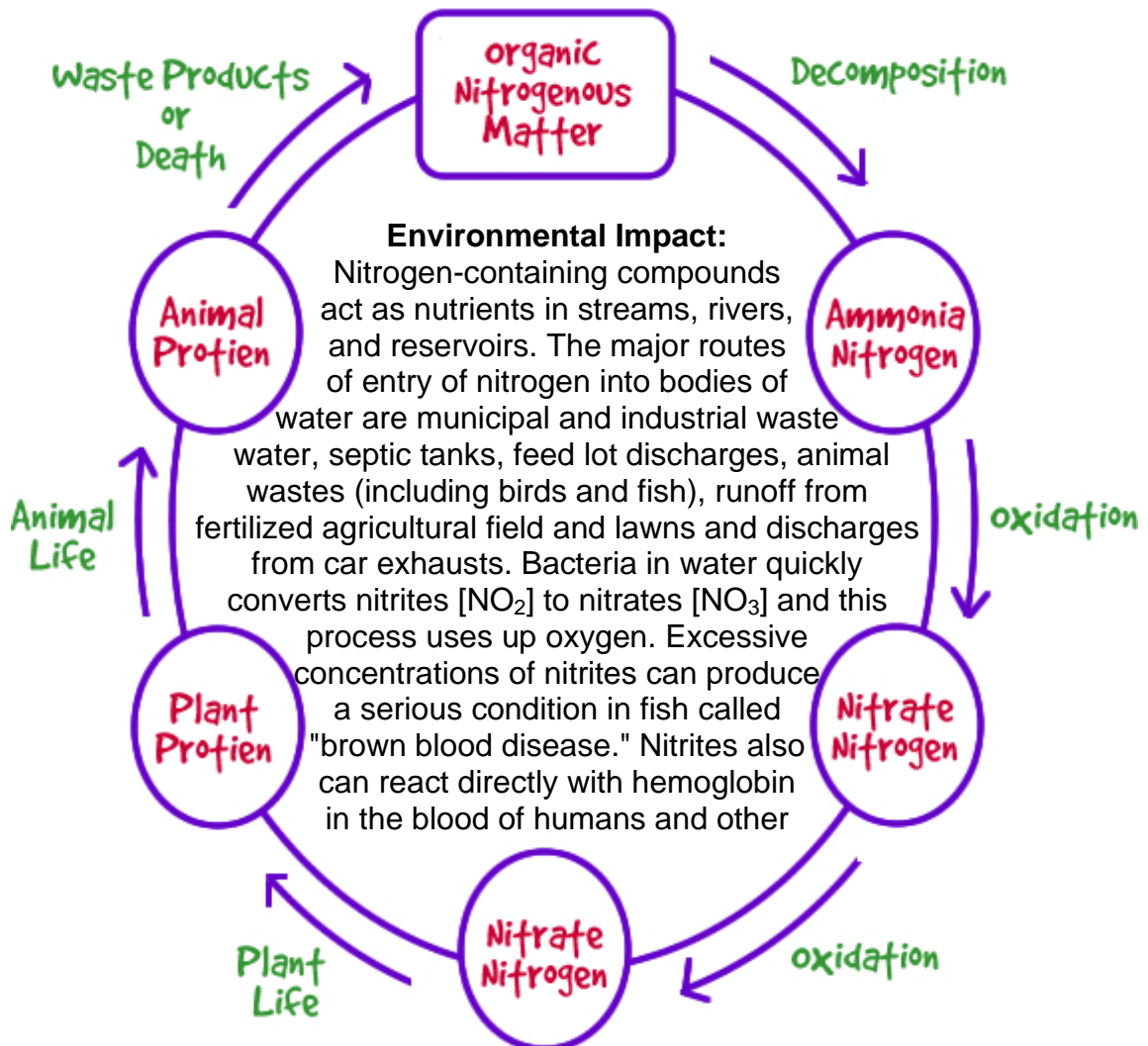
### Nitrogen Amounts in Water

#### Information on Nitrogen Amounts & Water Quality

## Nitrogen cycle

#### Introduction

Nitrogen is one of the most abundant elements. About 80 percent of the air we breathe is nitrogen. It is found in the cells of all living things and is a major component of proteins. Inorganic nitrogen may exist in the free state as a gas  $N_2$ , or as nitrate  $NO_3^-$ , nitrite  $NO_2^-$  or ammonia  $NH_3$ . Organic nitrogen is found in proteins, and is continually recycled by plants and animals. The nitrogen cycle is shown here:



warm-blooded animals to produce methemoglobin. **Methemoglobin** destroys the ability of red blood cells to transport oxygen. This condition is especially serious in babies under three months of age. It causes a condition known as methemoglobinemia or "blue baby" disease. Water with nitrate levels exceeding 1.0 mg/L should not be used for feeding babies.

High nitrates in drinking water can cause digestive disturbances in people. Nitrite/nitrogen levels below 90 mg/L and nitrate levels below 0.5 mg/L seem to have no affect on warm water fish.

The major impact of nitrates/nitrites on fresh water bodies is that of enrichment or fertilization called **eutrophication**. Nitrates stimulate the growth of algae and other plankton which provide food for higher organisms (invertebrates and fish); however an excess of nitrogen can cause over-production of plankton and as they die and decompose they use up the oxygen which causes other oxygen-dependent organism to die.

### **Method of Testing:**

1. Fill a test tube (0124) to the **5 mL line** with sample water.
2. Add one **Nitrate #1 Tablet** (2799). Cap and mix until tablet disintegrates.
3. Add one **Nitrate #2 Tablet** (NN-2791). Cap and mix until tablet disintegrates.
4. **Wait 3- 5 minutes.**
5. Insert Nitrate-Nitrogen Octa-Slide (3492) into Octa-Slide Viewer (1100). Insert test tube into Octa-Slide Viewer. Match sample color to a color standard. Record a ppm (parts per million) nitrate-nitrogen.
6. Multiply nitrate-nitrogen **by 4.4** and record as ppm nitrate.

### **Criteria:**

- Nitrates/nitrites should remain below **10 mg/L in water** to be used as a domestic water supply.
- Water with nitrate levels exceeding **1.0 mg/L** should **not** be used for **feeding babies**.
- Nitrite/nitrogen levels **below 90 mg/L** and nitrate levels **below 5.0 mg/L** seem to have no affect on warm water fish.