PA Experimental Design Rubric for 2022 State Tournament

(Note: The maximum points available for each task are shown.)

School:_____Team#_____

Part I – Design and Construction of the Experiment (55 pts)

A. Statement of the Problem (2 pts)

② ① ⓪ Statement addresses the experiment including variables (Not a yes/no question)

B. Hypothesis (6 pts)

② ① ⓪ Statement predicts a relationship between the independent and dependent variables

② ① ⓪ Statement gives specific direction to the prediction(s) (i.e., a stand is taken)

② ① ⓪ A rationale is given for the hypothesis.

C. Variables (14 pts)

a. Independent (IV) & Dependent (DV) Variables (8 pts)
② ① ⓪ IV Correctly identified & defined
③ ② ① ⓪ Levels of IV given
③ ② ① ⓪ DV Correctly identified & defined

b. Controlled Variables (CV) & Constants (6 pts)
② ① ⓪ First CV identified & explained
② ① ⓪ Second CV identified & explained
② ① ⓪ Constant identified & explained

D. Materials (4 pts)

② ① ⓪ All materials listed and quantified
② ① ⓪ No extra materials are listed

E. Procedure and Set-up Diagrams (14 pts)

② ① ⓪ Procedure is presented in list form
② ① ⓪ Procedure is in a logical sequence
② ① ⓪ Steps for repeated trials are included
② ① ⓪ Multiple diagrams of setup are provided
② ① ⓪ All diagrams are appropriately labeled
④ ③ ② ① ⓪ Procedure detailed enough to repeat experiment accurately

F. Qualitative Observations (5 pts)

③ ② ① ⓪ Observations throughout the procedure
② ① ⓪ Observations about the results provided

G. Quantitative Data - Data Table (10 pts)

② ① ⓪ All raw data is provided
② ① ⓪ Condensed data table with only the data to be graphed is provided
② ① ⓪ Tables and columns labeled properly
② ① ⓪ All data has units
② ① ⓪ Example calculations for derived variables are given

(revised 3/30//22)

Part II – Data, Analysis and Conclusions (60 pts)

H. Graph (12 pts)

④ ③ ② ① ⓪ Appropriate Graph is provided
④ ③ ② ① ⓪ Graph properly titled & labeled
④ ③ ② ① ⓪ Appropriate scale & units

I. Statistics (14 pts)

④ ③ ② ① ⓪ Statistics of Central Tendency used (ex. best fit, median, mode, mean, or percent error)
④ ③ ② ① ⓪ One accurate example given for above statistic with units
③ ② ① ⓪ Statistics of variation are included (ex. min, max, range)
③ ② ① ⓪ One accurate example of each statistic with units

J. Analysis of Claim/Evidence/Reason (CER) (12 pts)

② ① ⓪ **Precision** Claim completed logically (i.e., precise, not precise)
② ① ⓪ Evidence using statistics completed logically
② ① ⓪ Reasoning completed logically

② ① ⓪ **Data Trend** Claim completed logically
② ① ⓪ Evidence using statistics completed logically
② ① ⓪ Reasoning completed logically

K. Possible Experimental Errors (8 pts)

④ ③ ② ① ⓪ 1st specific error is identified and the effect on results discussed.
④ ③ ② ① ⓪ 2nd specific error is identified and the effect on results discussed.

L. Conclusion (8 pts)

② ① ⓪ Hypothesis is re-stated
② ① ⓪ Hypothesis Claim completed logically
② ① ⓪ Hypothesis Evidence completed logically
② ① ⓪ Hypothesis Reasoning completed logically

M. Applications & Recommendations for Further Use (**6 pts**)

② ① ⓪ Suggestions to improve the experiment
② ① ⓪ Suggestions for practical applications of experiment
② ① ⓪ Suggestions for future experiments

Point Total: _____/115

Deduction multiplier(s): _____
Non-clean up (0.95)
Off topic (0.75)
Not following PA rubric (0.90)
Non-lab (0.25)

Final Score: _____