Biology II

Independent Research Experiment/Project

Objective: Students will choose a question and/or problem IN THE FIELD OF BIOLOGY. The project will include: 1) background research on the topic in question, 2) an original experimental design, 3) completion of an original experiment, 4) interpretation of results, and 5) a formal presentation of the experiment.

Standards: Science and Engineering Practices
1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (for science) and designing solutions (for engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

Timeline for the completion of the project:

This project will be completed in stages. Class time will be given as appropriate for completion of portions of the overall project. Each deadline is a DRAFT of the component of the project. It does not require a polished, finished submission at each stage. However, all portions of each component should be complete in the submitted draft. A grade is not given for drafts, however, if drafts are not submitted on time (including revisions), there will be a reduction in the final overall grade.

Component 1: OBTAIN a project data book (theme books are fine, but should be bound pages not a spiral) and three-ring binder.

Component 2: Topic, Question, and Hypothesis

1/20 - 2/17: Research and choose your topic, question, and hypotheses. You MUST present evidence of your research (printed out sources or notes on sources) with your TYPED submission. KEEP IN MIND- YOU MUST HAVE QUANTITATIVE DATA AND STATISTICAL ANALYSIS (Chi-square or t-test) IN SUPPORT OF YOUR EXPERIMENT!

**Topic DUE: February 5, 2016**
**Question and Hypothesis DUE: February 17, 2016**

2/18 – 3/14: Continue to gather background information on your experiment. Prepare a separate 3-ring binder that is organized to include research, research notes, articles, interviews, any and all things pertaining to your project, and a bibliography (APA). You must take notes on your background research in your notebook or on index cards. YOU MAY NOT JUST PRINT THINGS OFF AND TURN THEM IN!

**DUE: March 14, 2016**

Please Understand: **You have a data book that is to be used for your actual experiment. You are to write down EVERYTHING that you do for your experiment EACH DAY after you complete your design (this includes the set-up, materials, and procedure). The three-ring binder is to be used for writing and organizing your research paper. ALL SOURCES AND DRAFTS SHOULD BE SAVED IN THIS Binder.**
Component 3: Experimental Design

2/18 – 3/14: Organize and design your experiment. Areas that will need to be addressed include safety, materials, finalized and DETAILED procedure, data collection tables, and the full plans for necessary calculations and statistical analysis (Chi-square or t-test).

- Your procedure should be a detailed, numbered or bulleted list of instructions for your experiment. A reasonably intelligent person should be able to complete your experiment the EXACT WAY you did based on your procedure.
- Data tables do not have to include data, but you must have a template for how you will organize your data.
- Assistance will be given in identifying and conducting statistical analysis of data.
- All experiments must be conducted AT SCHOOL!
- Be sure to consider timing logistics when planning your experiment.
- Indicate the number of trials/test subjects you intend to use in your experiment.

DUE: March 14, 2016

REVISED EXPERIMENTAL DESIGN DUE: March 21, 2016

Component 4: Conducting your experiment and writing your paper

3/15 – 3/24: Set up your experiment and make sure that all of the materials needed are gathered (make sure you are using your project data book to record what you do/data you collect each day). Practice trials are encouraged to make sure that everything works the way it was intended. Trial and error is common—be sure to record ALL trials, even if you end up not using it for your final analysis.

3/29 – 4/8: Collection of data. Actually run your experiment and collect the necessary qualitative and quantitative data. Ensure you have a sufficient amount of trials and test subjects. All experiments are to be conducted AT SCHOOL.

3/29 – 4/22: Continue to collect data on your own or if given any time in class. Begin working on your final research paper. Be sure to follow the grading rubric provided for you when writing your paper. (You will be given parts of these weeks to work in class, TAKE ADVANTAGE OF IT!)

DRAFT INTRODUCTION DUE: APRIL 6, 2016

FIRST DRAFT OF YOUR RESEARCH PAPER DUE: APRIL 22, 2016

(Please realize the importance of your first draft! This should be as polished as possible when submitted!) Begin working on the visual aspects of your class presentation.

FIRST DRAFT OF YOUR ABSTRACT DUE: APRIL 27, 2016
FINAL DUE DATES:

SENIOR PAPERS AND PROJECT MATERIALS DUE: May 4, 2016

SENIOR PRESENTATIONS ON RESEARCH: May 9, 2016

JUNIOR PAPERS AND PROJECT MATERIALS DUE: May 6, 2016

JUNIOR PRESENTATIONS ON RESEARCH: May 9-17, 2016

Dates to Remember:

SPRING BREAK (March 7-March 11)
EASTER BREAK (March 25-March 28)
SPRING MUSICAL (April 9-10)
PROM (April 30)
ORCHESTRA CONCERT (May 9)
BAND SENIOR CONCERT (May 2)
CHORUS CONCERT (May 7)
CLASS NIGHT (May 11)
GRADUATION (May 15)
JUNIOR FINALS (May 17-18) Note: This may change depending on snow days.