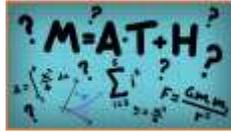


## COURSE OUTLINE – MYP YEAR 4 MATHEMATICS



### Course Overview & Expectations:

This course is designed to provide students with the mathematical understanding and critical thinking skills identified for further learning either in Workplace Math 10 or Foundations and Pre-Calculus 10. Students will have many opportunities to improve their computational fluency, number sense, abstract reasoning abilities sequential logic and strategic thinking capacities. Students require writing implements, a scientific calculator, the technological proficiency to navigate Teams and OneNote and the work ethic to solve problems with persistence and diligence.

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

The principles and processes underlying operations with numbers apply equally to algebraic situations and can be described and analyzed.



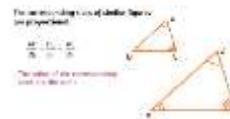
Computational fluency and flexibility with numbers extend to operations with rational numbers.



Continuous linear relationships can be identified and represented in many connected ways to identify regularities and make generalizations.



Similar shapes have proportional relationships that can be described, measured, and compared.



Analyzing the validity, reliability, and representation of data enables us to compare and interpret.



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

Statement of Inquiry	Key Concept/Concepts	Unit Title/Topic
Using logic to identify, generalize and simplify patterns can lead to scientific and technical innovations.	Logic, Simplification	Exponents and Exponents with Whole Numbers
Equality can be represented in different forms by following universal principles.	Form, Equivalence	Rational Numbers
Patterns in the natural world can be represented as relationships to help in making predictions.	Relationships, Models	Two variable Linear Relations
Finding commonalities and simplifying using logic can lead to solutions to problems in the natural world.	Definition, Simplification	Polynomials
The use of proportional reasoning enhances our understanding as to the relationship between real-life measurements and scale models.	Relationships, Equivalence	Scale Factors and Similarity
Logical systems aid in justification for financial decisions.	Logic, Systems	Financial Literacy
Analyzing how data are collected and represented can help you evaluate whether generalizations and decisions based on the data are reasonable.	Relationships, Generalization	Statistics

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

CURRICULAR COMPETENCIES CATEGORIES	EXAMPLES
<b>Reasoning and analyzing</b>	<ul style="list-style-type: none"> <li>Use logic and patterns to solve puzzles and play games</li> <li>Use reasoning and logic to explore, analyze, and apply mathematical ideas</li> <li>Estimate Reasonably</li> </ul>
<b>Understanding and solving</b>	<ul style="list-style-type: none"> <li>Apply multiple strategies to solve problems in both abstract and contextualized situations</li> <li>Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving</li> </ul>
<b>Communicating and representing</b>	<ul style="list-style-type: none"> <li>Use mathematical vocabulary and language to contribute to mathematical discussions</li> <li>Explain and justify mathematical ideas and decisions</li> </ul>
<b>Connecting and reflecting</b>	<ul style="list-style-type: none"> <li>Reflect on mathematical thinking</li> <li>Connect mathematical concepts to each other and to other areas and personal interests</li> </ul>

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

Below are some examples of how we develop ATL skills in Math:

Category Skill indicator	Examples
Thinking skills	Consider ideas from multiple perspectives, apply skills and knowledge in unfamiliar situations, make connections between subject groups and disciplines
Social skills	Practise empathy, help others to succeed, take responsibility for one's own actions, plan short- and long-term assignments; meet deadlines, give and receive meaningful feedback
Communication skills	Give and receive meaningful feedback, negotiate ideas and knowledge with peers and teachers, take effective notes in class, make effective summary notes for studying, exercise leadership and take on a variety of roles within groups
Self-management skills	bring necessary equipment and supplies to class, keep an organized and logical system of information files/notebooks, select and use technology effectively and productively, practise strategies to overcome distractions, practise "bouncing back" after adversity, mistakes and failures, identify strengths and weaknesses of personal learning strategies (self-assessment)
Research skills	Make connections between various sources of information, collect and analyse data to identify solutions and make informed decisions

### 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, handouts	Tests, Projects
<b>B: Investigating Patterns</b>	Class activities, class discussions	Guided inquiry pattern assessments
<b>C: Communicating</b>	Class discussions, group work, group projects	Tests, Projects
<b>D: Applying Mathematics in Real Life Contexts</b>	Class activities, group work, in-class projects	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:

### Criterion A: Knowing and understanding

At the end of year 4, 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 4, students should be able to:

- i. select and apply mathematical problem-solving techniques to discover complex patterns
- ii. describe patterns as general rules consistent with findings
- iii. prove, or verify and justify, 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>prove, or verify</b> and <b>justify</b> these relationships and/or general rules.</li> </ul>

## Criterion C: Communicating

At the end of year 4, 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>complete</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>• <b>usually</b> move 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</b> work 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, coherent and concise</b></li> <li>• <b>present</b> work 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 4, 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. justify the degree of accuracy of a solution
- v. justify 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>discuss</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>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>
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>justify</b> the degree of accuracy of the solution</li> <li>• <b>justify</b> whether the solution makes sense in the context of the authentic real-life situation.</li> </ul>