

DP - Mathematical exploration

Duration: 10 to 15 hours

Weighting: 20%

1. The exploration should be approximately **12-20 pages** long including diagrams and graphs, but excluding the bibliography
2. Use **double line** spacing
3. The following details should be stated on the **cover page** of the exploration:
 - title of the exploration (optional)
 - number of pages.
4. Include **referencing**, if they are not included in the final report, it may be flagged in terms of academic honesty. (Follow your EE referencing style)
5. Include **Bibliography**

Criterion A – Presentation

- Logically developed - Start with Introduction, body and conclusion
- Heading for each section
- Aim of exploration clearly stated
- Plan of the exploration (Data collection process + Describe Mathematics to be used with reason)
- Describe the sampling process to aid the flow of Exploration
- Easy to follow and meets its aim
- Reflection after each Math Process and link developed for the next Process.
- Reasoning throughout for the choices made
- Graphs, Tables and diagrams in appropriate place
- No irrelevant or unnecessary repetitive calculations, graphs or descriptions.

Criterion B - Mathematical communication

- Use appropriate mathematical language (**notation, symbols, terminology**)
- Define **key terms**
- Define **variables** for every calculation, graph etc.
- No need to explain generic formulae
- Appropriate referencing of diagrams, pictures etc.
- Used **multiple forms of mathematical representation**, such as formulae, diagrams, tables, charts, graphs and models, where appropriate
- Write Mathematical steps rather than statements/sentences
- Use Equation editor for Math typing. E.g. Avoid *(for multiply) , ^(for power) , / (for fraction) etc.
- Units mentioned in table, graph, calculations, explanation etc
- Tables and diagram with appropriate heading and labels
- Graphs easy-to-read, properly labelled and have a title, as well as appropriate scale
- Scale of measurement if any
- Thoughtful choice of significant figures

Criterion C - Personal engagement

- **NOT** a measure of effort
- **Personal interest** for choosing the topic (what inspired you - A clear and focussed rationale can help. Personal interest to be deeper than "I like, " I am keen of studying..)
- thinking independently, presenting mathematical ideas in your own way, exploring the topic from different perspectives, making and testing predictions.
- drive the exploration forward in a creative way
- approach demonstrates a complete understanding of the context of the exploration topic and the reader better understands the writer's intentions.

Criterion D - Reflection

- Linking the interpretation to the aim of the exploration,
- Reflect on the validity/reliability of the data / Why a particular data is being collected
- Reflect on the reason for your choices throughout the exploration (What and why)
- Critical Reflection /detailed analysis of the results throughout the task (Eg - What does this mean? Why is it interesting? Is it what you expected? Etc)
- Discuss the reason for each result – connection with real life scenario with the help of some research if required,
- Discuss implications of results (do the results make sense or are they reasonable or meaningful)

Conclusion

- Link it back to aim of the task.
- Overall discussion of results
- Reflect on limitations of exploration / data / results.
- Discuss strengths and weaknesses of Mathematical approaches used or other possibilities.
- Discuss possible extension.

Criterion E - Use of mathematics

- Include Plenty of Mathematics
- Overly complicated mathematics where simple mathematics would suffice is not relevant.
- Mathematics explored should either be part of the syllabus, or at a similar level.
- Give reason for a method used or any specific step that is not obvious.
- Thorough knowledge and understanding of Mathematics used demonstrated.
- Mathematics used is relevant to the topic being explored.
- Calculations done without error.
- Cite the source if any formula is used from textbook or online; not necessary if they are from your course e.g. Trig identities, Pythagoras etc.

HL

- clarity of logic and language when making mathematical arguments and calculations
- understanding and using challenging mathematical concepts,
- looking at a problem from different perspectives and seeing underlying structures to link different areas of mathematics.