Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	3	3	1	6	4	15	13
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A2—The work is coherent but not well organized. There is no aim or rationale in the introduction.

Criterion B: Mathematical presentation

B3—There is good definition of terms.

Criterion C: Personal engagement

C3—While there was not "abundant" evidence, there was sufficient to award level 3: for example, making her own code (page 9); learning and describing unfamiliar maths; and timing herself doing the spreadsheet (page 9).

Criterion D: Reflection

D1—Only limited reflection, some on the significance of the timing of the spreadsheets.

SL Criterion E: Use of mathematics

E6—She used mathematics beyond the syllabus (derangements). Her understanding of this was verified in discussions.

HL Criterion E: Use of mathematics

E4—This is sophisticated but descriptive rather than rigorous mathematics.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	3	2	2	6	6	16	16
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—The work is concise, as it proves the conjecture in fewer than seven pages. It fulfills the aims, is well organized and complete. The exploration would benefit from more complete explanations (refer to page 7 annotation).

Criterion B: Mathematical presentation

B3—Condone use of "N" rather than "n" in the table on page 4. The class was familiar with the modular arithmetic, so definitions were not needed.

Criterion C: Personal engagement

C2—There was evidence of sufficient personal interest to award a level 2.

Criterion D: Reflection

D2—It links areas of maths. There is reflection on the elegance of the mathematics (page 7).

SL Criterion E: Use of mathematics

E6—It is highly unlikely that a mathematics SL student will produce work of this calibre, but it obviously achieves level 6.

HL Criterion E: Use of mathematics

E6—It is commensurate with the level of the course, precise and demonstrates thorough knowledge, insight, sophistication and the rigour expected for mathematics HL.

General comments

Background information from the teacher:

"The student is a further mathematician and as such has been taught the 'Discrete' and 'Sets, relations and groups' options. He is therefore familiar with the language of modular arithmetic and had encountered Fermat's little theorem in class. The proof of this theorem, although not required in the syllabus, was set as a homework. In his research of this, he also encountered Euler's totient theorem. He then asked to do a pure mathematics exploration. He absolutely did understand everything he wrote. If only all students were like him!"

The teacher's comment provides evidence that the student was personally engaged in the exploration and explains why some of the terms were not fully defined, as they were fully understood by the student and his class, which was his intended audience.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	1	1	1	0	0	5	5
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A2—There is an introduction, but no aim or rationale, although the aim is implied on the last page. The exploration has some coherence and organization. There is no explanation of the statements on page 3.

Criterion B: Mathematical presentation

B1—The student uses minimal mathematical terminology, and some of it is incorrect.

Criterion C: Personal engagement

C1—There is limited evidence: student creates examples; unfamiliar maths is quoted, but not explained.

Criterion D: Reflection

D1—Only superficial reflection is shown.

SL Criterion E: Use of mathematics

E0—There is no use of mathematics.

HL Criterion E: Use of mathematics

E0—There is no use of mathematics.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	1	2	1	3	1	9	7
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A2—The work is repetitive, and lacks explanations. There is some structure and organization, but the lack of definition of key musical terms makes this difficult for readers who do not have a musical background.

Criterion B: Mathematical presentation

B1—The graphs are unrelated to the tables. There is poor notation in functions. If using references to colour, the work should be printed in colour.

Criterion C: Personal engagement

C2—There is some independent creative thinking and personal interest, for example, created own way of looking for patterns in the chord.

Criterion D: Reflection

D1—There is very limited reflection, for example, an attempt to reflect on the ratios.

SL Criterion E: Use of mathematics

E3—There is little evidence of understanding.

HL Criterion E: Use of mathematics

E1—Although the mathematics used is commensurate, the limited understanding means that it achieves only level 1 for mathematics HL.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	2	2	1	4	2	11	9
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A2—There is an aim and a rationale in an introduction, but there is a lack of explanations throughout. For example, on page 4, where do the numbers in the table come from? The diagrams do not aid the explanations very much.

Criterion B: Mathematical presentation

B2—There is inconsistent use of terminology, for example, "root or zero" on page 7. There is some appropriate use of ICT tools.

Criterion C: Personal engagement

C2—The student does apply some unfamiliar mathematics, and some research has taken place. Some examples were created, but not followed through.

Criterion D: Reflection

D1—There is very limited and superficial reflection. Opportunities for reflection were not taken.

SL Criterion E: Use of mathematics

E4—The mathematics used is mostly correct. The student can apply the method, but there is no evidence of understanding why it works.

HL Criterion E: Use of mathematics

E2—There is partial, rather than good, understanding.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	4	3	4	3	6	3	20	17
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A4—The exploration is concise and easy to follow. A couple of typing errors does not detract from the flow.

Criterion B: Mathematical presentation

B3—Multiple forms are well used.

Criterion C: Personal engagement

C4—The work is highly original, and the student used historical idea to create her own similar situation. She is clearly engaged in the work.

Criterion D: Reflection

D3—There is critical reflection, where the student tries to resolve contradictions discovered.

SL Criterion E: Use of mathematics

E6—Areas of sectors using radians and descriptive statistics are commensurate with the mathematics SL course, and are done well enough at achieve level 6.

HL Criterion E: Use of mathematics

E3—While areas of sector using radians and descriptive statistics are commensurate with the mathematics HL course, the mathematics is not sophisticated enough for a level 4, even though is it rigorous.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	2	3	2	6	5	16	15
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Although the communication is good, it is not concise enough for a level 4.

Criterion B: Mathematical presentation

B2—There are many notation errors, but not enough to award only a level 1.

Criterion C: Personal engagement

C3—The student has created some examples.

Criterion D: Reflection

D2—The reflection is meaningful, but not critical.

SL Criterion E: Use of mathematics

E6—Thorough knowledge and understanding have been demonstrated. Accuracy errors are not penalized given the level of understanding demonstrated.

HL Criterion E: Use of mathematics

E5—Thorough knowledge and understanding have been demonstrated, but it lacks the precision required for a level 6.

General comments

Background information from the teacher:

"The student was interested in the stimulus 'weather' and said that she wanted to look into rainfall and to see whether this could be extended to other falling objects.

Once research had started, the student developed differential equations to explain rainfall, but soon found out that she did not have enough knowledge to solve one of the equations. She taught herself how to separate algebraic fractions into partial fractions, which helped her to find the solution she was after. Having supervised the student throughout the process, I can confirm that the student was very engaged with the task and all the work produced is her own."

This information provided by the teacher justifies the levels awarded. Without this information, it may not be clear to others that the student was engaged and understood the work.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	3	3	2	5	4	16	15
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Too much detail in the tables detracts from conciseness and hinders easy reading. Appendices should have been used for some of this information.

Criterion B: Mathematical presentation

B3—This is appropriate throughout.

Criterion C: Personal engagement

C3—There is some evidence of this, for example, applying unfamiliar maths, creating his own example, but not the abundant evidence needed for level 4.

Criterion D: Reflection

D2—There is meaningful, but not critical, reflection.

SL Criterion E: Use of mathematics

E5—The mathematics used is beyond the syllabus, and good understanding is demonstrated.

HL Criterion E: Use of mathematics

E4—The work is sophisticated enough for a level 4.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	4	2	2	2	4	2	14	12
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A4—The exploration is well organized, coherent, concise and complete, and fulfills its aims. This means that it is complete and is awarded a level 4.

Criterion B: Mathematical presentation

B2—The "approximately equal to" sign is either not used, or is inconsistently used. The student did not recognize that the data are discrete.

Criterion C: Personal engagement

C2—Some personal interest is expressed, with evidence of thinking independently.

Criterion D: Reflection

D2—The student links mathematical ideas and considers the significance of the results. But this is not extended in the context of the exploration and not enough questions are raised.

SL Criterion E: Use of mathematics

E4—The mathematics used is relevant and commensurate with the level of the course, but the knowledge shown is not good.

HL Criterion E: Use of mathematics

E2—Although commensurate with the level of the course, the knowledge demonstrated is not good, and this merits only a level 2

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	2	4	3	6	6	18	18
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—The aim is clearly described in the introduction which also contains a rationale. No proper conclusion but the aim of the task is fulfilled; the lack of a conclusion renders this exploration incomplete. The exploration is well organized and easy to follow.

Criterion B: Mathematical presentation

B2—Not all key terms are defined (eg chord). Graphs and diagrams are not always clearly linked to the mathematical working

Criterion C: Personal engagement

C4—The examples created and the development of the task show abundant evidence of personal engagement. This is a challenging topic that the student has made their own.

Criterion D: Reflection

D3—Results are extensively analysed all through the document. There is a critique of the results compared to real world information.

SL Criterion E: Use of mathematics

E6—This is clearly the work of an HL student and goes beyond the expectations of an SL level of 6 in this criterion.

HL Criterion E: Use of mathematics

E6—Mathematics is beyond the scope of the syllabus but still well handled. The development of the task shows precision and rigour. The thinking involved is sophisticated, requires logic and focus. Thorough knowledge and understanding of a challenging topic are demonstrated.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	1	1	1	1	2	1	6	5
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A1—The exploration contains an aim, introduction and rationale but it is not totally coherent or organized. It is extremely difficult to follow the mathematics without prior knowledge of the problem.

Criterion B: Mathematical presentation

B1—Whilst there are different forms of mathematical presentations in the work, these are often not used appropriately. Key terms are not defined and there are notational errors.

Criterion C: Personal engagement

C1—The work seems to be taken from one source (which is referenced as "Kolchin et al. (1978)"). The student does not make the problem his / her own or demonstrate any independent thinking or address any personal interest by presenting their own mathematical ideas. The student presented some practical applications in the conclusion which would have given an opportunity to demonstrate personal engagement had they been explored.

Criterion D: Reflection

D1—There is some superficial reflection at the end of the exploration. This seems to be more of a conclusion rather than a meaningful reflection on the work presented in the exploration.

SL Criterion E: Use of mathematics

E2—Some relevant mathematics is used but the student does not demonstrate sufficient understanding to warrant a higher achievement level.

HL Criterion E: Use of mathematics

E1—Some relevant mathematics is used but the student does not demonstrate sufficient understanding to warrant a higher achievement level.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	2	4	1	5	2	15	12
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Coherent and well organized, however some of the information is not focused on the problem in hand and more complete explanation of results would have led to the top attainment level..

Criterion B: Mathematical presentation

B2—Excellent sourcing of pictures at point of reference and a complete bibliography is given. Good use of photographs to generate parabolas for the development of the mode, however, the mathematics itself was not well presented and not all variables were explicitly defined. Graphs need to be labelled and units should be used for a real world problem such as this.

Criterion C: Personal engagement

C4—The work contained an abundance of personal engagement. The student showed initiative in using still photographs to plot curves. The interest of the student in the topic studied is evident throughout.

Criterion D: Reflection

D1—The student reflects on a regular basis, however this is either limited or superficial. The significance of the results in a real life context is not explored in any depth.

SL Criterion E: Use of mathematics

E5—Relevant mathematics is used to find the equation of a parabola, it is mostly correct and good knowledge and understanding is demonstrated.

HL Criterion E: Use of mathematics

E2—Plotting a parabola to a set of points is correct, however in the context of the problem this does not lead to a meaningful solution. The student starts to comment on the angle of attack but does not explore this concept, since this is effectively a projectile motion problem.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	1	3	1	5	3	13	11
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—The exploration is complete and well organized but lacks some coherence.

Criterion B: Mathematical presentation

B1—Key terms like the law of total probability is not defined. Many examples of notation that is confusing or ill-defined.

Criterion C: Personal engagement

C3—There is significant evidence of personal engagement especially when using Geogebra to simulate the problem. The student appears to have made the exploration their own and explored variations of the Monty Hall Problem.

Criterion D: Reflection

D1—The student attempts to reflect on his / her work by comparing results from simulation with the theoretical model. This however is superficial and not meaningful.

SL Criterion E: Use of mathematics

E5—Relevant mathematics commensurate with the level of the course is used. The mathematics is mostly correct and a good attempt was made to develop alternate games demonstrating good knowledge and understanding.

HL Criterion E: Use of mathematics

E3—Relevant mathematics commensurate with the level of the course is used. The mathematics is mostly correct and a good attempt was made to develop alternate games demonstrating good knowledge and understanding, however the work lacked the sophistication to achieve the higher level in this criterion.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	2	3	3	2	6	4	16	14
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A2—The work shows some coherence but lacks an aim and rationale. It is important for students to define a clear focus and / or question for their exploration. Labelling of diagrams is important. Penalized here and not in criterion B.

Criterion B: Mathematical presentation

B3—Representing spherical geometry is a challenge. The student's diagrams and photographs are good examples of appropriate mathematical presentations.

Criterion C: Personal engagement

C3—The student engaged with unfamiliar mathematics and generated his / her examples. The student made the work their own by practically examining their results on a basketball. This is evidenced in the photographs and calculations included in the exploration.

Criterion D: Reflection

D2—Reflection is done throughout the exploration. The examination of error boundaries is a good example of meaningful reflection. The conclusion includes reflection but it is not critical.

SL Criterion E: Use of mathematics

E6—The mathematics is commensurate with the level of the course despite not being on the syllabus. Thorough knowledge and understanding is demonstrated.

HL Criterion E: Use of mathematics

E4—The mathematics is commensurate with the level of the course despite not being on the syllabus. It is correct and sophisticated but lacks a degree of rigour and precision.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	3	3	2	6	4	17	15
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—The exploration is well organized, coherent and easy to follow. More explanation for the derivation of "alpha" and "gamma" on page 6 would have helped. The use of Euler's method did not add greatly to the exploration and made it less concise.

Criterion B: Mathematical presentation

B3—A good mix of mathematical presentation including text, notation, graphs and tables were used. Although the main data table using iteration was in the appendix this was a good decision by the student, since it was used to produce the graphs and these were clearly referenced to the table. The addition of the long table in the body of work would have detracted from communication.

Criterion C: Personal engagement

C3—The creation of their own excel spread sheet to model the disease was an example of good personal engagement.

Criterion D: Reflection

D2—Meaningful reflection throughout however the student did not critically reflect on the veracity of the model.

SL Criterion E: Use of mathematics

E6—Mathematics goes beyond the syllabus, is correct and thorough knowledge and understanding is demonstrated.

HL Criterion E: Use of mathematics

E4—The mathematics used is correct and sophisticated. More rigour was required in the application of the model. The final example given needs to be more carefully examined to determine where the SIR model could be applied in this case.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	1	4	2	4	2	14	12
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Mostly coherent and well organised although difficult to follow reasoning at times. Rationale for choice of exploration given. Aim not explicitly stated but implied throughout and addressed at end. Analysis of results at appropriate moments. Repetitive calculations affects conciseness. Best fit is a 3.

Criterion B: Mathematical presentation

B1—Good use of tables to present and organise data. Key terms are defined = rather than ≈ Ratio/fraction representation not clear throughout. Does not explain use of n-1 divisor rather than n divisor (penalised here rather than in E).

Criterion C: Personal engagement

C4—Addresses personal interest from the beginning and throughout. Extensive research into topic is obvious. Conducts own data collection amongst teammates. Compares teammates proportions to those of elite athletes. What if....I consider 3 new teammates.

Criterion D: Reflection

D2—Not critical – for example does not consider bias in data recorded or limitations of data throughout. Reflection on results in first part of paper strong but tails off until conclusion.

SL Criterion E: Use of mathematics

E4—Limited data used. Mainly basic Mathematics calculations (mean/ratio). Considers standard deviation on p10 commensurate with SL course – partially correct. P11 – not clear what is being calculated

HL Criterion E: Use of mathematics

E2—Limited data used. Mainly basic Mathematics calculations (mean/ratio). Considers standard deviation on p10 commensurate with SL course – partially correct. P11 – not clear what is being calculated.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	1	3	2	4	2	13	11
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Not easy to follow at times but clear structure in trying consecutive cases. Brief rationale and clear aim and clearly addresses aim in conclusion. Lacks conciseness – repetitive calculation (|Pp –7).

Criterion B: Mathematical presentation

B1—Defines frequency of geodesic domes. Pi symbol (P 2). Units in formula unnecessary. Uses technology appropriately to display domes but graphs of correlation between type of dome v triangle area are difficult to read. Repeated rounded errors throughout (eg Pp 3–4…). Does not define x on p11.

Criterion C: Personal engagement

C3—TV series sparked interest to explore different types of domes. Relates to physics knowledge. Original approach to using technology to represent domes. Approaches problem using different methods – geometrically, graphically.

Criterion D: Reflection

D2—Reflects on durability of different sizes and shapes and on results in the context of the exploration. Does not reflect on nature of non-integer dome types.

SL Criterion E: Use of mathematics

E4—Limited data used. Basic mathematics (area/perimeter) used at first but necessary to build up exploration. Use of cosine rule and area formula commensurate with SL course and well understood. Reason for choice of functions on Pp8–9 not given so does not demonstrate thorough understanding. Too few data points used for regression analysis.

HL Criterion E: Use of mathematics

E2—Limited data used. Basic mathematics (area/perimeter) used at first but necessary to build up exploration. Use of cosine rule and area formula commensurate with HL course and well understood. Reason for choice of functions on Pp 8–9 not given so does not demonstrate thorough understanding. Too few data points used for regression analysis.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	4	2	4	3	5	3	18	16
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A4—Has all required elements. Rationale and implied aim and reaches conclusion Clearly written with helpful explanations and diagrams. Avoids repetition of calculations to keep piece concise.

Criterion B: Mathematical presentation

B2—Most graphs are clearly labelled (but not all). Defines key terms, units and variables throughout. Error on p11 and p13.

Criterion C: Personal engagement

C4—Engaged with the Mathematics in a topic obviously relevant to herself and uses real-life data. Explores unfamiliar maths and devises own approach to area under curve. Comparison of methods (geometric v calculus). Considers modelling.

Criterion D: Reflection

D3—Considers other concentration time graphs. Compares results and reflects on this. Considers suitability and accuracy of chosen modelling functions as they develop and when they produce results. Returns to original problem to discuss results in context.

SL Criterion E: Use of mathematics

E5—Integration steps are clearly understood. Demonstrates understanding of concepts throughout. Understands concept of modelling.

HL Criterion E: Use of mathematics

E3—Limited data used. Integration steps are clearly understood. Demonstrates understanding of concepts throughout. Understands concept of modelling. Minor error on p12.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	1	2	1	1	4	2	9	7
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A1—Brief aim. Coherence affected by 5 pages of data, blurry formulas and need to refer back to see units on graphs etc (penalised here not in B). Some organisation but not complete – only partial conclusion.

Criterion B: Mathematical presentation

B2—Wrong use of ≤ on p 2. Defined x and y on table on p 3. Appropriate representation of data – using scattergraph.

Criterion C: Personal engagement

C1—Superficial interest addressed only in introduction.

Criterion D: Reflection

D1—"barely correlates" is not meaningful reflection. No discussion of results relating back to original context.

SL Criterion E: Use of mathematics

E4—Integration steps are clearly understood. Does not explain why linear regression may be appropriate but some knowledge and understanding demonstrated in correct use of formulas.

HL Criterion E: Use of mathematics

E2—Does not explain why linear regression may be appropriate but some knowledge and understanding demonstrated in correct use of formulas.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	4	2	3	3	6	4	18	16
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A4—Brief aim. Easy to read, logical, detailed. Clear aim (although the student does stray from it slightly). Coherent work through transformations required to obtain model. Returns to original question at end to fulfil aim – complete.

Criterion B: Mathematical presentation

B2—Tables displaying data and units and clear. Labels on axes not always clear but appropriate graphs throughout. Misuse of words "scatter graph", "constants". Variables clearly defined.

Criterion C: Personal engagement

C3—Application of area of mathematical interest to real-life situation. Conducts own experiment. Comparison of different approaches to produce models. Looks for different ways to explore problem.

Criterion D: Reflection

D3—Reflects on nature of problem. Reflects on degree of accuracy of results. Constantly comparing models. Reflects on possible reasons for discrepancies between model and real-life data and considers ways to analyse this.

SL Criterion E: Use of mathematics

E6—Good initial analysis of results. Understanding of transformations of graphs and exponentials/natural logarithms (commensurate with syllabus) clearly demonstrated. Correct calculations throughout.

HL Criterion E: Use of mathematics

E4—Good initial analysis of results. Understanding of transformations of graphs and exponentials/natural logarithms (commensurate with syllabus) clearly demonstrated. Correct calculations throughout. Lacks sophistication and rigour expected.

Assessment

Criterion	A	B	C	D	E (SL)	E (HL)	Total (SL)	Total (HL)
Achievement level awarded	3	3	4	2	5	3	17	15
Maximum possible achievement level	4	3	4	3	6	6	20	20

Comments

Criterion A: Communication

A3—Brief aim. Very easy to follow. Excellent introduction, clear rationale related to own difficulties with English language. Clear aim and reaches a clear conclusion. Could be more concise – takes a while to get to Mathematics.

Criterion B: Mathematical presentation

B3—Use of * and x for multiplication condoned as not distracting flow of work. Clearly defined variables (P 10). Clear and appropriate graphs throughout with axes labelled or described.

Criterion C: Personal engagement

C4—Own research. Discusses around the topic to give it a context. ESOL Student who shows authentic personal interest. Takes academic research and expands on this by deriving and applying own formula.

Criterion D: Reflection

D2—Brief reflection of data sources in the introduction section. Reflects on and examines strength and usefulness of the Google tool. Reflects on results but no critical reflection of the techniques used. Reflection tails off at end. It seems a little forced.

SL Criterion E: Use of mathematics

E5—Natural logarithms commensurate with the level of the course clearly understood and correctly used. Exponential decay function is correct and used to develop own model but understanding of its origin not clearly demonstrated.

HL Criterion E: Use of mathematics

E3—Natural logarithms commensurate with the level of the course clearly understood and correctly used however no sophistication and rigour demonstrated. Exponential decay function is correct and used to develop own model but understanding of its origin not clearly demonstrated.