

Tier II Lab Report Rubric Evaluation Rubric

Name _____

Lab # _____ Date _____

Design (24)

Title: (2)

- Clearly and concisely states a essential relationship between Independent Variable (IV) and Dependent Variable (DV):

0 1 2

Background/Information: (3)

- States current research on topic and includes sufficient information for the reader to understand the purpose of the question. Explains techniques to be applied in the investigation. Uses in-cite text citations and cites academic sources using APA format:

0 1 2 3

Research Question: (3)

- Writes a focused question which identifies the relevant variables: (DV= f (IV), range of values for IV, methods & units of measurement of DV)

0 1 2 3

Independent Variables: (3)

- Properly describes details of IVs: (Describes range of values for IV, equipment needed to measure IV, units of measurement, states sample size as $n = \#$, clear, concise)

0 1 2 3

Dependent Variables: (3)

- Properly describes details of DVs: (Describes equipment needed to measure DV, describes methods and units of measurement, clear, concise)

0 1 2 3

Hypothesis: (3)

- Clearly states reasonable prediction: (States DV= f (IV) stated as an "If, then" statement (quantitative, if appropriate). Hypothesis is quantitative and the prediction explains scientific theory and includes units of measurement and describes the relationship between independent and dependent variable.

0 1 2 3

Materials: (2)

- Clearly describes all equipment & materials: (Properly describes equipment & organisms, materials quantified: e.g. time, concentration, volume, number, model, etc.)
- Includes a drawing of the experiment or lab set up:

0 1 2

0 1 2

Method: (5)

- Allows for collection of adequate relevant data: (Experiment can be successfully replicated from instructions alone, describes how both IV and DV are measured including units, states sample size as $n = \#$, describes physical layout of treatments, considers preliminary trials and equilibration periods)
- Controls for variables: (ensures that the DV= f (IV) relationship is not affected by extraneous variables, describes how CVs are kept constant across all treatments)

0 1 2 3

0 1 2

Data Collection & Presentation (22)

Qualitative Data: (2)

- Describes qualitative aspects of the experiment: (Labeled, clear & thorough)

0 1 2

Quantitative Data: (9)

- Records raw data clearly in appropriate tables: (Columns name DV measured in proper S.I. units with appropriate precision and with only significant figures, rows name IV for which data is collected, further divisions shown for replicates)
- Appropriately presents raw data: (Tables numbered, titles state DV= f (IV), columns & rows properly represent experimental design, spaces for replicates and means)
- Appropriately states uncertainties: (Defined as $\pm$ for all measured variables, using proper units & precision

0 1 2 3

0 1 2 3

0 1 2 3

Data Processing: (4)

- Appropriately transforms of data: (Properly determines totals, means, rates, and/or % as relevant)
- Applying any relevant data calculations:

0 1 2

0 1 2

Data Presentation: (6)

- | | | | | |
|---|---|---|---|---|
| • Appropriately represents $DV = f(IV)$ with graphs/tables:
(Appropriate type of graph/table selected, axes/columns/row properly selected, scale properly quantified, data points properly located, appreciation of continuous vs. discontinuous data, line of best fit for continuous data) | 0 | 1 | 2 | 3 |
| • Clearly presents $DV = f(IV)$ with graphs/tables:
(Figure properly numbered and labeled stating $DV=f(IV)$, axes properly labeled with appropriate units, error bars properly placed and defined, key defines variables when appropriate, multiple data sets clear & easy to interpret) | 0 | 1 | 2 | 3 |

Conclusion & Evaluation (21)

Conclusion: (8)

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| • Clearly states a conclusion:
(Results interpreted in context of hypothesis $DV=f(IV)$, which is supported/not supported rather than proved/disproved or correct/incorrect, reasonable explanation of observed relationship between IV and DV) | 0 | 1 | 2 | 3 |
| • Appropriately supports conclusion with reference to data tables:
(Cites specific, relevant data from tables and figures) | 0 | 1 | 2 | 3 |

Evaluation: (6)

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|--|---|---|---|---|
| • Critically evaluates limitations of experimental design:
(Identifies and describes both design aspects and performance aspects of the experiment that led to weaknesses in the results) | 0 | 1 | 2 | 3 |
| • Properly defines errors:
(Appropriately describes errors as systematic or random, and as human or equipment errors) | 0 | 1 | 2 | 3 |

Modifications: (5)

- | | | | | |
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| • Suggests realistic improvements for experimental design:
(Suggests modifications that are reasonable in relationship to resources and time available in a standard high school laboratory) | 0 | 1 | 2 | 3 |
| • Suggestions relate to identified limitations:
(Suggests improvements for both the design aspects and performance aspects of the experiment that are identified in the evaluation) | 0 | 1 | 2 | |

Citations: (2)

- | | | | | |
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| • Uses APA formatted citations for works referenced: | 0 | 1 | 2 | |
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Manipulative Skills (6)

Follows instructions: (2)

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| • Follows instructions accurately, adapts to new circumstances
Seeks assistance only when required | 0 | 1 | 2 | |
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Carries out techniques: (2)

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| • Competent and methodical in the use of a range of techniques and equipment | 0 | 1 | 2 | |
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Works safely & ethically: (2)

- | | | | | |
|---|---|---|---|--|
| • Pays attention to safety issues; does not expose self or others to Safety risks, experiments have little or no negative effect on environment; inflicts no pain or harm living animals, & shows due consideration to human subjects, including informed consent | 0 | 1 | 2 | |
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Comments: _____

Evaluation: students must not receive a zero in any section. Suggested grade ranges are: 73-64=A, 63-54=B. It is strongly suggested that the teacher focus on separate focus sections of the labs for the beginning units and have the students perform 3-5 full labs for the year