Matija Gubec International School Zagreb

Subject Overviews

MYP 0

Mathematics

MYP0: Mathematics

Unit 1: Natural numbers

Through the activities students will do their own research on history of Natural numbers. Students will use different forms of mathematical representation of large numbers. Students will develop graphing skills. Students will develop deductive and inductive reasoning: applying general rules to particular situations and developing general rules from particular data inductive reasoning.

Students will be communicating a mathematical way of thinking in solving problems using BODMAS.

KEY CONCEPT: Relationships

RELATED CONCEPTS: System, Quantity, Pattern

GLOBAL CONTEXT: Orientation in space and time

STATEMENT OF INQUIRY: The position of a numbers determines their place values.

Main Content Addressed:

- Set of Natural numbers
- Identification of large numbers
- Comparing Natural numbers and Number line
- Rounding Natural numbers to the nearest ten, hundred, thousand
- Adding and basic properties of adding numbers
- Subtracting Natural numbers
- Multiplying Natural numbers and basic properties of multiplying numbers
- Distributivity of multiplication to addition
- Divisibility of Natural numbers
- Priority of operations

Unit 2: Divisibility of natural numbers

Through the activities of finding rules for divisibility, students will built up much of the mathematical foundation.

KEY CONCEPT: Forms

RELATED CONCEPTS: System, Change, Equivalence

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Understanding that number systems are a representation of interactions - Why do numbers exist?

Main Content Addressed:

- Divisibility by 10,5,2,3 i 9
- Prime and composite numbers
- Prime factorization
- Divisors. Highest common divisor
- Multiples. Lowest common multiple

Unit 3: Set of points in a plane

Through the activities of finding differences between lines, line segments and planes students will get better understanding of basic geometry.

KEY CONCEPT: Logic

RELATED CONCEPTS: Measurement, Justification

GLOBAL CONTEXT: Orientation in space and time

STATEMENT OF INQUIRY: Logic is a powerful tool for justifying what we discover through measurement and observation.

Main Content Addressed:

- Plane, line, semi-segment, segment
- Parallel and perpendicular lines
- Measuring unit for length
- Bisector of a segment
- Circle and circumference
- Types of angles
- Complementary and supplementary angles
- Symmetries

Unit 4: Geometric shapes, perimeter and area

Through the activities of finding links between geometry and art, students will learn about formulas for perimeter and area for special types of triangles and quadrilaterals.

KEY CONCEPT: Form

RELATED CONCEPTS: Pattern, Space, Personal and cultural expression

GLOBAL CONTEXT: Personal and cultural expression

STATEMENT OF INQUIRY: Understanding form and shape enhances creativity.

Main Content Addressed:

- Types of Triangles and formula and the description of the perimeter of a triangle
- Quadrilaterals and formula for the perimeter of a quadrilaterals
- Description of the surface area and measuring units
- Surface area of a rectangle and square

Unit 5: Fractions and decimals

Through the activities of graphing, converting and applying basic rules, students will learn why people created fractions and decimals.

KEY CONCEPT: Change

RELATED CONCEPTS: Equivalence, Representation, Change

GLOBAL CONTEXT: Identities and relationships

STATEMENT OF INQUIRY: Every fraction has an equivalent decimal.

Main Content Addressed:

- Graphical representation of fractions
- Proper and improper fractions
- Mixed numbers
- Expanding and reducing fractions
- Fractions as a part of a group
- Comparing fractions with like denominators
- Adding and subtracting fractions with like denominators
- Decimal fractions
- Converting decimal into fractions and vice versa
- Decimals on the number line
- Comparing decimal numbers
- Rounding decimal numbers
- Adding and subtracting decimal numbers
- Multiplying decimals by the power of ten
- Multiplying decimal numbers
- Dividing decimal numbers

Matija Gubec International School Zagreb

Subject Overviews

MYP 1

Mathematics

MYP1: Mathematics

Unit 1: Fractions

Through the activities students will do their own research on history of fractions. Students will use different forms of mathematical representation of fraction. Students will develop graphing skills. Students will develop deductive and inductive reasoning: applying general rules to particular situations and developing general rules from particular data inductive reasoning.

Students will be communicating a mathematical way of thinking in solving problems using BODMAS.

KEY CONCEPT: Forms

RELATED CONCEPTS: System, Change, Equivalence

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Number systems are a representation of interactions - Why do numbers exist?

Main Content Addressed:

- Mixed numbers and improper fractions
- Comparing and ordering fractions
- Adding, subtracting, multiplying and dividing fractions
- Order of operations; Fractions in equations

Unit 2: Triangle

Through the activities of finding links between geometry and art, students will learn about different types of angles and special types of triangles.

KEY CONCEPT: Forms

RELATED CONCEPTS: Pattern, Equivalence

GLOBAL CONTEXT: Personal and cultural expressions

STATEMENT OF INQUIRY: Understanding form and shape enhances creativity.

Main Content Addressed:

- Vertices, sides and angles of a triangle
- Special types of triangles
- The interior and exterior angles of a triangle
- Constructing a line (axis) of symmetry
- Constructing of some angles
- Three basic constructions of triangles
- Triangle congruence
- Area of a triangle

Unit 3: Integers

Through the activities of measuring time through history students will research the development of concept of a negative number.

KEY CONCEPT: Forms

RELATED CONCEPTS: System, Change, Quantity

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Recognizing and classifying numbers give a deeper understanding of different number systems.

Main Content Addressed:

- Positive and negative numbers
- Graphing on a number line
- Opposite numbers
- Absolute value of an integer
- Comparing integers
- Adding, subtracting, multiplying and dividing integers
- Extracting the common factor
- Using brackets in algebra
- Solving equations

Unit 4: Rational Numbers

Through the activities of graphing, converting and applying basic rules with rational numbers, students will learn why people created fractions and decimals.

KEY CONCEPT: Forms

RELATED CONCEPTS: Representation, Equivalence

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Form of rational numbers represents quantities in real-world context.

Main Content Addressed:

- Positive and negative rational numbers
- Graphing on a number line
- Opposite numbers
- Absolute value of a rational number
- Comparing rational numbers
- Adding, subtracting, multiplying and dividing rational numbers

Unit 5: Linear Equations with One Unknown

Through the activities of solving word problems, students will research why people created linear equations.

KEY CONCEPT: Relationships

RELATED CONCEPTS: Model, Representation, Simplification

GLOBAL CONTEXT: Scientific and technical innovation

STATEMENT OF INQUIRY: Modelling using a logical process helps us to understand the world.

Main Content Addressed:

- Solving linear equations with one unknown
- Solving linear inequalities with one unknown
- Problem solving

Unit 6: Quadrilateral

Through the activities of constructing tangram, puzzles students will research about different types of quadrilaterals.

KEY CONCEPT: Logic

RELATED CONCEPTS: Measurement, Justification

GLOBAL CONTEXT: Orientation in space and time

STATEMENT OF INQUIRY: Logic is a powerful tool for justifying what we discover through measurement and observation.

Main Content Addressed:

- Vertices, sides, angles and diagonals of a quadrilateral
- Special types of quadrilaterals
- The interior angles in a quadrilateral
- Parallelogram
- Area of a parallelogram
- Trapezium
- Area of a trapezium

Matija Gubec International School Zagreb

Subject Overviews

MYP 2

Mathematics

MYP2: Mathematics

Unit 1: CO-ORDINATE SYSTEM

Through the activities of communicating with geographic coordinate system, students will understand Cartesian coordinate system. They will be able to develop graphing skills.

KEY CONCEPT: Forms of Mathematical Representation

RELATED CONCEPTS: Space, Model

GLOBAL CONTEXT: Orientation in space and time

STATEMENT OF INQUIRY: Forms of mathematical representation expand the understanding of orientation in space and time (*geographic coordinate system).*

Main Content Addressed:

- Co-ordinate system on a line
- Ordered pair
- Rectangular co-ordinate system in a plane

Unit 2: PROPORTION AND INVERSE PROPORTION

Through the activities of making cocktails using ratios and performing word problem calculations students will learn how to communicate with ratios, proportion and inverted proportion, budget planning

KEY CONCEPT: Relationships

RELATED CONCEPTS: Quantity, Simplification

GLOBAL CONTEXT: Fairness and development

STATEMENT OF INQUIRY: Interaction is vital for system function.

Main Content Addressed:

- Ratio
- Proportion
- Proportional quantities and its graph
- Solving proportion problems
- Inverse proportion
- Solving inverse proportion problems
- Graph of inverse proportion
- Percentages, converting percentages to fraction and decimal numbers and vice versa
- Solving problems involving percentages
- Simple interest and solving interest problems

Unit 3: POLYGONS

Through the activities of drawing polygons using a pair of compasses, students begin to broaden their knowledge on different types of polygons. Students will research tangram puzzles.

KEY CONCEPT: Forms

RELATED CONCEPTS: Pattern, Generalization

GLOBAL CONTEXT: Identities and relationships

STATEMENT OF INQUIRY: Developing mathematical models and formulae describe real life phenomena.

Main Content Addressed:

- Diagonals of polygons. Number of diagonals
- Sum of all interior and exterior angles of a polygon.
- Regular polygons. Measure of an interior and exterior angle in regular polygons
- Constructing regular polygons
- Perimeter and area of polygons

Unit 4: STATISTICS

Through the activities of describing different types of graphs found in newspapers students will learn how to construct and interpret graphs.

KEY CONCEPT: Logic

RELATED CONCEPTS: Quantity, Model

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Statistics is a powerful model to develop global perspectives.

Main Content Addressed:

- Graphical analysis and representation (pie charts, histogram, line graphs, scatter plots)

Unit 5: SIMULTANEOUS EQUATIONS

Through the activities of graphing, students begin to broaden their knowledge of some word problems from a real life. Students will research how to use linear equations to predict real life situations

KEY CONCEPT: Relationships

RELATED CONCEPTS: Model, Equivalence

GLOBAL CONTEXT: Scientific and technical innovation

STATEMENT OF INQUIRY: Modelling using a logical process helps us to understand the world.

Main Content Addressed:

- All possible solutions of a system of linear equations with two unknown
- Method of substitution
- Method of the opposite coefficients

Unit 6: LINEAR FUNCTION AND PLOTTING GRAPHS

Through the activities of communicating with graphical representation of linear function in physics students will research linear model. Students will research the properties of a line in a coordinate plane.

KEY CONCEPT: Relationships

RELATED CONCEPTS: Representation, Model, Change

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Linear models explain correlation between variables.

Main Content Addressed:

- The concept of linear function
- Input and output values
- Graph of linear function
- Falling and growing function
- Slope formula
- Point-slope formula
- Implicit and explicit form of equation of a line
- Parallel lines
- Intersection of two lines
- Solving the system of two linear equations with two unknown graphically

Unit 7: CIRCLE AND CIRCUMFERENCE

Through the activities students will investigate the origin of number π and its calculation methods through history.

.

KEY CONCEPT: Logic

RELATED CONCEPTS: Pattern, Generalization

GLOBAL CONTEXT: Identities and relationships

STATEMENT OF INQUIRY: There is logic in creative constructions around us.

Main Content Addressed:

- Radius and diameter
- Relations of two circumferences of the same plane

- Relations of a circumference and a line of the same plane
- Circle slices: sector and segment
- Central and inscribed angle. Inscribed/central angle theorem
- Thales theorem
- Perimeter of a circle
- Area of a circle. Arc length

Matija Gubec International School Zagreb

Subject Overviews

MYP 3

Mathematics

MYP3: Mathematics

Unit 1: SQUARING, EXTRACTING THE ROOT, POWERS

Through the activities students will learn how to find squares, roots and powers of numbers
-using table of squares of the numbers from 1 to 100
-using calculator to speed things up
Students will discuss patterns for multiplying and dividing by powers 10.

KEY CONCEPT: Relationships

RELATED CONCEPTS: Model, Generalization, Simplification

GLOBAL CONTEXT: Identities and relationships

STATEMENT OF INQUIRY: Using a model to represent relationships can enable recognizing patterns in different situations,

Main Content Addressed:

- Squaring numbers. Table of squares.
- Graph and properties of the quadratic function
- Squaring binominals. The difference of two squares
- Quadratic equation
- Extracting the root
- Partial rooting
- The graph of the function of extracting the root
- Operations with square roots
- Rationalization of the denominator
- Powers

Unit 2: PYTHAGORAS' THEOREM

Through the activities of researching and investigating patterns, students get to know how people made use of mathematical concepts to solve practical problems in ancient times Students will learn how to recognize simple patterns in different situations.

KEY CONCEPT: Logic

RELATED CONCEPTS: Measurement, Justification

GLOBAL CONTEXT: Orientation in space and time

STATEMENT OF INQUIRY: Mathematics is involved in architecture and design.

Main Content Addressed:

- Right triangle. Pythagoras' theorem.
- Applying the Pythagoras' theorem on isosceles, equilateral and scalene triangle
- Applying the Pythagoras' theorem on square, rectangle, rhombus and isosceles trapezium

Unit 3: REAL NUMBERS

Students will research the origin of rational numbers with periodic decimal expansion and irrational numbers with non-repeating expansion.

KEY CONCEPT: Relationships

RELATED CONCEPTS: Pattern, Generalization

GLOBAL CONTEXT: Globalization and sustainability

STATEMENT OF INQUIRY: Recognizing and classifying numbers give a deeper understanding of different number systems.

Main Content Addressed:

- Natural numbers. Integers.
- Finite and infinite periodical rational numbers. Irrational numbers.
- Real numbers.
- Graphing on the number line

Unit 4: MOTION GEOMETRY AND TESSELLATIONS

Through the activities students begin to broaden their knowledge on different types of symmetries. Students will research the links between motion geometry and art-architecture.

KEY CONCEPT: Form

RELATED CONCEPTS: Pattern, Space

GLOBAL CONTEXT: Personal and cultural expression

STATEMENT OF INQUIRY: Understanding form and shape enhances creativity.

Main Content Addressed:

- Line symmetry
- Central symmetry
- Rotation
- Vectors
- Translation
- Adding and subtracting vectors.
- Composition of translation of a plane

Unit 5: SURFACE AREA OF THREE-DIMENSIONAL FIGURES

Students will find out which dimension *(radius and height)* has the greatest effect on surface area and volume.

KEY CONCEPT: Form

RELATED CONCEPTS: Space, Measurement

GLOBAL CONTEXT: Fairness and development

STATEMENT OF INQUIRY: Designing new structures responsibly can minimize waste of material.

Main Content Addressed:

- Surface area of a parallelepiped (cube and cuboids)
- Surface area of a prism
- Surface area of a pyramid
- Surface area of a cylinder and a cone
- Surface area of a sphere
- Volume of a parallelepiped
- Volume of a prism and a pyramid
- Volume of a cylinder and a cone
- Volume of a sphere