

Name _____ Class _____ Date _____

Dissolved Oxygen and Temperature Lab

Background: In this experiment, you will try to find out what happens to the amount of dissolved oxygen when the temperature of the water increases or decreases. This will help you understand how seasonal changes as well as long-term changes, such as climate change, might affect aquatic ecosystems.

Before you begin: Make a hypothesis about what you think will happen: Will cold water hold more or less dissolved oxygen? _____

Copy this data table in your lab notebook, and make enough columns for all the groups in your class plus the average:

Temperature (when sealed)	DO in jars when opened: Group 1	DO in jars when opened: Group 2	DO in jars when opened: Group 3	DO in jars when opened: Group 4	DO in jars when opened: Group 5	DO in jars when opened: Average
50° C						
100° C						

Procedure:

1. Obtain a DO test kit from your teacher.
2. Test the temperature of the two samples of unsealed water: ice cold water and room temperature. Record your result and then test the DO of these two samples.
3. Next, carefully obtain a water sample from the water that was heated to 50° C and test the DO level.
4. Obtain a sample from the water that was heated to 100° C, perform the DO test, and record your results.
5. Compare your results with that from the other groups, and find the average.

Discussion questions:

1. Describe the difference in what happened with your predictions. Why do you think you got your results? Explain in as much detail as you can.
2. Include a line graph of your results showing the result for each temperature from each group. You could add a trendline to your graph.
3. What would you expect the amount of dissolved oxygen to be if you heated a sample of water to 75 C?
4. Based on your results, what can you say about the relationship between dissolved oxygen and water temperature?
5. What kinds of human activities could create a higher water temperature? What kinds of natural events could create a higher water temperature?
6. When do you expect fish and other aquatic organisms to have the most problems getting enough dissolved oxygen?

Modified with permission from: "When the oxygen goes..." 1997. Living in Water, National Aquarium in Baltimore, Kendall Hunt Publishing, Iowa.

Part 2: Seasons in the Hudson

In your lab, you learned about the relationship between dissolved oxygen (DO) and temperature. Complete the following sentences:

When the temperature increases, the dissolved oxygen _____.

When the temperature decreases, the dissolved oxygen _____.

Now, you will be able to take some data collected in the Hudson River and prove the relationship between DO and the seasons. Open the dataset titled “DO and Temp Seasonal”. This dataset was collected in the Hudson River over 19 years by Cary Institute scientists. The numbers in the seasons column refer to specific times of the year:

Season 1: April/May

Season 2: June/July

Season 3: August/September

Season 4: October/November

Graph both Dissolved Oxygen and Temperature (you’ll need to add a secondary axis; one for DO and one for temperature) as a line graph in Excel. You don’t need to graph all of the years; 5-10 years of data will be enough for you to see the trend. When you are finished with your graph, you should answer the questions below.

1. During what time of year did the highest temperatures occur? The lowest?
2. During what time of year did the highest DO levels occur? The lowest?
3. Based on your lab activity and these data, what can you say about the relationship between dissolved oxygen and temperature?
4. During what time of year do you think plants and animals would be under the most stress? Why?
5. Do these data give you enough information about the types of dissolved oxygen stress the aquatic ecosystem might experience?