MYP 4 Course overview 2019/2020 MATHEMATICS

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit title** | | **Key concept** | **Related concepts** | **Global context** | **Statement inquiry** | **Objectives** | **ATL skills** | **Content** |
| Unit 1  **Numbers and Algebra**  Ch: 1,2,3  September, October, November  12 weeks | Relationships | | Simplification  Equivalence  Model  Generalization | Scientific and technical innovation: the natural world and its law | Relationships in natural world can be simplified by algebraic models. | A i, ii, iii  B 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 inequalities  Knowing 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 exponents  Investigating patterns:  - Discovering last digit of numbers written as product  - Determining the general rule that represents numerical patterns  Communicating:  - 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.  February  8 weeks | Relationships | | Justification  Representation  Model | 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, iii  C i, ii, iii  D 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 equations  Knowing and understanding:  - Solving systems of equations algebraically and graphically  - Expanding, simplifying and factoring algebraic expressions  - Using the laws of exponents  Communicating:  - Using coordinate system to present and inspect information  Applying mathematics in real-life contexts:  - Using equations of lines in real-life situations |
| Unit 3  **Trigonometry and Transformation Geometry**  Ch: 12,15  February, March  5 weeks | Form | | Measurement  Pattern  Space | 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, iii  C i, ii, iii  D 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 transformations  Knowing and understanding:  - Using sine, cosine and tangent to relate angles and sides of right-angled triangles  - Transforming figures by rotation, reflection, translation and enlarging  Communicating:  - Using and interpreting trigonometric rations  - Making connections between different forms of a same object  Applying mathematics in real-life contexts:  - Solving real-life situations using trigonometry  - Designing geometrical patterns |
| Unit 4  **Further Algebra and Quadratic Equation**  Ch: 13,16,21  March,  April,  May  8 weeks | Logic | | Generalization  Justification  Simplification | Identities and relationships- identity; beliefs and values | Discovering mathematical identities and relationship leads to effective action | A i, ii, iii  B i, ii, iii  D 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 equations    Knowing and understanding:  - Solving quadratic equations by formula  - Performing operations with algebraic fractions  - Factoring algebraic expressions  Investigating patterns:  - Discovering relations between coefficients of quadratic equations and their solutions  Applying mathematics in real-life contexts:  - Applying quadratic equations in geometry, physics and other real-life contexts |
| Unit 5  **Statistics**  Ch: 9  May,  June  4 weeks | Relationships | | Pattern  Quantity  Model | 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, iii  B i, ii, iii  C i, ii, iii, v  D 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 tendency  Investigating patterns:  - Discovering Investigating how transformation of data influences measures of central tendency  Communicating:  - 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

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Unit title** | **Key concept** | **Related concepts** | **Global context** | **Statement inquiry** | **Objectives** | **ATL skills** | **Content** |
| Unit 1  **Probability**  September, October  6 weeks | Relationships | Representation  Quantity | 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, iii  B: i, ii, iii  C: i, ii, iii, iv, v  D: 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 trials  Knowing and understanding:  -Describing experimental and theoretical probability  -Finding probabilities of independent, mutually exclusive and combined events  Investigating patterns:  Discovering patterns in dice problems  Communicating:  Representing data to calculate probabilities using tree diagrams and Venn diagrams  Applying mathematics in real-life contexts:  Applying probability to make a fair decision |
| Unit 2  **Number plane graphs**  October, November, December  9 weeks | Form | Model  Representation | Globalization and sustainability | Using a model to represent a form can give us a strategy in urban planning | A: i, ii, iii  B: i, ii, iii  C: i, ii, iii, iv, v  D: 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 inequalities  Knowing 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 not  Applying 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,  February  5 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, iii  C: i, ii, iii, iv, v  D: 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 dispersion  Knowing 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 dispersion  Communicating:  - Organizing statistical data using a logical structure and presenting it differently  -Using standard deviation in data analysis  Applying mathematics in real-life contexts:  Analysing real life situations statistically in order to make a decision |
| Unit 4  **Geometry and/or Trigonometry**  March  April  8 weeks | Systems | Change  Models | 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, iii  C: i, ii, iv, v  D: 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 theorems  Knowing 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 graphs  Communicating:  - 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 function  Applying 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**  May  June  7 weeks | Relationships | System  Change | Scientific and technical innovation:  the natural world and its laws | Discovering relationships can lead to understanding how systems are changing | A: i, ii, iii  B: i, ii, iii  C: i, ii, iv, v  D: 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 properties  Knowing 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 logarithms  Communicating:  - Present exponential and logarithmic functions graphically  - Using asymptotes to advocate a nature of a function  Applying 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