Criterion A: Introduction

In this context, the word "task" is defined as "what the student is going to do"; the word "plan" is defined as "how the student is going to do it". A statement of the task should appear at the beginning of each project. It is expected that each project has a clear title.

Achievement level	Descriptor
0	The project does not contain a clear statement of the task. *There is no evidence in the project of any statement of what the student is going to do or has done.*
1	The project contains a clear statement of the task. *For this level to be achieved, the task should be stated explicitly.*
2	The project contains a title, a clear statement of the task and a description of the plan. *The plan need not be highly detailed, but must describe how the task will be performed. If the project does not have a 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. *The plan should specify what techniques are to be used at each stage and the purpose behind them, thus lending focus to the task.*

Criterion B: Information/measurement

In this context, generated measurements include those that have been generated by computer, by observation, 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 exhaustive and mathematical information does not solely imply data for statistical analysis. If a questionnaire or survey is used then a copy of this along with the raw data must be included.

Achievement level	Descriptor
0	The project does not contain any relevant information collected or relevant measurements generated. *No attempt has been made to collect any relevant information or to generate any relevant measurements.*
1	The project contains relevant information collected or relevant generated measurements. *This achievement 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.*

Achievement level	Descriptor
2	The relevant information collected, or set of measurements generated, 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/measurement collection process has been thoroughly described and the quantity of information justified. The raw data must be included for this achievement level to be awarded.*
3	The relevant information collected, or set of measurements generated, is organized in a form appropriate for analysis **and** is sufficient in both quality and quantity. *The information/measurements have been properly structured ready for analysis **and** the information/measurement collection process has been thoroughly described and the quantity of information justified. If the information/measurements are too sparse or too simple, this achievement level cannot be awarded. If the information/measurements are from a **secondary** source, then there must be evidence of sampling if appropriate. All sampling processes should be completely described.*

Criterion 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 project does not contain any mathematical processes. *For example, where the processes have been copied from a book, with no attempt being made to use any collected/generated information.* *Projects consisting of only historical accounts will achieve this level.*
1	At least two simple mathematical processes have been carried out. *Simple processes are considered to be those that a mathematical studies SL student could carry out easily, for example, percentages, areas of plane shapes, graphs, trigonometry, bar charts, pie charts, mean and standard deviation, substitution into formulae **and any** calculations and/or graphs using technology only.*
2	At least two 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 two simple mathematical processes have been carried out correctly. All processes used are relevant. *The simple mathematical processes must be relevant to the stated aim of the project.*

Achievement level	Descriptor
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.*

Criterion D: Interpretation of results

Use of the terms "interpretation" and "conclusion" refer very specifically to statements about what the mathematics used tells us after it has been used to process the original information or data. Discussion of limitations and validity of the processes is assessed elsewhere.

Achievement level	Descriptor
0	The project does not contain any interpretations or conclusions. *For the student to be awarded this level, there 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	The project contains at least one interpretation or conclusion. *Only minimal evidence of 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 or contradictory conclusions.*
2	The project contains interpretations and/or conclusions 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.*

Criterion E: Validity

Validity addresses whether appropriate techniques were used to collect information, whether appropriate mathematics was used to deal with this information, 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	There is no awareness shown that validity plays a part in the project.
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.*

Criterion F: Structure and communication

The term "structure" should be taken primarily as referring 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 is 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	No attempt has been made 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.*

Criterion 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.*

Glossary of command terms

Command terms with definitions

Students should be familiar with the following key terms and phrases used in examination questions, which are to be understood as described below. Although these terms will be used frequently in examination questions, other terms may be used to direct students to present an argument in a specific way.

Calculate	Obtain a numerical answer showing the relevant stages in the working.
Comment	Give a judgment based on a given statement or result of a calculation.
Compare	Give an account of the similarities between two (or more) items or situations, referring to both (all) of them throughout.
Construct	Display information in a diagrammatic or logical form.
Deduce	Reach a conclusion from the information given.
Describe	Give a detailed account.
Determine	Obtain the only possible answer.
Differentiate	Obtain the derivative of a function.
Draw	Represent by means of a labelled, accurate diagram or graph, using a pencil. A ruler (straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted (if appropriate) and joined in a straight line or smooth curve.
Estimate	Obtain an approximate value.
Find	Obtain an answer showing relevant stages in the working.
Hence	Use the preceding work to obtain the required result.
Hence or otherwise	It is suggested that the preceding work is used, but other methods could also receive credit.
Interpret	Use knowledge and understanding to recognize trends and draw conclusions from given information.
Justify	Give valid reasons or evidence to support an answer or conclusion.
Label	Add labels to a diagram.
List	Give a sequence of brief answers with no explanation.
Plot	Mark the position of points on a diagram.
Show	Give the steps in a calculation or derivation.