

Marine Science Research Project

This project focuses on the original research that you conduct on conditions/organisms in your aquarium. This is like a REALLY big lab report. The project constitutes half of your exam grade and requires a formal, typed report. For this project you are to do the following:

- Develop a research question. A research question is one that can be answered by performing a controlled experiment.
- Do background research. Don't reinvent the wheel. Investigate what has already been learned about your topic. Keep a bibliography of the sources you use. Be prepared to cite as needed. You will discuss this background research in your report.
- Develop a hypothesis based on your prior knowledge and background research. A hypothesis is a predicted answer to your research question.
- Design a controlled experiment to test your hypothesis. Remember that a controlled experiment has:
 - ✓ An experimental group which contains ONE manipulated variable
 - ✓ A control group in which background conditions are maintained in order to provide a comparison to the experimental group.
- Design an ethogram if needed, and data tables on which to record your data.
- Run your experiment. Collect and record data systematically
- Organize and analyze your data. Graph.
- Come to a conclusion based on your data. Was your hypothesis upheld? What does this tell you? How would you proceed from here? What experimental error might have been present? Write a formal "analysis and conclusion" section.

Your report for the project should be organized into the following parts:

- **Title**—Should specifically describe your research (real examples: "The Zonation of *Chthamalus* and *Semibalanus* on Horse Island, Connecticut"; "The Sand Dollar, *Mellita quinquesperforata* as a Possible Indicator of Environmental Stress")
- **Abstract**—Should provide a BRIEF summary (250 words or fewer) of your entire project from beginning to end.
- **Introduction**—Here, you should introduce your research question. You should discuss all background research that is relevant to your research question. Then, you should state and justify your hypothesis as it relates to your background research.
- **Methods and Materials**—This is basically the "procedure" section. Here you provide a DETAILED discussion your experimental design. Describe your procedure and the materials you used. BE SPECIFIC!
- **Results**—This is your section for data and discussion (but NOT analysis) of data. Include your data tables and any graphs here, as well as a discussion of what occurred in your experiment. NO ANALYSIS of this result should occur in this section (don't tell the reader why you think the result occurred, for example).
- **Discussion and Conclusions**—Analyze here! Explain whether or not your result was expected, if it upheld (or seemed to uphold) your hypothesis, discuss any abnormalities in the data, sources of experimental error, things you would change if running the experiment again. Then explain where the research should go from here; what is the next logical step to extend your hypothesis (or should it be reformulated?).
- **References**—List, using an approved format, all of the references you used, ESPECIALLY those that you cited.

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Yes Test and Rubric

Yes Test

You must receive all "yes" responses for your paper to be coached and scored. Any "no" response will stop the process.

<i>Yes</i>	<i>No</i>	<i>Basic Requirements</i>
		1. Paper is typed, Times New Roman, 12 point font, on an electronic file
		2. Paper is a minimum of 5 pages long, double-spaced, 1 inch margins each page
		3. Reveals evidence of consistent and conscientious editing (good GUMS)
		4. Includes adequate TRIALS for research, as well as discussion thereof
		5. Student generated charts and graphs
		6. Paper includes all required sections.

Deadlines:

Date:

Research question defined	3/14/14
Experimental design completed	3/21/14
Rough draft submitted	5/2/14
Oral Presentations (criterion grade)	5/28/14
Final paper submitted	5/28/14

Criterion/ Part of Paper	Total Points Possible	Points Earned	Comments
Title	5		
Abstract	10		
Introduction: a) Problem b) Background Research c) Hypothesis	a) 5 b) 10 c) 5		
Materials/ Methods	10		
Results: a) Table & graph b) Quality/extent of data/discuss	a) 10 b) 5		
Discussion/Analysis	20: based on content and quality of analysis		
Documented sources	10		
Page length: five or more pages	10 (fewer than 5 pp.= zero points)		

Oral Presentation

Your oral presentation is a criterion grade. It will not add points to your paper grade, but may subtract points if you do a less than adequate job (and your paper grade will go to “zero” if you do not present). You may use the following presentation rubric to guide your preparation for the presentation:

Criterion	5 (Excellent)	4 (Good)	3 (Adequate)	2 (Needs Improvement)	1 (Unacceptable)
Clear presentation of material					
Knowledgeable about subject					
Able to successfully field questions					
Interesting presentation; does not read from script					
Uses visuals appropriately					
Good eye contact, posture, and clear speaking voice					
Appropriate timing (3-5 minutes, plus questions)					