**[Investigation Design Diagram](http://www.longwood.edu/cleanva/images/sec6.designexperiment.pdf) Title and date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Planning Draft** **Names of investigators: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Problem, or research question:** Written as a question. **The effect of …………** *E.g. The effect of the* ***concentration of an acid solution*** *on* ***the pH of a solution.*****Hypothesis:**A short statement, making a prediction about how one variable affects another variable, that is the relationship between the variables… As the independent variable **increases** the dependent **variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** *E.g. As the concentration of an acid solution* ***increases*** *the pH of the solution* ***increases.*****Variables and how they will be measured****Independent variable**: state the values of the variables to be measured and which value will be **the control value.***E.g. concentration of an acid solution*  *0.1M, 0.2M, 0.4M, 0.5M**the control will be 0.1M* **Dependent variable**: State how it will be measured, and theunits it will be measured in*E.g. Use a pH meter, or Universal indicator and colour chart to record the pH value***Controlled variables**. (Note how you kept these the same.)*E.g.*1. *The type of acid, ethanoic acid, CH3COOH*
2. *The volumes of acid used, 5mL*
3. *Clean test tube/dimple tray, with distilled water after each test.*
4. *The number of drops of indicator used*
 | **Problem:****Hypothesis:****Variables and how they will be measured****Independent variable:** **Dependent variable** **Controlled variables.**  |

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| **Materials:** List of materials written with quantities of apparatus and quantities and units of chemical so that the laboratory technicians know exactly what it is you are doing.*E.g. 1 dimple tray, ….**1 dropper bottle each of CH3COOH in the following concentrations, 0.1M, 0.2M, 0.4M, 0.5M***Safety considerations:**Consider how to behave in a responsible manner and the safety equipment needed.*E.g. Wear safety glasses**Wash affected area if splashes occur***Method:** Listed in steps so that anyone else couldrepeat your experiment exactly.*Set up apparatus and reagents*1. *Accurately measure out 5mL of…*
2. *Perform…*
3. *Return apparatus….*
4. *Clean up…*

**Diagram:** Use a ruler and pencil. | **Materials:** **Safety considerations:****Method:** **Diagram:** |

**Investigation Conducting and Evaluation Title and date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Results and Conclusion Draft**  **Names of investigators: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| **Results**:Refer to the *Table* in the text of the **Report.*****Table 1*: TITLE**

|  |  |
| --- | --- |
| Independent variable(units) | Dependent variable (units) |
| Trial1 | Trial2 | Trial3 | Average |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

Do as many trials as is practicable.**Graph:** What type of graph will you draw and why?Plot the **average** results against the independent variableDependent variable(units)Independent variable(units) ***Figure 1:* TITLE – relates the two variables** | **Results**:***Table 1*: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- |
|  |  |
| Trial1 | Trial2 | Trial3 | Average |
|  |  |  |  |  |
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**Sketch of Graph** |

|  |  |
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| **Conclusion**:Refer to the graph, *Figure* ? and* Describe what your results show.
* Describe any patterns or trends (relationships) in the data.
* Discuss proportionality of the data.
* Explain, using science ideas why the relationship was observed.

Consider how this concept could be applied.Consider further research to extend this topic.**Evaluation of investigation design:*** State whether the hypothesis was supported or

not.* Describe the difficulties you had in measuring the variables accurately.
* How reliable were your results?
	+ - * + Explain why three trials were performed.
				+ Explain why averages were calculated.
				+ Explain if the sample sizes were large enough.
				+ Describe and explain any significant difference between the results.
				+ Describe what was done to control the other variables.
* Use scientific language and concepts to describe what was learned from this investigation.

**Bibliography** | **Conclusion**:**Evaluation of the method:** |

# NOTE: This is a draft planning document written to the students who are investigating. Write the final report in the past tense, third person and passive voice.