Research Report Quick Check List

Section 1: Exploration

Introduction

- Topic of the investigation is described.
- Research Question is precisely defined
- Independent variable(s), dependent variable(s) and controlled factors are all clearly identified.
- Personal Engagement or Creativity with the investigation is demonstrated. Relevant theory and vocabulary are introduced.
- Relevant scientific context is introduced and discussed.
- Theory is used to suggest a prediction or model, if appropriate.
- Safety, environmental, and ethical concerns are addressed.

Methods

- Experimental setup is described, often with use of images or diagrams.
- Methods for collecting sufficient independent variable data are described.
- Methods for collecting sufficient dependent variable data are described.
- Methods for controlling other relevant factors are described.
- Diagrams are clearly annotated and captioned.

Section 2: Analysis

Data Collection

- Quantitative data, including uncertainties, is presented fully and appropriately.
- Qualitative data is presented fully and appropriately (if relevant).

Data Processing

- All manipulation and processing of data needed is clearly shown, including: Samples of all calculations performed.
- Samples of all uncertainty calculations performed.
- Samples of how data was obtained from computer-generated graphs, if appropriate.
- Processed data results are presented appropriately (graph, table, figure…)
- Results are presented to enable a conclusion addressing the research question.
- Further details on requirements for the Analysis section

Quantitative Data Tables

- Head each column with a label and unit, and an uncertainty (±) if appropriate.
- Report data to the appropriate number of significant figures.
- Organize data clearly so that it is easy to interpret and see any trends (patterns).
- Title each table (e.g.: Table 3: Mass of reactants vs. Time)
- Write a caption describing table contents if anything is unusual or needs explanation.

Qualitative Data

- Include a clear description of what you SAW (use descriptive adjectives!)
- This data is also best included in a table, and can be important in your evaluation.

Sample Calculations

- Give one example of each important calculation done on the raw data. (formula / substitution / final value)
- Label what calculation you are showing (ex. Calculation of Percent Change in Mass)
- Identify and use the same treatment and trial for the sample calculations.
- Uncertainty (±) in the average of 3 trials is half the range of the trials, rounded to 1 significant figure. (ie, (max min) / 2)
- Averages should be rounded to the decimal place where the uncertainty starts.
- Use units and make your calculations neat and organized.

Graphs

- Include a label (such as Figure 1) and a caption describing the graph.
- Note in the caption important values (peaks, starting points, durations, slopes, y or xintercepts) and explain their meaning, if appropriate.
- Put the independent variable on the xaxis, and the dependent variable on the yaxis
- Include labels and units for each axis.
- Scale your graph appropriately (Start from (0,0), data takes 75% of the space.)
- Size your graph appropriately so that it is easy to read the labels and analysis boxes.
- Use an appropriate curve or line fit, if needed.

Section 3: Evaluation

Conclusion

- What the results show regarding the research question is fully discussed.
- The answer to the research question is presented as an equation from a graph, if appropriate.
- The conclusion is placed in its scientific context.
- The conclusion is compared to any predictions made.
- The results are compared to any 'known' or literature values, if appropriate.
- A discussion of how strongly and reliably the conclusions are supported by the results is included.
- Any limitations on the validity of the conclusions are discussed.
- The level of confidence in the conclusion is discussed and justified.

Evaluation

- Strengths in the experimental setup are discussed by considering
    - the techniques used for controlling factors
    - the techniques used for making measurements in terms of accuracy, reliability, and repeatability.
- Weaknesses in the experimental setup are discussed by considering
    - the techniques used for controlling factors
    - the techniques used for making measurements in terms of accuracy, reliability, and repeatability.
- Several of the most important sources of error, along with their impact on the results, are discussed.
- Ways to reduce or eliminate each of the issues/sources of error outlined above are suggested.
- *Do not state "human error" as sources of error.*
- *Do not say "be more careful", "try not to spill", etc.*

4. Communication

- Tables, diagrams and graphs are titled with captions.
- The presentation of the report is clear.
- Report sections are in order.
- Tables, figures, and/or graphs and captions are not split across pages.
- Subject specific terminology and conventions is appropriate and correct.
- Sources are correctly cited using MLA formatting.