

BIL 151 Laboratory:

Enzymes: Finalizing Your Protocol with a mini PPT

By the end of today's lab session, your team should

- have a good, working overall hypothesis
- make a prediction with respect to your overall hypothesis
- have null and alternative experimental/statistical hypotheses
- have a complete, step-by-step protocol including instructions for preparing reagents in specific quantities and concentrations, as necessary.

I. Visualizing your ideas

When your team has completed **Project Planning Worksheet 1 - Planning (PPW1)**, use it to create exactly **THREE POWERPOINT SLIDES**:

Slide #1. Clearly state your research question and **hypotheses**.

Slide #2. Create a visual representation of your research (**methods**).

Slide #3. State what you think your results will be (**prediction**).

This exercise will help you focus on the most important aspects of your research:

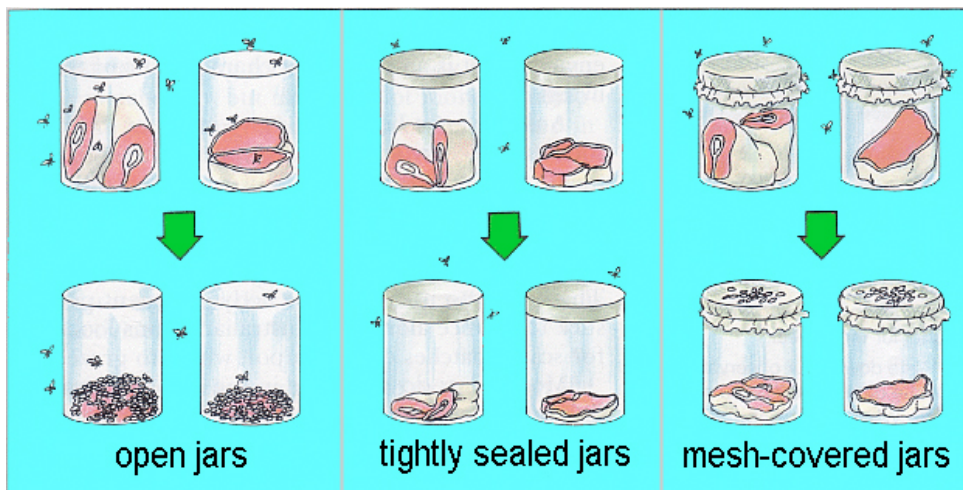
Aspect #1. The **idea** behind your experiment.

Aspect #2. The **protocol** you will use to examine your idea.

Aspect #3. What you **expect to observe** after analyzing your results.

For an example of how to create Slide #2, see the example in Figures 1 below. Create something like this to visually show your colleagues how you will test your idea.

Figure 1. Francesco Redi tested the idea of spontaneous generation (that life could spring from non-living matter, and in this specific case that maggots could spring, fully formed, from rotting meat) with the experimental set up shown here. In Treatment 1, he placed meat in uncovered jars. In Treatment 2, he placed meat in sealed jars. In Treatment 3 he placed meat in jars covered with a screen that would allow air into the jar, but not much else. Each Treatment yielded different results.



You will have about 30 minutes to create the three slides. When you are finished, give them to your instructor electronically.

When all teams are ready, each team will give a brief presentation of their slides.

Your instructor and colleagues (fellow lab students) will critique your work and offer suggestions.

II. Refining Your Experiment

Once your proposal has been critiqued, revisit your project and refine your ideas and protocols. Revise your **Project Protocol Worksheet 1 – Planning (PPW1)** as necessary. Electronically deliver the revised PPW1 to your lab instructor for approval.

A. Observation, Hypothesis, Prediction

When your instructor has approved PPW1, your team is ready to complete **Project Protocol Worksheet 2 – Materials & Methods (PPW2)**, linked to the syllabus.

B. Materials

Your literature search—and those of many of your colleagues—may have revealed that much research done on catalase involves chemicals that pose a safety hazard. While we feel it is important for you to have read these papers and thus learned more about catalase (and other, incidental things that could prove interesting and helpful), we also feel it is important that you end this semester alive and well. To this end, we will provide only the following stock chemicals from which your team may choose to design its experiment.

- **ascorbate solution, 0.1M (100mL brown or foil-wrapped bottle)**
- **succinate solution (0.04M) (100mL covered glass vessel)**
- **copper sulfate solution (0.1M) (100mL covered glass vessel)**
- **acetyl salicylate solution (10mM) (100mL in covered glass vessel)**
- **sodium chloride solution (1M) (100mL in covered glass vessel)**
- **95% ethanol in covered glass vessel**
- **100% isopropanol in covered glass vessel**

(NOTE: a solid chemical's name is often different from that chemical's name in solution. For example, ascorbic acid is a solid. In its dissolved, ionized form, it is known as ascorbate. The same is true for succinic acid/succinate. So don't let the names above confuse you.)

Use the template linked to the syllabus (**Project Protocol Worksheet 2 – Materials & Methods**) to create a detailed, step-by-step protocol for your particular needs. The PPW2 is already formatted with the methods you used for the sample experiment you performed in a previous lab session (the effect of NaCl on catalase reaction). The PPW2 is posted as an MS Word Document so you can easily **modify it to be a step-by-step guide to your team's particular materials and methods**. Modify only those parts that will be different from the sample experiment you performed in a previous lab session.

Before you leave lab today, your team must submit an electronic version of the following to your lab instructor:

- ***final revision of PPW1 (Project Protocol Worksheet 1 – Planning)***
- ***completed PPW2 (Project Protocol Worksheet 2 – Materials & Methods)***