Lab Experiment Planning, Executing, and Reporting

There are three basic parts to planning, executing, and writing a report for a lab experiment: **Design**, **Data Collection and Processing**, and **Evaluation and Conclusion**. In addition, there are some "essential extras" that are important components of many lab write-ups.

Design

Problem or Research Question

- ☐ For example: "How does _____ affect _____?" What will happen to _____ when we _____?

Background Information

- ☐ Record background information based on notes, text, and discussion pertaining to your problem.
- ☐ Sources for background information are cited

Hypothesis

- ☐ Predicted outcome to the Research Question
- ☐ Prediction is supported with a scientific reason

Variables

- ☐ Independent (Manipulated) Variable correctly identified with units/range
- ☐ Dependent (Responding) Variable correctly identified with units
- ☐ Controlled variables (optional: presented as a table)

Materials

- ☐ Materials list is complete

Procedure or Method

- ☐ Procedure or Method is clearly presented in *step-wise* format and **can be repeated by others**
- ☐ A minimum number of three trials is included in the procedure
- ☐ Method includes how variables will be treated

Data Collection and Processing (DCP)

Qualitative Data

- ☐ Observations using your senses are recorded in good detail at each step of the procedure where change occurs

Quantitative Data (Recording Raw Data)

- ☐ Date Table presents *raw* data and calculated data
- ☐ Table title describes contents of table
- ☐ Detailed description of data entry
- ☐ Units and uncertainty are included

Calculations (Processing Raw Data)

- ☐ Includes titles of the calculation being performed
- ☐ Worked examples of calculations are provided including units on all numbers

Graphs and Charts (Presenting Processed Data)

- ☐ Titles describe contents of graphs and charts
- ☐ Appropriate choice of graph style
- ☐ Graphs are clear, no funny coloring or patterns
- ☐ Axes labeled clearly with units when necessary
- ☐ Axes scaled appropriately and graph uses most of the page
- ☐ Best-fit line produced by student (not computer generated or dot to dot)

Flathead High School Science Department
Adapted by: Cordes for Biology Lab Experiment Guidelines - 2013
*This document was heavily influenced by the IB Internal Assessment Guidelines

Discussion, Evaluation and Conclusion

Discussion

- ☐ Shows understanding of the experiment.
- ☐ Discuss how the data is related to hypothesis, research questions, or problem and to what extent do they agree or disagree
- ☐ Describes the patterns and trends in data gathered, with reference to the graph/tables
- ☐ Include discussion of qualitative data where appropriate
- ☐ Appropriate language used (*"Supports my hypothesis"* **not** *"proves"* or *"is correct"*)
- ☐ Optional: Comparison with published data, if possible (sources are cited)

Evaluating Procedures

- ☐ Explanation of reliability of results addresses both physical and experimental error. Do not say "human error."
- ☐ How does the error affect the results?
- ☐ Is there enough data to address the problem or answer the question?
- ☐ Explain/address any outlying or unusual data points
- ☐ How could improved experimental design remove or reduce the impact of the error? Suggest realistic and achievable improvements to the experimental design

Conclusion

- ☐ Research question is restated
- ☐ Hypothesis is restated
- ☐ Results are restated in few brief sentences
- ☐ A statement is made about whether the hypothesis is supported or refuted (not *"proves"* or *"is correct"*)

Essential Extras

Academic Honesty

- ☐ Data is authentic and not fabricated
- ☐ Sources cited completely and appropriately in correct order
- ☐ Images given a "fig x" legend with short description
- ☐ Academic honesty statement signed on coversheet of write-up

Formatting

- ☐ Title reflects investigation
- ☐ Typed with 1.5 line-spacing or neatly written
- ☐ Grammar and spell-checked
- ☐ Clear font, no funny color-schemes
- ☐ Logical order, with headings clear

Submission

- ☐ one neatly written or printed copy

Academic Honesty

I confirm this assessment is my own work.

Student signature: _____ Date: _____