

IBESS LAB RUBRIC

Author's Name: _____ Period: _____

Lab Title: _____

Directions: Circle the descriptor that the report completes. If all the descriptors for that section are circled, then the author receives the higher mark for that section, otherwise, they receive the lower mark for that section.

Identifying the context (6) Environmental systems and societies guide 82

This criterion assesses the extent to which the student establishes and explores an environmental issue (either local or global) for an investigation and develops this to state a relevant and focused research question.

A c h i e v e m e n t l e v e l	Descriptor	
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1-2	The student's report: states a research question, but there is a lack of focus outlines an environmental issue (either local or global) that is linked to the research question lists connections between the environmental issue (either local or global) and the research question but there are significant omissions.
	3-4	The student's report: states a relevant research question outlines an environmental issue (either local or global) that provides the context to the research question describes connections between the environmental issue (either local or global) and the research question, but there are omissions.
	5-6	The student's report: states a relevant, coherent and focused research question discusses a relevant environmental issue (either local or global) that provides the context for the research question explains the connections between the environmental issue (either local or global) and the research question.
I d e n t i f y i n g t h e C o n t e x t	TITLE (THE EFFECT OF IV ON DV)	
	I. ENVIRONMENTAL ISSUE & RESEARCH QUESTION (RQ)	
	Give a specific, relevant, coherent and focused research question RQ is connected a local or global <u>environmental</u> issue/problem Explicitly state local or global <u>environmental</u> issue/problem: The local or global <u>environmental</u> issue/problem is...	
	II. BACKGROUND	
	<input type="checkbox"/> 1-2 pages (3-6 paragraphs) explaining the background of lab, based on personal experience and or cites research. <input type="checkbox"/> At least 3 different in-text cited sources using MLA format. <input type="checkbox"/> Include balanced review that includes a range of arguments, factors or hypotheses explaining the environmental issue this IA will address. <input type="checkbox"/> Detailed explanation of the environmental issue and how is it connect to the RQ, including reasons or causes.	
	III. HYPOTHESIS	
	<input type="checkbox"/> Hypothesis is clearly stated as an "IF...[IV]...then...[DV]..., because..."	
	<input type="checkbox"/> Hypothesis can be scientifically supported or refuted by your experiment.	

Statements with reasoning for the Identifying the context score provided:

Planning (6) Environmental systems and societies guide 83

This criterion assesses the extent to which the student has developed appropriate methods to gather data that is relevant to the research question. This data could be primary or secondary, qualitative or quantitative, and may utilize techniques associated with both experimental or social science methods of inquiry. There is an assessment of safety, environmental and ethical considerations where applicable.

Achievement level	Descriptor	
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1–2	The student's report: designs a method that is inappropriate because it will not allow for the collection of relevant data outlines the choice of sampling strategy but with some errors and omissions lists some risks and ethical considerations where applicable.
	3–4	The student's report: designs a repeatable* method appropriate to the research question but the method does not allow for the collection of sufficient relevant data describes the choice of sampling strategy outlines the risk assessment and ethical considerations where applicable.
	5–6	The student's report: designs a repeatable* method appropriate to the research question that allows for the collection of sufficient relevant data justifies the choice of sampling strategy used describes the risk assessment and ethical considerations where applicable.

*Repeatable, in this context, means that sufficient detail is provided for the reader to be able to replicate the data collection for another environment or society. It does **not** necessarily mean repeatable in the sense of replicating it under laboratory conditions to obtain a number of runs or repeats in which all the control variables are exactly the same.

Planning	IV. VARIABLES
	<input type="checkbox"/> Variable table completed with all 3 columns
	<input type="checkbox"/> Independent variable identified as Continuous or Discontinuous
	<input type="checkbox"/> Effect of independent variable on experiment explained
	<input type="checkbox"/> Dependent variable identified
	<input type="checkbox"/> Must have at least 3 controlled variables
	<input type="checkbox"/> Effect of controlled variable on experiment explained
	<input type="checkbox"/> Method for controlling the controlled variable explained
	V. MATERIALS
	<input type="checkbox"/> A complete description of the materials (size/location/brand) is included.
<input type="checkbox"/> Picture/drawing is included if it is an obscure item	
VI. SAMPLING STRATEGY (<i>What are you measuring for qual and quant data, why is that method the best way to take data and how will you measure it? What statistical calculations will you use and why are you using it?</i>)	
<input type="checkbox"/> Justify the sampling strategy chosen.	
VII. ETHICAL CONSIDERATIONS	
<input type="checkbox"/> Risk assessments statement and ethical consideration, in detail (if none- indicate)	
VIII. METHOD	
<input type="checkbox"/> The procedures setting-up and conducting so that you can collect relevant data to answer the research question	
<input type="checkbox"/> The experiment is explained pictorially and written.	
<input type="checkbox"/> The methods of data collection are described both (including units and scales).	
<input type="checkbox"/> The procedures are written in enough detail that experiment could be replicated.	
<input type="checkbox"/> The drawing is detailed, neat, labeled and with scale. It clearly shows the experimental set-up.	

Statements with reasoning for the Identifying the context score provided:

Results, analysis and conclusion (6) Environmental systems and societies guide 84

This criterion assesses the extent to which the student has collected, recorded, processed and interpreted the data in ways that are relevant to the research question. The patterns in the data are correctly interpreted to reach a valid conclusion

Achievement level	Descriptor	
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1–2	constructs some diagrams, charts or graphs of quantitative and/or qualitative data, but there are significant errors or omissions analyses some of the data but there are significant errors and/or omissions states a conclusion that is not supported by the data.
	3–4	constructs diagrams, charts or graphs of quantitative and/or qualitative data which are appropriate but there are some omissions. analyses the data correctly but the analysis is incomplete interprets some trends, patterns or relationships in the data so that a conclusion with some validity is deduced.
	5–6	constructs diagrams, charts or graphs of all relevant quantitative and/or qualitative data appropriately analyses the data correctly and completely so that all relevant patterns are displayed interprets trends, patterns or relationships in the data, so that a valid conclusion to the research question is deduced.
Results, Analysis, Conclusion	IX. DATA TABLES (results)	
	<input type="checkbox"/> Neatly drawn with ruler or on the computer <input type="checkbox"/> One Sample raw data. If there are more raw data tables, then they are in the appendix <input type="checkbox"/> Quantitative data: processing data that makes sense (mean & SD or Mode/Median & Frequency Distribution, etc) <input type="checkbox"/> Qualitative data: clearly displayed and processed using Mode/Median and Frequency Distribution <input type="checkbox"/> Title clearly labeled (Effect of IV on DV) <input type="checkbox"/> Vertical columns for (1) dependent variable (trials) and (2) statistical calculations (i.e. mean). <input type="checkbox"/> Horizontal rows for independent variable (from smallest to largest) <input type="checkbox"/> Title all the columns <input type="checkbox"/> Correct units provided <input type="checkbox"/> Consistent with decimal places <input type="checkbox"/> Data was collected independently	
	<i>Processing Data:</i>	
	<input type="checkbox"/> <i>Raw data is manipulated before it is finally presented. This might include grouping elements from raw data, calculation of mean values, percentages, indices or statistical tests.</i> <input type="checkbox"/> <i>Show all work for at least the first calculation of its type</i>	
	X. Data Presentation (Graphs):	
	<input type="checkbox"/> The processed data is graphed in a format that <u>appropriately</u> represents the data <ul style="list-style-type: none"> · Continuous IV → Line graph · Discontinuous IV → Bar graph 	
	<input type="checkbox"/> Quantitative data: statistical analysis (ie: mean & SD or Mode/Median & Frequency Distribution) graphed <input type="checkbox"/> Qualitative data: statistical analysis (ie: Mode/Median & Frequency Distribution) graphed <input type="checkbox"/> Graphs must be titled (Effect of IV on DV) <input type="checkbox"/> Axes must be accurately scaled and labeled <input type="checkbox"/> Neatly drawn with ruler on graph paper or on the computer <input type="checkbox"/> Data is not unnecessarily repeated; Presentation of the same data set in a variety of formats is inappropriate. <input type="checkbox"/> 1-4 bullet points under the graph to interprets trends, patterns or relationships in the data, so that a valid conclusion to the research question is deduced ("What do you see?")	
	XI. Conclusion: "Make meaning of what you see."	
	<input type="checkbox"/> Briefly restated the purpose of the study. <input type="checkbox"/> Explained what the experiment designed to test and measure <input type="checkbox"/> In depth explanation of outliers, irregularities <input type="checkbox"/> Briefly restated the major findings of the experiment. <input type="checkbox"/> Stated if your hypothesis was supported or refuted. Briefly explained why this may have been the case. <input type="checkbox"/> Using standard deviation and/or frequency distribution, explained trends (patterns) and anomalies (unexpected results). <input type="checkbox"/> Explained in depth, the best scientific explanations that might have caused the trends (patterns) and anomalies (unexpected results). <input type="checkbox"/> Suggestions offered in terms of further study related to this experiment	

Statements with reasoning for the Identifying the context score provided:

Discussion and evaluation (6) Environmental systems and societies guide 85

This criterion assesses the extent to which the student discusses the conclusion in the context of the environmental issue, and carries out an evaluation of the investigation.

A c h i e v e m e n t l e v e l		Descriptor
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1–2	The student's report: identifies how some aspects of the conclusion are related to the environmental issue describes some strengths and weaknesses and limitations of the method suggests superficial modifications and/or further areas of research.
	3–4	The student's report: describes the conclusion in the context of the environmental issue but there are omissions evaluates some strengths, weaknesses and limitations within the method used suggests modifications and further areas of research.
	5–6	The student's report: discusses the conclusion in the context of the environmental issue evaluates strengths, weaknesses and limitations within the method used suggests modifications addressing one or more significant weaknesses with large effect and further areas of research.
Discussion and Evaluation	XII. Discussion <input type="checkbox"/> Makes connections between the conclusion made and the environmental context they originally identified. <i>The conclusion demonstrates that (your env issue)....</i> XIII. Evaluation <input type="checkbox"/> Evaluates how well did your experiment answers the environmental issue you originally made <input type="checkbox"/> <i>Suggests modifications:</i> take a bigger weakness/es mentioned and how can you make it better and what extension (if there is one bad weakness, use that. If there are two same sized weaknesses, use both of them) <input type="checkbox"/> Propose solutions of how to improve that weakness and limitation (on right column). <input type="checkbox"/> Identified <i>systemic</i> weakness and limitations of the lab procedure or major human errors	

Statements with reasoning for the Identifying the context score provided:

Applications (3) Environmental systems and societies guide 86

This criterion assesses the extent to which the student identifies and evaluates one way to apply the outcomes of the investigation in relation to the broader environmental issue that was identified at the start of the project.

A c h i e v e m e n t l e v e l		Descriptor
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1	states one potential application and/or solution to the environmental issue that has been discussed in the context describes some strengths, weaknesses and limitations of this solution.
	2	describes one potential application and/or solution to the environmental issue that has been discussed in the context, based on the findings of the study, but the justification is weak or missing evaluates some relevant strengths, weaknesses and limitations of this solution
	3	justifies one potential application and/or solution to the environmental issue that has been discussed in the context, based on the findings of the study evaluates relevant strengths, weaknesses and limitations of this solution.
A p p l i c a t i o n s	XIV. APPLICATIONS <input type="checkbox"/> Explain the implication of results, basically, "Why should people care about this lab, why is this important for society to know?" <input type="checkbox"/> Make this response in the context of relevant literature, accepted scientific understanding/models and/or class discussions. <input type="checkbox"/> Refer back to the original Environmental issue; justify (one potential application and/or) solution to the environmental issue that has been discussed in the context, based on the findings of the study. <ul style="list-style-type: none"> • <i>Solution</i> = what is the fix?; <i>Application</i> = how would this work in the real work? <input type="checkbox"/> Evaluate relevant strengths, weaknesses and limitations of the application/solution that you mentioned.	

Statements with reasoning for the Identifying the context score provided:

Communication (3) Environmental systems and societies guide 87

This criterion assesses whether the report has been presented in a way that supports effective communication in terms of structure, coherence and clarity. The focus, process and outcomes of the report are all well presented.

A c h i e v e m e n t l e v e l		Descriptor
	0	The student's report does not reach a standard described by any of the descriptors given below.
	1	The investigation has limited structure and organization. The report makes limited use of appropriate terminology and it is not concise. The presentation of the report limits the reader's understanding.
	2	The report has structure and organization but this is not sustained throughout the report. The report either makes use of appropriate terminology or is concise. The report is mainly logical and coherent, but is difficult to follow in parts.
	3	The report is well structured and well organized. The report makes consistent use of appropriate terminology and is concise. The report is logical and coherent.

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Please note that while the report would be expected to be correctly referenced, students will not be penalized under this criterion for a lack of bibliography or other means of citation. It is likely that such an omission would be treated under the IB Diploma Programme academic honesty policy.

Statements with reasoning for the Identifying the context score provided:

C o m m u n i c a t i o n	<input type="checkbox"/> Section titles provided. <input type="checkbox"/> The report should be 1,500 to 2,250 words long. External moderators will not read beyond 2,250 words and teachers should only mark up to this limit. <input type="checkbox"/> Formatting is concise, clear, and consistent. <input type="checkbox"/> The report is well structured and well organized (logical). <input type="checkbox"/> Missing details in graphs and data tables is penalized in this section <input type="checkbox"/> No issues with lab graph formatting <input type="checkbox"/> Lab is easy to read
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Statements with reasoning for the Identifying the context score provided:

Total /30

Command Terms used in the HIGHEST level for each section of the IA:

- State- Give a specific name, value or other brief answer without explanation or calculation.
- Discuss - Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence.
- Explain- Give a detailed account, including reasons or causes. (Say the what and why)
- Design - Produce a plan, simulation or model.
- Justify – Give valid reasons or evidence to support an answer or conclusion.
- Describe - Give a detailed account.
- Constructs - Display information in a diagrammatic or logical form.
- Analyses - Break down in order to bring out the essential elements or structure.
- Interprets- Use knowledge and understanding to recognize trends and draw conclusions from given information.
- Evaluates - Make an appraisal by weighing up the strengths and limitations.
- Suggests - Propose a solution, hypothesis or other possible answer.