

## COURSE OUTLINE – MYP YEAR 5 MATHEMATICS (Enriched)

$$\begin{cases} 2x_1 + x_2 = 7 \\ x_1 + x_2 - 3x_3 = -10 \\ 6x_2 - 2x_3 + x_4 = 7 \\ 2x_1 - 3x_4 = 13 \end{cases}$$

### Course Overview & Expectations:

The Enriched MYP Year 5 Mathematics consists of all topics in Foundations of Mathematics and Pre-Calculus 10 and some important topics in Pre-Calculus 11 prescribed by the BC Ministry of Education. This course is designed to not only help students develop proficiency in numeracy but also provide students with the mathematical understanding and critical thinking skills, all of which are necessary for further learning either in DP math 11 or Pre-Calculus 11. The key concepts covered in this course involve Form, Relationship and Logic. Through inquiry into these key concepts, this course will assist students to develop the ability to conjecture, reason logically, employ quantitative and spatial information, and apply a variety of mathematical methods to solve problems and make decisions confidently and independently. This course is more challenging; therefore, students are expected to have developed solid fundamental math skills through MYP Year 3 & 4 Mathematics learning.

### Learning:

#### Through engaging with this course, students should UNDERSTAND...

Algebra allows us to generalize relationships through abstract thinking.



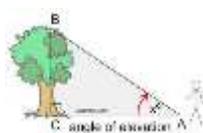
The meanings of, and connections between, each operation extend to powers and polynomials.



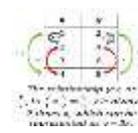
Constant rate of change is an essential attribute of linear relations and has meaning in different representations and contexts.



Trigonometry involves using proportional reasoning to solve indirect measurement problems.



Representing and analyzing situations allows us to notice and wonder about relationships.



#### Through engaging with this course, students will KNOW...

Statement of Inquiry	Key Concept/Concepts	Unit Title/Topic
Information about inaccessible heights can be determined safely and efficiently.	<b>Relationships</b> , Model, Space	Trigonometry
Discovering mathematical patterns using logic can lead to a better understanding of how physical systems work.	<b>Logic</b> , Pattern, Change	Exponents (Integral Exponents)
It is important that humans farm in a responsible manner to minimize the impact on the environment.	<b>Relationships</b> , Model, Pattern	Arithmetic Sequences and Series
By changing the form of an expression or question, we can simplify or solve complex models.	<b>Form</b> , Equivalence, Model	Polynomial Expressions
By representing data in different forms, it allows us to discover relationships in our world.	<b>Relationships</b> , Model, Change	Linear Relations
There is a need to relate variables that are around us and represent them in different forms.	<b>Form</b> , Equivalence, Representation	Linear Equations and Graphs
Simultaneous equations inform and give a better understanding of systems and their consequences.	<b>Relationships</b> , Justification, Representation	Solving System of Linear Equations
By understanding the system of taxation, we can legally and logically minimize the amount of tax we have to pay.	<b>Logic</b> , System	Finance
Quadratic equations give opportunities to maximize and minimize sets of variables in the world around us.	<b>Relationships</b> , Model, Representation	Quadratic Equations

## Through engaging with this course, students will DO...

CURRICULAR COMPETENCIES	EXAMPLES
Reasoning and analyzing	<ul style="list-style-type: none"> <li>Develop thinking strategies to solve problems</li> <li>Explore, analyze, and apply mathematical ideas using reason, tech (graphing calculator or Desmos), &amp; other tools</li> <li>Estimate reasonably and demonstrate fluent, flexible, and strategic thinking about numbers</li> <li>Model with mathematics in situational contexts</li> <li>Thinking creatively and with curiosity and wonder when exploring problems</li> </ul>
Understanding and solving	<ul style="list-style-type: none"> <li>Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, inquiry, and problem solving</li> <li>Visualize to explore and illustrate mathematical concepts and relationships</li> <li>Apply flexible and strategic approaches to solve problems</li> <li>Solve problems with persistence and a positive disposition</li> </ul>
Communicating and representing	<ul style="list-style-type: none"> <li>Explain and justify mathematical ideas and decisions in many ways</li> <li>Represent mathematical ideas in concrete, pictorial, and symbolic forms</li> <li>Use mathematical vocabulary and language to contribute to discussions in the classroom</li> <li>Take risks when offering ideas in classroom discourse</li> </ul>
Connecting and reflecting	<ul style="list-style-type: none"> <li>Reflect on mathematical thinking</li> <li>Connect mathematical concepts with each other, with other areas, and with personal interests</li> <li>Use mistakes as opportunities to advance learning</li> <li>Incorporate First Peoples worldviews, perspectives, knowledge, and practices to make connections with mathematical concepts</li> </ul>

## Through this course, students will develop the following Approaches to Learning skills...

Category Skill	Examples
Thinking skills	Use prioritization and order of precedence in problem-solving. For example: draw justifiable conclusions and generalizations from investigating patterns.
Social skills	Help others to create success for themselves during group work. For example: give and receive meaningful feedback; negotiate ideas and knowledge with peers and teachers; collaborate with peers.
Communication skills	Organize and interpret data using both analogue and digital tools. For example: a regular journal during the investigation to maintain a record of reflections.
Self-management skills	Practise focus and concentration while solving multiple problems. For example: plan short- and long-term assignments; meet deadlines; use class time wisely; concentrate on task with perseverance and resilience.
Research skills	Use a variety of technologies and media platforms, including social media and online networks, to source information.

## Assessment:

### Throughout this course, students will demonstrate their learning...

The MYP Mathematics course will focus on developing skills related to 4 criteria based objectives.	Formative assessment is assessment <i>as</i> learning, or assessment <i>for</i> learning. <b>Formative assessments could include;</b>	Summative assessment is assessment <i>of</i> learning. <b>Summative assessments could include;</b>
<b>A: Knowing and Understanding</b>	Class instructions, class discussions, quizzes, worksheets	Tests, Projects
<b>B: Investigating Patterns</b>	Class activities, class discussions	Structured pattern assessments before the concepts are taught
<b>C: Communicating</b>	Class discussions, group work, group investigation activities	Tests, Projects
<b>D: Applying Mathematics in Real Life Contexts</b>	Class activities, group work	Tests, Projects

## Academic Honesty and Personal Integrity

The faculty at Carson Graham expects our students to complete academic and nonacademic work that is authentic and respectful of intellectual property. All students are expected to adhere to the school's Policy for Academic Integrity. Ignorance of the standards related to academic honesty and student integrity is not an excuse for dishonesty, plagiarism and malpractice. You are expected to familiarize yourself with the policy.

<https://www.sd44.ca/school/carson/About/schoolpolicies/Documents/Carson%20Graham%20Academic%20Honesty%20Policy%20reviewed%20December%202018.pdf>

### Grade Descriptors:

#### Grade 7

Produces high-quality work that frequently uses mathematics insightfully. Communicates comprehensive, nuanced understanding of concepts and contexts demonstrating proficient application of mathematical techniques and terminology. Consistently demonstrates sophisticated analytical thinking and logical processes when problem-solving and investigating. Frequently transfers mathematical knowledge and applies skills, with independence and expertise, in a variety of complex classroom and real-world situations.

#### Grade 6

Produces high-quality, occasionally insightful mathematical work. Communicates extensive understanding of concepts and contexts demonstrating proficient application of mathematical techniques and terminology. Demonstrates analytical thinking and logical processes, frequently with sophistication when problem-solving and investigating. Transfers mathematical knowledge and applies skills, often with independence, in a variety of familiar and unfamiliar classroom and real-world situations.

#### Grade 5

Produces generally high-quality mathematical work. Communicates good understanding of concepts and contexts demonstrating proficient application of mathematical techniques and terminology. Demonstrates analytical thinking and logical processes, sometimes with sophistication, when problem-solving and investigating. Usually transfers mathematical knowledge and applies skills, with some independence, in familiar classroom and real-world situations.

#### Grade 4

Produces good-quality mathematical work. Communicates basic understanding of most concepts and contexts with evidence of appropriate application of mathematical techniques and terminology, with few misunderstandings and minor gaps. Often demonstrates analytical thinking when problem-solving and investigating. Transfers some mathematical knowledge and applies skills in familiar classroom situations, but requires support in unfamiliar situations.

#### Grade 3

Produces mathematical work of an acceptable quality. Communicates basic understanding of many concepts and contexts with occasional evidence of appropriate application of mathematical techniques and terminology, with occasional significant misunderstandings or gaps. Begins to demonstrate some analytical thinking when problem-solving and investigating. Begins to transfer mathematical knowledge and apply skills, requiring support even in familiar classroom situations.

#### Grade 2

Produces mathematical work of limited quality. Communicates limited understanding of some concepts and contexts. Demonstrates limited evidence of mathematical thinking. Limited evidence of transfer of mathematical knowledge and application of skills.

#### Grade 1

Produces work of a very limited quality. Conveys many significant misunderstandings or lacks understanding of most concepts and contexts. Very rarely demonstrates evidence of mathematical thinking. Very inflexible, rarely shows evidence of knowledge or skills.

## Assessment Rubrics:

### Grade 10

#### Criterion A: Knowing and understanding

At the end of year 5, students should be able to:

- i. select appropriate mathematics when solving problems in both familiar and unfamiliar situations
- ii. apply the selected mathematics successfully when solving problems
- iii. solve problems correctly in a variety of contexts.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1-2	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> appropriate mathematics when solving <b>simple problems</b> in <b>familiar situations</b></li> <li>• <b>apply</b> the selected mathematics successfully when solving these problems</li> <li>• generally <b>solve</b> these problems correctly in a variety of contexts.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> appropriate mathematics when solving <b>more complex problems</b> in <b>familiar situations</b></li> <li>• <b>apply</b> the selected mathematics successfully when solving these problems</li> <li>• generally <b>solve</b> these problems correctly in a variety of contexts.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> appropriate mathematics when solving <b>challenging problems</b> in <b>familiar situations</b></li> <li>• <b>apply</b> the selected mathematics successfully when solving these problems</li> <li>• generally <b>solve</b> these problems correctly in a variety of contexts.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> appropriate mathematics when solving <b>challenging problems</b> in <b>both familiar and unfamiliar situations</b></li> <li>• <b>apply</b> the selected mathematics successfully when solving these problems</li> <li>• generally <b>solve</b> these problems correctly in a variety of contexts.</li> </ul>

#### Criterion B: Investigating patterns

At the end of year 5, students should be able to:

- i. select and apply mathematical problem-solving techniques to discover complex patterns
- ii. describe patterns as relationships and/or general rules consistent with findings
- iii. verify and justify and/or general rules.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1-2	The student is able to: <ul style="list-style-type: none"> <li>• <b>apply, with teacher support</b>, mathematical problem-solving techniques to discover <b>simple patterns</b></li> <li>• <b>state predictions</b> consistent with patterns.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>apply</b> mathematical problem-solving techniques to discover <b>simple patterns</b></li> <li>• <b>suggest relationships</b> and/or general rules consistent with <b>findings</b>.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> and <b>apply</b> mathematical problem-solving techniques to discover <b>complex patterns</b></li> <li>• <b>describe patterns</b> as relationships and/or general rules consistent with <b>findings</b></li> <li>• <b>verify</b> these relationships and/or general rules.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>select</b> and <b>apply</b> mathematical problem-solving techniques to discover <b>complex patterns</b></li> <li>• <b>describe patterns</b> as relationships and/or general rules consistent with <b>correct findings</b></li> <li>• <b>verify</b> and <b>justify</b> these relationships and/or general rules.</li> </ul>

## Criterion C: Communicating

At the end of year 5, students should be able to:

- i. use appropriate mathematical language (notation, symbols, and terminology) in both oral and written explanations
- ii. use appropriate forms of mathematical representation to present information
- iii. move between different forms of mathematical representation
- iv. communicate complete, coherent and concise mathematical lines of reasoning
- v. organize information using a logical structure.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1-2	The student is able to: <ul style="list-style-type: none"> <li>• use <b>limited</b> mathematical language</li> <li>• use <b>limited forms</b> of mathematical representation to present information</li> <li>• <b>communicate</b> through lines of reasoning that are <b>difficult to interpret</b>.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• use <b>some appropriate</b> mathematical language</li> <li>• use <b>appropriate forms</b> of mathematical representation to present information <b>adequately</b></li> <li>• <b>communicate</b> through lines of reasoning that are <b>able to be understood</b></li> <li>• <b>adequately organize</b> information using a logical structure.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>usually</b> use <b>appropriate</b> mathematical language</li> <li>• <b>usually</b> use <b>appropriate forms</b> of mathematical representation to present information <b>correctly</b></li> <li>• move between different forms of mathematical representation <b>with some success</b></li> <li>• <b>communicate</b> through lines of reasoning that are <b>not always complete and coherent</b></li> <li>• <b>present work</b> that is <b>usually organized</b> using a logical structure.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>consistently</b> use <b>appropriate</b> mathematical language</li> <li>• use <b>appropriate forms</b> of mathematical representation to <b>consistently</b> present information <b>correctly</b></li> <li>• move <b>effectively</b> between different forms of mathematical representation</li> <li>• <b>communicate</b> through lines of reasoning that are <b>complete and coherent</b></li> <li>• <b>present work</b> that is <b>consistently organized</b> using a logical structure.</li> </ul>

## Criterion D: Applying Mathematics in real life contexts

At the end of year 5, students should be able to:

- i. identify relevant elements of authentic real-life situations
- ii. select appropriate mathematical strategies when solving authentic real-life situations
- iii. apply the selected mathematical strategies successfully to reach a solution
- iv. explain the degree of accuracy of a solution
- v. explain whether a solution makes sense in the context of the authentic real-life situation.

Achievement level	Level descriptor
0	The student <b>does not</b> reach a standard described by any of the descriptors below.
1-2	The student is able to: <ul style="list-style-type: none"> <li>• <b>identify some</b> of the elements of the authentic real-life situation</li> <li>• <b>apply</b> mathematical strategies to <b>find a solution</b> to the authentic real-life situation, <b>with limited success</b>.</li> </ul>
3-4	The student is able to: <ul style="list-style-type: none"> <li>• <b>identify</b> the <b>relevant</b> elements of the authentic real-life situation</li> <li>• <b>select, with some success, adequate</b> mathematical strategies to model the authentic real-life situation</li> <li>• <b>apply</b> mathematical strategies to <b>reach a solution</b> to the authentic real-life situation</li> <li>• <b>describe</b> whether the solution makes sense in the context of the authentic real-life situation.</li> </ul>
5-6	The student is able to: <ul style="list-style-type: none"> <li>• <b>identify</b> the <b>relevant</b> elements of the authentic real-life situation</li> <li>• <b>select adequate</b> mathematical strategies to model the authentic real-life situation</li> <li>• <b>apply</b> the selected mathematical strategies to <b>reach a valid solution</b> to the authentic real-life situation</li> <li>• <b>describe</b> the degree of accuracy of the solution</li> <li>• <b>discuss</b> whether the solution makes sense in the context of the authentic real-life situation.</li> </ul>
7-8	The student is able to: <ul style="list-style-type: none"> <li>• <b>identify</b> the <b>relevant</b> elements of the authentic real-life situation</li> <li>• <b>select appropriate</b> mathematical strategies to model the authentic real-life situation</li> <li>• <b>apply</b> the selected mathematical strategies to <b>reach a correct solution</b> to the authentic real-life situation</li> <li>• <b>explain</b> the degree of accuracy of the solution</li> <li>• <b>explain</b> whether the solution makes sense in the context of the authentic real-life situation.</li> </ul>