**TYPE:** Science Inquiry

**TASK 6: Enzymes Investigation –**

Students are to complete an in class assessment on enzymes. This task will be completed in three sessions.

The first two parts will be in a group, the third will be an individual Report, written in class under test conditions.

ENZYMES INVESTIGATION

This investigation will be conducted in three parts:

1. Planning – in groups, in class, to be submitted at the end of the Planning lesson.

2. Experiment – in groups – you will be marked on safety, equipment technique and general experimental skills.

3. Report – Individual Report including Validation questions

While you will have three lessons in total to do this Investigation, that doesn’t stop you working on it yourself prior to the experiment, or report… in fact it would be to your advantage to do so.

1. PLANNING THE EXPERIMENT

* This will be conducted in one lesson, you will be working in a group with other students as selected by your teacher. The teacher will collect your planning document, photocopy it and return it to you during the next lesson. You may work on it between then and the experiment lesson.
* The teacher will decide if your planning is appropriate, and if not will give you a basic method to follow to achieve experimental data.
* Reference: it is suggested that you use the first two chapters of your text to remind you of things that need to be considered in a Scientific Investigation – particularly what should be in your report, so that you remember to include it in your planning.
* You and your group are to fully plan the investigation…so that someone not in this class can carry out the experiment and achieve Scientifically fair, valid, reliable results. i.e. show good use of Scientific Method.

You and your group will be assigned to work on one of the following three problems:

The enzyme pepsin breaks down protein to polypeptides. You will be provided with a suspension of egg white, which will be milky in appearance. When pepsin acts on egg white the suspension becomes clear.

Your task is to design and carry out a controlled experiment to find out:

Problem 1. whether pepsin works better in an acidic, alkaline or neutral medium.

Problem 2. the temperature at which pepsin works best.

Problem 3. the effect of boiling or concentration of the enzyme (teacher will choose one of these for you)on the enzyme activity.

**Notes on available resources are listed on the following page.**

**STUDENT NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

NOTES:

* Normal laboratory equipment will be available – such as:
* Test tubes, test tube racks, stop watch, hot plate, safety glasses, marker pens, measuring cylinder, thermometer, stoppers, labels,
* The following chemicals will be available:

15 mL of egg white suspension - **only**

10 mL of 1% gastric protease solution packed in ice - **only**

Distilled water

2M NaOH – in dropping bottle

2M HCl - in dropping bottle

Universal indicator paper

If there is anything else you think your group needs, ask.

Assumptions:

For Problem 1 - assume an optimum temperature of 35 oC

For Problem 2 - assume an optimum pH the same as the dropping bottle of HCl

For Problem 3 – assume an optimum pH and temperature as above…in Problem 1 and 2.

Any further Notes which may develop: