

# Grade 9 Mathematics

## Units of Study

<b>UNIT 1:</b>	<b>Equality models (Systems of Linear Equations)</b>	<b>Start:</b> August	<b>Duration:</b> 6 weeks
<ul style="list-style-type: none"> <li>● <b>Concepts:</b> Form, relationships, equivalence, model</li> <li>● <b>Subject Specific Skills:</b> Pythagoras, midpoints, perpendicular and parallel lines, graphing linear functions, standard form, systems of equations, arithmetic sequences</li> <li>● <b>Learning Experiences:</b> Students will explore the concepts of form, equivalence and models by looking at equivalence transformations to solve systems of linear equations, creating mathematical models to solve real-life problems, and interpreting the solution in order to make appropriate decisions.</li> </ul>			
<b>UNIT 2:</b>	<b>Trusting Information (Statistics and Data)</b>	<b>Start:</b> October	<b>Duration:</b> 7 weeks
<ul style="list-style-type: none"> <li>● <b>Concepts:</b> Relationships, quantity, representation</li> <li>● <b>Subject Specific Skills:</b> Data collection, statistical graphing, measures of centre and spread, comparing data</li> <li>● <b>Learning Experiences:</b> In this unit, the students will continue their understanding of representation and quantity; they will use statistical analysis to identify the trends in populations; and by applying these to real-life applications, they will see how this can impact decision-making with respect to the environment.</li> </ul>			
<b>UNIT 3:</b>	<b>Quantities and Conversion</b>	<b>Start:</b> December	<b>Duration:</b> 4 weeks
<ul style="list-style-type: none"> <li>● <b>Concepts:</b> Relationships, quantity, representation</li> <li>● <b>Subject Specific Skills:</b> Converting between different currencies; calculating commission charges; knowing different definitions for the absolute value of a number; understanding the properties of the absolute value of a number; converting between metric units, including metric units of area and volume</li> <li>● <b>Learning Experiences:</b> In this unit students will explore the concepts of quantity and measurement by looking at the topics of currency conversions, absolute value and systems of measurement. There is also a link to the concept of system in the latter part of this unit. At the end of each topic, the students will apply their learning to real-life applications and explore the necessity for both quantity and measurements within human-made systems.</li> </ul>			
<b>UNIT 4:</b>	<b>Algebraic Manipulation</b>	<b>Start:</b> February	<b>Duration:</b> 7 weeks
<ul style="list-style-type: none"> <li>● <b>Concepts:</b> Relationships, measurement, model</li> <li>● <b>Subject Specific Skills:</b> Simplification of surds and operation with surds; index laws and rational indices; algebraic expansion and simplification of algebraic fractions; factoring; formula construction, substitution, rearrangement; solving quadratic equations by factoring; simplifying irrational numerical expressions</li> <li>● <b>Learning Experiences:</b> In this unit, students will begin by consolidating their algebraic skills for manipulating formulae and using these skills to change more complex rational expressions. Moving on to rational equations, they will reflect on equivalent methods, and, by integrating technology, students begin to see how they can use these scientific principles to make precise models.</li> </ul>			
<b>UNIT 5:</b>	<b>Measurement and Trigonometry</b>	<b>Start:</b> April	<b>Duration:</b> 5 weeks
<ul style="list-style-type: none"> <li>● <b>Concepts:</b> Relationships, measurement, model</li> <li>● <b>Subject Specific Skills:</b> Converting units, perimeter, circumference, surface area and volume of 3D shapes; finding the length of an arc, the angle in a sector of a circle, the area and perimeter of a sector; trigonometry, solving problems that include an angle of elevation and depression; bearings</li> <li>● <b>Learning Experiences:</b> In this unit students will begin by looking at measurements in right-angled triangles using trigonometry; they will discover special triangles. This naturally leads to looking at how to measure 3D spaces and how to find the surface area and volume of pyramids, cones and spheres.</li> </ul>			

# Grade 9 Mathematics

## Unit 1: Equality Models

**Start:** August

**Duration:** 6 weeks

**LEARNING EXPERIENCES:** In this unit, the students will explore the concepts of form, equivalence and models by looking at equivalence transformations to solve systems of linear equations, creating mathematical models to solve real-life problems, and interpreting the solution in order to make applicable decisions.

**KEY CONCEPT:** Form

**Related Concepts / Subject Specific:** Equivalence, Model

**STATEMENT OF INQUIRY:**

Modelling with equivalent forms of representation can improve decision making.

**INQUIRY QUESTIONS:**

**Factual:**

What determines equivalence?

**Conceptual:**

Which skills enable you to model effectively?

**Debatable:**

To what extent does understanding identities and relationships help you make the best choices?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**

Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**

Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**

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

**D: Applying mathematics in real-life situations**

Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**

Thinking. Transfer Skills: Apply skills and knowledge in unfamiliar situations.  
Communication: Organize and depict information logically.

### RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press. Chapters 3.1, 11.1 & 14.3
- Mathspace

### SUMMATIVE ASSESSMENT TASKS:

1. Criterion BC : Investigate a linear pattern, find and justify a general rule. Communicate Ideas.
2. Criterion A: Unit review test- coordinate geometry and linear functions

# Grade 9 Mathematics

## Unit 2: Statistics- Trusting Information

**Start:** October

**Duration:** 7 weeks

**LEARNING EXPERIENCES:** In this unit the students will continue their understanding of representation and quantity; they will use statistical analysis to identify the trends in populations; and by applying these to real-life applications, they will see how this can impact decision-making with respect to the environment.

**KEY CONCEPT: Relationships**    **Related Concepts / Subject Specific:** Quantity, Representation

**STATEMENT OF INQUIRY:** How quantities are represented can help to establish underlying relationships and trends in a population.

**INQUIRY QUESTIONS:**

**Factual:** What makes a good representation?

**Conceptual:** How does understanding quantities enable you to make decisions about trends?

**Debatable:** How do individuals stand out in a crowd?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**    Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**    Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**    Use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations; use appropriate forms of mathematical representation to present information; move between different forms of mathematical representation; communicate complete, coherent and concise mathematical lines of reasoning; organize information using a logical structure.

**D: Applying mathematics in real-life situations**    Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**    Thinking. Critical Thinking Skills: Revise understanding based on new information and evidence.  
 Communication: Organize and depict information logically.  
 Research: Collect and analyse data to identify solutions and make informed decisions

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 4.1, 4.2, 4.3, 6.2 & 12.3
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion CD: Communicating ideas. Writing a statistical analysis report. Applying mathematics in real-life contexts
2. Criterion A: Knowledge and Understanding Test:

# Grade 9 Mathematics

## Unit 3: Quantities and Conversion

**Start:** December

**Duration:** 4 weeks

**LEARNING EXPERIENCES:** In this unit students will explore the concepts of quantity and measurement by looking at the topics of currency conversions, absolute value and systems of measurement. There is also a link to the concept of system in the latter part of this unit. At the end of each topic the students will apply their learning to real-life situations and explore the necessity for both quantity and measurements within human-made systems.

**KEY CONCEPT: Relationships**    **Related Concepts / Subject Specific:** Quantity, Representation

**STATEMENT OF INQUIRY:** Quantities and measurements illustrate the relationships between human-made systems and communities.

**INQUIRY QUESTIONS:**

**Factual:** What is the difference between a measurement and a quantity?

**Conceptual:** Can all quantities be measured?

**Debatable:** How do systems influence communities?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**    Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**    Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**    Use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations; use appropriate forms of mathematical representation to present information; move between different forms of mathematical representation; communicate complete, coherent and concise mathematical lines of reasoning; organize information using a logical structure.

**D: Applying mathematics in real-life situations**    Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**    Thinking. Critical Thinking Skills :Draw reasonable conclusions and generalizations  
 Communication: Access information to be informed and inform others.  
 Communication: Use intercultural understanding to interpret communication.

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 5.1, 6.1, 7.1, 7.2
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A : Knowledge & Understanding Test

# Grade 9 Mathematics

## Unit 4: Algebraic Manipulation

**Start:** February

**Duration:** 7 weeks

**LEARNING EXPERIENCES:** In this unit, students will begin by consolidating their algebraic skills for manipulating formulae and using these skills to change more complex rational expressions. They will reflect on equivalent methods, and, by integrating technology, students begin to see how they can use these scientific principles to make precise models.

**KEY CONCEPT:** Form      **Related Concepts / Subject Specific:** Change, Equivalence

**STATEMENT OF INQUIRY:** Representing change and equivalence in a variety of forms has helped humans apply their understanding of scientific principles.

**INQUIRY QUESTIONS:**

**Factual:** Does change alter the form?

**Conceptual:** Can change and equivalence be equal?

**Debatable:** Does science solve problems or create them?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**      Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**      Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**      Use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations; use appropriate forms of mathematical representation to present information; move between different forms of mathematical representation; communicate complete, coherent and concise mathematical lines of reasoning; organize information using a logical structure.

**D: Applying mathematics in real-life situations**      Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:** Self-management. Organization. Use appropriate strategies for organizing complex information  
Thinking. Transfer. Apply skills and knowledge in unfamiliar situations

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 8.1, 8.2, 10.2, 11.3 & 12.1
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A: Knowledge & Understanding Test
2. Criterion BC: Investigating Patterns. Communicate ideas.

# Grade 9 Mathematics

## Unit 5: Measurement and Trigonometry

**Start:** April

**Duration:** 5 weeks

**LEARNING EXPERIENCES:** In this unit students will begin by looking at measurements in right-angled triangles using trigonometry; they will discover special triangles. This naturally leads to looking at how to measure 3D spaces and how to find the surface area and volume of pyramids, cones and spheres.

**KEY CONCEPT:** Relationships

**Related Concepts / Subject Specific:**  
Measurement, Model

**STATEMENT OF INQUIRY:**

Generalizing relationships between measurements can lead to better models and methods

**INQUIRY QUESTIONS:**

**Factual:**

What are the properties of different types of triangle?  
What are some properties of prisms, cylinders, pyramids and cones?

**Conceptual:**

What are the minimum requirements to create a triangular structure?  
How are the surface area of pyramids, cones and spheres related?

**Debatable:**

How might an architect prioritize the shape of a building when designing it?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**

Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**

Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**

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

**D: Applying mathematics in real-life situations**

Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**

Self-management. Organization. Select and use technology effectively and productively

### RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 4&5: Oxford University Press Chapters 7.4 & 9.1
- Mathspace

### SUMMATIVE ASSESSMENT TASKS:

1. Criterion A : Knowledge & Understanding Test
2. Criterion CD: Applying mathematics in real-life contexts to make informed choices. Communicate ideas through a written report.

# Grade 9 Mathematics

## Units of Study

UNIT 1:	Equality models (Systems of Linear Equations)	Start: August	Duration: 6 weeks
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Form, relationships, equivalence, model</li><li>● <b>Subject Specific Skills:</b> Pythagoras, midpoints, perpendicular and parallel lines, graphing linear functions, standard form, systems of equations, arithmetic sequences, inequalities, linear programming</li><li>● <b>Learning Experiences:</b> Students will explore the concepts of form, equivalence and models by looking at equivalence transformations to solve systems of linear equations, creating mathematical models to solve real-life problems, and interpreting the solution in order to make appropriate decisions.</li></ul>		
UNIT 2:	Trusting Information (Statistics and Data)	Start: October	Duration: 7 weeks
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Relationships, quantity, representation</li><li>● <b>Subject Specific Skills:</b> Data collection, statistical graphing, measures of centre and spread, comparing data</li><li>● <b>Learning Experiences:</b> In this unit, the students will continue their understanding of representation and quantity; they will use statistical analysis to identify the trends in populations; and by applying these to real-life applications, they will see how this can impact decision-making with respect to the environment.</li></ul>		
UNIT 3:	Quantities and Conversion	Start: December	Duration: 4 weeks
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Relationships, quantity, representation</li><li>● <b>Subject Specific Skills:</b> Converting between different currencies; calculating commission charges; knowing different definitions for the absolute value of a number; understanding the properties of the absolute value of a number; converting between metric units, including metric units of area and volume</li><li>● <b>Learning Experiences:</b> In this unit students will explore the concepts of quantity and measurement by looking at the topics of currency conversions, absolute value and systems of measurement. There is also a link to the concept of system in the latter part of this unit. At the end of each topic, the students will apply their learning to real-life applications and explore the necessity for both quantity and measurements within human-made systems.</li></ul>		
UNIT 4:	Algebraic Manipulation	Start: February	Duration: 7 weeks
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Relationships, measurement, model</li><li>● <b>Subject Specific Skills:</b> Simplification of surds and operation with surds; index laws and rational indices; algebraic expansion and simplification of algebraic fractions; factoring; formula construction, substitution, rearrangement; solving quadratic equations by factoring; simplifying irrational numerical expressions</li><li>● <b>Learning Experiences:</b> In this unit, students will begin by consolidating their algebraic skills for manipulating formulae and using these skills to change more complex rational expressions. Moving on to rational equations, they will reflect on equivalent methods, and, by integrating technology, students begin to see how they can use these scientific principles to make precise models.</li></ul>		
UNIT 5:	Measurement and Trigonometry	Start: April	Duration: 5 weeks
	<ul style="list-style-type: none"><li>● <b>Concepts:</b> Relationships, measurement, model</li><li>● <b>Subject Specific Skills:</b> Converting units, perimeter, circumference, surface area and volume of 3D shapes; finding the length of an arc, the angle in a sector of a circle, the area and perimeter of a sector; trigonometry, solving problems that include an angle of elevation and depression; bearings</li><li>● <b>Learning Experiences:</b> In this unit students will begin by looking at measurements in right-angled triangles using trigonometry; they will discover special triangles. This naturally leads to looking at how to measure 3D spaces and how to find the surface area and volume of pyramids, cones and spheres.</li></ul>		

# Grade 9 Mathematics

## Unit 1: Equality Models

**Start:** August

**Duration:** 6 weeks

**LEARNING EXPERIENCES:** In this unit, the students will explore the concepts of form, equivalence and models by looking at equivalence transformations to solve systems of linear equations, creating mathematical models to solve real-life problems, and interpreting the solution in order to make applicable decisions.

**KEY CONCEPT:** Form

**Related Concepts / Subject Specific:** Equivalence, Model

**STATEMENT OF INQUIRY:**

Modelling with equivalent forms of representation can improve decision making.

**INQUIRY QUESTIONS:**

**Factual:**

What determines equivalence?

**Conceptual:**

Which skills enable you to model effectively?

**Debatable:**

To what extent does understanding identities and relationships help you make the best choices?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**

Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**

Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**

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

**D: Applying mathematics in real-life situations**

Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**

Thinking. Transfer Skills: Apply skills and knowledge in unfamiliar situation.  
Communication: Organize and depict information logically.

### RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press. Chapters 3.1, 11.1 & 14.3
- Mathspace

### SUMMATIVE ASSESSMENT TASKS:

1. Criterion B : Investigate a linear pattern, find and justify a general rule
2. Criterion A: Unit review test- coordinate geometry and linear functions



# Grade 9 Mathematics

## Unit 2: Statistics- Trusting Information

**Start:** October

**Duration:** 7 weeks

**LEARNING EXPERIENCES:** In this unit the students will continue their understanding of representation and quantity; they will use statistical analysis to identify the trends in populations; and by applying these to real-life applications, they will see how this can impact decision-making with respect to the environment.

**KEY CONCEPT: Relationships**    **Related Concepts / Subject Specific:** Quantity, Representation

**STATEMENT OF INQUIRY:** How quantities are represented can help to establish underlying relationships and trends in a population.

**INQUIRY QUESTIONS:**

**Factual:** What makes a good representation?

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**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**    Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

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**D: Applying mathematics in real-life situations**    Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**    Thinking. Critical Thinking Skills: Revise understanding based on new information and evidence.  
 Communication: Organize and depict information logically.  
 Research: Collect and analyse data to identify solutions and make informed decisions

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 4.1, 4.2, 4.3, 6.2 & 12.3
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion CD: Communicating ideas. Writing a statistical analysis report. Applying mathematics in real-life contexts
2. Criterion A: Knowledge and Understanding Test:

# Grade 9 Mathematics

## Unit 3: Quantities and Conversion

**Start:** December

**Duration:** 4 weeks

**LEARNING EXPERIENCES:** In this unit students will explore the concepts of quantity and measurement by looking at the topics of currency conversions, absolute value and systems of measurement. There is also a link to the concept of system in the latter part of this unit. At the end of each topic the students will apply their learning to real-life situations and explore the necessity for both quantity and measurements within human-made systems.

**KEY CONCEPT: Relationships**    **Related Concepts / Subject Specific:** Quantity, Representation

**STATEMENT OF INQUIRY:**    Quantities and measurements illustrate the relationships between human-made systems and communities.

**INQUIRY QUESTIONS:**

**Factual:**    What is the difference between a measurement and a quantity?

**Conceptual:**    Can all quantities be measured?

**Debatable:**    How do systems influence communities?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**    Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**    Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

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**D: Applying mathematics in real-life situations**    Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**    Thinking. Critical Thinking Skills :Draw reasonable conclusions and generalizations  
 Communication: Access information to be informed and inform others.  
 Communication: Use intercultural understanding to interpret communication.

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 5.1, 6.1, 7.1, 7.2
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A : Knowledge & Understanding Test

# Grade 9 Mathematics

## Unit 4: Algebraic Manipulation

**Start:** February

**Duration:** 7 weeks

**LEARNING EXPERIENCES:** In this unit, students will begin by consolidating their algebraic skills for manipulating formulae and using these skills to change more complex rational expressions. They will reflect on equivalent methods, and, by integrating technology, students begin to see how they can use these scientific principles to make precise models.

**KEY CONCEPT:** Form      **Related Concepts / Subject Specific:** Change, Equivalence

**STATEMENT OF INQUIRY:** Representing change and equivalence in a variety of forms has helped humans apply their understanding of scientific principles.

**INQUIRY QUESTIONS:**

**Factual:** Does change alter the form?

**Conceptual:** Can change and equivalence be equal?

**Debatable:** Does science solve problems or create them?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**      Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**      Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**      Use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations; use appropriate forms of mathematical representation to present information; move between different forms of mathematical representation; communicate complete, coherent and concise mathematical lines of reasoning; organize information using a logical structure.

**D: Applying mathematics in real-life situations**      Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:** Self-management. Organization. Use appropriate strategies for organizing complex information  
Thinking. Transfer. Apply skills and knowledge in unfamiliar situations

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 8.1, 8.2, 10.2, 11.3 & 12.1
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A: Knowledge & Understanding Test
2. Criterion BC: Investigating Patterns. Communicate ideas.

# Grade 9 Mathematics

## Unit 5: Measurement and Trigonometry

**Start:** April

**Duration:** 5 weeks

**LEARNING EXPERIENCES:** In this unit students will begin by looking at measurements in right-angled triangles using trigonometry; they will discover special triangles. This naturally leads to looking at how to measure 3D spaces and how to find the surface area and volume of pyramids, cones and spheres.

**KEY CONCEPT: Relationships**      **Related Concepts / Subject Specific:**  
Measurement, Model

**STATEMENT OF INQUIRY:**      Generalizing relationships between measurements can lead to better models and methods

**INQUIRY QUESTIONS:**

**Factual:**      What are the properties of different types of triangle?  
What are some properties of prisms, cylinders, pyramids and cones?

**Conceptual:**      What are the minimum requirements to create a triangular structure?  
How are the surface area of pyramids, cones and spheres related?

**Debatable:**      How might an architect prioritize the shape of a building when designing it?

**OBJECTIVES AND ASSESSMENT CRITERIA:**

**A: Knowing and understanding**      Select appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations, apply the selected mathematics successfully when solving these problems, generally solve these problems correctly in a variety of contexts.

**B: Investigating patterns**      Select and apply mathematical problem-solving techniques to discover complex patterns; describe patterns as general rules consistent with correct findings; prove, or verify and justify, these general rules.

**C: Communicating**      Use appropriate mathematical language (notation, symbols and terminology) in both oral and written explanations; use appropriate forms of mathematical representation to present information; move between different forms of mathematical representation; communicate complete, coherent and concise mathematical lines of reasoning; organize information using a logical structure.

**D: Applying mathematics in real-life situations**      Identify relevant elements of authentic real-life situations; select appropriate mathematical strategies when solving authentic real-life situations; apply the selected mathematical strategies successfully to reach a solution; justify the degree of accuracy of a solution, justify whether a solution makes sense in the context of the authentic real-life situation.

**ATLs:**      Self-management. Organization. Select and use technology effectively and productively

**RESOURCES / LITERATURE OPTIONS:**

- MYP Mathematics 4&5: Oxford University Press Chapters 7.4 & 9.1
- Mathspace

**SUMMATIVE ASSESSMENT TASKS:**

1. Criterion A : Knowledge & Understanding Test
2. Criterion CD: Applying mathematics in real-life contexts to make informed choices. Communicate ideas through a written report.