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| **Instructions of Use of the Template**   1. Use the template to write up your lab. 2. Pay close attention to the suggestions/questions in blue. 3. When you are finished, delete these instruction and the suggestions/questions in blue. 4. If you wish to have more control over formatting, use *File >> Download as…* and download it as a Word file for final editing. |

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| **IA Paper Requirements**   * Font: Arial size 12 * Spacing: Main text double-spaced * Page Limit: 12 * Citations: MLA formatting in body of paper and *Works Cited* section |

**Title:**

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| --- | --- |
| * Title clearly identifies the **topic** of the investigation |  |

**Research question:**

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| --- | --- |
| * Research question is **relevant** to your topic | * Examples of **focused** research question: |
| Traditional independent-dependent variable investigation: *What is the relationship between* **independent variable**, *as measured by \_\_\_\_\_\_\_\_\_\_, and* **dependent variable**, *as measured by \_\_\_\_\_\_\_\_\_\_?* | |

**Background Information:**

|  |  |
| --- | --- |
| * Information provided is **relevant**. It relates directly to your research question. | * Information provided is **appropriate**. It only relates to your research question. |
| * Do you provide the theoretical framework for your question or topic? | * Do you provide the information need to understand your research methods including the assumptions that your research method uses? (E.g. that the density of a solution is 1 g/cm3) |
| * Is your information required to understand the investigation or are your writing everything you know regardless of whether it’s required or not? | * Did you reference (in MLA format) all of the resources that you used in your background information? [and everywhere else?] |

**Variables:**

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| --- | --- |
| * Have you accounted for all **relevant** variables? | * Have you been very specific about how your variables are changed, measured or controlled? |

|  |  |  |
| --- | --- | --- |
| **Type of Variable** | **Variable** | **How variable is changed, measured or controlled** |
| IV |  |  |
| DV |  |  |
| Controlled |  |  |
| Controlled |  |  |
| Controlled |  |  |

**Method/Procedure:** Equipment List

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| --- | --- |
| * Have you included all of your equipment, each with its specific name? | * Have you included uncertainties for all of your measuring equipment? |

|  |  |  |  |
| --- | --- | --- | --- |
| **Equipment** | **Uncertainty** | **Equipment** | **Uncertainty** |
|  |  |  |  |
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**Method/Procedure:** Diagram

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| --- | --- |
| * Is your diagram clear and clearly labeled? | * Does your diagram show how the equipment is actually used? |

**Method/Procedure:** Instructions

|  |  |
| --- | --- |
| * Is your method in a numbered, step-by-step format? | * Is your method so detailed that another IB student could carry it out without you and get the same results? |
| * Does your method describe how to use the equipment to get **reliable** results? (E.g. reproducible and close to each other) | * Does your method take **sufficient** data? (E.g. at least 5 different values of the independent variable and repeated at least 3 times) |

1. Step one.
2. Step two.
3. Step three...

**Safety and Environmental Concerns:**

|  |  |
| --- | --- |
| * Have you identified all the **relevant** safety ethical or environmental issues? | * Have you explained how those issues are **relevant** to your investigation? |
| * Have you described how you will deal with those issues? | * Have you clearly explained the significance of your issues? |

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| **Safety, Ethical or Environmental Issue** | **Explanation of how that issue is relevant to your investigation and how significant it is** | **Description of how you will deal with that issue** |
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**Qualitative and Quantitative Data:**

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| * Have you included **sufficient relevant** raw data? | * Has your quantitative raw data been recorded to the appropriate precision, with correct units, correct absolute uncertainties and percent uncertainties? |
| * Does your table have proper formatting? Labels and units in the headers, independent variable usually on left | * Have you included **sufficient relevant** qualitative data? |

**Data Processing--Data and Uncertainty:**

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| --- | --- |
| * Is all of your data processing correct and appropriate to your research question? | * Have you included one single example of each type of calculation? Each example should be labeled as to type and should have both the equation and an actual calculation. |
| * Have you included a single example of each type of uncertainty calculation as well? | * Have you drawn your processed data results (including uncertainty) into a single summary table for easy analysis? |
| * If you have a graph(s) does it follow proper conventions: clearly legible, properly scaled, labels with units on both axes, title, proper best-fit line or curve, proper consideration of uncertainty/error (if appropriate) | |

**Conclusion and Justification by Data:**

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| --- | --- |
| * **Describe** final conclusion, uncertainty and percent error results here (where appropriate) | * **Justify** the conclusion using your data |
| * Is the conclusion **fully supported** by the data? | * Conclusion is **relevant** to the research question |
| * Have you identified your error as random or systematic? |  |

**Conclusion and Justification by Scientific Context:**

|  |  |
| --- | --- |
| * Have you referred by to the theoretical framework and assumptions you laid out in the background section? | * Have you explained why your assumptions are valid (or not valid) in this investigation? (Hint: the assumptions are often in your method) |
| * Have you compared your conclusion to your expectations based on the scientific context? |  |

**Evaluation--Strengths and Weaknesses:**

|  |  |
| --- | --- |
| * Was your data **relevant** to your question? Explain. | * Was your data **reliable**? Explain. |
| * Was your data **sufficient**? Explain. | * Have you discussed the **strengths** of your investigation? |

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| **Strengths of your method** | **Explanation of how that is a strength** |
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| * Have you identified the weakness(es) in your method AND given their significance? | * Have you explained how that weakness could cause the error that you saw and discussed in your conclusion? |
| * Have you given a specific and realistic improvement for that particular weakness? |  |

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| **Weakness and significance** | **Explanation of the effect of the weakness on experimental results** | **Improvement for weakness** |
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**Suggested Extension:**

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| --- | --- |
| * Have you discussed at least one specific extension to the investigation? | * Your extension should not be the implementation of an improvement. |

**Works Cited:**

|  |  |
| --- | --- |
| * Have you cited everything you used in proper MLA format? | * Have you used in-text annotations appropriately throughout, including things like diagrams. |