

Gas Transfer

Course/Grade Level: 9-12

Experiment Duration: 30 minutes

Website Link to Experiment:

[Gas Transfer | Rowan Research | Rowan University](#)

Expectations:

Be able to collect data or use the sample data to graph the points on an X and Y plot and determine the slope of the line, where the slope is the gas transfer coefficient, K_{LA}

Sample Data/Tables if Needed:

To be added later along with the graph to be used

Context for Learning

Objective:

Understand how treatment works using transfer of gas to treat wastewater and surface water using various chemicals to maintain safe levels of organic matter in water.

How this experiment relates to wastewater/water treatment:

Gas transfer is an important process used in wastewater/water treatment to maintain safe levels of organic matter in the water.

Instructional Delivery

Materials:

1. Pond water (1000 mL)
2. (1) 2000 mL beaker
3. (1) Hot plate stirrer
4. (1) Magnetic stirrer
5. (1) mL measuring tool
6. (1) Dissolved oxygen meter and probe
7. Cobalt chloride (4 mL)
8. Sodium Sulfate (8 mL)
9. (1) Stopwatch
10. (1) Aerator

Procedures:

1. Place 1000 mL of the pond water into the beaker.
2. Set the beaker on top of the hot plate stirrer, and place the magnetic stirrer inside the beaker.
3. Turn on the hot plate stirrer.
4. Insert the dissolved oxygen meter and probe and record the temperature of the water.
5. Add 4 mL of cobalt chloride.
6. Gradually add 8 mL of sodium sulfite, or until the dissolved oxygen meter is between 2-3 mg/L
7. After the ideal dissolved oxygen reading is obtained, turn off the hot plate stirrer.
8. Have a stopwatch ready, once the aerator is turned on and placed inside the beaker, record the dissolved oxygen values every 10 seconds for 2 minutes, and every minute for 18 minutes.

9. Plot the data on the provided graph, or in Excel.
10. Use the equation $y = mx + b$ to determine the slope, m , which is the gas transfer coefficient, K_{LA}

Assessment/Evaluation

Questions:

- Where are some places where algae grows?
Oceans, lakes, rivers, and ponds.
- Why is too much algae a bad thing?
 - The overgrowth of algae consumes the oxygen in the water, and blocks sunlight from underwater aquatic plants
- Why do we transfer oxygen into water?
 - To deter the spread of algae and protect aquatic life.
- Why is it important to maintain a steady range of oxygen in water?
 - Too much oxygen or too little oxygen can be harmful to aquatic life.

Notes: