

Environmental Youth Connection Lesson Plan

Title: Dissolved Oxygen

Submitted by: Kristi Jackson, Environmental Educator

Age level: 4th grade

Natural Environment required for teaching activity:
Lake, Stream, Pond, or any wetland

Location: Waupaca River, Rachel Carson Trail

Directions and driving time:

Walk time: allow 5 to 10 minutes from Waupaca Learning Center

Bike time:

Accessibility:

Other possible park locations: Brainerd's Bridge, South Park, Riverview Park, Oz Natural Area, Hartman Creek State Park, Pauer's, or any other Natural area with a wetland

Related subjects:

Materials: LaMotte Dissolved Oxygen Test Kit, Code 5860

Waste Container for liquids

Safety Glasses

Additional necessary supplies:

Paper Towels

Other possible supplies:

Water depth sampler

Objectives:

Knowledge of DO

Occurrence and depletion levels (range)

Factors that affect, change DO

Results of DO

Awareness of chemical changes within DO test

Precipitate, flocculent (fluffy precipitate), color changes

Curriculum standard connection:

Background information: Investigating Water Problems, P. 19

Name some substances that can dissolve in water.

i.e. sugar, salt, koolaid, carbon dioxide in pop

What does the word "dissolve" mean?

One substance physically spreads out into another material and retains its molecular structure and characteristics and also can be physically separated again. (i.e. evaporate off water)

Why measure DO?

Measure of purity of water

How does oxygen get in the water?

Wind, turbulence and vegetation

Who in the water uses dissolved oxygen?

Fish

What happens if the DO is too low?

Fish die

Too high?

Causes gas bubble disease (in aquariums, fish tanks, not naturally)

Range – at least 4.0 ppm – usually 5 ppm and above

Can fish live in this river? (check DO)

What can cause change in amount of DO?

INCREASE DO

Cold water

Fresh water

Less organic matter

No pollution

DECREASE DO

warm water

salt water

more organic matter
(decomposition of organisms)

pollution (liquid or solid)
Acid rain (air pollution)

Procedure: See Chemical Test Procedure for Dissolved Oxygen With LaMotte Kit
Chemical Test Procedure for Dissolved Oxygen
With LaMotte Kit

Rinse sample bottle with water to be tested.

Carefully fill sample bottle while submerged and cap underwater. Check for bubbles. Put on safety glasses.

Fix the Sample (can then be transported to finish test)

1. Add 8 drops of Manganous Sulfate Solution and 8 drops of Alkaline KI Azide.

Invert 20 times.

2. A precipitate (called a flocculent) will form. Allow the precipitate to settle below the shoulder of the bottle.

3. Add 8 drops of Sulfuric Acid, H_2SO_4 . Sulfuric acid is a strong acid and should be handled very carefully.

Invert 20 times. (clear yellow to brown orange color)

Test procedure

1. Fill the titration tube with fixed sample to the 20 mL mark.
2. Fill the titrator with Sodium Thiosulfate.
3. Insert titrator into center hole of the titration tube cap.
4. While gently swirling the tube, slowly press the plunger to titrate dropwise until the yellow brown color is reduced to a very faint yellow.
5. Add 8 drops of Starch indicator solution. (blue)
6. Continue titration until blue color just disappears.
7. Record results in ppm (parts per million).

Evaluation of lesson plan by student:

Why important to the community?

How could this activity be improved or supplemented?

What laws or regulations impact this activity?

Can you identify a service component to this activity?

Evaluation of lesson plan by teacher:

How easy was this to use?

Are there tasks missing or information that needs to be updated?

Are there components or verbiage you would add or change to make this easier to use?