Grade 6 Mathematics

Units of Study

UNIT 1:	Number and Number Systems: Civilisations and Human Interactions	**Start:** September	**Duration:** 6 weeks

- **Concepts:** Form, Representation and Systems
- **Subject Specific Skills:** Researching, representing and comparing number systems and methods of calculation. Fluently using algorithms for operations with numbers. Representing a number as an exponent, a square root and a product of its prime factors in order to solve problems. Positioning and ordering positive and negative integers and rational numbers on a number line and understanding the absolute value. Using number terminology.
- **Learning Experiences:** In this unit students will discover a range of number systems that have arisen as civilisations evolve and humans interact. By learning about numbers, their properties, and how to perform operations with them, students will realize how important numbers have been throughout history.

UNIT 2:	What do the numbers say? (Data Management)	**Start:** October	**Duration:** 6 weeks

- **Concepts:** Relationships, representation, validity
- **Subject Specific Skills**: Creating statistical questions and collecting data. Displaying data in a variety of ways that could include box plots and histograms. Summarizing data through observations, measures of central tendency and spread. Describing patterns in data, including striking features and data distribution. Analysing and interpreting data. Using data and statistical terminology.
- **Learning Experiences:** In this unit, students will explore how to use data techniques to find out more about themselves and their immediate community.

UNIT 3:	Algebraic Expressions and Equations: Patterns in Nature	**Start:** November	**Duration:** 6 weeks

- **Concepts:** Logic, Generalization, Representation and Patterns
- **Subject Specific Skills:** Using correct terminology when analyzing algebraic patterns and sequences. Representing patterns in different forms - diagrams, sequences, tables, words. Creating and simplifying basic algebraic expressions. Generalizing a mathematical pattern using algebra and solving applications involving algebraic patterns. Solving single-step and two-step algebraic equations. Write and solve equations for real world problems.
- **Learning Experiences**: In this unit, students will use algebra to explore patterns in the natural world, which is one aspect of the global context Scientific and Technical Innovations. In order to better understand the patterns around us, students will need the tools of algebra, including writing expressions and solving equations.

UNIT 4:	Ratio and Proportional Relationships	**Start:** February	**Duration:** 6 weeks

- **Concepts:** Relationships, change, quantity
- **Subject Specific Skills:** Write ratios of quantities, unit rates, ratio and rate reasoning to solve problems. Apply ratio concepts to pricing and speed problems. Connect ratios, fractions and percentages and understand the relationship between them. Create visual models for fractions and equations to represent problems.
- **Learning Experiences:** In this unit, students will learn about the concept of ratios and how to use ratio and rate reasoning to solve real-world problems. Students will appreciate the connection between ratios, fractions and percentages.

UNIT 5:	Shape Up!	**Start:** March	**Duration:** 6 weeks

- **Concepts:** Form, models, space
- **Subject Specific Skills:** Concert units of measurement, find the area of triangles, quadrilaterals and other polygons. Find the volume of cuboids and simple prisms. Solve real world problems concerning area and volume. Represent 3D figures using nets and find the surface area of these figures.
- **Learning Experiences:** In this unit, students will primarily find the area and volume of geometric shapes. They will investigate how the understanding of the form of shapes helps them to understand the principles concerning space.

UNIT 6:	Graphs	**Start:** May	**Duration:** 4 weeks

- **Concepts:** Relationships, patterns, systems, models
- **Subject Specific Skills:** Extend number lines to coordinate axes. Plot coordinates in all four quadrants of the coordinate plane. Plot and find coordinates on horizontal and vertical lines. Solve real world and mathematical problems using the coordinate plane. Draw polygons in the coordinate plane and find missing vertices using mathematical principles.
- **Learning Experiences:** In this unit, students will learn how to solve real-world and mathematical problems by graphing on a coordinate plane. Students will review work on number lines and shapes in this unit.
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Grade 6 Mathematics

Unit 1: Number and Number Systems: Civilisations and Human Interactions

Start: September **Duration:** 6 Weeks

LEARNING EXPERIENCES: In this unit students will discover a range of number systems that have arisen as civilisations evolve and humans interact. By learning about numbers, their properties, and how to perform operations with them, students will realize how important numbers have been throughout history.

KEY CONCEPT: Form	**Related Concepts / Subject Specific:** Representation and Systems

STATEMENT OF INQUIRY:	Different number systems and forms of representation develop as civilizations evolve & humans interact.

INQUIRY QUESTIONS:	
Factual:	What is a number? What is a number system?
Conceptual:	How are the ways we represent quantities related? How do the ways we represent something affect its usefulness?
Debatable:	How much are we influenced by the events of the past?

OBJECTIVES AND ASSESSMENT CRITERIA:		
A:	**Knowing and understanding**	Select and apply appropriate arithmetic strategies to solve problems, including multiplying and dividing with decimals. Knows how to find factors and multiples and extends this to find lowest common multiples and greatest common factors. Can locate negative numbers and explain their meanings.
B:	**Investigating patterns**	Not assessed
C:	**Communicating**	Not assessed
D:	**Applying mathematics in real-life situations**	Not assessed

ATLs:	Self Management: organizational skills, Social: Collaboration skills

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. Knowledge and understanding performance assignment
   Criterion A: Knowing and Understanding

Grade 6 Mathematics

Unit 2: What do the numbers say?

Start: October **Duration:** 6 Weeks

LEARNING EXPERIENCES: In this unit, students will explore how to use data techniques to find out more about themselves and their immediate community.

KEY CONCEPT: **Relationships**	**Related Concepts / Subject Specific:** Representation and validity
STATEMENT OF INQUIRY:	Representing data helps to identify relationships so we can make valid conclusions about communities.

INQUIRY QUESTIONS:	
Factual:	How do we collect information? How do we represent information? How do we summarise data?
Conceptual:	How does the way in which information is represented impact our ability to interpret it? How do I reach valid conclusions?
Debatable:	To what extent do summaries allow us to understand the whole picture?

OBJECTIVES AND ASSESSMENT CRITERIA:	
A: Knowing and understanding	Not assessed
B: Investigating patterns	Not assessed
C: Communicating	Show and use statistical language, calculations, diagrams and graphs to communicate data about Grade 6 students.
D: Applying mathematics in real-life situations	Select and apply statistical strategies, such as finding averages and showing data on a variety of statistical graphs, to make conclusions about the Grade 6 student population. Discuss any limitations to the findings and how accurate the data might be.

ATLs:	Critical thinking skills Information Literacy skills Communication skills Collaboration skills.

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. The Average 6th Grader - a statistical project
   Criterion C: Communicating mathematics
   Criterion D: Applying mathematics in real-life situations.

Grade 6 Mathematics

Unit 3: Algebraic Expressions and Equations: Patterns in Nature

Start: November **Duration:** 6 Weeks

LEARNING EXPERIENCES: In this unit, students will use algebra to explore patterns in the natural world, which is one aspect of the global context Scientific and Technical Innovations. In order to better understand the patterns around us, students will need the tools of algebra, including writing expressions and solving equations.

KEY CONCEPT: Logic	**Related Concepts / Subject Specific:** Generalisation, Patterns, Representation

STATEMENT OF INQUIRY:	A logical process helps to model and generalise patterns in the natural world.

INQUIRY QUESTIONS:	
Factual:	What is a pattern? What are the different types of patterns?
Conceptual:	How do we model and investigate patterns? How is it possible to model a pattern and make predictions?
Debatable:	Is there a mathematical order to our natural world?

OBJECTIVES AND ASSESSMENT CRITERIA:	
A: Knowing and understanding	Select and apply algebraic techniques to write expressions and solve one and two step equations and inequalities.
B: Investigating patterns	Select and apply mathematical strategies to describe patterns and relationships using words and algebraic statements. Relationships will be described as general rules that need to be verified.
C: Communicating	Not assessed
D: Applying mathematics in real-life situations	Not assessed

ATLs:	Thinking: Practise observing carefully in order to recognize problems, Communication: Understand and use mathematical notation

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. Knowledge and Understanding performance assessment
   Criterion A: Knowing and understanding
2. Investigating patterns in nature
   Criterion B: Investigating patterns
   Criterion C: Communicating

Grade 6 Mathematics

Unit 4: Ratio and Proportional Relationships

Start: February **Duration:** 6 Weeks

LEARNING EXPERIENCES: In this unit, students will learn about the concept of ratios and how to use ratio and rate reasoning to solve real-world problems. Students will appreciate the connection between ratios, fractions and percentages.

KEY CONCEPT: Relationships	**Related Concepts / Subject Specific:** Change, quantity

STATEMENT OF INQUIRY:	Enterprising ideas require us to understand the changes and relationships in quantities

INQUIRY QUESTIONS:	
Factual:	What are the different ways of writing a ratio? What is the connection between ratios and fractions? What are the different strategies I can take to work with ratio?
Conceptual:	How are relationships between quantities expressed in different ways? How does changing the relationship affect the quantities in the ratio?
Debatable:	To what extent do entrepreneurs need mathematics? Is a good idea enough?

OBJECTIVES AND ASSESSMENT CRITERIA:		
A:	**Knowing and understanding**	Select and apply number techniques to solve problems involving fractions, including improper fractions and mixed numbers
B:	**Investigating patterns**	Not assessed
C:	**Communicating**	Use mathematical notation, vocabulary and strategies associated with fractions, ratio and proportion to solve a real world problem surrounding catering for an event.
D:	**Applying mathematics in real-life situations**	Identify relevant information to solve a real world problem. Select and apply mathematical strategies associated with fractions, ratio and proportion to solve a real world problem surrounding catering for an event. Discuss the limitations of the chosen strategies and the accuracy of the answer.

ATLs:	Communication Collaboration Organisation Critical thinking

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. Ratio Relations - Food stall
   Criterion C: Communicating mathematics
   Criterion D: Applying mathematics in real-life situations

Grade 6 Mathematics

Unit 5: Shape up!

Start: March **Duration:** 6 Weeks

LEARNING EXPERIENCES: In this unit, students will primarily find the area and volume of geometric shapes. They will investigate how the understanding of the form of shapes helps them to understand the principles concerning space.

KEY CONCEPT: Form	**Related Concepts / Subject Specific:** Models, space

STATEMENT OF INQUIRY:	The model of a form allows us to understand properties and principles concerning space.

INQUIRY QUESTIONS:	
Factual:	How do we calculate the volume of a prism? How do we calculate the area of polygons? How do we construct a 3D shape from a net?
Conceptual:	What unit of measurement is best? Do all triangles have an altitude? Are all 3D shapes made up of 2D shapes?
Debatable:	Can all shapes be measured?

OBJECTIVES AND ASSESSMENT CRITERIA:	
A: Knowing and understanding	Not assessed
B: Investigating patterns	Select and apply mathematical strategies to describe patterns and relationships using words and algebraic statements. Relationships will be described as general rules that need to be verified.
C: Communicating	Use appropriate mathematical language, notation and diagrams concerned with describing patterns and relationships. Use appropriate mathematical language, diagrams and calculations concerned with the area of shapes.
D: Applying mathematics in real-life situations	Not assessed

ATLs:	Critical thinking Communication

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. Knowledge and understanding performance test
   Criterion A: Knowing and Understanding
2. Investigating patterns concerned with 2D shapes
   Criterion B: Investigating Patterns
   Criterion C: Communicating

Grade 6 Mathematics

Unit 6: Graphs

Start: May **Duration:** 4 Weeks

LEARNING EXPERIENCES: In this unit, students will learn how to solve real-world and mathematical problems by graphing on a coordinate plane. Students will review work on number lines and shapes in this unit.

KEY CONCEPT: Relationships	**Related Concepts / Subject Specific:** Patterns, systems, models

STATEMENT OF INQUIRY:	Representing values using graphs enables creativity.

INQUIRY QUESTIONS:	
Factual:	What is a graph? What is a coordinate plane? How do we plot coordinates in the four quadrants of the coordinate plane?
Conceptual:	What is the purpose of graphs? How are graphs useful?
Debatable:	Can everything be represented on a graph?

OBJECTIVES AND ASSESSMENT CRITERIA:		
A:	**Knowing and understanding**	Select appropriate mathematics to solve problems involving plotting coordinates and drawing graphs on a Cartesian Plane.
B:	**Investigating patterns**	Not assessed
C:	**Communicating**	Not assessed
D:	**Applying mathematics in real-life situations**	Not assessed

ATLs:	Critical thinking Creative thinking Communication

RESOURCES / LITERATURE OPTIONS:

- MYP Mathematics 1: Oxford University Press
- International Mathematics for the Middle Years 1: Pearson.
- Mathematics 6 for the International Student MYP 1: Haese & Harris.

SUMMATIVE ASSESSMENT TASKS:

1. Knowledge and understanding performance assignment
   Criterion A: Knowledge and Understanding