Scientific Method Lab 2

Scientific Method Lab

Directions:

Read the following story, then follow the directions that follow. 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 blood at a higher temperature. The following reflects the scientists experiment and the data he collected.

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

|  |  |  |  |
| --- | --- | --- | --- |
| **Temperature in Degrees C** | **Amount of Dissolved Oxygen found in fish in Tank A -ml/g** | **Temperature in Degrees C** | **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. What is the hypothesis of the above experiment?  
     
   The scientist has predicting (hypothesized) that the temperature of water will influence the amount of oxygen carried by blood.
2. Is the above experiment a controlled experiment? Yes
3. Explain your answer to question 2.  
     
   In this experiment the following variables are fixed:
   * Fish
   * Water Amount
   * Oxygen saturation

The unknown variable amount of oxygen is the old free form variable.

1. What term would be used to denote a person who studies blood?  
     
   Hematologist for 200
2. What is the variable factor in the above experiment?  
     
   The perch are the first variable, with different DNA might have statistically significant resistance. Or perhaps one fish is 2lb and another is 1.5lb. This small difference could influence results.  
     
   The aerators being properly calibrated could influence results as well.

Are the measurement done in close proximity? Or was one done at sea level and the other done at a friend’s house in the mountains.

1. Line Graph the above data and then answer the questions that follow.

A good site to help you to make all different kinds of graphs is, Graphs Made Easy at: [http://nces.ed.gov/nceskids/graphing (Links to an external site.)](http://nces.ed.gov/nceskids/graphing)

**Save the grid below to your computer**  
   PC: Right click > save picture as...  
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Then import the image to a graphics program, such as Microsoft Paint or Paintbrush for the Mac. You may also use Adobe Photoshop, Adobe Acrobat, Word, Excel or PowerPoint to create the line graph. Use this to create your line graph and include it with the rest of this document that you email to me at: [ksteiner@bellevuecollege.edu](mailto:ksteiner@bellevuecollege.edu)

1. What is the dependent variable?  
     
   Oxygen amount in ml/g
2. What is the independent variable?  
     
   Temperature
3. Based on the above data, is the scientist’s hypothesis correct? Yes.
4. What are the controls used in the above experiment?  
     
   The temperatures are recorded at well-defined intervals.