

DATA HANDLING

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
<p>Conceptual understandings: We collect information to make sense of the world around us. Organizing objects and events helps us to solve problems. Events in daily life involve chance.</p>	<p>Conceptual understandings: Information can be expressed as organized and structured data. Objects and events can be organized in different ways. Some events in daily life are more likely to happen than others.</p>	<p>Conceptual understandings: Data can be collected, organized, displayed and analysed in different ways. Different graph forms highlight different aspects of data more efficiently. Probability can be based on experimental events in daily life. Probability can be expressed in numerical notations.</p>	<p>Conceptual understandings: Data can be presented effectively for valid interpretation and communication. Range, mode, median and mean is used to interpret statistical data. Probability can be represented on a scale between 0–1. The probability of an event can be predicted theoretically.</p>	<p>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 or experimentally.</p>
Use tally marks to count objects/frequency	Sort objects into sets which are organized by more than one attribute (e.g. colour and shape)	Design a survey and systematically collect data	Identify different types of graphs and their purpose (thermal, box plot, scatter plot, histogram, bubble, radar, tree map)	Understand that different types of graphs, mode, median, mean and range can summarize a set of data
Illustrate with models or pictorial representations to solve problems	Use Venn and/or Carroll diagram to show relationships between data/objects	Sort data into frequency tables, and be able to interpret the results	Design a survey for a chosen sample, and systematically collect, record, organize and display the data in a bar graph and line graph	Identify, describe and explain the range, mode, median and mean in a set of data
Sorts and labels objects into sets by one or more attributes	Plan and conduct a simple survey to collect data	Create bar graphs and line graphs to display data	Display, read and interpret grouped data in a bar graph	Interpret a pie chart/circle graph
Collects, displays and interprets data to find out information	Display results in a bar graph	Interpret and respond to questions related to data displayed in bar graphs and line graphs	Use intervals to group data and sort into a grouped frequency table	Collect, display and interpret data in circle graphs (pie charts) and line graphs
Use bar graphs and pictographs to organize and display data and compare quantities	Interpret the data displayed in a bar graph	Determine the range and mode from a set of data	Create a simple spreadsheet/database to organize and display data	Construct a pie chart
Discuss chance in relation to daily events (impossible, maybe, certain, will, won't)	Identify and describe chance in relation to events (impossible, less likely, maybe, most likely, certain)	Identify the scale used in bar graphs and line graphs	Determine the range, median and mode from a set of data	Design a complex survey and systematically collect, record, organize and display the data in an appropriate graph type
		Select an appropriate scale when creating bar graphs and line graphs	Use tree diagrams to express probability	Express probabilities using scale (0-1) or percent (0-100%)

ISÄ PYP MATHS SCOPE AND SEQUENCE



		Understand that probability is based on experimental events	Express probability using simple fractions	Understand the difference between experimental and theoretical probability
		Use probability to determine mathematically fair and unfair games and to explain possible outcomes	Interpret range and scale on graphs	Determine the theoretical probability of an event and explain why it might differ from experimental probability
				Give reasons why different outcomes may result from repeating an experiment

MEASUREMENT

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
<p>Conceptual understandings: Measurement involves comparing objects and events. Objects have attributes that can be measured using non-standard units. Events can be ordered and sequenced.</p>	<p>Conceptual understandings: Standard units allow us to have a common language to identify, compare, order and sequence objects and events. We use tools to measure the attributes of objects and events. Estimation allows us to measure with different levels of accuracy.</p>	<p>Conceptual understandings: Objects and events have attributes that can be measured using appropriate tools. Relationships exist between standard units that measure the same attributes.</p>	<p>Conceptual understandings: Conversion of units and measurements allows us to make sense of the world we live in. Relationships exist between standard units that measure the same attributes.</p>	<p>Conceptual understandings: Accuracy of measurements depends on the situation and the precision of the tool. A range of procedures exists to measure different attributes of objects and events.</p>
<p>Compare and describe the length, mass and capacity of objects (longer, shorter, heavier, empty, full, hotter, colder)</p>	<p>Estimate and measure length using metres and centimetres</p>	<p>Estimate, measure and record length, height and distance using standard units including m, dm, cm, mm, km, Swedish mil</p>	<p>Understand the relationship between area and perimeter</p>	<p>Understand procedures and formulas for finding area, volume and capacity</p>
<p>Estimates, measures, and compares mass and temperature</p>	<p>Estimate and measure mass using grams and kilograms.</p>	<p>Describe the relationships between metric standard units of measurement for length, capacity and mass</p>	<p>Calculate the perimeter of a compound shape.</p>	<p>Understand the relationship between area and volume.</p>
<p>Estimates, measures and compares lengths using nonstandard units of measurement</p>	<p>Estimate and measure capacity using litres and millilitres</p>	<p>Understand that measures can fall between numbers on a measurement scale, for example, 3½ kg, between 4 cm and 5 cm</p>	<p>Calculate the area of triangles, rectangles, parallelograms, squares and rectangular compound shapes</p>	<p>Understand the relationship between volume and capacity</p>
<p>Uses a calendar to determine the date, sequence days of the week and months of the year</p>	<p>Estimate and measure temperature using a thermometer with degrees Celsius</p>	<p>Calculate the perimeter of polygons using standard units</p>	<p>Recognize an angle as a measure of rotation</p>	<p>Calculate the circumference of a circle using the appropriate formula</p>
<p>Sequence events using before, after, today, tomorrow, etc</p>	<p>Identify the relationship between centimetres and metres</p>	<p>Read and write digital and analogue time on 12hr and 24hr clocks</p>	<p>Classify angles as right, acute or obtuse</p>	<p>Calculate the area of a circle using the appropriate formula</p>
<p>Recite the days of the week</p>	<p>Identify the relationship between litres and milliliters</p>	<p>Calculate a start/finish time given a/an elapsed time (in hours and/or minutes)</p>	<p>Measure angles to the nearest degree using a protractor</p>	<p>Identify the volume of 3D shapes using the appropriate formula</p>
<p>Recite the months of the year</p>	<p>Identify the relationship between grams and kilograms</p>	<p>Calculate an elapsed time in minutes</p>	<p>Convert between metric units of measurement including decimals</p>	<p>Calculate a distance given speed and time</p>

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Estimate one minute and one second	Reads time to hour, $\frac{1}{2}$ hour, and $\frac{1}{4}$ hour, as well as refer to elapsed time to the hour	Identify century given the age of an object, or the elapsed time	Describe measures that fall between numbers on a scale (e.g. 3 $\frac{1}{2}$ kg)	Calculate a speed given time and distance
Reads and writes time to the hour and half hour	Can read and use a calendar or schedule	Use a rate to calculate total time taken	Begin to use decimal and fractional notation in measurement, for example, 3.2 cm, 1.47 kg, $1\frac{1}{2}$ miles	Use timetables and schedules (12hr and 24hr) to solve problems
	Count money using Swedish currency (notes and coins)	Interpret and create a timeline	Determine times worldwide	Draw angles in degrees using a protractor with good accuracy
	Model purchasing with Swedish currency and be able to give change			Draw circles of specified radius using a compass

SHAPE AND SPACE

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
<p>Conceptual understandings: <i>Shapes can be described and organized according to their properties. Objects in our immediate environment have a position in space that can be described according to a point of reference.</i></p>	<p>Conceptual understandings: <i>Shapes are classified and named according to their properties. Some shapes are made up of parts that repeat in some way. Specific vocabulary can be used to describe an object's position in space.</i></p>	<p>Conceptual understandings: <i>Changing the position of a shape does not alter its properties. Shapes can be transformed in different ways. Geometric shapes and vocabulary are useful for representing and describing objects.</i></p>	<p>Conceptual understandings: <i>Manipulation of shape and space takes place for a particular purpose. Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.</i></p>	<p>Conceptual understandings: <i>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 relating to shape and space.</i></p>
Creates and explains symmetrical designs	Sorts and labels 2-D and 3-D shapes and their properties using appropriate mathematical vocabulary (e.g. face, vertices, edge, circle, sphere, square, cube)	Sort and classify regular and irregular polygons	Understand the common language used to describe shapes	Understand that 2D representations of 3D objects can be used to visualize and solve problems
Complete a simple symmetrical design (with 1 line of symmetry)	Create and describe symmetrical and tessellating patterns	Identify the properties of regular and irregular polygons	Identify the order of symmetry when rotating a shape on a point of axis	Understand that geometric ideas and relationships can be used to solve problems in other areas of mathematics and in real life
Recognize and describe common 2D shapes including rectangle, square, circle and triangle	Identify/draw lines of reflective symmetry	Identify and build nets that make a common 3D shape (cube, cuboid, pyramid, cone)	Create a shape with a specified order of symmetry	Analyse, describe, classify and visualize 2D (including circles, triangles and quadrilaterals) and 3D shapes, using geometric vocabulary
Sorts and labels 2-D and 3-D shapes using appropriate mathematical vocabulary (e.g. side, corner, circle, sphere, square, cube)	Identify the position of an object after rotation	Identify three or more shapes required to make a larger shape	Describe lines and angles using geometric vocabulary	Identify and use scale (ratios) to enlarge and reduce shapes, use the language and notation of bearing to describe direction and position
Sort and compare 3D shapes according to their attributes	Identify two shapes required to make a larger shape	Identify and describe congruent shapes	Identify quadrilaterals according to their properties	Identify and create nets that make a complex 3D shape (e.g. tetrahedron, dodecahedron)
Recognize and describe up to four 3D shapes	Begin to locate features on a grid using coordinates	Identify types of shapes in a tessellation	Sort and classify regular and irregular polyhedral according to their properties	Identify and draw a compound 3D shape given different views of the object

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Recognize and describe the position of various objects (inside, outside, above, below, next to, etc.)	Interpret a map and use position words to describe locations	Analyse angles by comparing and describing rotations: whole turn; half turn; quarter turn; north, south, east and west on a compass	Classify triangles using their angles and also by their sides	Create and model how a 2D net converts into a 3D shape and vice versa
Gives and follows simple directions, describing paths, regions and boundaries of their immediate environment and positions	Use compass points to give simple directions	Understand that directions for location can be represented by coordinates on a grid	Identify and describe the properties of a circle (radius, diameter and circumference)	Use 2D representations of 3D objects to visualize and solve problems, for example using drawings or models
		Locate features on a grid using coordinates	Use and understand a scale on a map to estimate a distance	Apply the language and notation of bearing to describe direction and position
		Describe and/or represent images of objects, patterns, and paths (Google maps, hand drawn maps etc)	Use scale to enlarge and reduce shapes	Graph and name points on a coordinate plane
			Model congruency and similarity in 2D shapes	

PATTERN AND FUNCTION

PHASE 1	PHASE 2	PHASE 3	PHASE 4	PHASE 5
Conceptual understandings: <i>Patterns and sequences occur in everyday situations. Patterns repeat and grow.</i>	Conceptual understandings: <i>Whole numbers exhibit patterns and relationships that can be observed and described. Patterns can be represented using numbers and other symbols.</i>	Conceptual understandings: <i>Functions are relationships or rules that uniquely associate members of one set with members of another set. By analysing patterns and identifying rules for patterns it is possible to make predictions.</i>	Conceptual understandings: <i>Patterns can often be generalized using algebraic expressions, equations or functions. By identifying rules for patterns, it is possible to make predictions</i>	Conceptual understandings: <i>Patterns can often be generalized using equations or functions. Exponential notation is a powerful way to express repeated products of the same number.</i>
Identify and describe patterns in everyday situations (sounds, actions, objects, nature)	Identify, extend and create visual patterns (e.g. containing shapes)	Identify, extend and create number patterns that include multiplication and division	Demonstrate understanding that the inverse relationship between multiplication and division	Understand that patterns can be generalized by a rule
Extend and create simple patterns using objects/pictures	Identify, extend and create number patterns that include addition and subtraction	Identify a pattern and write the rule	Use symbols to represent unknown quantities	Understand exponents as repeated multiplication
Describes and extends patterns in numbers, odd and even, skip counting (counts in 2's,5s and 10's)	Identify a doubling pattern and calculate the next term	Use a rule to identify a future term in a pattern/sequence	Identify values for the symbols. ($10 - y = 7; y=3$)	Demonstrate understanding of the inverse relationship between exponents and roots
Continue a simple pattern with numbers to 20	Identify odd and even numbers	Demonstrate understanding that multiplication is repeated addition	Identify a pattern and write the rule as an algebraic expression	Understand that patterns can be represented, analysed and generalized using tables, graphs, words, and, when possible, symbolic rules
Identify doubling patterns that equal up to 20	Skip count by 2s, 3s, 5s, 10s, 50s 100s.	Demonstrate understanding that division is repeated subtraction	Continue a number pattern to find an unknown value ($x=?$)	Analyse pattern and function using words, tables and graphs, and, when possible, symbolic rules
Model equivalency using concrete materials	Demonstrate understanding that the inverse relationship between addition and subtraction	Demonstrate understanding of the associative property of multiplication. $(3 \times 1) \times 4 = 3 \times (1 \times 4)$	Identify the Lowest Common Multiple	Represent the rule of a pattern by using a function
Determine the missing number in a simple equation involving addition	Demonstrate understanding of the commutative property of addition. $(3+5=5+3)$	Identify prime numbers using appropriate strategies	Identify the Greatest Common Factor	Use functions to solve problems

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Identifies patterns and rules for addition and subtraction	Demonstrate understanding of the associative property of addition. (3+1)+4=3+(1+4)	Identify a sequence of operations relating one set of numbers to another set	Identify factors using prime factorization	Write powers of 10 in exponential form
Creates, describes and extends patterns	Demonstrate understanding of the commutative property of multiplication. (3x5=5x3)	Identify and create Fact Family of numbers	Use the properties and relationships of the four operations to solve problems	Use the Lowest Common Multiple to find common denominators and equivalent fractions
				Use the Greatest Common Factor to simplify fractions

NUMBER

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<p>Conceptual understandings: Numbers are a naming system. Numbers can be used in many ways for different purposes in the real world. Numbers are connected to each other through a variety of relationships. Making connections between our experiences with number can help us to develop number sense.</p>	<p>Conceptual understandings: The base 10 place value system is used to represent numbers and number relationships. Fractions are ways of representing whole-part relationships. The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems. Number operations can be modelled in a variety of ways. There are many mental methods that can be applied for exact and approximate computations.</p>	<p>Conceptual understandings: The base 10 place value system can be extended to represent magnitude. Fractions and decimals are ways of representing whole-part relationships. The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems. Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation.</p>	<p>Conceptual understandings: The base 10 place value system extends infinitely in two directions. The operations of addition, subtraction, multiplication and division are related to each other and are used to solve problems using multi-digit numbers. Fractions and decimal are ways of representing whole-part relationships. Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation</p>	<p>Conceptual understandings: The base 10 place value system extends infinitely in two directions. 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.</p>
<p>Reads, writes, sequences and models numbers using the base ten system, to 100</p>	<p>Read, write, order and compare numbers to 1000 and beyond</p>	<p>Read, write, order and compare numbers to hundred thousandths</p>	<p>Read, write, order and compare numbers to millions and beyond using base 10 system</p>	<p>Read, write, order and compare numbers to billions and beyond using base 10 system</p>
<p>Compare quantities using more/less, first/second</p>	<p>Order and compare whole numbers to 1000 by using $< = >$</p>	<p>Round numbers to the nearest ten, hundred and thousand</p>	<p>Round numbers to the nearest ten thousand, hundred thousand and million</p>	<p>Write numbers to billions and beyond in standard form, expanded form and expanded form with exponents</p>
<p>Estimate the number of objects up to 10 by subitizing (recognizing the quantity without looking)</p>	<p>Uses mathematical vocabulary and symbols: multiply, divide ($+ - \times \div = > <$)</p>	<p>Write numbers to hundred thousandths in standard form and expanded form</p>	<p>Write numbers to hundred million in standard form, expanded form, word form and short word form</p>	<p>Model ratios, integers, decimal fractions (thousandths or beyond) exponents, percentages, square roots, improper and mixed numbers</p>
<p>Demonstrate understanding of conservation of number</p>	<p>Read, write, compare and order ordinal numbers (1st, 2nd etc)</p>	<p>Solve two-step worded problems by selecting the appropriate operations ($+ , - , \times , \div$)</p>	<p>Select an appropriate method to solve a problem (e.g. create a table, trial and error, write a sum)</p>	<p>Read and write numbers using a different number system (e.g. Roman numerals)</p>
<p>Uses mathematical vocabulary and symbols: add, subtract, difference, sum, greater than and less than ($+ - = > <$)</p>	<p>Have a fast recall of addition facts</p>	<p>Use the language of multiplication and division, for example, factor, multiple, product, quotient, prime numbers, composite number</p>	<p>Know that the position of a digit in a number affects its value.</p>	<p>Read and write exponents and square roots</p>

ISÄ PYP MATHS SCOPE AND SEQUENCE



Automatically recalls addition and subtraction facts to 10	Have a fast recall of subtraction facts	Develop strategies for memorizing addition, subtraction, multiplication and division number facts	Add and Subtract five-digit numbers using regrouping	Read, write and order decimals to thousandths place
Model addition and subtraction bonds using manipulatives	Calculate 2 and 3-digit addition problems using regrouping	Multiply a multi-digit number by a 2-digit number	Solve multi-step worded problems (involving \times and \div) involving 2- and 3-digit numbers.	Round decimals to the nearest whole number, tenth, hundredth or thousandth
Use manipulatives to help solve a worded addition or subtraction problem (2-digit numbers)	Calculate 2 and 3-digit (or beyond) subtraction problems using regrouping	Divide a multi-digit number by a one-digit divisor	Divide a multi-digit number by a two-digit divisor	Add and subtract decimals, including examples with money
Record addition and subtraction bonds using a written sum with the correct symbols	Have a fast recall of the 2, 5, 10 times tables	Use the language of fractions, for example, numerator, denominator	Multiply a multi-digit number by a multi-digit number	Multiply and divide decimals
Uses fraction names (half, quarter) to describe part or whole relationship	Solve single-digit multiplication problems using manipulatives	Read, write, compare and order fractions to hundredths or beyond	Understand the relationship between fractions, decimals and percentages	Simplify fractions in mental, written form and computation answers
Show various meanings of addition and subtraction and the relationship between the two operations through a variety of (word)problems	Solve single-digit division problems using manipulatives	Model decimal fractions to hundredths or beyond	Add and subtract fractions with unlike denominators	Read, write, compare and order percentages
	Select an appropriate method to solve a problem (e.g. make a model, draw a picture, use objects, write a sum)	Add and subtract fractions with like denominators	Simplify fractions	Convert between fractions and decimals
	Interpret and solve single -step worded problems by selecting the appropriate operation ($+$, $-$, \times , \div)	Read and write equivalent fractions	Convert improper fractions to mixed numbers and vice versa	Convert between fractions and percentages
	Write a simple one-step worded problem	Have a fast recall of the times tables up to 10	Estimate sum, difference, product and quotient in real-life situations, including fractions and decimals	Convert between decimals and percentages
	Identify, read and write simple fractions ($\frac{2}{3}$, $\frac{1}{5}$, $\frac{3}{4}$)	Create a two-step worded problem	Is able to use a calculator to solve problems	Use mental and written strategies for adding, subtracting, multiplying and dividing fractions and decimals in real-life situations

ISÄ PYP MATHS SCOPE AND SEQUENCE



	Add and subtract simple fractions with common denominators using pictures or manipulatives		Have a fast recall of the times tables up to 20	Use ratios in real-life situations
				Use strategies to evaluate the reasonableness of answers