Name_____

INFORMATION FOR IB MATH SL EXPLORATION

What is the Exploration?
This is a short report (approximately 6-12 pages) written by the student based on a topic chosen by him or her, and it should focus on the mathematics of that particular area. The emphasis is on mathematical communication (including formulae, diagrams, graphs and so on), with accompanying commentary, good mathematical writing and thoughtful reflection.

A student should develop his or her own focus, with the teacher providing feedback via, for example, discussion and interview. This will allow the students to develop area(s) of interest to them without a time constraint as in an examination, and allow all students to experience a feeling of success.

Students should be able to explain all stages of their work in such a way that demonstrates clear understanding. It should be written in such a way that their peers would be able to follow it fairly easily. The report should include a detailed bibliography, and sources need to be referenced in line with the IB academic honesty policy. Direct quotes must be acknowledged.

The Purpose of the Exploration:
The exploration is intended to provide students with opportunities to increase their understanding of mathematical concepts and processes, and to develop a wider appreciation of mathematics. These are noted in the aims of the course, in particular, aims 6–9 (applications, technology, moral, social and ethical implications, and the international dimension). It is intended that, by doing the exploration, students benefit from the mathematical activities undertaken and find them both stimulating and rewarding.
The specific purposes of the exploration are to:

- develop students' personal insight into the nature of mathematics and to develop their ability to ask their own questions about mathematics
- provide opportunities for students to complete a piece of mathematical work over an extended period of time
- enable students to experience the satisfaction of applying mathematical processes independently
- provide students with the opportunity to experience for themselves the beauty, power and usefulness of mathematics
- encourage students, where appropriate, to discover, use and appreciate the power of technology as a mathematical tool
- enable students to develop the qualities of patience and persistence, and to reflect on the significance of their work provide opportunities for students to show, with confidence, how they have develop mathematically.

Exploration Grading:
The exploration is internally assessed by the teacher and externally moderated by the IB using assessment criteria that relate to the objectives for mathematics SL. A student's mark on the exploration will count for 20% of the final IB mathematics grade. The other 80% will come from Paper I and Paper II (which are actually exams; they call them papers in the IB program)

Each exploration is assessed against the following five criteria. The final mark for each exploration is the sum of the scores for each criterion. The maximum possible final mark is 20.

Criterion A	Communication
Criterion B	Mathematical Presentation
Criterion C	Personal Engagement
Criterion D	Reflection
Criterion E	Use of Mathematics

Suggestions in components necessary for a successful exploration:

· Criterion A: Communication (4/20 marks)

***** You must include:
* An *introduction* in which you should discuss the context of the exploration
* A *rationale* which should include an explanation of why you chose this topic.
* A description of the *aim* of the exploration which should be clearly identifiable (What do you hope your reader will learn.)
* A *conclusion*.

***** Must "read well" which means it must be logically developed, easy to follow and concise (avoid irrelevancies).
***** Graphs, tables and diagrams should be clearly labelled.
***** 6 to 12 pages using a 11 -12 point easily read font (ie. Times New Roman)
*** References must be cited. Your exploration should contain appropriate footnotes and a bibliography.**

· Criterion B: Mathematical Presentation (3/20 marks)

***** Use appropriate mathematical language (notation, symbols and terminology)
***** Use multiple forms of mathematical representation such as formulae, diagrams, tables, charts, and graphs.
***** Choose and use appropriate ICT tools such as graphic display calculators, mathematical software, spreadsheets, databases, drawing and word-processing software.
***** Define key terms and explicitly define variables.
***** Express your results to an appropriate degree of accuracy.
***** Include scales and labels on graphs; include concise, descriptive headings on tables.
*** Do not use calculator notation (ie. use 2^x and not 2^x) May want to use MathType or Equation Editor**

· Criterion C: Personal Engagement (4/20 marks)

***** You should choose a topic that you are genuinely interested in as it will be easier to display personal engagement.
***** Suggestions for demonstrating personal engagement (this must be in your paper):
* Thinking and working independently; Thinking creatively
* Addressing your personal interests
* Presenting mathematical ideas in your own way, using simple language to describe complex ideas
* Asking questions, making conjectures and investigating mathematical ideas
* Looking for and creating mathematical models for real-world situations
* Considering historical and global perspectives
* Exploring unfamiliar mathematics
* Asking and answering questions: "I wonder if…", "What would happen if…" "Why does that happen…"

· Criterion D: Reflection (3/20 marks)

***** Although reflection may be seen in the conclusion to the exploration, it may also be found throughout the exploration. This assesses how well you *review*, *analyze* and *evaluate* your exploration.
***** You can show reflection by:
* Discussing the implications of your results
* Considering the significance of your findings and results
* Stating possible limitations and/or extensions to your results
* Finding fault in your own analysis and reworking your mathematics in a different way
* Making links to different fields and/or areas of mathematics.

Criterion E: Use of Mathematics (6/20 marks)

***** The mathematics you explore should be either part of the syllabus, or at a similar level (or beyond) (NOT Prior Learnings).
*****Applying mathematics in different contexts
*****Applying problem-solving techniques
*****Recognizing and explaining patterns, where appropriate
*****Looking at a problem from different perspectives
*****Using logic
*****Error-free mathematics
***** *If the level of mathematics is inadequate, your maximum achievement level will be two marks.*
***** Your mathematics must clearly demonstrate that you fully understand the mathematics.

Choosing a Topic

You need to choose a topic that interests you, because then you will enjoy working on your exploration, you will put more effort into the exploration, and you will be able to demonstrate authentic personal engagement more effectively. You should discuss the topic with your teacher before you put too much time and effort into writing your exploration.

These questions may help you to find a topic for your exploration:

- What areas of the syllabus interest me the most?
- What areas of the syllabus have I performed the best in?
- Which mathematical skills are my strengths?
- Do I prefer pure mathematics, or applied mathematics and modelling?
- Have I discovered, either through reading or the media, mathematical areas outside of the syllabus that I find interesting?
- What career do I eventually want to enter, and what mathematics is important in this field?
- What are my own special interests or hobbies? Where is the mathematics in these areas?

These questions will help you decide if your chosen topic is suitable.

- What areas of mathematics are contained in my topic?
- Which of these areas are accessible to me or are part of the syllabus?
- Is there mathematics outside the syllabus that I would have to learn in order to complete the exploration successfully? Am I capable of doing this?
- Can I show personal engagement in my topic, and how?
- Can I limit my work to the recommended length of 6 to 12 pages if I choose this topic?

You may sometimes find it difficult to know where to start with a task as open-ended as this. While it is hoped that you will appreciate the richness of opportunities for mathematical exploration, it may sometimes be useful to be provided by a stimulus as a means of helping you to get started on your explorations.

Possible stimuli that could be given include:

Sport	food	health
archaeology	Volcanoes	dance
computers	diet	play
algorithms	Euler	pi (π)
cell phones	games	geography
music	symmetry	biology
sine	architecture	business
musical harmony	codes	economics

motion
e
electricity
water
space
orbits

the internet
communication
tiling
population
agriculture
viruses

physics
chemistry
psychology
information technology in a global society

Sites to explore for potential topics and examples…

http://www.dpcdsb.org/NR/rdonlyres/FE43C622-9FA0-4385-8E19-0C539513295E/133918/ListofPotentialTopicsfortheExploration1.pdf

http://dpmathematicssl.weebly.com/exploration.html

http://home.earthlink.net/~bhsfrisbie/Precalc/ExplorationsSites.html

http://ibmathsresources.com/2013/09/03/maths-ia-exploration-topics/

Math Type Trial that turns to Lite

GeoGebra

Great software for working with graphs, diagrams, functions, spreadsheets, statistics, calculus and much, much more. www.geogebra.org

KHAN ACADEMY

Fabulous resource for quick tutorial on many math topics. Use the search feature to find videos, applets, and notes to help you understand some of the math behind your topic. http://www.khanacademy.org/

FOOPLOT

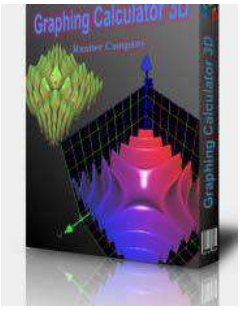
An online graph plotter with graphing capabilities similar to those of your graphical calculators. www.fooplot.com

WolframAlpha

A really powerful search (For example, type "find antiderivative of f(x) = 3x" into the search bar.) There is an app available for iphones, etc.www.wolframalpha.com

Not sure how to do something? You tube is a great source of tutorial videos. For example, here is a video on how to create a graph using Excel. **http://www.youtube.com/watch?v=oZAZj7NIkic**

Word has an equation editor built in – this will make your life easier when it comes to word processing mathematics. You may need to install this feature. There are youtube videos and various websites that show you have to use the editor.



Graphing Calculator 3D . A free program that can graph in three dimensions. Can be downloaded or used online http://calculator.runiter.com/graphing-calculator/

Internal assessment

Purpose of internal assessment

Internal assessment is an integral part of the course and is compulsory for all students. It enables students to demonstrate the application of their skills and knowledge, and to pursue their personal interests, without the time limitations and other constraints that are associated with written examinations. The internal assessment should, as far as possible, be woven into normal classroom teaching and not be a separate activity conducted after a course has been taught.

Internal assessment in mathematics SL is an individual exploration. This is a piece of written work that involves investigating an area of mathematics. It is marked according to five assessment criteria.

Guidance and authenticity

The exploration submitted for internal assessment must be the student's own work. However, it is not the intention that students should decide upon a title or topic and be left to work on the exploration without any further support from the teacher. The teacher should play an important role during both the planning stage and the period when the student is working on the exploration. It is the responsibility of the teacher to ensure that students are familiar with:

- the requirements of the type of work to be internally assessed
- the IB academic honesty policy available on the OCC
- the assessment criteria—students must understand that the work submitted for assessment must address these criteria effectively.

Teachers and students must discuss the exploration. Students should be encouraged to initiate discussions with the teacher to obtain advice and information, and students must not be penalized for seeking guidance. However, if a student could not have completed the exploration without substantial support from the teacher, this should be recorded on the appropriate form from the *Handbook of procedures for the Diploma Programme*.

It is the responsibility of teachers to ensure that all students understand the basic meaning and significance of concepts that relate to academic honesty, especially authenticity and intellectual property. Teachers must ensure that all student work for assessment is prepared according to the requirements and must explain clearly to students that the exploration must be entirely their own.

As part of the learning process, teachers can give advice to students on a **first draft** of the exploration. This advice should be in terms of the way the work could be improved, but this first draft must not be heavily annotated or edited by the teacher. The next version handed to the teacher after the first draft must be the final one.

All work submitted to the IB for moderation or assessment must be authenticated by a teacher, and must not include any known instances of suspected or confirmed malpractice. Each student must sign the coversheet for internal assessment to confirm that the work is his or her authentic work and constitutes the final version of that work. Once a student has officially submitted the final version of the work to a teacher (or the coordinator) for internal assessment, together with the signed coversheet, it cannot be retracted.

Authenticity may be checked by discussion with the student on the content of the work, and scrutiny of one or more of the following:

- the student's initial proposal
- the first draft of the written work
- the references cited
- the style of writing compared with work known to be that of the student.

The requirement for teachers and students to sign the coversheet for internal assessment applies to the work of all students, not just the sample work that will be submitted to an examiner for the purpose of moderation. If the teacher and student sign a coversheet, but there is a comment to the effect that the work may not be authentic, the student will not be eligible for a mark in that component and no grade will be awarded. For further details refer to the IB publication *Academic honesty* and the relevant articles in the *General regulations: Diploma Programme*.

The same piece of work cannot be submitted to meet the requirements of both the internal assessment and the extended essay.

Group work

Group work should not be used for explorations. Each exploration is an individual piece of work.

It should be made clear to students that all work connected with the exploration, including the writing of the exploration, should be their own. It is therefore helpful if teachers try to encourage in students a sense of responsibility for their own learning so that they accept a degree of ownership and take pride in their own work.

Time allocation

Internal assessment is an integral part of the mathematics SL course, contributing 20% to the final assessment in the course. This weighting should be reflected in the time that is allocated to teaching the knowledge, skills and understanding required to undertake the work as well as the total time allocated to carry out the work.

It is expected that a total of approximately 10 teaching hours should be allocated to the work. This should include:

- time for the teacher to explain to students the requirements of the exploration
- class time for students to work on the exploration
- time for consultation between the teacher and each student
- time to review and monitor progress, and to check authenticity.

Using assessment criteria for internal assessment

For internal assessment, a number of assessment criteria have been identified. Each assessment criterion has level descriptors describing specific levels of achievement together with an appropriate range of marks. The level descriptors concentrate on positive achievement, although for the lower levels failure to achieve may be included in the description.

Teachers must judge the internally assessed work against the criteria using the level descriptors.

- The aim is to find, for each criterion, the descriptor that conveys most accurately the level attained by the student.
- When assessing a student's work, teachers should read the level descriptors for each criterion, starting with level 0, until they reach a descriptor that describes a level of achievement that has not been reached. The level of achievement gained by the student is therefore the preceding one, and it is this that should be recorded.
- Only whole numbers should be recorded; partial marks, that is fractions and decimals, are not acceptable.
- Teachers should not think in terms of a pass or fail boundary, but should concentrate on identifying the appropriate descriptor for each assessment criterion.
- The highest level descriptors do not imply faultless performance but should be achievable by a student. Teachers should not hesitate to use the extremes if they are appropriate descriptions of the work being assessed.
- A student who attains a high level of achievement in relation to one criterion will not necessarily attain high levels of achievement in relation to the other criteria. Similarly, a student who attains a low level of achievement for one criterion will not necessarily attain low achievement levels for the other criteria. Teachers should not assume that the overall assessment of the students will produce any particular distribution of marks.
- It is expected that the assessment criteria be made available to students.

Internal assessment details

Mathematical exploration

Duration: 10 teaching hours
Weighting: 20%

Introduction

The internally assessed component in this course is a mathematical exploration. This is a short report written by the student based on a topic chosen by him or her, and it should focus on the mathematics of that particular area. The emphasis is on mathematical communication (including formulae, diagrams, graphs and so on), with accompanying commentary, good mathematical writing and thoughtful reflection. A student should develop his or her own focus, with the teacher providing feedback via, for example, discussion and interview. This will allow the students to develop area(s) of interest to them without a time constraint as in an examination, and allow all students to experience a feeling of success.

The final report should be approximately 6 to 12 pages long. It can be either word processed or handwritten. Students should be able to explain all stages of their work in such a way that demonstrates clear understanding. While there is no requirement that students present their work in class, it should be written in such a way that their peers would be able to follow it fairly easily. The report should include a detailed bibliography, and sources need to be referenced in line with the IB academic honesty policy. Direct quotes must be acknowledged.

The purpose of the exploration

The aims of the mathematics SL course are carried through into the objectives that are formally assessed as part of the course, through either written examination papers, or the exploration, or both. In addition to testing the objectives of the course, the exploration is intended to provide students with opportunities to increase their understanding of mathematical concepts and processes, and to develop a wider appreciation of mathematics. These are noted in the aims of the course, **in particular, aims 6–9 (applications, technology, moral, social**

and ethical implications, and the international dimension). It is intended that, by doing the exploration, students benefit from the mathematical activities undertaken and find them both stimulating and rewarding. It will enable students to acquire the attributes of the IB learner profile.

The specific purposes of the exploration are to:

- develop students' personal insight into the nature of mathematics and to develop their ability to ask their own questions about mathematics
- provide opportunities for students to complete a piece of mathematical work over an extended period of time
- enable students to experience the satisfaction of applying mathematical processes independently
- provide students with the opportunity to experience for themselves the beauty, power and usefulness of mathematics
- encourage students, where appropriate, to discover, use and appreciate the power of technology as a mathematical tool
- enable students to develop the qualities of patience and persistence, and to reflect on the significance of their work
- provide opportunities for students to show, with confidence, how they have developed mathematically.

Management of the exploration

Work for the exploration should be incorporated into the course so that students are given the opportunity to learn the skills needed. Time in class can therefore be used for general discussion of areas of study, as well as familiarizing students with the criteria.

Further details on the development of the exploration are included in the teacher support material.

Requirements and recommendations

Students can choose from a wide variety of activities, for example, modelling, investigations and applications of mathematics. To assist teachers and students in the choice of a topic, a list of stimuli is available in the teacher support material. However, students are not restricted to this list.

The exploration should not normally exceed 12 pages, including diagrams and graphs, but excluding the bibliography. However, it is the quality of the mathematical writing that is important, not the length.

The teacher is expected to give appropriate guidance at all stages of the exploration by, for example, directing students into more productive routes of inquiry, making suggestions for suitable sources of information, and providing advice on the content and clarity of the exploration in the writing-up stage.

Teachers are responsible for indicating to students the existence of errors but should not explicitly correct these errors. It must be emphasized that students are expected to consult the teacher throughout the process.

All students should be familiar with the requirements of the exploration and the criteria by which it is assessed. Students need to start planning their explorations as early as possible in the course. Deadlines should be firmly established. There should be a date for submission of the exploration topic and a brief outline description, a date for the submission of the first draft and, of course, a date for completion.

In developing their explorations, students should aim to make use of mathematics learned as part of the course. The mathematics used should be commensurate with the level of the course, that is, it should be similar to that suggested by the syllabus. It is not expected that students produce work that is outside the mathematics SL syllabus—however, this is not penalized.

Internal assessment criteria

The exploration is internally assessed by the teacher and externally moderated by the IB using assessment criteria that relate to the objectives for mathematics SL.

Each exploration is assessed against the following five criteria. The final mark for each exploration is the sum of the scores for each criterion. The maximum possible final mark is 20.

Students will not receive a grade for mathematics SL if they have not submitted an exploration.

Criterion A	Communication
Criterion B	Mathematical presentation
Criterion C	Personal engagement
Criterion D	Reflection
Criterion E	Use of mathematics

Criterion A: Communication

This criterion assesses the organization and coherence of the exploration. A well-organized exploration includes an introduction, has a rationale (which includes explaining why this topic was chosen), describes the aim of the exploration and has a conclusion. A coherent exploration is logically developed and easy to follow.

Graphs, tables and diagrams should accompany the work in the appropriate place and not be attached as appendices to the document.

Achievement level	Descriptor
0	The exploration does not reach the standard described by the descriptors below.
1	The exploration has some coherence.
2	The exploration has some coherence and shows some organization.
3	The exploration is coherent and well organized.
4	The exploration is coherent, well organized, concise and complete.

Criterion B: Mathematical presentation

This criterion assesses to what extent the student is able to:

- use appropriate mathematical language (notation, symbols, terminology)
- define key terms, where required
- use multiple forms of mathematical representation, such as formulae, diagrams, tables, charts, graphs and models, where appropriate.

Students are expected to use mathematical language when communicating mathematical ideas, reasoning and findings.

Students are encouraged to choose and use appropriate ICT tools such as graphic display calculators, screenshots, graphing, spreadsheets, databases, drawing and word-processing software, as appropriate, to enhance mathematical communication.

Achievement level	Descriptor
0	The exploration does not reach the standard described by the descriptors below.
1	There is some appropriate mathematical presentation.
2	The mathematical presentation is mostly appropriate.
3	The mathematical presentation is appropriate throughout.

Criterion C: Personal engagement

This criterion assesses the extent to which the student engages with the exploration and makes it their own. Personal engagement may be recognized in different attributes and skills. These include thinking independently and/or creatively, addressing personal interest and presenting mathematical ideas in their own way.

Achievement level	Descriptor
0	The exploration does not reach the standard described by the descriptors below.
1	There is evidence of limited or superficial personal engagement.
2	There is evidence of some personal engagement.
3	There is evidence of significant personal engagement.
4	There is abundant evidence of outstanding personal engagement.

Criterion D: Reflection

This criterion assesses how the student reviews, analyses and evaluates the exploration. Although reflection may be seen in the conclusion to the exploration, it may also be found throughout the exploration.

Achievement level	Descriptor
0	The exploration does not reach the standard described by the descriptors below.
1	There is evidence of limited or superficial reflection.
2	There is evidence of meaningful reflection.
3	There is substantial evidence of critical reflection.

Criterion E: Use of mathematics

This criterion assesses to what extent students use mathematics in the exploration.

Students are expected to produce work that is commensurate with the level of the course. The mathematics explored should either be part of the syllabus, or at a similar level or beyond. It should not be completely based on mathematics listed in the prior learning. If the level of mathematics is not commensurate with the level of the course, a maximum of two marks can be awarded for this criterion.

The mathematics can be regarded as correct even if there are occasional minor errors as long as they do not detract from the flow of the mathematics or lead to an unreasonable outcome.

Achievement level	Descriptor
0	The exploration does not reach the standard described by the descriptors below.
1	Some relevant mathematics is used.
2	Some relevant mathematics is used. Limited understanding is demonstrated.
3	Relevant mathematics commensurate with the level of the course is used. Limited understanding is demonstrated.
4	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is partially correct. Some knowledge and understanding are demonstrated.
5	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is mostly correct. Good knowledge and understanding are demonstrated.
6	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is correct. Thorough knowledge and understanding are demonstrated.

IB MATH SL IA OUTLINE WORKSHEET

Name: _____

Stimuli: _____

Specific Topic: _____

My Research question is:

_____

_____

_____

My Aim is:

_____

_____

_____

_____

My Rationale is:

_____

_____

_____

_____

_____

What are the math connections (syllabus topics) to your area of interest?

What are some things that you may have to research in order to answer your research question?

What are the definitions you will need to define for people not familiar with this topic?

What are some possible visual representations (graphs, tables, diagrams,…) that you might want to have?

to writing a good Math Exploration

- Start with an introduction that includes your research question.

- Then state your aim and rationale.

  Aim: What is the point of your exploration?
  Rationale: Why did you choose this topic? What do you hope your reader will learn?

- Create an outline to help you organize your ideas and streamline your research.

- While doing your research, keep a record of each website you visited and include the date.

- If you need to round any decimal, consider the degree of accuracy. For your topic, how many decimal places are relevant? For example, while a difference of one tenth may not matter if you are talking about speed of a locomotive, it could matter if you are talking about the amount of milligrams of morphine administered to a patient.

- Use ≈ for any rounded values.

- Include page numbers for easier reference later on.

- Only use mathematics that YOU understand. Khan Academy or YouTube could help. If you still can't figure it out, it's probably too hard for this level of math. It is not your teacher's responsibility to teach you the math.

- Ask and answer personal questions ("I wonder if…, What if…)?. Make conjectures (an opinion or theory without sufficient evidence or proof).

- Use proper math vocabulary (~~plug in~~ ≠ substitute) and notation (x^2 ≠ x^2).

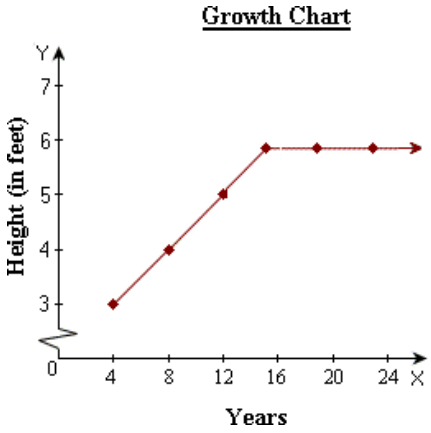
- Consider the historical and global perspectives of your topic.

  Historical perspective: things that have happened with your topic in the past
  Global perspective: the links between your own life and others throughout the world

- Discuss the implications of your results. (What do they mean? Why are they important? How do they affect your life?...)

- Discuss your results in the context of your topic, not just in general terms.

  Ex:



~~*The graph levels off at x > 15*~~

The graph levels off after the age of 15 because that is the average age when girls tend to reach their maximum height.

- Discuss possible limitations and/or extensions of your topic.

  Limitation: a restriction, a defect or failing
  Extension: an occurrence in another area

- Make connections between your topic and different disciplines and/or areas of mathematics?

- Add "your voice" to your paper.

IB MATH SL IA

A CHECKLIST FOR WRITING YOUR DRAFT EXPLORATION

Communication & Mathematical presentation

- ☐ Did you start with an introduction?
- ☐ Do you have a clearly written aim and rationale?
- ☐ Does the entire paper focus on the aim and avoiding irrelevance? Don't go off on a tangent.
- ☐ Does the writing flow nicely?
- ☐ Is your exploration coherent? (Def'n: logically organized, understandable, having clarity)
- ☐ Did you include graphs, tables and diagrams at appropriate places and not attach them all at the end?
- ☐ Have you had someone (not a student in Math SL) edit your paper?
- ☐ Did you cite all references in your bibliography and acknowledge direct quotes appropriately?
- ☐ Did you use appropriate mathematical language and representation? (No computer notation *,^, etc)
- ☐ Did you define key terms where necessary?
- ☐ Did you use appropriate technology?
- ☐ Did you think about the degree of accuracy? (For your topic, how many decimal places are relevant?)
- ☐ Did you end with a conclusion and relate it back to your aim and rationale?
- ☐ Do you have page numbers?

Use of mathematics

- ☐ Did you explore unfamiliar math, or apply familiar math to a new situation?
- ☐ Did you create mathematical models for real-world situations, if this applied to your topic?
- ☐ Did you apply problem-solving techniques?
- ☐ Did you look for and explain patterns, if this applied to your topic?

Reflection

- ☐ Did you ask questions, make conjectures and investigate mathematical ideas?
- ☐ Did you consider the historical and global perspectives of your topic?
- ☐ Did you discuss the implications of your results? (What do they mean? Why are they important?...)
- ☐ Did you consider the significance of your paper?
- ☐ Did you look for possible limitations and/or extensions of your topic?
- ☐ Did you make links between your topic and different fields and/or areas of mathematics?

Personal engagement

- ☐ Did you ask and answer personal questions ("I wonder if…, What if…)?
- ☐ Did you try to think independently and creatively?
- ☐ Did you address why you think your topic is interesting or why it appealed to you?
- ☐ Did you present mathematical ideas in your own way (as opposed to copy someone else' theory)?
- ☐ Did you try to add "your voice" to the work?
- ☐ Did you relate the results to your own life?

MATHSLIA: STUDENT LED INTERVIEW

Be prepared to do the following things during your 10 minute interview. You should have notes and/or post-its all over your exploration.

- *Show me:*
  - *your clear aim & rationale in your opening paragraph*
  - *evidence that key words are defined*
  - *where/how you have used technology*
  - *where you have considered an appropriate degree of accuracy*
  - *where you considered historical and global perspectives*
  - *where you discussed possible limitations and/or extensions*
  - *that your conclusion related back to your aim & rationale*
  - *your bibliography*

- *Briefly describe:*
  - *how/where you used math. Be prepared to defend the level*
  - *how/where you showed personal engagement and made the work your own*

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Bachillerato Internacional

SELF-EVALUTON

Award yourself a mark and write a brief justification for each criterion.

Candidate name: _____

Syllabus Topic: _____

Date due: _____

		Marks Earned
A: COMMUNICATION		
0	The exploration does not reach the standard described by the descriptors	
1	The exploration has some coherence.	
2	The exploration has some coherence and shows some organization.	
3	The exploration is coherent and well organized.	
4	The exploration is coherent, well organized, concise and complete.	
Justification:		
B: MATHEMATICAL PRESENTATION		
0	The exploration does not reach the standard described by the descriptors.	
1	There is some appropriate mathematical presentation.	
2	The mathematical presentation is mostly appropriate.	
3	The mathematical presentation is appropriate throughout.	
Justification:		
C: PERSONAL ENGAGEMENT		
0	The exploration does not reach the standard described by the descriptors.	
1	There is evidence of limited or superficial personal engagement.	
2	There is evidence of some personal engagement.	
3	There is evidence of significant personal engagement.	
4	There is abundant evidence of outstanding personal engagement.	
Justification:		

		Marks Earned
D: REFLECTION		
0	The exploration does not reach the standard described by the descriptors.	
1	There is evidence of limited or superficial reflection.	
2	There is evidence of meaningful reflection.	
3	There is substantial evidence of critical reflection.	
Justification:		

E: USE OF MATHEMATICS		
0	The exploration does not reach the standard described by the descriptors below.	
1	Some relevant mathematics is used.	
2	Some relevant mathematics is used. Limited understanding is demonstrated.	
3	Relevant mathematics commensurate with the level of the course is used. Limited understanding is demonstrated.	
4	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is partially correct. Some knowledge and understanding are demonstrated.	
5	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is mostly correct. Good knowledge and understanding are demonstrated.	
6	Relevant mathematics commensurate with the level of the course is used. The mathematics explored is correct. Thorough knowledge and understanding are demonstrated.	
Justification:		