**Title: Liver Lab**

***Learning Goal:***To observe the optimal condition for enzyme activity.

***Background***

Enzymes are catalysts that speed up chemical reactions that would otherwise happen more slowly.  The enzyme is a protein that is not used up in the chemical reaction and can repeatedly react with other poisons once it attaches to the activation site.  In this lab we will observe the optimal conditions for the catalase enzyme, an enzyme found in the liver.  Catalase breaks down a harmful chemical, hydrogen peroxide into water and oxygen.  If the liver did not do this, we would be poisoned and die.

***Research Questions: What is the optimal condition for liver enzyme activity?***

***Procedure:***

*Part 1*

1. Put on safety goggles and aprons if available.
2. Obtain three test tubes and a test tube rack.
3. From your instructor obtain three liver samples.  One is boiled, one is normal, and one has been soaked in acid.
4. Using a pipette transfer 2 ml of hydrogen peroxide into each test tube.  Complete this process one-at-a-time in order to record data.
5. Record qualitative observations in a data table as you observe the reaction, including the rate of bubbling and temperature (to the touch) of the test tube.
6. Quantify the rate of bubbling as 0(no reaction)-5(bubbles vigorously).
7. Create a bar graph recording the effect of liver sample and enzyme activity (Remember TAILS graphing).
8. When you are finished dump the liver into the garbage that your instructor has identified.

*Part 2*

1. Clean your test tubes and obtain three normal pieces of liver.
2. Obtain 30 ml of hot H2O in a beaker.
3. Fill another beaker with ice water.
4. Obtain a third beaker with room temperature water.
5. Place your test tubes containing regular liver into each beaker.  Wait for 5 minutes for the liver to warm or cool.  Once again add 2ml of hydrogen peroxide.
6. Now we are observing the effect of temperature on the rate of this chemical reaction.
7. Record the rate of bubbling once again in a data table using the same scale as before.
8. Create a graph comparing the effect of temperature on the rate of enzyme activity.

***Conclusion:***

Write a paragraph summarizing what you have learned about enzymes through this activity and include the following: Claim- Conclusion contains answer to questions that was investigated; Evidence: Essential data used to draw conclusions is summarized; and Reasoning: Students make sense of their evidence as it relates to their claim.