Grading Criteria for IB Mathematical Studies Internal Assessment

A. Introduction

Task → what you are going to do
Plan → how you are going to do it
Statement of task should appear at the beginning of each project and you must have a clear title.

Achievement Level	Descriptor
0	The student does not produce a clear statement of task. (no evidence of any statement of what the student is going to do or has done)
1	Student produces a clear statement of the task. (task stated explicitly)
2	Student produces a title, a clear statement of the task and a clear description of the plan. (Plan need not be highly detailed, but must describe how the task will be performed. If there is no title, this achievement level cannot be awarded.)
3	The project contains a title, a clear statement of the task and a detailed plan that is followed. (plan should specify what techniques are to be used at each stage and the purpose behind them, thus leading focus to the task.)

B. Information/Measurement

Generated measurements include those that have been generated by computer, by observation, by investigation, by prediction from a mathematical model or by experiment. Mathematical information includes geometrical figures and data that is collected empirically or assembled from outside sources. This list is not exclusive and mathematical information does not solely imply data for statistical analysis.

Achievement Level	Descriptor
0	Student does not collect relevant information or generate relevant measurements. (no attempt has been made to collect any relevant information or generate any relevant measurements)
1	Student collects relevant information or generates relevant measurements. (this level can be awarded even if a fundamental flaw exists in the instrument used to collect the information, for example, a faulty questionnaire or an interview conducted in an invalid way)
2	Relevant information collected, or set of measurements generated by the student, is organized in a form appropriate for analysis **or** is sufficient in both quality and quantity. (A satisfactory attempt has been made to structure the information/measurements ready for the process of analysis, or the information/measurements are adequate in both quantity and quality)
3	Relevant information collected, or set of measurements generated by the student, is organized in a form appropriate for analysis **and** is sufficient in both quality and quantity. (This level cannot be achieved if the measurements/information are too sparse or too simple(for example 1-dimensional) as clearly it does not lend itself to be structured. It should therefore be recognized that within this descriptor there are assumptions about the quantity and, more importantly, the quality (in terms of depth and breadth) of information or measurements generated.) If the information/measurements are from a **secondary** source, then there must be evidence of sampling if appropriate. All sampling techniques should be completely described)

C. Mathematical Processes

When presenting diagrams, students are expected to use rulers where necessary and not merely sketch. A freehand sketch would not be considered a correct mathematical process. When technology is used the student would be expected to show a clear understanding of the mathematical processes used. All graphs must contain all relevant information. The teacher is responsible for determining the accuracy of the mathematics used and must indicate any errors on the final project. If a project contains no simple mathematical processes, then the first two further processes are assessed as simple.

Achievement Level	Descriptor
0	The student does not attempt to carry out any mathematical processes. (This includes students who have copied processes from a book with no attempt being made to use their own collected/generated information, Projects consisting of only historical accounts, for example, will achieve this level.)
1	Student carries out **at least 2** simple mathematical processes. (Simple processes are considered to be those that the average mathematical studies student could carry out easily, for example, percentages, areas of plane shapes, graphs, trigonometry, bar chars, pie charts, mean and standard deviation, substitution into formulae **and** any calculations and/or graphs using technology only. This level does not require the representation to be comprehensive, nor does it demand the calculations to be without error)
2	**At least 2** simple mathematical processes have been carried out **correctly** (A small number of isolated mistakes should not disqualify a student from achieving this level. If there is incorrect use of formulae, or consistent mistakes in using data, this level cannot be awarded.)
3	**At least 2** simple mathematical processes have been carried out correctly. All processes used are relevant. (the simple processes must be relevant to the stated aim of the project.)
4	The simple relevant mathematical processes have been carried out correctly. In addition, at least one relevant further process has been carried out. (Examples of further processes are differential calculus, mathematical modelling, optimization, analysis of exponential functions, statistical tests and distributions, compound probability. For this level to be achieved, it is not required that the calculations of the further process be without error. At least one further process must be calculated showing full working.)
5	The simple relevant mathematical processes have been carried out correctly. In addition, at least one relevant further process has been carried out. All processes, both simple and further, that have been carried out are without error. (If the measurements, information or data are limited in scope, then this achievement level cannot be awarded.)

D. Interpretation of Results

Refers specifically to statements about what the mathematics used tells us after it has been used to process the original information or data. Wider discussions of limitations and validity of the processes is assessed elsewhere.

Achievement Level	Descriptor
0	Student does not produce any interpretations or conclusions. (must be no evidence of interpretation or conclusions anywhere in the project, or a completely false interpretation is given without reference to any of the results obtained)
1	Student produces at least one interpretation or conclusion (only minimal evidence or interpretations or conclusions is required for this level. This level can be achieved by recognizing the need to interpret the results and attempting to do so, but reaching only false conclusions.)
2	Student produces at least one interpretation and/or conclusion that are consistent with the mathematical processes used. (A "follow through" procedure should be used and, consequently, it is irrelevant here whether the processes are either correct or appropriate; the only requirement is consistency)
3	The project contains a meaningful discussion of interpretations and conclusions that are consistent with the mathematical processes used. (To achieve this level, the student would be expected to produce a discussion of the results obtained and the conclusions drawn based on the level of understanding reasonably to be expected from a student of mathematical studies SL. This may lead to a discussion of underlying reasons for results obtained. If the project is a very simple one, with few opportunities for substantial interpretation, this achievement level cannot be awarded.)

E. Validity

An important distinction is drawn between interpretations and conclusions, and validity. Validity addresses the questions as to whether appropriate mathematics was used to deal with the information collected and whether the mathematics used has any limitations in its applicability within the project. Any limitations or qualifications of the conclusions and interpretations should also be judged within this criterion. The considerations here are independent of whether the particular interpretations and conclusions reached are correct or adequate.

Achievement Level	Descriptor
0	Student does not comment on the mathematical processes used or the interpretations/conclusions made. (no attempt to evaluate the project to assess the validity of the mathematical processes or model used)
1	There is an indication, with reasons, if and where validity plays a part in the project. (There is discussion of the validity of the techniques used or recognition of any limitations that might apply. A simple statement such as "I should have used more information/measurements" is not sufficient to achieve this level. If the student considers that validity is not an issue, this must be fully justified.)

F. Structure and Communication

Structure → refers to the organization of the information, calculations and interpretations in such a way as to present the project as a logical sequence of thought and activities starting with the task and the plan, and finishing with the conclusions and limitations.

Communication → not enhanced by a large number of repetitive procedures. All graphs must be fully labelled and have an appropriate scale. It is not expected that spelling, grammar and syntax are perfect, and these features are not judged in assigning a level for this criterion. Nevertheless, teachers are strongly encouraged to correct and assist students with the linguistic aspects of their work. Projects that are very poor linguistically are less likely to excel in the areas that are important in this criterion. Projects that do not reflect the significant time commitment required will not score highly on this assessment criterion.

Achievement Level	Descriptor
0	Student has made no attempt to structure the project. (it is not expected that many students will be awarded this level)
1	Some attempt has been made to structure the project. (Partially complete and very simple projects would only achieve this level.)
2	The project has been structured in a logical manner so that it is easily followed. (There must be a logical development to the project. The project must reflect the appropriate commitment for this achievement level to be awarded.)
3	The project has been well structured in accordance with the stated plan and is communicated in a coherent manner. (To achieve this level, the project would be expected to read well, and contain footnotes and a bibliography, as appropriate. The project must be focused and contain only relevant discussions.)

G. Notation and terminology

This criterion refers to the use of correct terminology and mathematical notation. The use of calculator or spreadsheet notation is not acceptable.

Achievement Level	Descriptor
0	The project does not contain correct mathematical notation or terminology. (It is not expected that many students will be awarded this level.)
1	The project contains some correct mathematical notation or terminology.
2	The project contains correct mathematical notation and terminology throughout. (Variables should be explicitly defined. An isolated slip in notation need not preclude a student from achieving this level. If it is a simple project requiring little or no notation and/or terminology, this achievement level cannot be awarded.)