

REPORT CHECKLIST

Research Question:

- ☐ Identifies independent variable (with range) and dependent variable (with measurement details)
- ☐ Contains specific details (includes key amounts, timings, conditions and scientific names)

Introduction:

- ☐ Key terms are defined and concepts relevant to the purpose of the investigation are explained
- ☐ References are made to related scientific findings (cited in the text and listed in the bibliography)
- ☐ Investigation is contextualised to provide scientific relevance (study has a legitimate application)
- ☐ Provides a concise description of the system in which the research question is embedded

Hypothesis:

- ☐ A prediction is made as to the relationship between the independent and dependent variable
- ☐ A justification for the proposed outcome has been provided based on relevant scientific literature

Variables / Procedural Development:

- ☐ The independent variable includes intervals that reflect scope of study (and the range is justified)
- ☐ The mechanism for measuring the dependent variable is specified (i.e. method of data collection)
- ☐ A negative control is included to establish baseline values (may not be appropriate to all designs)
- ☐ The main control variables are all identified and the reason for their level of control is made clear
- ☐ Uncontrolled variables are identified and their potential impact on data collection is assessed
- ☐ If adapting an existing method (pilot study / prior experiment), reasons for changes are explained

Materials:

- ☐ All items of equipment are listed and include specific sizes, quantities and concentrations
- ☐ Brand / model / source provided for electronic devices and certain reagents (e.g. agar plates)
- ☐ Absolute uncertainties are provided for all electronic devices and measuring apparatuses

Methodology:

- ☐ Method is outlined according to a logical and progressive list of numbered steps (not repetitive)
- ☐ Method includes sufficient detail to allow for independent replication of the experimental design
- ☐ Method allows for collection of sufficient data (minimum of five repetitions and five IV intervals)
- ☐ A diagram or photograph (labelled) of the experimental setup may also be included for clarity
- ☐ The methodology is written according to standard convention (i.e. third person and past tense)
- ☐ The methodology may be organised according to the following sections
 - Setting up experiment (outlines steps involved in equipment set up and preparing mixtures)
 - Conducting experiment (outlines steps involved in manipulating the independent variable)
 - Collecting data (outlines process by which dependent variable is quantitatively measured)

Risk Assessment:

- ☐ Potential experimental risks are identified, and the relevant safety precautions are outlined
- ☐ Consideration is given to the appropriate disposal of all chemical or biological reagents
- ☐ Identifies steps taken to minimise environmental impact when undertaking ecological analysis

Raw Data:

- ☐ Qualitative observations outline observable trends and identify specific anomalous conditions
- ☐ Qualitative observations are descriptive and not interpretative – do not explain patterns / trends
- ☐ Quantitative data presented in a table (row = independent variable; column = dependent variable)
- ☐ All numerical values have the same number of decimal places (appropriate to measuring device)

Processed Data:

- ☐ Data processing includes mean, standard deviation, skew, outlier fences and percent uncertainty
- ☐ Sample calculations are included (use mean values for calculating percentage uncertainties)
- ☐ Outliers highlighted within the raw data and may be excluded from data processing calculations
- ☐ All data values have the same number of decimal places (with appropriate significant figures)

Graph:

- ☐ Processed data is plotted according to an appropriate graph (trend line included for scatter plots)
- ☐ Graph has correct formatting (variables on proper axes with correct labels – DV represents mean)
- ☐ Plotted data displays variation (graph includes appropriate error bars that are clearly defined)
- ☐ Outcome of regression analysis is included for trend line (linear = r -value ; non-linear = r^2 value)

Statistical Analysis:

- ☐ Statistical test is clearly described (type of test, probability levels, null vs alternative hypotheses)
- ☐ Sample calculations are included (identifying the relevant degree of freedom and critical values)
- ☐ All data values have the same number of decimal places (with appropriate significant figures)

Discussion:

- ☐ Results of the experiment are briefly summarised with regards to discernible patterns and trends
- ☐ Expected and actual results are compared, with potential explanations provided for exceptions
- ☐ Data accuracy is discussed (referencing the total percentage uncertainty for each IV condition)
- ☐ The precision (reliability) of the data is discussed (referencing standard deviations and error bars)
- ☐ Significance of any patterns or trends is discussed (via correlation coefficients or inferential tests)
- ☐ Results of the experiment are explained using relevant scientific literature (from the introduction)

Evaluation:

- ☐ Methodological weaknesses are identified (e.g. control of variables, measurement accuracy)
- ☐ Experimental limitations are identified (e.g. data range, length of collection, system confines)
- ☐ All weaknesses and limitations are evaluated according to their relative impact on the results
- ☐ A realistic improvement is suggested for every identified issue (try to include 5 – 6 proposals)

Conclusion:

- ☐ A conclusion is formed which cites experimental evidence to support or reject the hypothesis
- ☐ The extent to which any conclusions formed from the data can be generalised is discussed

Communication:

- ☐ All external sources are referenced (work cited or consulted) using an appropriate style guide
- ☐ Report is correctly formatted (tables and graphs have clear headings – do not break across pages)
- ☐ Follows formatting conventions (min font size = 12, pages numbered, total length < 3,000 words)