Stage 1: Integrate significant concept, area of interaction and unit question

**Area of interaction focus**
Which area of interaction will be our focus? Why have we chosen this?

- Community & Service
  - Project: plan a Celebration Honouring Someone special in the community

**Significant concept(s)**
What are the big ideas? What do we want our students to retain for years into the future?

- The right number and the wrong number

**MYP unit question**
Can Human beings live without numbers?

**Assessment**
What task(s) will allow students the opportunity to respond to the unit question?

- What will constitute acceptable evidence of understanding? How will students show what they have understood?

- A End of unit test, Homework
- B Solving Puzzles, Activity Lab, in class Investigation
- C,D Project: “Celebration”

Which specific MYP objectives will be addressed during this unit?

- A- Students will be able to know and demonstrate understanding of some of the basic concepts of numbers.
  - Use basic concept-specific strategies to solve simple problems in both familiar and unfamiliar situations including those in real-life contexts.

- B- apply basic inquiry and mathematical problem-solving techniques, with guidance from the teacher, by identifying variables, posing relevant questions, organizing data and using an appropriate model

- C- use appropriate mathematical language (notation, symbols, terminology) in both oral and written communications, with guidance from the teacher.
Students could estimate answers before carrying out calculations

Which MYP assessment criteria will be used?
A – Test, Investigation, B Project C&D

Stage 2: Backward planning: from the assessment to the learning activities through inquiry

Content
What knowledge and/or skills (from the course overview) are going to be used to enable the student to respond to the unit question?
What (if any) state, provincial, district, or local standards/skills are to be addressed? How can they be unpacked to develop the significant concept(s) for stage 1?

Knowledge: Estimating with whole numbers, Understanding Decimals, Comparing and Ordering Decimals, Operations with Decimals
Skills: To write and compare whole numbers/ to estimate with whole numbers by rounding and by using compatible numbers/ to understand and use the properties of numbers/ to use the order of operation to solve problems/ To read, write, and round decimals/ to compare and order Decimals using models and place value/ to add and subtract decimals and to solve problems involving decimals/ to multiply and divide decimals and to solve problems involving decimals/

Approaches to learning
How will this unit contribute to the overall development of subject-specific and general approaches to learning skills?

Through the following approaches to learning, we will provide students with the tools to enable them to take full responsibility for their own learning and become successful lifelong learners knowledge-acquisition skills, problem-solving skills, and collaborative skills. This unit encourages critical thinking levels of applying, analyzing, and evaluating. Students become Knowledgeable, Thinkers, Inquirers, Communicators, Open minded, Reflective.

Learning experiences
How will students know what is expected of them? Will they see examples, rubrics, templates?
How will students acquire the knowledge and practise the skills required? How will they practise applying these?
Do the students have enough prior knowledge? How will we know?

Teaching strategies
How will we use formative assessment to give students feedback during the unit?
What different teaching methodologies will we employ?
How are we differentiating teaching and learning for all? How have we made provision for those learning in a language other than their mother tongue? How have we considered those with special educational needs?

Students will know the achievement levels and every task will be with rubrics
The Project “Celebration” will give students the chance to be inquirers and practise the skills required.
The students studied numbers in the PYP

A thinking routine along the lines of, Question starts-based on quote from Fuzzy numbers, Discussions Connect/Extend/Challenge reflect on learning and understanding Think/Pair/Share
Resources
What resources are available to us?
How will our classroom environment, local environment and/or the community be used to facilitate students’ experiences during the unit?

Course 1 Student textbook

Ongoing reflections and evaluation

In keeping an ongoing record, consider the following questions. There are further stimulus questions at the end of the “Planning for teaching and learning” section of MYP: From principles into practice.

Students and teachers
What did we find compelling? Were our disciplinary knowledge/skills challenged in any way?
What inquiries arose during the learning? What, if any, extension activities arose?
How did we reflect—both on the unit and on our own learning?
Which attributes of the learner profile were encouraged through this unit? What opportunities were there for student-initiated action?

Possible connections
How successful was the collaboration with other teachers within my subject group and from other subject groups?
What interdisciplinary understandings were or could be forged through collaboration with other subjects?

Assessment
Were students able to demonstrate their learning?
How did the assessment tasks allow students to demonstrate the learning objectives identified for this unit? How did I make sure students were invited to achieve at all levels of the criteria descriptors?
Are we prepared for the next stage?

Data collection
How did we decide on the data to collect? Was it useful?
MYP unit planner

<table>
<thead>
<tr>
<th>Unit title</th>
<th>Solving Inequalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher(s)</td>
<td>Osama Elkashef</td>
</tr>
<tr>
<td>Subject and grade level</td>
<td>Math MYP4</td>
</tr>
<tr>
<td>Time frame and duration</td>
<td>4 week</td>
</tr>
</tbody>
</table>

Stage 1: Integrate significant concept, area of interaction and unit question

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<th>Area of interaction focus</th>
<th>Significant concept(s)</th>
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<tr>
<td>Health &amp; social education</td>
<td>Quantities' weight is making a difference in human being life</td>
</tr>
<tr>
<td>Project &quot;No Sweat&quot;</td>
<td></td>
</tr>
</tbody>
</table>

MYP unit question

How can we compare between Quantities to make decisions?

Assessment

What task(s) will allow students the opportunity to respond to the unit question?

What will constitute acceptable evidence of understanding? How will students show what they have understood?

Test- A
IN class Investigation-B
Project- C,D

Which specific MYP objectives will be addressed during this unit?
A• select and apply basic rules correctly to solve problems including those in real-life contexts
B• select and apply basic inquiry and mathematical problem solving techniques to problems by asking searching questions
• arrive at a single result or set of results and make predictions consistent with findings
C• use appropriate mathematical language (notation, symbols, terminology) in both oral and written explanations in familiar situations
• communicate a mathematical line of reasoning in solving simple problems using different forms of representation
D• consider the reasonableness of their results in the context of the problem and attempt to explain whether they make sense

Which MYP assessment criteria will be used?
A,B,C,D

Stage 2: Backward planning: from the assessment to the learning activities through inquiry

Content
What knowledge and/or skills (from the course overview) are going to be used to enable the student to respond to the unit question?
What (if any) state, provincial, district, or local standards/skills are to be addressed? How can they be unpacked to develop the significant concept(s) for stage 1?

To solve and graph the solution for any kind of inequality.
To use inequalities to solve verbal problems and a real life situation problems.

Approaches to learning
How will this unit contribute to the overall development of subject-specific and general approaches to learning skills?

We will try to make our students inquirers and open minded

Learning experiences
Teaching strategies
How will students know what is expected of them? Will they see examples, rubrics, templates?
How will we use formative assessment to give students feedback during the unit?
How will students acquire the knowledge and practise the skills required? How will they practise applying these?
What different teaching methodologies will we employ?
Do the students have enough prior knowledge? How will we know?
How are we differentiating teaching and learning for all?
How have we made provision for those learning in a language other than their mother tongue? How have we considered those with special educational needs?

Explanation
Discussions, relate, define, explain

Resources
What resources are available to us?
How will our classroom environment, local environment and/or the community be used to facilitate students’ experiences during the unit?

Text book, Internet, CDS, DVD, School Library.

**Ongoing reflections and evaluation**

In keeping an ongoing record, consider the following questions. There are further stimulus questions at the end of the “Planning for teaching and learning” section of MYP: From principles into practice.

**Students and teachers**
What did we find compelling? Were our disciplinary knowledge/skills challenged in any way?  
What inquiries arose during the learning? What, if any, extension activities arose?  
How did we reflect—both on the unit and on our own learning? 
Which attributes of the learner profile were encouraged through this unit? What opportunities were there for student-initiated action?

**Possible connections**
How successful was the collaboration with other teachers within my subject group and from other subject groups? 
What interdisciplinary understandings were or could be forged through collaboration with other subjects?

**Assessment**
Were students able to demonstrate their learning?  
How did the assessment tasks allow students to demonstrate the learning objectives identified for this unit? How did I make sure students were invited to achieve at all levels of the criteria descriptors?  
Are we prepared for the next stage?

**Data collection**
How did we decide on the data to collect? Was it useful?
**Stage 1: Integrate significant concept, area of interaction and unit question**

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<td>What are the big ideas? What do we want our students to retain for years into the future?</td>
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<tr>
<td>Why have we chosen this?</td>
<td>Algebra and Geometry are intertwined.</td>
</tr>
<tr>
<td>Human Ingenuity. Through this unit the student can realize how Mathematicians found a way to create a bridge between algebraic methods and geometric transformations. The works of Pythagoras, Descartes and Cayley show this idea clearly.</td>
<td>An algebraic expression can help us to transform a geometrical object. The analysis of a geometrical shape can help us to understand characteristics of an algebraic expression.</td>
</tr>
</tbody>
</table>

**MYP unit question**

*How can a formula transform a shape?*

**Assessment**

- What task(s) will allow students the opportunity to respond to the unit question?
- What will constitute acceptable evidence of understanding? How will students show what they have understood?

The tasks will have an increasing level of complexity.

Firstly, giving the students opportunities to perceive some relationships between geometrical constructions and formulae. For example, the geometric proof of the Pythagoras’ Theorem, The square of a Binomial, the difference between two squares,
and the Cube of a Binomial.

Secondly, moving to the Cartesian plane, and working with the parameters of linear and quadratic function. The tasks should be able to show the students how the change of any parameter (gradient, y-intercepts, etc) will have in the shape of the function.

Finally, working with geometric transformations such as reflection, rotation and enlargement and study what matrices are related to them. (If we were working within Extended Maths framework even complex numbers could be used)

All those tasks must provide the student with opportunities to move from different forms of representations

Which specific MYP objectives will be addressed during this unit?
A (Knowledge & understanding), B (Pattern recognition), C( Communication) and D (Reflection)

Which MYP assessment criteria will be used?
Criteria A, B, C, D

Stage 2: Backward planning: from the assessment to the learning activities through inquiry

Content

What knowledge and/or skills (from the course overview) are going to be used to enable the student to respond to the unit question?

What (if any) state, provincial, district, or local standards/skills are to be addressed? How can they be unpacked to develop the significant concept(s) for stage 1?

Basic algebra manipulation: Distributive property of multiplication over addition, square of a binomial, difference between two squares, cube of a binomial.

Polynomial functions: Graphs and parameters of linear and quadratic functions.


Approaches to learning

How will this unit contribute to the overall development of subject-specific and general approaches to learning skills?

Organizing information: Drawing the graphs of different linear/quadratic functions, changing parameters appropriately in order to observe the changes in the graphs.
Doing the same by multiplying given matrices for the coordinates of the vertices of a shape.
Collaboration: Working in groups, some of them, for example, changing one parameter of the linear/quadratic function, and the other groups another parameter.

Reflection: After collecting all the information trying to see the relationship between the changes made in the formulae and the graphs.

Transfer: If the reflection was successful, the students should be able to discover patterns and transfer their newly acquired concepts to new situations. Given a formula of a linear/quadratic function they would sketch a graph, and conversely, given the graph of a polynomial function studied, they should provide the formula. Similar situation with the matrices.

Communication: Oral presentations based on previously written reports.

Learning experiences

- How will students know what is expected of them? Will they see examples, rubrics, templates?
- How will students acquire the knowledge and practise the skills required? How will they practise applying these?
- Do the students have enough prior knowledge? How will we know?

Teaching strategies

- How will we use formative assessment to give students feedback during the unit?
- What different teaching methodologies will we employ?
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Type your information here

Previous basic knowledge will be checked through diagnostic tests. Some activities assessed with the MYP criteria will have a specific rubric that will help the student to know which are their achievement. The students will always be aware of the criteria used in every assignment. They will be exposed to different types of assignments. In some of them the knowledge of topics will be assessed against criterion A. Part of the knowledge will be acquired thanks to activities assessed against criterion B. Activities assessed against criteria C and D would give them opportunities to show their skills regarding Communication and reflection.

Working in groups and making peer assessment will help us to provide continually feedback during the process of acquiring the knowledge of the main topics.

The methodology should include mixing different kind of activities: working with concrete material when discovering the geometric proofs of algebraic identities such as Distributive property of multiplication over addition, square of a binomial, difference between two squares, cube of a binomial. Also some kinestetical activities can be useful, such as "graphing functions with their bodies in the school yard", where every student will represent a cartesian point. Every team will have a formula to represent and a time allotted to do it.

Working with software from Wolfram website will help them to experience with matrices.
### Resources

What resources are available to us?

How will our classroom environment, local environment and/or the community be used to facilitate students’ experiences during the unit?

**Type your information here**

All kind of concrete material we can use (paper, cardboard, scissors, ) also videos or vodcasts, and a open area such as the yard of the school.

**Websites such as:**

- [http://www.members.shaw.ca/ron.blond/QFA.CSF.APPLET/index.html](http://www.members.shaw.ca/ron.blond/QFA.CSF.APPLET/index.html),