

Name _____

SCIENTIFIC METHOD ANALYSIS

DIRECTIONS: Analyze the following experimental design and data.

BACKGROUND:

A marine biologist conducted a study of the ability of vertebrate blood to carry oxygen. He believed that a low environmental temperature would cause the organism's blood to carry less oxygen than at a higher temperature. The following reflects the scientists experiment and the data he collected.

- Two tanks of salt water, each containing 25 gallons, were set up in the lab.
- Each tank was filled with the same types of organisms (perch and salmon).
- The same types of aerators were added to each tank to supply oxygen to the fish.
- To one of the tanks, marked TANK A, the temperature was decreased at increments of 5 degrees Celsius every 20 minutes.
- The second tank, marked TANK B, the temperature was raised at increments of 5 degrees Celsius every 20 minutes.
- Blood was removed from each of the fish and measured for its oxygen content.
- Below are the results from the above experiment.

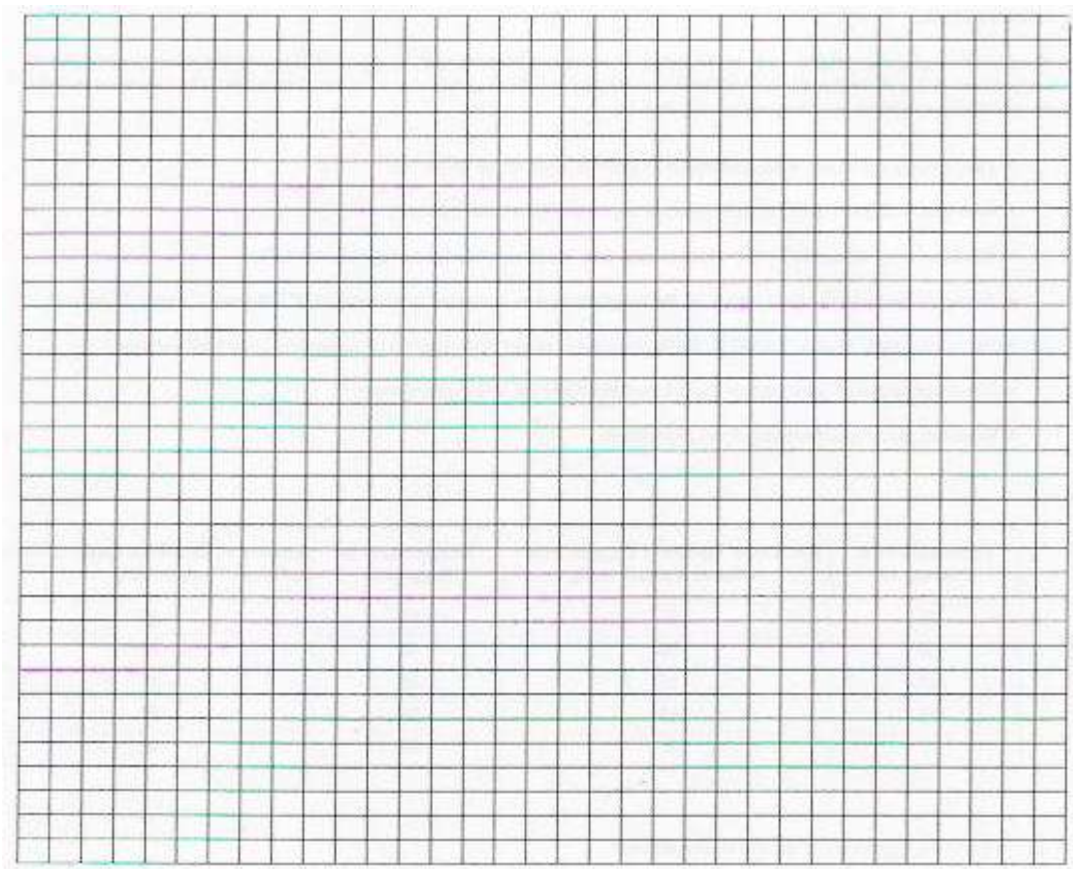
Amount of Dissolved Oxygen in fish at Varying Temperatures

Temperature in Degrees Celsius	Amount of Dissolved Oxygen found in fish in TANK A (ml/g)	Temperature in Degrees Celsius	Amount of Dissolved Oxygen found in fish in TANK B (ml/g)
25	35	25	35
20	30	30	32
15	23	35	39
10	12	40	35
5	8	45	20

1. Develop a hypothesis for the experiment based on the background information.
(If _____ then _____ because _____)
2. What are the experimental controls in this experiment?

3. What is the independent variable in the above experiment?
4. What is the dependent variable in the above experiment?
5. Is the above experiment a controlled experiment?
6. Why or why not?

VISUALIZING THE DATA: Create a graph of the above data. (Ask yourself... what type of graph would be most appropriate. Remember to include all aspects of a graph)



7. Based on the data, is the hypothesis correct?
8. Why or why not?
9. What equation could you use to calculate rate of change in the dissolved oxygen levels?
10. Calculate the rate of change in dissolved oxygen over time in the fish in TANK A? Show your work, answer, and units.
11. Provide an explanation for the data collected. You might have to do a little research. Cite your resources.