

## MCDS IB Lab Write-Up Checklist

Design	<b>Aspect 1: Define the problem and select the variables</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Research Question or Aim clearly stated</li> <li><input type="checkbox"/> RQ/Aim includes IV and DV</li> <li><input type="checkbox"/> Background to investigation included</li> <li><input type="checkbox"/> IV correctly identified with units/ range</li> <li><input type="checkbox"/> DV correctly identified with units and precision</li> </ul>	<p><i>If a hypothesis is required:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> It is quantitative</li> <li><input type="checkbox"/> A sketch graph is included, with explanation</li> <li><input type="checkbox"/> Prediction is explained using scientific theory</li> <li><input type="checkbox"/> Sources are cited</li> </ul>
	<b>Aspect 2: Controlling variables</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Method to manipulate IV, including specific details of range or increments</li> <li><input type="checkbox"/> Method for recording results, including units and uncertainty of tools (<math>\pm</math> _____ )</li> <li><input type="checkbox"/> Annotated photo of equipment or experimental set-up</li> <li><input type="checkbox"/> Full citation of published protocol, if used</li> </ul>	<p><i>Controlled variables presented as a table:</i></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> List all variables to be controlled</li> </ul> <p><b>For each variable:</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> How could it impact the results?</li> <li><input type="checkbox"/> Exactly how will it be controlled? (Value, with method for achieving that value.</li> </ul>
<b>Aspect 3: Developing a method for collection of sufficient relevant data</b>		
<ul style="list-style-type: none"> <li><input type="checkbox"/> How will results be presented? Reason.</li> <li><input type="checkbox"/> What statistical test(s) will be used? Why?</li> <li><input type="checkbox"/> Does plan to collect data address RQ?</li> <li><input type="checkbox"/> Min. 5 increments over a suitable range for the IV (unless comparing populations)</li> <li><input type="checkbox"/> Explain how range of IV was selected.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Sufficient repeats at each increment to ensure reliability and allow for stats.</li> <li><input type="checkbox"/> Method clearly presented in step-wise format and can be repeated by others.</li> <li><input type="checkbox"/> Safety/ ethics concerns addressed, including <i>animal experimentation policy</i>.</li> </ul>	

Data Collection and Processing	<b>Aspect 1: Recording Raw Data</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Table presents only raw, unmodified data</li> <li><input type="checkbox"/> Title outlines the investigation</li> <li><input type="checkbox"/> Units of IV and DV present and correct</li> <li><input type="checkbox"/> Uncertainties correct (<math>\pm</math> _____ )</li> <li><input type="checkbox"/> All data are recorded correctly</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Decimal points consistent throughout</li> <li><input type="checkbox"/> Decimal points consistent with precision of the measuring equipment</li> <li><input type="checkbox"/> Associated qualitative data (observations) <b>MUST</b> be recorded or zero awarded.</li> </ul>
	<b>Aspect 2: Processing Raw Data</b>	
	<ul style="list-style-type: none"> <li><input type="checkbox"/> Calculations to determine DV carried out, if necessary</li> <li><input type="checkbox"/> Calculations or statistical tests appropriate to investigation and address RQ</li> <li><input type="checkbox"/> Mathematics correctly applied</li> <li><input type="checkbox"/> Worked example calculations given</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Processed data (and decimal places) consistent with precision of recorded data</li> <li><input type="checkbox"/> Uncertainties adjusted to reflect any calculations carried out.</li> <li><input type="checkbox"/> Standard deviations included where appropriate</li> </ul>
<b>Aspect 3: Presenting Processed Data</b>		
<ul style="list-style-type: none"> <li><input type="checkbox"/> Separate processed data tables from raw data tables for clarity of presentation</li> <li><input type="checkbox"/> Titles self-explanatory and complete</li> <li><input type="checkbox"/> Consistent decimal places</li> <li><input type="checkbox"/> Uncertainties/ errors included</li> <li><input type="checkbox"/> Appropriate choice of graph</li> <li><input type="checkbox"/> Graphs clear, no funny coloring</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Axes labeled clearly, including metric/ SI units and uncertainties of values</li> <li><input type="checkbox"/> Axes scaled appropriately</li> <li><input type="checkbox"/> Error bars included, unless insignificant</li> <li><input type="checkbox"/> Error bar source (e.g. standard deviation) stated and data are correct</li> <li><input type="checkbox"/> Best fit line produced by you, not Excel.</li> </ul>	

<b>Conclusion and Evaluation</b>	<b>Aspect 1: Concluding</b>	
	<input type="checkbox"/> Patterns and trends in data stated, with reference to the graph/ tables. <input type="checkbox"/> Comparisons, if appropriate, are made <input type="checkbox"/> Data related to hypothesis or RQ – to what extent to they agree/ disagree? <input type="checkbox"/> Scientific explanation for results <input type="checkbox"/> Associated qualitative data add value to explanations.	<input type="checkbox"/> Appropriate language used “ <i>Supports my hypothesis</i> ” (not ‘proves’ or ‘is correct’) <input type="checkbox"/> Comparison with published data, if possible. <input type="checkbox"/> Sources cited appropriately
	<b>Aspect 2: Evaluating procedures</b>	
	<input type="checkbox"/> Reference to error bars (or STDEV) with regard to suggested reliability of results <input type="checkbox"/> Explanation of reliability of results <input type="checkbox"/> Are data sufficient to address the RQ? <input type="checkbox"/> Was the range of the IV appropriate? <input type="checkbox"/> Explain any anomalous data points. <input type="checkbox"/> Associated qualitative data referred to.	Evaluate <i>random biological variation, measurement/ instrument errors, systematic error</i> (problems with the method) in terms of: <input type="checkbox"/> Possible effect on data <input type="checkbox"/> Significance of the weakness or limitation in terms of the data set <i>This can be clearly presented in a table.</i>
	<p><i>Time management or human error</i> may be mentioned, though these are not scientific errors – they should be eliminated with good practical skills. The focus here should be on <i>the investigation</i>.</p>	
<b>Aspect 3: Improving the investigation</b>		
For each weakness or limitation mentioned above, how could improved experimental design remove or reduce the impact of the error in terms of: <ul style="list-style-type: none"> <li><input type="checkbox"/> Techniques used to collect and record data, including precision of equipment</li> <li><input type="checkbox"/> Design of the investigation, including range of values chosen and repeats of each IV data point</li> <li><input type="checkbox"/> Realistic and achievable improvements</li> </ul>		

<b>Essential Extras</b>	<b>Safety and Ethical Working</b>	
	<input type="checkbox"/> <i>Animal experimentation policy</i> supported <input type="checkbox"/> Appropriate risk assessment completed <input type="checkbox"/> Safety precautions taken throughout <input type="checkbox"/> Instructions followed carefully	<input type="checkbox"/> Design of investigation minimizes environmental impacts <input type="checkbox"/> Safe disposal and reduced wastage <input type="checkbox"/> Data are authentic and not fabricated
	<b>Academic Honesty</b>	
	<input type="checkbox"/> Council of Biological Editors (ISO 690 Numerical on MS Word) format <input type="checkbox"/> In-text citations <input type="checkbox"/> Citations in correct order <input type="checkbox"/> Works Cited section in correct order	<input type="checkbox"/> Quotations in italics and quotation marks <input type="checkbox"/> Images given a ‘fig x’ legend with short description and cited as in-text citations <input type="checkbox"/> Academic honesty statement signed on coversheet of write-up
	<b>Formatting</b>	<b>Submission</b>
<input type="checkbox"/> Title reflects investigation <input type="checkbox"/> 1.5 line-spacing <input type="checkbox"/> Grammar and spell-checked <input type="checkbox"/> Clear font, no funny color-schemes <input type="checkbox"/> Sentences and sections are not split on separate pages. <input type="checkbox"/> Logical order, with headings clear	<input type="checkbox"/> One printed copy <input type="checkbox"/> One digital copy to student submissions <input type="checkbox"/> Plagiarism checked	