

# DESIGN LAB REPORTS: CRITERIA & GUIDELINES

## MYP SCIENCES YEAR 5

Criterion B: Inquiring and Designing				
(o)	Beginning (1-2)	Developing (3-4)	Accomplished (5-6)	Exemplary (7-8)
[i]	<i>I am able to:</i> <b>state</b> a problem or question to be tested by a scientific investigation	<i>I am able to:</i> <b>outline</b> a problem or question to be tested by a scientific investigation	<i>I am able to:</i> <b>describe</b> a problem or question to be tested by a scientific investigation	<i>I am able to:</i> <b>explain</b> a problem or question to be tested by a scientific investigation
[ii]	<i>I have not achieved a standard described to the right.</i> <b>outline</b> a testable hypothesis	<b>formulate</b> a testable hypothesis <b>using scientific reasoning</b>	<b>formulate and explain</b> a testable hypothesis <b>using scientific reasoning</b>	<b>formulate and explain</b> a testable hypothesis <b>using correct scientific reasoning</b>
[iii]	<b>outline</b> the variables	<b>outline</b> how to manipulate the variables, and <b>outline</b> how <b>relevant data</b> will be collected	<b>describe</b> how to manipulate the variables, and <b>describe</b> how <b>sufficient, relevant data</b> will be collected	<b>explain</b> how to manipulate the variables, and <b>explain</b> how <b>sufficient, relevant data</b> will be collected
[iv]	<b>design</b> a method, <b>with limited success.</b>	design a <b>safe method</b> in which he or she <b>selects materials and equipment.</b>	design a <b>complete and safe method</b> in which I select <b>appropriate materials and equipment.</b>	design a <b>logical, complete and safe method</b> in which I select <b>appropriate materials and equipment.</b>

**GENERAL FORMATTING:** Cover Page, Double-sided, 11 pt. font, regular margins, major headings underlined.

**Cover Page:** Title of lab (underlined), date of submission, name of teacher, your full name, class name, block

### Problem/Question [B-i]

- This is the question/objective that you are trying to answer by completing your experiment. It should be specific.
- Summarize any background information, concepts, or research that will help clarify the context of your question.
- Make sure to cite any research both in-text and in your bibliography.

### Hypothesis [B-ii]

- This statement reveals the relationship you predict exists between what you're manipulating (independent variable) and what you think will change as a result (dependent variable).
- Format: "If \_\_\_\_\_, then \_\_\_\_\_, because \_\_\_\_\_."
- What you predict will happen in your experiment, and why you think it will happen, **using scientific reasoning**
  - Make sure your reasoning includes specific science that would support your prediction
- Make sure to cite any research both in-text and in your bibliography.

### Variables & Data [B-iii]

- Identify the Variables:
  - **Independent Variable:** Name the variable that you will change (manipulate) in the experiment and explain how it will be manipulated.
  - **Dependent Variable:** Name the variable that will be MEASURED and how it will be measured.
  - **Controlled Variables:** List all of the variables that you will keep the same throughout the entire experiment and how you will keep them the same. (CONSTANT)
- Explain how sufficient (# of trials & increments) and relevant (types of measurements) data will be collected.

### Materials [B-iv]

- List all of the specific materials (including sizes/quantities) that you will use in this experiment.

### Method: [B-iv]

- Steps: Step-by-step instructions that logically and concisely describe how to complete your exact experiment.
  - Includes amounts (e.x. *add 20mL of water*) and instructions for when/where to make/record observations.
- Diagram: Includes a clearly labeled diagram(s) or image(s) of any apparatuses you will use "in action".
- Safety: Includes important safety information/warnings.
- Ethical Considerations: Includes important ethical concerns of procedure or materials.

Criterion C: Processing and Evaluating					
	(o)	Beginning (1-2)	Developing (3-4)	Accomplished (5-6)	Exemplary (7-8)
[i]		<i>I am able to:</i> collect and present data in numerical and/or visual forms	<i>I am able to:</i> correctly collect and present data in numerical and/or visual forms	<i>I am able to:</i> correctly collect, organize and present data in numerical and/or visual forms	<i>I am able to:</i> correctly collect, organize, transform and present data in numerical and/or visual forms
[ii]	<i>I have not achieved a standard described to the right.</i>	interpret data	accurately interpret data and explain results	accurately interpret data and explain results using scientific reasoning	accurately interpret data and explain results using correct scientific reasoning
[iii]		state the validity of a hypothesis based on the outcome of a scientific investigation	outline the validity of a hypothesis based on the outcome of a scientific investigation	discuss the validity of a hypothesis based on the outcome of a scientific investigation	evaluate the validity of a hypothesis based on the outcome of a scientific investigation
[iv]		state the validity of the method based on the outcome of a scientific investigation	outline the validity of the method based on the outcome of a scientific investigation	discuss the validity of the method based on the outcome of a scientific investigation	evaluate the validity of the method based on the outcome of a scientific investigation
[v]		state improvements or extensions to the method.	outline improvements or extensions to the method that would benefit the scientific investigation.	describe improvements or extensions to the method that would benefit the scientific investigation.	explain improvements or extensions to the method that would benefit the scientific investigation.

### Results & Observations:<sup>[C-i]</sup>

- This is an overview of your **Qualitative** (observations) and **Quantitative** (measurement) results.
- Quantitative data should be well-organized in a data table(s)
  - Columns and rows should have headings and units of measurements, with uncertainty if applicable
  - Individual trials and any columns for statistical analyses should be included
  - Title should be descriptive and underlined (title should describe exactly the data contained in the table)

e.x.: Mass of product X produced over time during reaction between substances A and B.

Time(s)	Mass (grams) ± .01 gram			
	Trial 1	Trial 2	Trial 3	Average

- Qualitative data can be included in a table, paragraphs, or in the form of images or diagrams.
- “Transform” raw data by modifying in some way to reveal or emphasize trends:
  - Do calculations (statistical analyses like avg, % change, etc.). Include sample calculations if you do this.
  - Create a graph(s) that shows trends or patterns clearly. Label it clearly and include a descriptive title.
    - Only draw a best fit line if appropriate (to emphasize a mathematical relationship)

### Analysis & Evaluation <sup>[C-ii, iii, iv, v]</sup>

This should be a four to five paragraph write up that addresses the following components:

- **Interpret Results:** <sup>[C-ii]</sup>
  - What does your data/results mean? What have your findings revealed (refer to specific data to support your inferences), and how are they explained and supported scientifically?
  - Comment on the reliability of the data – were there any unexpected results or outliers?
- **Assess the validity of the hypothesis:** <sup>[C-iii]</sup>
  - Was your hypothesis valid (was it validated by your results) or not? What proof (data) supports/rejects it?
- **Assess the validity of the method:** <sup>[C-iv]</sup>
  - Was your method valid? Did it allow you to collect:
    - data that is precise? (*Is there enough data? Is your data consistent? Are there any outliers? Why/why not? Did you control for all extrinsic variables?*)
    - data that is accurate? (if applicable) (*does it agree with literature values?*)
  - What were sources of error in your investigation? How did they impact the validity of your test?
- **Suggest improvements or extensions to the method:** <sup>[C-v]</sup>
  - How could the method of the experiment be improved to increase the precision or accuracy of your data? Could you fix some of the invalid components from part C?
  - What would you suggest for students doing this experiment next time; what more could you test?

### Works Cited

Document any research you included or sources you used in MLA format.