**Chemistry IA Write Up**

**Layout (6-12 pages)** Any pages after the 12th page will not be graded.

Introduction – Title includes your: name, student number, RQ and period number.

Method

Results

Analysis (calculations, graphs)

Conclusion

Evaluation

References – make sure there are in text citations. We will use APA referencing.

1. **Personal Engagement**

* Why did you choose this RQ? Why is it worth studying?
* In your evaluation section, you will note problems and solutions you had.

1. **Exploration**

Background Chemistry:

* Relevant Properties of your dependent variable and how that allows you to write an equation for reaction. This could include structural features, functional groups bonding etc.
* An explanation for how you can measure your dependent variable.
* Information relevant to the context of your investigation, e.g. known information about the amount of iodine in seaweed and how that might vary with species or location.

Variables

|  |  |
| --- | --- |
| **Variable(s)** | **How they will be changed/measured or controlled (i.e. equipment)** |
| Independent: | *justify why this is a sufficient range* |
| Dependent: |  |
| Control: |  |

Safety

* Chemicals 🡪 what there hazards are (reference source) 🡪 what precautions as a result?
* Procedures 🡪 is there anything about the procedure that adds a safety risk? E.g. heating corrosive chemicals, naked flames. glassware that could be easily broken etc.

Ethical

* I don’t think that this will apply to our IAs, but I would still include a statement to the effect of “there are no ethical issues associated with this research because…”

Environmental

* This primarily concerns disposal of chemicals. If you pour chemicals down the drain where do they go??? What impact will your specific chemicals have on the environment? How can you minimize the amount of chemicals going down the drain?

Method – this is a result of background chemistry, the variables and the safety/ethics/environmental concerns. Use a numbered list of your steps, include photos or diagrams to help explain your procedure.

1. **Analysis**

* Make sure you have data tables that show 5 changes to your independent variable and include sufficient replication of experiments.
* Tables should be titled e.g. “Table 1: Standardization Titration of 0.1 mol dm-3 NaOH using 0.1 mol dm-3KHP”. Make sure they have the uncertainties recorded, units and the data reported to the appropriate precision.
* Make sure **ALL** your calculations are exemplified. That means show each **type** of calculation you did. E.g. calculating the number of moles of vitamin C at 5 different temperatures via titration. You would have 5 data tables for the 5 different temperatures, and you would work out your average titre for each table. However, since the calculation for each temperature is exactly the same, you would only need to exemplify one of these and then just state the values for the other 4. A useful phrase is “The vitamin C concentration for the other 4 temperatures was calculated as above and are shown below:…”
* If graphs are included in your report, make sure they are drawn correctly…
* Have a subsection just on Uncertainties: make sure you note the absolute and relative uncertainties for all your measurements. Then have a section where you show how these uncertainties are combined in order to quote the uncertainty in your final calculated values.
* If you know what the actual values should be because either they were stated on the packaging or there is a equation for calculating them, then you should work out the reference error.
* If you had to make any assumptions about your experiment, list them.

1. **Evaluation**

* Whatever your calculated data values give you, state that as a conclusion.
* Comment on how valid you feel your conclusion is based on the measurement uncertainties and any reference error or theoretical value. By theoretical value an example would be things such as “the total mass of a tablet was only 1g, so my value of 1.2g of iron in each tablet is not possible. Or,“according to the databook values the enthalpy change should be exothermic and a value of ***X*** kJ mol-1, my calculated value was within measurement uncertainty of this value and therefore this provides confidence in my conclusion.” Give as much genuine rationale for the values you got, e.g. problems you might have experienced, unexpected color changes that might have suggested something not working as it should etc. This then leads and helps the next section on improvements and extensions.
* For highest score for evaluation both suggested improvements and extensions should be precise, focused and relevant to investigation. This means that the improvements are directly related to a problem that you actually had with your investigation and any extension would add to the validity of your project. Saying things such as I should have repeated my experiment more is not the best answer here, especially if it is a systematic error that you are describing because repeating experiments does not reduce systematic errors, only random errors.

1. **Communication**

* Make sure there are no chemistry theory errors. Include diagrams, structures of molecules, equations for reactions and that the whole report reads well and is easy to follow. Have side headings, page numbers. Label tables and calculations to make it easier for you to reference and follow. E.g. “the data in table 2.” Or “calculation 5a shows…”