

Lab 1: introduction to science essay examples

[Environment](#), [Water](#)



Lab 1 - Exercise 1: Data Interpretation

Dissolved oxygen is oxygen that is trapped in a fluid, such as water. Since many living organism requires oxygen to survive, it is a necessary component of water systems such as streams, lakes and rivers in order to support aquatic life. The dissolved oxygen is measured in units of parts per million (ppm). Examine the data in Table 4 showing the amount of dissolved oxygen present and the number of fish observed in the body of water the sample was taken from; finally, answer the questions below.

Questions

- What patterns do you observe based on the information in Table 4?

Very few fish were observed in dissolved oxygen levels under 4 ppm. It appears from the data that as soon as there is 6 ppm of dissolved oxygen in the water, it supports an average of 12 fish.

- Develop a hypothesis relating to the amount of dissolved oxygen measured in the water sample and the number of fish observed in the body of water?

Hypothesis: A minimum of 6 ppm of dissolved oxygen to sustain a healthy population of

fish.

Null hypothesis: There is not a difference between the number of fish and the level of

dissolved oxygen in the water.

- What would your experimental approach be to test this hypothesis?

Several samples would be taken from water bodies with similar size and biota with varying levels of dissolved oxygen.

- What would be the independent and dependent variables?

The independent variable would be level of dissolved oxygen.

The dependent variable would be the number of fish.

- What would be your control?

I would use a negative control for each dissolved oxygen concentration.

Sampling other water bodies with the same oxygen concentration should yield approximately the same number of fish. This would help control for the differences between water bodies. Water temperature also needs to have a control. It has been shown that metabolic rate (use and requirements for dissolved oxygen) for fish varies significantly with water temperature (Moss & Scott, 1961).

- What type of graph would be appropriate for this data set? Why?

A line graph would be most appropriate for this data because we are looking for a trend between the dependent and independent variables. I would put the number of fish on the y-axis and the dissolved oxygen concentration on the x-axis.

- Graph the data from Table 4: Water Quality vs. Fish Population (found at the beginning of this exercise). Describe what your graph looks like (you do not have to submit a picture of the actual graph!!).

The graph starts at origin and the slope increases slowly until reaching 6 ppm dissolved oxygen where the slope increases dramatically. The number of fish continue to increase on the graph as the ppm dissolved oxygen

increases to a maximum of 15 fish seen at 12 ppm. Then there is a dip in the faph at 14 ppm down to 10 fish, then the graph increases again to 12 and 13 fish at 16 and 18 ppm dissolved oxygen concentration.

- Interpret the data from the graph made in Question 7.

The graphed data indicates there is a positive relationship between concentration of dissolved oxygen and the number of fish observed in a body of water. There is a dramatic increase in the number of fish in the population as soon as the dissolved oxygen concentration reaches 6 ppm.

Lab 1 - Exercise 2: Percentage Error

In the questions below, determine the percentage error. Show your work on all problems.

- A dad holds five coins in his hand. He tells his son that if he can guess the amount of money he is holding within 5% error he can have the money. The son guesses that he is holding 81 cents. The dad opens his hand and displays 90 cents. Did the son guess close enough to receive the money from his father?

No, the percent error was 10%.

- A science teacher tells her class that their final project requires the students to measure a specific variable and determine the velocity of a car with no more than 2.50% error. Jennifer and Johnny work hard and decide the velocity of the car is 34.87 m/s. The teacher informs them that the actual velocity is 34.15 m/s. Will Jennifer and Johnny pass their final project?

Yes, their percent error was 2.1%.

- A locomotive train is on its way from Chicago, IL to Madison, WI. The trip is said to last 3.15 hours. When the train arrives in Madison the conductor notices it actually took them 3.26 hours. The train company prides itself on always having its trains to the station within a 3.00% error of the expected time. Will the train company live up to its reputation on this trip?

No, the train company has a percent error of 3.4%.

- A coach tells his little league players that hitting a 0.275 batting average, within 7.000% percentage error, means that they had a really great season. Seven year old Tommy ended the season hitting a 0.258 batting average. According to his coach, did he have a great season?

Yes, Tommy had a percent error of 6.6%.

References

Moss, D. D. & Scott, D. C. (1961). Dissolved-oxygen requirements of three species of fish. *Transactions of the American Fisheries Society*, 90(4), 377-393.

Add the citation for the laboratory manual, use this format (be sure to put it above in alphabetical order):