|  |  |
| --- | --- |
| **Research Question:** |  |

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| --- | --- |
| Prediction, based on observations: | Annotated sketch graph to show predicted outcomes: |
|  |  |

|  |
| --- |
| Scientific explanation for prediction: |
|  |

**Independent variable:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Independent Variable:** |  | Units & Uncertainties: | |  | |
| Range for **continuous variable**  (min 5 increments) |  | | **Number of repeats:** | |  |
| Explain how this range of values was selected: | | | | | |
|  | | | | | |
| Specific method for manipulating the independent variable: | | | | | |
|  | | | | | |

**Dependant variable:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Dependent Variable:** |  | Units & Uncertainties: |  |
| Measuring tools: |  | | |
| Specific method for measuring the DV: | | | |
|  | | | |
| Graph type to be used, with explanation | | Calculations needed, with explanation | |
|  | |  | |

**Control of variables:**

|  |  |  |
| --- | --- | --- |
| Controlled variables (constants), effect on results: | | Method for control: |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Materials:**

**Method (step-wise).** Include annotated photo of equipment set-up.

**Safety and Ethics**

|  |  |
| --- | --- |
| Safety precautions | Ethical considerations |
|  |  |

**Design: Self-Assessment Rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | ***Complete / 2*** | ***Partial / 1*** | ***Not at all / 0*** |
| **A**  **S**  **P**  **E**  **C**  **T** | Define problem & select variables | Formulates a **focused problem/ research question** and identifies the relevant variables. | Formulates a problem/research question that is incomplete or identifies only some relevant variables. | Does not identify a problem/ research question AND does not identify any relevant variables. |
| Controlling variables | Designs a method for the **effective control** of the variables. | Designs a method that makes some attempt to control the variables. | Designs a method that does not control the variables. |
| Developing a method for collection of data | Develops a method that allows for the collection of **sufficient relevant data**. | Develops a method that allows for the collection of insufficient relevant data. | Develops a method that does not allow for any relevant data to be collected. |

|  |  |  |
| --- | --- | --- |
| Marking Checklist: | * Completed & Correct | X Not complete/ incorrect |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Design** | **Aspect 1: Define the problem and select the variables** | | | |
| * Research Question or Aim clearly stated * RQ/Aim includes IV and DV * Background to investigation included * IV correctly identified with units/ range * DV correctly identified with units and precision | | *If a hypothesis is required:*   * It is quantitative * A sketch graph is included, with explanation * Prediction is explained using scientific theory * Sources are cited | |
| **Aspect 2: Controlling variables** | | | |
| * Method to manipulate IV, including specific details of range or increments * Method for recording results, including units and uncertainty of tools (± \_\_\_\_\_\_\_\_\_\_\_ ) * Annotated photo of equipment or experimental set-up * **Full citation** of published protocol, if used | | | *Controlled variables presented as a table:*   * **List all variables** to be controlled   ***For each variable:***   * How could it impact the results? * Exactly how will it be controlled? (Value, with method for achieving that value. |
| **Aspect 3: Developing a method for collection of sufficient relevant data** | | | |
| * Results table designed before investigation was planned, to guide Design * How will results be presented? Reason. * What statistical test(s) will be used? Why? * Does plan to collect data address RQ? * **Min. 5 increments** over a suitable range for the IV (continuous) * **Min. 15 samples** for the IV (discontinuous) * **Explain** how range of IV was selected | * **Explain** how raw data will be transformed into processed data for comparison/ plotting * Sufficient repeats at each increment to ensure reliability and allow for stats. * Method clearly presented in step-wise format and can be repeated by others. * **Safety/ ethics concerns addressed**, including *animal experimentation policy*. | | |