Mathematics overview

Year 2 (Grade 7)

Unit title and teaching hours	**Key concept** & **Related concepts**	**Global context** & exploration	**Statement of inquiry**	**Objectives**	**ATL skills**	**Content**
Number Sets 7 weeks	**Form** Quantities System Representation	Scientific and technical innovation methods	Quantities in a number system can be represented in different forms using appropriate methods.	A all C i,ii,iii D i,ii,iii	Communication: Give and receive meaningful feedback, negotiate ideas and knowledge with peers and teachers, understand and use mathematical notation Social /Collaboration: Help others to create success for themselves during group work Social /Self-management: Practice focus and concentration while solving multiple problems Thinking/Critical-thinking: Gather and organize relevant information to formulate an argument	Natural numbers Properties of numbers and order of operations Percentages-Fractions-Decimals Transformation between different forms of numbers Powers Directed numbers Rational numbers Ratios-rates-Scale drawing Use of math language
Patterns and Algebra, Equations and Inequations 8 weeks	**Relationships** Pattern Balance	Personal and cultural expression Creation, beauty	Discovering relationships and establishing patterns help us appreciate the elegance and power of mathematics	A all B all C all	Communication: Organise and depict information logically Thinking/Critical thinking: Practise observing carefully in order to recognize patterns, draw reasonable conclusions and generalisations, test generalisations and conclusions Research skills: Use a variety of means to collect information	Finding pattern rules using observation skills, tables, diagrams Sequences Term to term and position to term rules Simplifying algebraic expressions Using algebra for area/perimeter Index notation Substitution Expanding/Factorising Algebraic fractions Equations/Formulae/Inequations

Mathematics overview

The Number Plane 5 weeks	**Relationships** Model Change	Globalization and sustainability markets	Modelling relationships can inform decision making in markets	A all B all C all D all	Communication: Read critically and for comprehension, Make inferences and draw conclusions, Use and interpret a range of math terms and symbols, Structure information in summaries, essays and reports Self management/ Organization: Bring necessary equipment and supplies to class, Select and use technology effectively and productively Self management/ Reflection: Identify strengths and weaknesses of personal learning strategies (self-assessment) Research/Information literacy: Understand and use technology systems Thinking/Critical thinking : Gather and organize relevant information to formulate an argument, Propose and evaluate a variety of solutions	Coordinates and the Number plane Introducing straight lines graphs Graphing straight lines Lines parallel to the axes Gradient - intercepts Point of intersection
Reasoning in Geometry 6 weeks	**Logic** Measurement Justification	Scientific and technical innovation principles and discoveries	Logic is a powerful tool for justifying what we discover through measurement and observation.	A all B all C all	Communication: Read a variety of sources for information and for pleasure, Understand and use mathematical notation, Take effective notes in class, Make effective summary notes for studying Self-management/Organisation: Use appropriate strategies for organizing complex information, Understand and use sensory learning preferences (learning styles) Self-management/Reflection: Understand the benefits and limitations of personal sensory learning preferences when accessing, processing and recalling information Thinking/Critical-thinking: Gather and organize relevant information to formulate an argument, Evaluate evidence and arguments, Test generalizations and conclusions, Propose and evaluate a variety of solutions	Angles – adjacent, at a point, vertically opposite, associated with parallel lines Angle sum of a triangle Angle sum of a quadrilateral Isosceles and equilateral triangles Area and volume(prisms) Circles

Mathematics overview

					Thinking/ Transfer: Make connections between subject groups and disciplines	
Statistics 4 weeks	**Relationships** Generalization Representation	Identities and Relationships lifestyle choices	Generalizations made from representations of data can inform personal decisions	A all C all D all	Communication: Give and receive meaningful feedback, Organize and depict information logically Research/Information literacy: Collect, record and verify data, Access information to be informed and inform others, Process data and report results Research/Media literacy: Demonstrate awareness of media interpretations of events and ideas (including digital social media), Understand the impact of media representations and modes of presentation Thinking/Critical-thinking: Recognize unstated assumptions and bias	Collecting data Sorting data Analyzing data (mean, median, mode) Misleading statistics Grouped data Scatter diagrams

Mathematics overview

Year 3 (Grade 8)

Unit title and teaching hours	Key concept & Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Basic Skills and Algebra (5 weeks)	**Relationships** Representation	IDENTITIES AND RELATIONSHIPS Identity formation	Decision-making can be improved by using a model to represent relationships	A all B ii C i,ii,iii	COMMUNICATION: Communication Skills Reading, writing and using language to gather and communicate information - Write for different purposes - Understand and use mathematical notation - Organize and depict information logically THINKING: Critical-thinking Skills - Practise observing carefully in order to recognize problems	Add simple algebraic fractions Understand the equivalence of simple algebraic fractions Cancel common factors before multiplying Simplify algebraic fractions by finding common factors Recognize and use reciprocals Review of indices The index laws Negative indices
Numbers Ratios and Percentages Consumer Arithmetic (4 weeks)	**Relationships** Equivalence	SCIENTIFIC AND TECHNICAL INNOVATION ingenuity and progress	Establishing patterns in the natural world can help in understanding relationships.	A all B i,ii C i,ii,iii D iv,v	COMMUNICATION: Communication Skills Reading, writing and using language to gather and communicate information - Write for different purposes - Understand and use mathematical notation - Organize and depict information logically THINKING: Critical-thinking Skills - Practise observing carefully in order to recognize problems - Gather and organize relevant information to formulate an argument	Solve problems involving percentage changes Recognize when fractions or percentages are needed to compare proportions Use proportional reasoning to solve a problem Use the laws of arithmetic and inverse operations Compare two ratios Interpret and use ratio in a range of contexts Understand and use proportionality and calculate the result of any proportional change using multiplicative methods Round numbers to a given number of significant figures Table interpretation/creation

Mathematics overview

						Budgeting Solve problems involving earning and spending money. Solve problems involving simple&compound interest, depreciation and successive discounts.
Equations, inequations and problem solving (10 weeks)	**Form** Model	GLOBALIZATION AND SUSTAINABILITY how local experiences mediate the global	Discovering mathematical relationships can lead to a better understanding of how environmental systems evolve	A all B i,ii,iii C i,ii,iii,iv D ii,iii,v	COMMUNICATION: Communication Skills Reading, writing and using language to gather and communicate information - Write for different purposes - Understand and use mathematical notation - Organize and depict information logically THINKING: Critical-thinking Skills - Practise observing carefully in order to recognize problems - Gather and organize relevant information to formulate an argument - Draw reasonable conclusions and generalizations - Test generalizations and conclusions	Use algebraic techniques to solve linear equations. Use algebraic techniques to solve simple inequations. Graph and interpret linear equations on the coordinate axes. Use algebraic techniques to find the intercepts of a linear graph. Solve simultaneous equations graphically. Determine the gradient of an interval between two points and parallel lines Determine the gradient and y-intercept of a line given its equation. Draw and interpret distance vs time graphs. Translate written problems into numeric and algebraic expressions Substitute values into formulae and solve the resulting equation. Solve written problems by translating them into algebraic expressions.
Geometry (3 weeks)	**Form** Space	PERSONAL AND CULTURAL EXPRESSION the ways in which	Understanding form and shape enhances	A all B i,ii,iii C i,ii,iii,v D ii,iii,v	COMMUNICATION: Communication Skills Reading, writing and using language to gather and communicate information - Write for different purposes	Identify and name angles that are formed by the intersection of lines and pairs of lines crossed by a transversal and make use of the relationships between them.

Mathematics overview

		we reflect on, extend and enjoy our creativity	creativity		- Understand and use mathematical notation - Organize and depict information logically <u>THINKING: Critical-thinking Skills</u> - Practise observing carefully in order to recognize problems - Gather and organize relevant information to formulate an argument - Draw reasonable conclusions and generalizations - Test generalizations and conclusions	Determine the properties of triangles and quadrilaterals Apply results related to the angle sum of interior and exterior angles of polygons. Apply construction to locus problems Apply formulae to calculate the area and perimeter of circles and composite shapes. Calculate the surface area of rectangular and triangular prisms. Apply surface area to the solution of practical problems.
Statistics And Probability (7 weeks)	**Form** Justification	PERSONAL AND CULTURAL EXPRESSION Social constructions of reality	Understanding form and shape enhances creativity	A all B i,ii,iii C i,ii,iii,v D ii,iii,v	<u>COMMUNICATION: Communication Skills</u> Reading, writing and using language to gather and communicate information - Write for different purposes - Understand and use mathematical notation - Organize and depict information logically <u>THINKING: Critical-thinking Skills</u> - Practise observing carefully in order to recognize problems - Gather and organize relevant information to formulate an argument - Draw reasonable conclusions and generalizations - Test generalizations and conclusions	Arrange data in tables and frequency histograms. Use and understand the concept of cumulative frequency. Analyse data using measures of central tendency. Group data to make it easier to arrange in a table. Describe the chances of an event occurring in general terms Use statistics to determine experimental probability. Determine the theoretical probability of an event.

Mathematics overview

Year 4 (Grade 9)

Unit title and teaching hours	Key concept & Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Algebraic expressions (4 weeks)	**Form** Equivalence Representation	Scientific and technical innovation principles and discoveries	Humans use their understanding of mathematical principles to discover equivalent forms of mathematical representations	A B C	Communication: Organize and depict information logically Self management/ Reflection: Demonstrate flexibility in the selection and use of learning strategies Transfer: Apply skills and knowledge in unfamiliar situations	Writing algebraic expressions (encoding-decoding) Simplifying algebraic expressions Algebraic fractions Binomial products Perfect square, Difference of squares
The real number system (4 weeks)	**Form** Representation Communication	Scientific and technical innovation Systems	Scientists develop systems in order to describe forms in the universe	A C D	Communication: understand and use mathematical notation Transfer: Apply skills and knowledge in unfamiliar situations	Indices (including fractional indices) Rational and irrational numbers Scientific notation The real number system Surds Rationalizing
Equations, Inequations and Formulae, Factorising (6 weeks)	**Relationships** Model Equivalence	Identities and relationships equations and variations	Real life problems can be expressed as and solved with equations.	A B C D	Communication: Make inferences and draw conclusions Self management/ Organization: Use appropriate strategies for organizing complex information Thinking/Critical-thinking: Draw reasonable conclusions and generalizations, Test generalizations and conclusions	Linear equations (including fractions) Solving problems using equations Inequations Formulae-Solving problems with formulae Factorising algebraic expressions Factorising trinomials Solving quadratics equations using ab=0

Mathematics overview

Coordinate geometry/ Simultaneous equations (5 weeks)	**Relationships** Representation Model Solution	Identities and relationships modelling versus reality	Modelling relationships help us describe complex problems in real life and find optimal solutions.	B C D	Communication: Make inferences and draw conclusions, Use and interpret a range of mathematical terms and symbols Self management/ Organization: Select and use technology effectively and productively Thinking/Critical-thinking: Propose and evaluate a variety of solutions, Use models and simulations to explore complex systems and issues	Distance between two points- review of Pythagoras' theorem Midpoint Review - Straight line graphs Parallel and perpendicular lines Simultaneous equations (graphical and algebraic methods) Graphing inequalities on the number plane Graphs of physical phenomena
Deductive Geometry Measurement Trigonometry (6 weeks)	**Logic** Measurement Space Quantity	Orientation in space and time Mensuration and standardization	Measurement allows us to quantify the world around us. Using logic, it is possible to measure things impossible to do by hand for practical reasons.	A B C D	Communication: Use and interpret a range of mathematical terms and symbols, Organize and depict information logically Social /Collaboration: Build consensus Self management/ Affective: Demonstrate persistence and perseverance Thinking/Critical-thinking: Gather and organize relevant information to formulate an argument Thinking/Creative-thinking: Use brainstorming and visual diagrams to generate new ideas and inquiries	Deductive reasoning in exercises using parallel lines, triangles, quadrilaterals Review of polygons Congruent triangles Arcs and sectors Surface area and volume of prisms, cylinders and composite solids Right-angled triangles The trigonometric ratios Finding unknown sides and angles Angles of elevation and depression Compass bearings
Statistics, Probability (5 weeks)	**Global interaction** Representation Quantity	Fairness and development Fairness in games of chance	Sets of data can be compared and analysed using statistics, but also can be manipulated	C D	Communication: Make inferences and draw conclusions, Use and interpret a range of mathematical terms and symbols Social /Collaboration: Make fair and equitable decisions Social /Reflection: Consider ethical, cultural and environmental implications	Review of Statistics – frequency and cumulative frequency tables and graphs, grouped data, measures of central tendency Stem-and-leaf displays Inter-quartile range Box-and-whisker plots Comparing sets of data Organising outcomes of compound events

Mathematics overview

	Model		to distort reality as well as counter opinions and propaganda.		Research/Information literacy: Collect and analyse data to identify solutions and make informed decisions Research/media literacy: Understand the impact of media representations and modes of presentation Thinking/Critical-thinking: Identify trends and forecast possibilities Thinking/Creative-thinking: Use brainstorming and visual diagrams to generate new ideas and inquiries	Dependent and independent events Probability using tree diagrams, tables and Venn diagrams

Mathematics overview

Year 5 (Grade 10)

Unit title and teaching hours	Key concept & Related concepts	Global context	Statement of inquiry	Objectives	ATL skills	Content
Algebra: Graph and Transformations 45 hours	**Form** Change and Representation	**Scientific and Technical innovation** Systems, models, methods; products, processes and solutions	Changing the form of a problem often reveals relations and identities which lead to the solution!	A all B all C all D all	Thinking/Critical-thinking/ Creative-thinking: Practice observing carefully in order to recognize problems , Propose and evaluate a variety of solutions, Consider multiple alternatives, including those that might be unlikely or impossible , Make unexpected or unusual connections between objects and/or ideas	Quadratic equations and Quadratic functions Simultaneous equations Equation of a parabola Use coordinate geometry to solve problems Rational functions and the circle Systems of equations involving all the above. Lines, Parabolas, Hyperbolae, and the circle
Algebra2: Functions : (Notation, Inverse, domain, Range) Logarithms Matrices 30 hours	**Relationships** Representation Equivalence	**Globalization and Sustainability** The interconnectedness of human-made systems	Organizing relationships under a system of global interconnected representations (in a variety of equivalent ways) is essential to function in society.	A all B all C all D all	COMMUNICATION/Communication Skills - Understand and use mathematical notation SELF-MANAGEMENT/Organization Skills: Select and use technology effectively and productively RESEARCH/Information literacy skills: Collect and analyze data to identify solutions and make informed decisions, Process data and report results THINKING/Transfer skills: Make connections between subject groups and disciplines	Function The inverse of a function Translate graphs of functions vertically and horizontally Logarithms and draw exponential and log graphs The laws of logarithms Solve exponential and logarithmic equations Matrices Find the determinant and the Inverse of a 2 x 2 matrix Solving matrix equations and Solving simultaneous equations using matrices
Geometry: 3-D Shapes, Similarity Further	**Form** Space And Measurement	**Scientific and Technical innovation** Orientation in	Measuring and relating the features of the form of the	A all B all C all D all	SELF-MANAGEMENT/Organization Skills: Bring necessary equipment and supplies to class ,Plan strategies and take action to achieve personal and academic goals,	Surface area and Volumes of pyramids, cones and spheres Similar figures, Compare their Areas and Volumes

Mathematics overview

Trigonometry Circle Geometry		time and space the natural world and its laws; the interaction between people and the natural world Adaptation, ingenuity and progress	shapes around us are essential for our exploration of the world.		Set goals that are challenging and realistic, Keep an organized and logical system of information files/notebooks	Extend trigonometry to triangles with obtuse angles and understand the relationships between acute and obtuse angles Apply the sine rule (including Ambiguous case) and the cosine rule and the area of a non-right angled triangle using trigonometry. The parts and language of circles. Understand and prove the chord properties, the angle properties and the tangent properties of circles as well as the properties between intersecting chords secants and tangents.
Statistics (review) and Probability	**Form** Change Justification	**Globalization and Sustainability** Population and demography	Perceiving diverse forms of data from a global point of view influences our justification of making inferences about the population of different sample spaces.	A all B all C all D all	<u>COMMUNICATION/Communication Skills:</u> Give and receive meaningful feedback, Use appropriate forms of writing for different purposes and audience, Make inferences and draw conclusions <u>SELF-MANAGEMENT/Organization Skills:</u> Select and use technology effectively and productively <u>RESEARCH/Information literacy skills:</u> Collect and analyze data to identify solutions and make informed decisions, Process data and report results	Representation and analysis of sets of data Use of standard deviation and mean to compare sets of data Understanding of the normal distribution Usage of correlation and lines of best fit to compare sets of data Calculation of the probability of mutually exclusive events Usage of counting techniques to calculate the probability of repeated events Calculation of conditional probability