|  |
| --- |
| **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.
 |

|  |
| --- |
| **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:**

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

**Research question:**

|  |  |
| --- | --- |
| * 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:**

|  |  |
| --- | --- |
| * 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

|  |  |
| --- | --- |
| * 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** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

**Method/Procedure:** Diagram

|  |  |
| --- | --- |
| * 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?
 |

|  |  |  |
| --- | --- | --- |
| **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** |
|  |  |  |
|  |  |  |
|  |  |  |

**Qualitative and Quantitative Data:**

|  |  |
| --- | --- |
| * 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:**

|  |  |
| --- | --- |
| * 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:**

|  |  |
| --- | --- |
| * **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?
 |

|  |  |
| --- | --- |
| **Strengths of your method** | **Explanation of how that is a strength** |
|  |  |
|  |  |
|  |  |

|  |  |
| --- | --- |
| * 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?
 |  |

|  |  |  |
| --- | --- | --- |
| **Weakness and significance** | **Explanation of the effect of the weakness on experimental results** | **Improvement for weakness** |
|  |  |  |
|  |  |  |
|  |  |  |

**Suggested Extension:**

|  |  |
| --- | --- |
| * 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.
 |