

**Design an Experiment**  
**Johnson's Biology**  
**September 2008**

Name(s)

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## OVERVIEW

In this experimental design activity cooperative teams will compete using the steps of the scientific method to: gather baseline data; research the topic; offer possible solutions; design and execute a teacher approved, safe and repeatable experiment; record data; submit a typed report; make a classroom presentation to explain their results and conclusions. Investigation ideas will be obtained from the following list.

- Make a better egg carton
- Boil water faster
- Determine the effect of a magnet on a bubble?
- Dissolve a throat lozenge quicker
- Make brown rolls of "lab" paper towels absorb more water
- Pop more popcorn kernels
- Fly a paper plane further
- Sprout seeds in a shorter time

## PROBLEM

- ⊕ Each team will be randomly assigned one problem to solve.
- ⊕ All members of the group are responsible for all aspects of the experiment.
- ⊕ Each team will consist of a lab technician, spokesperson, recorder, and computer geek.
- ⊕ Each member of the team will share the same grade.
- ⊕ The winning team, will be the team that increases its' **"Dependant Variable Measurement" DVM** by the greatest percentage.

## JOB RESPONSIBILITIES

- **Lab Technician:** conduct experiment, setup and cleanup
- **Spokesperson:** keeping w/in budget, staying w/in timeline, make presentation
- **Recorder:** keep detailed records of all activities, submit outline for approval
- **Computer Geek:** research any and all possibilities, type the report,

## PROCEDURE

- ⊕ Each team will attempt to solve the problem it was assigned by conducting a series of experimental tests using all steps of the scientific method. Prior to any lab work an outline of procedures, required materials, and safety precautions must be approved by me (hj)
  1. **To begin**, baseline data about the “**DVM**” must be recorded.
  2. **The lab technician should conduct the control** portion of the experiment to gather baseline data. The average of this data should be used as the groups **beginning measurement**. The team should use the steps of the scientific method as a guideline in the contest. (Problem, Hypothesis, Experimental Design, Data/Observations, Conclusion.)
  3. **Using this data** the team should brainstorm and research a list of possibilities
  4. **Each team should then make a hypothesis** as to what would increase the “**DVM**”. Every hypothesis should be tested.
- ⊕ Every trial and hypothesis for increasing “**DVM**” must be documented, and appropriate data collected.

## DATA

- ⊕ All data should be recorded into tables and charts. Measurements should be recorded to the nearest tenth (of a centimeter, second, kernel, etc).
- ⊕ All “variables” and procedures should be clearly indicated. (ie: my control is..., the dependent variable is..., all have a 3 trial minimum.....etc.)
- ⊕ **Final Measurements** will be calculated during the presentation to the class.
- ⊕ Percentage of increase will be calculated by the following formula:  
$$[(\text{Final Measure} / \text{Beginning Measure}) - 1] \times 100$$

## LAB REPORT, PRESENTATION, AND CONCLUSION

- ⊕ All reports must be typed, single spaced.
- ⊕ Illustrations and/or charts may be hand drawn in pencil, or computer generated.
- ⊕ You must include at least one chart and one graph. However, multiple charts and graphs will probably be needed by most groups.
- ⊕ Percentage of increase should be calculated and reported.
- ⊕ Your conclusion(s) should make a statement about **all** hypothesizes that lead to your final competition entry.
- ⊕ Your presentation is required to be between 3 and 5 minutes in length. It may be a PowerPoint presentation or an oral presentation with notes.

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**RUBRIC**

	Meets Requirement (15pts)	Missing Part (10pts)	Incomplete (5pt)	Not Included (0 pts)
Cooperative team effort evident				
Follow directions				
Follow steps of scientific method				
Data recorded for each trial				
Conclusion				
Oral presentation				
Lab "hardcopy" properly formatted				
Win Competition	Bonus +10 pts	N/A	N/A	N/A