

Maths

Data Handling

Level 6

IB Phase 4

Learners will collect, organize and display data for the purposes of valid interpretation and communication. They will be able to use the mode, median, mean and range to summarize a set of data. They will create and manipulate an electronic database for their own purposes, including setting up spreadsheets and using simple formulas to create graphs. Learners will understand that probability can be expressed on a scale (0–1 or 0%–100%) and that the probability of an event can be predicted theoretically.

Conceptual Understandings IB4

Data can be presented effectively for valid interpretation and communication.
 Range, mode, median and mean can be used to analyse statistical data.
 Probability can be represented on a scale between 0–1 or 0%–100%.
 The probability of an event can be predicted theoretically.

Learning outcomes

Data Handling

Collect, organize and represent statistical data (including bar, pie, line graphs and tree diagrams)

Interpret and draw conclusions from statistical data using range, mode, median and mean and scale on graphs

Interpret and compare a range of data displays, including side-by-side column graphs

Identify potentially misleading data representations with consideration of purpose

Probability

Describe and order probability using fractions, decimals and percentages

Explain why the theoretical probability of an event might differ from experimental probability through conducting a chance experiment

Understands that a situation with limited options will result in a finite number of possible outcomes (possible combinations, tree diagram)

Understands mathematical fairness and identifies fair and unfair situations

Pattern and Function

Level 6

IB Phase 4

Learners will understand that patterns can be represented, analysed and generalized using algebraic expressions, equations or functions. They will use words, tables, graphs and, where possible, symbolic rules to analyse and represent patterns. They will develop an understanding of exponential notation as a way to express repeated products, and of the inverse relationship that exists between exponents and roots. The students will continue to use their understanding of pattern and function to represent and make sense of real-life situations and to solve problems involving the four operations.

Conceptual Understandings IB4

Patterns can often be generalized using algebraic expressions, equations or functions. Exponential notation is a powerful way to express repeated products of the same number.

Learning outcomes

Pattern and Function

Investigate and represent patterns using words, symbols, numbers, tables and graphs

Use algebraic expressions to record the rules for patterns

Continue and create sequences involving whole numbers, fractions and decimals

Identify and describe properties of square and triangular numbers

Explore the use of brackets and order of operations to write number sentences

Shape and Space

Level 6

IB Phase 4

Learners will understand the properties of regular and irregular polyhedra. They will understand the properties of 2D shapes and understand that 2D representations of 3D objects can be used to visualize and solve problems in the real world, for example, through the use of drawing and modelling. Learners will develop their understanding of the use of scale (ratio) to enlarge and reduce shapes. They will apply the language and notation of bearing to describe direction and position.

Conceptual Understandings IB4

Manipulation of shape and space takes place for a particular purpose.
Consolidating what we know of geometric concepts allows us to make sense of and interact with our world.
Geometric tools and methods can be used to solve problems

Learning outcomes

2D and 3D Shape

Identify, describe, classify and visualize properties of circles using mathematical vocabulary

Visualise, describe, draw and model two-dimensional representations of three-dimensional objects and vice versa

Transformation and symmetry

Identify and use scale (ratio) to reduce and enlarge 2D shapes

Transform, reduce and enlarge 3D objects

Describe and model congruency and similarity in 3D objects

Location

Describe position using the language and notation of bearing

Locate and record features on a grid using coordinates in all four quadrants

Measurement

Level 6

IB Phase 4

Learners will understand that a range of procedures exists to measure different attributes of objects and events, for example, the use of formulas for finding area, perimeter and volume. They will be able to decide on the level of accuracy required for measuring and using decimal and fraction notation when precise measurements are necessary. To demonstrate their understanding of angles as a measure of rotation, the learners will be able to measure and construct angles.

Conceptual Understandings IB4

Accuracy of measurements depends on the situation and the precision of the tool.
 Conversion of units and measurements allows us to make sense of the world we live in.
 A range of procedures exists to measure different attributes of objects and events.

Learning outcomes

Measurement of shape and space

Estimate, compare and measure objects using standard units of measurement: length, perimeter, mass, capacity, area, volume and temperature

Calculate and develop rules for determining area and perimeter of triangles

Calculate and develop rules for determining volume of cubes and cuboids

Identify and describe the relationships between area and volume, and between volume and capacity

Convert between units using decimals to at least two places (e.g. change 2.75 litres to 2750 ml, or vice versa)

Measurement of time

Calculate time across time zones

Solve problems involving difference in time

Angle

Estimate, compare, measure and construct angles within shapes

Calculate and develop rules to find unknown angles within shapes, around a point and on a straight line

Number

Level 6

IB Phase 4

Learners will understand that the base 10 place value system extends infinitely in two directions and will be able to model, compare, read, write and order numbers to millions or beyond, as well as model integers. They will develop an understanding of ratios. They will understand that fractions, decimals and percentages are ways of representing whole-part relationships and will work towards modelling, comparing, reading, writing, ordering and converting fractions, decimals and percentages. They will use mental and written strategies to solve problems involving whole numbers, fractions and decimals in real-life situations, using a range of strategies to evaluate reasonableness of answers

Conceptual Understandings IB4

The base 10 place value system extends infinitely in two directions.
 Fractions, decimal fractions and percentages are ways of representing whole-part relationships.
 For fractional and decimal computation, the ideas developed for whole-number computation can apply.
 Ratios are a comparison of two numbers or quantities.

Learning outcomes

Place Value

Apply place value to partition and rename numbers to thousandths

Recognise, and order integers (including negative integers)

Recognise, model and order decimal fractions to thousandths or beyond.

Round decimal fractions to the nearest tenth or whole number

Four Operations

Use efficient mental and written strategies to add integers and decimals

Use efficient mental and written strategies subtract integers and decimals

Model multiplication and division of decimals by a single digit integer

Use efficient mental and written strategies to multiply decimal fractions by a one digit integer

Use efficient mental and written strategies for division representing remainders as fractions

Fractions

Understand the relationship and convert between common fractions, decimal fractions and percentages

Find percentages of numbers or quantities with and without a calculator

Simplify fractions in mental and written form

Solve problems involving addition and subtraction of common fractions with the same or related denominators

Convert improper fractions to mixed numbers and vice versa

Read, write and solve problems involving ratio