**Enzyme Catalysis: An Inquiry Based Approach**

*Biology*

**Goal:**

* To make and support a claim on how changes in biochemical conditions affect enzyme activity through the process of scientific inquiry.

**Role:**

* To be a productive and cooperative member of a group in order to successfully carryout the process of scientific inquiry.

**Situation:**

* You will be placed in a group of 2-4 students. Each group will carry out the scientific inquiry process to determine how one factor affects enzyme activity. A starting list of materials that area available will be provided

**Product, Performance, and Purpose:**

* After completing the experimentation process, everyone in the group will be responsible for typing their own lab report about the experiment, and presenting their finding to the class.
* Each student will receive 4 grades for this assignment (see attached rubrics):
  + Lab Participation
  + Individual Lab Report
  + Presentation of Findings
  + Self/Peer evaluations

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**Background Information:**

* Hydrogen peroxide (H2O2) is a poisonous byproduct of metabolism that can damage cells if it is not removed. Catalase is an enzyme that speeds up the breakdown of hydrogen peroxide into water (H2O) and oxygen gas (O2).

2H2O2--------catalase----------> 2H2O + O2

* REMEMBER: A CATALYST is a substance that lowers the activation energy required for a chemical reaction, and therefore increases the rate of the reaction without being used up in the process. CATALASE is an enzyme, a biological (organic) catalyst. Hydrogen peroxide is the substrate for catalase.

**Available Materials:**

|  |  |
| --- | --- |
| * Raw liver * Chicken breast * Potatoes * Apples * Hydrogen Peroxide * Test tubes * Test tube rack * Test tube holder * Beakers | * Hot plate * Thermometers * Dissecting scissors * Forceps * Ice * Stopwatch * balance * If you determine you need something else during the process, ask me if it is available |

**Experimental Design (Enzyme Catalysis)**

**Instructions: Before entering the lab, the following information is needed. Fill out the information below & submit to Ms. Rust for approval.**

1. Purpose/Question:

* *Choose one of your factors from your research and propose a question of what you are trying to solve.*

1. Hypothesis:

* *This needs to be a statement. Can be in IF…THEN format. Make sure that your hypothesis addresses and answers your group’s specific question.*

1. Experimental Design:

* *Make sure it is a CONTROLLED experiment. Identify what your independent, dependent, control, and constant variables are first!*
* *Your experiment needs to address your group’s specific problem.*
* *When writing the procedure – BE DETAILED. Write down every step so that anyone could perform your experiment. You will not be allowed to try your experiment until Ms. Rust approves your procedure.*
  1. Independent Variable
  2. Dependent Variable
  3. Experimental Control
  4. Constants
  5. Written Procedure:

1. Materials Needed:

* *List of Materials & amounts of each needed.*

1. Data Tables:

* *How are you going to collect data? Have your data table ready BEFORE you do your experiment.*