MYP 4 Course overview 2019/2020 MATHEMATICS

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| **Unit title** | **Key concept**  | **Related concepts** | **Global context** | **Statement inquiry** | **Objectives** | **ATL skills** | **Content** |
| Unit 1**Numbers and Algebra**Ch: 1,2,3September, October, November12 weeks | Relationships | SimplificationEquivalenceModelGeneralization | Scientific and technical innovation: the natural world and its law | Relationships in natural world can be simplified by algebraic models. | A i, ii, iiiB i, ii C i, ii, iii, iv | * Communication skills (understand, use and interpret mathematical notation in algebra/algebraic expressions; make inferences and draw conclusions solving problems written literally)
* Social- collaboration (manage and resolve conflict and work collaboratively in teams; listen actively to others; negotiate ideas with peers and teacher concerning equivalence)
* Self-management - reflection skills (consider content, develop new skills, techniques and strategies for effective learning)
* Thinking - critical thinking skills (recognize and evaluate propositions for number patterns, draw reasonable conclusions and generalizations and test them: evaluate evidence and arguments concerning equivalence)
* Thinking - transfer (apply skills in unfamiliar situations)
 | **Topics:** **-** Forms of numbers- Number lines- Operations with algebraic expressions- Integer exponents- Linear equations and inequalitiesKnowing and understanding:- Expanding, simplifying and factoring algebraic expressions- Using substitution for evaluation and simplification of an expression/equation- Solving equations, inequalities algebraically and graphically- Using the laws of exponentsInvestigating patterns:- Discovering last digit of numbers written as product- Determining the general rule that represents numerical patternsCommunicating:- Using different forms of numbers: integers, fractions, decimals, exponents, standard form, scientific notation- Translating sentences into algebraic expressions and vice versa- Solving problems written literally |
| Unit 2**Coordinate Geometry and Simultaneous Equations**Ch: 6,17 (A&B)December,January.February8 weeks | Relationships | JustificationRepresentationModel | Scientific and technical innovation-the impact of scientific and technological advances on communities and environments  | Patterns between variables and relationships can be represented visually | A i, ii, iiiC i, ii, iiiD i, ii, iii, iv | * Communication skills (Take effective notes in class; make inferences and draw conclusions relating equations of lines)
* Social-collaboration (work collaboratively in teams during group work)
* Self-management- organisation skills (bring necessary equipment and supplies: rulers)
* Thinking-critical thinking skills (use models and simulations to explore complex systems and issues: equations of lines, applying in real-life contexts)
 | **Topics:** **-** The Cartesian plane- The distance formula- The midpoint formula- Equations of lines- Simultaneous equationsKnowing and understanding:- Solving systems of equations algebraically and graphically- Expanding, simplifying and factoring algebraic expressions- Using the laws of exponentsCommunicating:- Using coordinate system to present and inspect informationApplying mathematics in real-life contexts:- Using equations of lines in real-life situations |
| Unit 3**Trigonometry and Transformation Geometry**Ch: 12,15February, March5 weeks | Form | MeasurementPatternSpace | Orientation in space and time- the relationships between, and the interconnectedness of, individuals and civilizations, from personal, local and global perspectives  | Form in everyday life can be explored using geometry and trigonometry | A i, ii, iiiC i, ii, iiiD i, ii, iii, iv | * Communication skills (use and interpret a range of discipline-specific terms and symbols; trigonometric ratios, transformations)
* Social-collaboration (exercise leadership and take on a variety of roles within groups)
* Self-management-organisation skills (bring necessary equipment and supplies to class; calculators)
* Reflection (identify strengths and weaknesses of personal learning strategies)
* Research-Information literacy (use memory techniques to develop long term memory; trigonometric ratios)
* Thinking-critical thinking skills (Identify obstacles and challenges)
* Thinking-research (make connections between subject groups and disciplines)
 | **Topics:** **-** Trigonometric ratios in right-angled triangles- Simple isometric transformationsKnowing and understanding:- Using sine, cosine and tangent to relate angles and sides of right-angled triangles - Transforming figures by rotation, reflection, translation and enlargingCommunicating:- Using and interpreting trigonometric rations- Making connections between different forms of a same objectApplying mathematics in real-life contexts:- Solving real-life situations using trigonometry- Designing geometrical patterns |
| Unit 4**Further Algebra and Quadratic Equation**Ch: 13,16,21March,April,May8 weeks | Logic | GeneralizationJustificationSimplification | Identities and relationships- identity; beliefs and values |  Discovering mathematical identities and relationship leads to effective action  | A i, ii, iiiB i, ii, iiiD i, ii, iii, v | * Communication skills (organize and depict information logically; give and receive meaningful feedback)
* Self-management-organisation skills (keep an organized and logical system of information files/notebooks)
* Self-management-reflection (develop new skills, techniques and strategies for effective learning)
* Affective skills (practice analysing and attributing causes for failure)
* Thinking-critical thinking skills (test generalizations and conclusions, propose and evaluate a variety of solutions; select appropriate solutions)
 | **Topics:** **-** Factorization of algebraic expressions- Algebraic fractions- Quadratic equationsKnowing and understanding:- Solving quadratic equations by formula- Performing operations with algebraic fractions- Factoring algebraic expressionsInvestigating patterns:- Discovering relations between coefficients of quadratic equations and their solutionsApplying mathematics in real-life contexts:- Applying quadratic equations in geometry, physics and other real-life contexts |
| Unit 5**Statistics** Ch: 9May,June4 weeks | Relationships | PatternQuantityModel | Scientific and technical innovation- the impact of environments on human activity; how humans adapt environments to their needs  | Statistics are a powerful model to develop global perspective | A i, ii, iiiB i, ii, iiiC i, ii, iii, vD i, ii, iii, v | * Communication skills (use and interpret a range of discipline-specific terms and symbols)
* Self-management-organisation skills (use appropriate strategies for organizing complex information; Select and use technology effectively and productively)
* Research-Information literacy (collect and analyse data to identify solutions and/or make informed decisions)
* Thinking-critical thinking skills (revise understanding based on new information and evidence)
 | **Topics:** Knowing and understanding:- Collecting data, constructing and interpreting graphs, drawing the line of best fit- Calculating the mean, median and mode; choosing the best measure of central tendencyInvestigating patterns:- Discovering Investigating how transformation of data influences measures of central tendencyCommunicating:- Presenting data using pie charts, histograms, line graphs, scatter plots, box-and whisker-plots- Discussing and interpreting data using mean, mode, median, quartile, percentile Applying mathematics in real-life contexts:- Analysing real-life situations statistically- Using a line of best fit to discover relationships between phenomena |

MYP 5 Course overview 2019/2020 MATHEMATICS

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| **Unit title** | **Key concept**  | **Related concepts** | **Global context** | **Statement inquiry** | **Objectives** | **ATL skills** | **Content** |
| Unit 1**Probability**September, October6 weeks | Relationships | RepresentationQuantity | Fairness and Development | Discovering mathematical relationships can help us to make a fair decision by representing different opportunities and consequences by a probability. | A: i, ii, iiiB: i, ii, iiiC: i, ii, iii, iv, vD: iii, v | * Thinking -critical thinking skills (Consider ideas from multiple perspectives; Draw reasonable conclusions and generalizations)
* Thinking -creative thinking skills (-Make guesses, ask “what if” questions and generate testable hypotheses; Use brainstorming and visual diagrams to generate new ideas; Consider multiple alternatives, including those that might be unlikely or impossible)
* Communication skills (Organize and depict information logically; Read critically and for comprehension)
* Self-management -organization skills (Use appropriate strategies for organizing complex information)
 | **Topics:** -Experimental and theoretical probability-Sample space-Tree diagrams and Venn diagrams-Probabilities of independent, mutually exclusive and combined events-Probability of successive trialsKnowing and understanding:-Describing experimental and theoretical probability-Finding probabilities of independent, mutually exclusive and combined events Investigating patterns:Discovering patterns in dice problemsCommunicating:Representing data to calculate probabilities using tree diagrams and Venn diagramsApplying mathematics in real-life contexts:Applying probability to make a fair decision |
| Unit 2 **Number plane graphs**October, November, December9 weeks | Form | ModelRepresentation | Globalization and sustainability  | Using a model to represent a form can give us a strategy in urban planning | A: i, ii, iiiB: i, ii, iiiC: i, ii, iii, iv, vD: i, ii, iii, iv, v | * Thinking -critical thinking skills (Evaluate evidence and arguments; Propose and evaluate a variety of solutions)
* Communication skills (Find information for disciplinary inquiries, using a variety of media, Structure information in summaries, essays and reports)
* Self-management -organization skills (Select and use technology effectively and productively)
* Research (Seek a range of perspectives from multiple and varied sources)
 | **Topics:** - Quadratic, cubic and rational functions, -Maximum/minimum of functions-Non-linear inequalitiesKnowing and understanding:-Graphing quadratic function by transformations, by vertex and intercepts-Using different forms of quadratic function (standard, vertex and intercepts form) -Finding equations of functions given graphically-Determining and interpreting maximum or minimum of the quadratic function-Graphing cubic and rational function by transformations-Solving non-linear inequalities Investigating patterns:Investigating relationships between form of the formulas and their graphs (general form, x-intercepts form, vertex form)Communicating:-Representing functions using tables, graphs and formulas and move between different forms of representations-Completely and coherently explaining and justifying whether an arch is a parabola or notApplying mathematics in real-life contexts:- Applying quadratic function in modelling real-life objects and real-life phenomena- Justifying interpreting maximum/minimum |
| Unit 3**Statistics**January,February5 weeks | Logic | Justification Representation  | Identities and relationships: The nature of the self and relationship to others  | Logic can help us justify our choices  | A: i, ii, iiiC: i, ii, iii, iv, vD: i, ii, iii, iv, v | * Thinking-critical thinking skills (Gather and organize relevant information to formulate an argument; Interpret data; Revise understanding based on new information and evidence)
* Research-Information skills (Collect and analyse data to identify solutions and make informed decisions; Understand and use technology systems)
 | **Topics:** Data analysis using measures of central tendency and dispersionKnowing and understanding:Finding mean, median and mode, range and IQR for discrete and continuous data Investigating patterns:Investigating how transformation of data influences measures of dispersionCommunicating:- Organizing statistical data using a logical structure and presenting it differently-Using standard deviation in data analysisApplying mathematics in real-life contexts:Analysing real life situations statistically in order to make a decision  |
| Unit 4 **Geometry and/or Trigonometry** MarchApril8 weeks | Systems | ChangeModels | Scientific and technical innovation  | Understanding systems help us to change characteristic patterns or to improve existing models thus achieving scientific and technical innovations | A: i, ii, iiiC: i, ii, iv, vD: i, ii, iii, iv, v | * Thinking- transfer skills (Transfer current knowledge to learning of new technologies
* Thinking-critical thinking skill (Use models and simulations to explore complex systems and issues;
* Research skills (Understand and use technology systems.)
* Self-management -Organization skills (Bring necessary equipment and supplies to class; Select and use technology effectively and productively)
 | **Topics:** -Surface area and volume of a 3D object- Sine and cosine theoremsKnowing and understanding:-Determining surface area and volume of a 3D object-Using unit circle to define sine and cosine of a real number and calculating their values-Drawing sine and cosine function graphsCommunicating:- Representing a solid by its net and reversely- Interpreting real-life data using trigonometry- Using degrees and radians to express sizes of angles respecting their advantages - Using mathematical language to Interpret physics phenomena - Present sine and cosine functions graphically- Interpret amplitude and period of sine/cosine functionApplying mathematics in real-life contexts:- Creating a new object using 3D geometry- Applying sinusoidal functions in physics - sound waves- Solving authentic real-life situations using trigonometry |
| Unit 5**INTERDISCIPLINARY UNIT** **Growth of the cells**MayJune7 weeks | Relationships | SystemChange | Scientific and technical innovation:the natural world and its laws | Discovering relationships can lead to understanding how systems are changing | A: i, ii, iiiB: i, ii, iiiC: i, ii, iv, vD: i, ii, iii, iv, v | * Self-management -Organization skills (Use appropriate strategies for organizing complex information; Practice dealing with change)
* Thinking-Transfer skills (Apply skills and knowledge in unfamiliar situations; Compare conceptual understanding across multiple subject groups and disciplines; Make connections between subject groups and disciplines)
* Communication skills (Make inferences and draw conclusions; Use and interpret a range of discipline-specific terms and symbols)
 | **Topics:** Exponential and logarithmic functions, their graphs and propertiesKnowing and understanding:-Evaluating the logarithm of a number and simplifying numerical expressions-Solving exponential and logarithmic equations and inequalities-Applying laws of logarithms Investigating patterns:Discovering laws of logarithmsCommunicating:- Present exponential and logarithmic functions graphically- Using asymptotes to advocate a nature of a functionApplying mathematics in real-life contexts:Applying exponential and logarithmic functions in-real life problems |

**DIFFERENTIATION**

**For students with**

**dyslexia and dysgraphia**

* Bigger font in Sarif, bigger space between rows
* Dividing text in tests, practise sheets and instruction papers in smaller sections
* More time for reading, checking if the text/questions are understood
* Tolerating writing mistakes
* Questions and enough space for answers should be on the same page
* Allowing longer time for finishing a task if needed
* Working in a pair or a team with pears

 **ADHD**

* Bigger font and space between rows
* Shorter paragraphs
* Check which type of graphs/diagrams are suitable for the student
* Fewer questions in tests
* Frequent checking if a student is concentrated on the work
* Instead of complex questions with a, b, c..., create separate questions
* Questions and enough space for answers should be on the same page
* Work in pairs or small teams (up to four)
* Creating summary sheets if needed
* Encourage students to participate in class discussions
* Commend student on progress
* Regularly make notes about progress in e-dnevnik
* Allowing the student to leave the classroom for a short time during the lesson if needed

**Hearing disability**

* Face the student during a lesson as often as possible
* Check understanding of the content
* Check the notes in student's notebook
* Providing summaries for a unit or parts of it if needed
* Pay attention that the student is not disturbed by a variety of sounds (other students, films, outside noise...)
* Work in pairs and small groups

**Hodgkins disesase**

* Prolonging deadlines if needed
* Providing summaries if needed