MEASURING WATER QUALITY: NITRATE

**WHAT IS NITRATE?**

Nitrate is a **chemical** characteristic of water. Nitrate is a nitrogen-based nutrient created by natural and man-made processes. It is measured in parts per million (ppm). Just like dissolved oxygen, ppm is the measure of how many particles of nitrate are found in a given volume of water.

**WHY IS NITRATE IMPORTANT?**

Nitrate is a nutrient that is necessary for plant and animal growth. However, in high concentrations, nitrate can cause plants and algae to overgrow, causing problems like algae blooms. As plants and algae grow and die, more “food” becomes available for bacteria. In turn, bacteria populations increase and deplete the stream of oxygen for other organisms, such as fish and insects. Nitrate is also commonly found in sewage and fertilizers. Leaky sewage pipes and runoff from farms cause excess nitrate to enter the stream. High concentrations of nitrate in a stream can indicate pollution and can be harmful to human health and water quality.

**ACTIVITY**

Measure nitrate of the stream site you selected. You will then rate water quality based on the nitrate concentration and make observations about the stream that help to explain your results.

**MATERIALS**

* Water test kit plastic cup
* One 10 milliliter (mL) plastic test tube
* One nitrate tablet
* Stopwatch / timer / smartphone
* Nitrate color chart
* Datasheet & pencil
* **Optional**: instructional video, *“Measuring Nutrients”*, found at www.oei2.org/water-quality-sampling/

**INSTRUCTIONS**

1. **Measuring Nitrate**
2. From the stream sample in the cup, pour water from the test kit cup into the plastic test tube to the 5 mL line
3. Place the test tube in the protective sleeve
4. Add one nitrate tablet to the tube, place the cap on, and shake for 2 minutes
5. Let the test tube sit in the plastic sleeve for 5 minutes
6. After 5 minutes, remove the test tube from the protective sleeve and use the nitrate color chart to find the nitrate concentration of your sample; if you find that the color of your sample does not match the color options on the chart, you may estimate the correct nitrate concentration; for example, if you find that the color of your sample is between 20 and 40 ppm, you may determine that nitrate should be 30 ppm; you may not see a color change at all, in which case nitrate is < 5 ppm
7. Record the nitrate level of your sample in the table below, as well as the date and time you took the reading

**Nitrate Data Table**

|  |  |
| --- | --- |
|  | **Result** |
| **Nitrate Level** |  |
| **Date** |  |
| **Time** |  |

1. **Assessing Water Quality**
2. Using the ratings below, determine if the nitrate level you found at your stream site is good, fair, or poor. Circle the correct choice:

< 5 ppm = Good 5-19 ppm = Fair 20-40 ppm = Poor

1. What observations did you make at the stream that could help explain the nitrate level you measured?
2. What is one way we could help nitrate levels stay low in streams?