

Time – 15 minutes

Persons - 1

Materials -

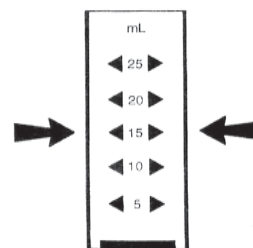
- Chemetrics Nitrate Sampling Kits

Sunlight can damage the ampoules in your Nitrogen kit. Keep them shaded at all times.

- This test detects nitrate at concentrations of 0.1 to 3 mg/l (ppm).

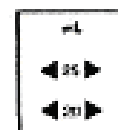
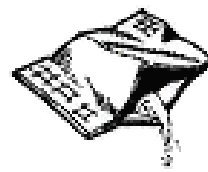
## Step 1

1. Pre-rinse collection bottle with stream water.
2. Fill the sample cup to the 15 ml mark with your water sample.



## Step 2

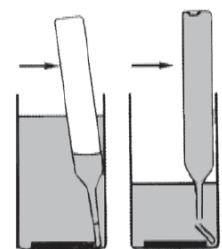
1. Empty the contents of one Cadmium Foil Packet into the sample cup. Use caution when handling the Cadmium Packet. Tear it carefully or open with scissors. Do NOT use your teeth.
2. Cap the sample cup and shake it vigorously for exactly 3 minutes.
3. Allow the sample to sit undisturbed for 30 seconds.



## Step 3

1. Place the ampoule in the sample cup.
2. Snap the tip by pressing the ampoule against the side of the cup.

The ampoule will fill leaving a small bubble to help mixing.



## Step 4

1. Mix the contents of the ampoule by turning it up and down several times, allowing the bubble to travel from end to end each time.
2. Wipe all liquid from the outside of the ampoule.

# Nitrate - Continued

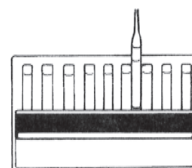
## Step 5

1. Wait 10 minutes for color development.

## Step 6

1. Use the comparator to determine the level of nitrate-nitrogen in the sample.

Hold the compactor horizontal while standing underneath a bright light source. Place the ampoule between the color standards moving it from right to left along the comparator rack until the best color match is found.



## Step 7

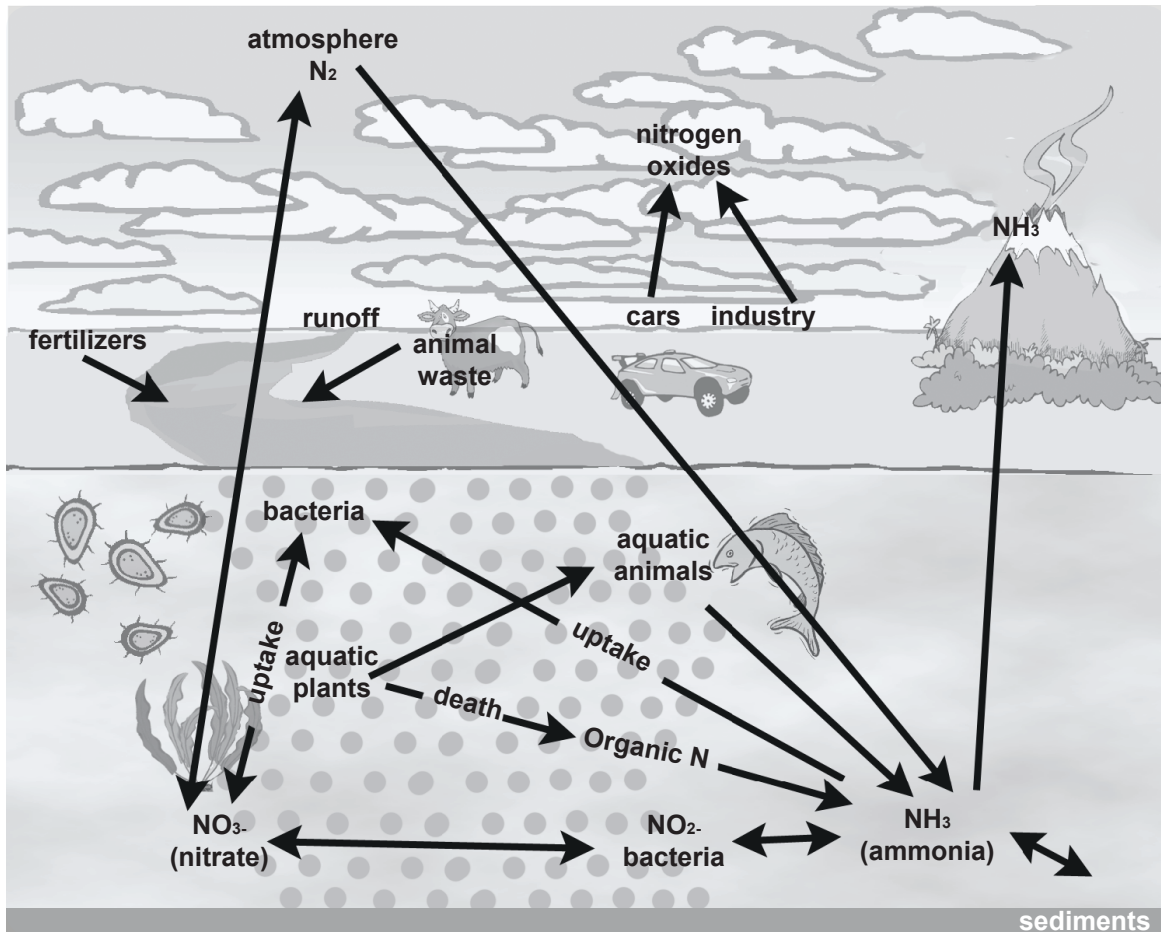
1. Record the number of the best match on the comparator on the board. This is your nitrate-nitrogen concentration in mg/l (ppm).

**In Utah:**

The maximum concentration of nitrate allowed in drinking water is 10 mg/l.

The State of Utah considers nitrate concentrations of 4 mg/l in stream water to be an indicator of pollution problems.

# The Nitrogen Cycle



Source: Gilbert Graphics

## Global reservoirs of nitrogen:

- Stream and lake sediment
- Living plants and animals
- Dead plants and animals
- Animal waste
- Soils
- Atmosphere
- Lakes and rivers
- Ocean
- Fertilizers
- Groundwater
- Rain water

## How nitrogen moves from one reservoir to another:

- Uptake by plants
- Eaten by animals
- Decay of dead material
- Rainfall
- Surface runoff
- Bacterial conversion
- Nitrogen fixation
- Denitrification
- Nitrification
- Lightning
- Volcanic eruptions
- Animal waste
- Groundwater movement

# Nitrogen Sources

Global Sources of Biologically Available (Fixed) Nitrogen	
ANTHROPOGENIC (HUMAN) SOURCES	ANNUAL RELEASE OF FIXED NITROGEN (teragrams)*
Fertilizer	80 tg
Legumes and other plants grown as crops	40 tg
Fossil fuels (coal plants and automobiles)	20 tg
Biomass burning	40 tg
Wetland draining	10 tg
Land clearing	20 tg
<b>Total from human sources</b>	<b>210 tg</b>
NATURAL SOURCES	
Soil bacteria, algae, lightning, etc.	140 tg

Source: Peter M. Vitousek et al. 1997. "Human Alteration of the Global Nitrogen Cycle: Causes and Consequences," *Issues in Ecology*, No. 1, pp. 4-6.

\* 1 tg (teragram)  
is equal to 1 million  
metric tons