

ISZL

**Primary School
Mathematics
Scope and Sequence**

ISZL Mathematics Scope and Sequence

Mathematics in the Primary Years Programme at ISZL

Acknowledging that learning is a developmental process, the **ISZL Mathematics Scope and Sequence** presents a developmental continuum, organized into **4 phases**, to assist teachers in planning mathematical learning experiences and monitoring and assessing students' development. Based on the PYP Scope and Sequence, the ISZL Mathematics Scope and Sequence makes explicit the **conceptual understandings** that need to be developed with each phase. Possible evidence of these understandings is described in the behaviours or **learning outcomes** associated with each phase.

At ISZL, although we indicate expected phase levels for each grade level, we acknowledge that learners within a grade level will be observed working within a range of phase levels. Therefore, the focus is on planning for this diversity and supporting students to make continued, personal progress rather than describing a set of expected outcomes at each Grade level.

Mathematics Learning and Teaching at ISZL:

At ISZL, Mathematics practices are guided by the ISZL Mathematics Guiding Statements.

Purposeful inquiry is the main approach to learning and teaching mathematics, whether mathematics is taught within or outside the programme of inquiry. At ISZL we recognise that an inquiry approach can take many forms, from structured to open inquiry and that direct instruction for individuals, small groups or whole class will also be appropriate. Teachers make intentional decisions about which instructional approach to select.

Wherever possible, mathematics is taught through the relevant and realistic contexts of the transdisciplinary programme of inquiry. Alongside this, Mathematical learning experiences also occur outside the programme of inquiry and this is planned separately from the programme of inquiry. The yearly overviews for each grade level indicate the Mathematics taught within and outside the programme of inquiry and additional mathematics planners are used to document and support mathematics learning and teaching.

Mathematics in the Early Years:

Play and exploration have a vital role in the learning and applications of mathematical knowledge. Teachers provide a variety of areas and resources to allow students to encounter situations that will introduce and develop Mathematical skills. Students are actively involved in a range of activities that can be free or directed. Applying mathematical skills to real-world tasks supports students' learning. (IB Mathematics Scope and Sequence, 2018, p. 3.)

ISZL Mathematics Scope and Sequence

Primary School Reporting Mathematics Phases and Grade Level Expectations

Early Years 1 and Early Years 2 are working within Phase 1

Kindergarten

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

Grade 1

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

Grade 2

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

Grade 3

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

Grade 4

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

Grade 5

Achieving within ISZL expectations									
Early 1	Phase 1	Early 2	Phase 2	Early 3	Phase 3	Early 4	Phase 4	Early 5	Phase 5

“There are no year level expectations in a series of achievement standards. No one is at, on, above or below expectations. Every student is simply at a level of development defined by what learning is developmentally appropriate.”

(Griffin, 2009 in IB Learning and Teaching, 2018)

ISZL Mathematics Scope and Sequence

Strand: Data Handling

Phase 1	Phase 2	Phase 3	Phase 4
Overall reporting Expectations			
<p>Students will develop an understanding of how the collection and organization of information helps to make sense of the world.</p> <p>They will sort, describe and label objects by attributes and represent information in graphs including pictographs and tally marks.</p> <p>The learners will discuss chance in daily events.</p>	<p>Students will understand how information can be expressed as organized and structured data and that this can occur in a range of ways.</p> <p>They will collect and represent data in different types of graphs, interpreting the resulting information for the purpose of answering questions.</p> <p>The learners will develop an understanding that some events in daily life are more likely to happen than others and they will identify and describe likelihood using appropriate vocabulary.</p>	<p>Students will continue to collect, organize, display and analyse data, developing an understanding of how different graphs highlight different aspects of data more efficiently.</p> <p>They will understand that scale can represent different quantities in graphs and that mode can be used to summarize a set of data.</p> <p>The learners will make the connection that probability is based on experimental events and can be expressed numerically.</p>	<p>Students will collect, organize and display data for the purposes of valid interpretation and communication.</p> <p>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.</p> <p>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.</p>
Conceptual Understandings			
<p>We collect information to make sense of the world around us.</p> <p>Organizing objects and events helps us to solve problems.</p> <p>Events in daily life involve chance.</p>	<p>Information can be expressed as organized and structured data.</p> <p>Objects and events can be organized in different ways.</p> <p>Some events in daily life are more likely to happen than others.</p>	<p>Data can be collected, organized, displayed and analysed in different ways.</p> <p>Different graph forms highlight different aspects of data more efficiently.</p> <p>Probability can be based on experimental events in daily life.</p> <p>Probability can be expressed in numerical notations.</p>	<p>Data can be presented effectively for valid interpretation and communication.</p> <p>Range, mode, median and mean can be used to analyse statistical data.</p> <p>Probability can be represented on a scale between 0-1 or 0%-100%.</p> <p>The probability of an event can be predicted theoretically.</p>

ISZL Mathematics Scope and Sequence

Phase 1	Phase 2	Phase 3	Phase 4
Learner Outcomes Data Handling			
Sort familiar objects to identify their similarities and differences.	Answer a question by collecting and recording data in tables, charts and lists; represent the data in block graphs or pictograms; use ICT to organize and present data.	Answer a question by identifying what data to collect; organize, present, analyze and interpret the data in tables, tally charts, diagrams, pictograms and bar charts, using ICT where appropriate.	Solve problems by collecting, selecting, organizing, presenting and interpreting data, using ICT where appropriate; draw conclusions and identify further questions to ask.
Present data using pictures, drawings or numerals.	Follow a line of enquiry by deciding what information is important; make and use lists, tables, charts and graphs to organize and interpret the information.	Construct frequency tables; pictograms and bar and line graphs to represent the frequencies of events and changes over time; find and interpret the mode of a set of data.	Construct and interpret frequency tables, bar charts with grouped discrete data, and line graphs; interpret pie charts
Use diagrams to sort objects into groups according to given criterion.	Answer a question by collecting, organizing and interpreting data; use tally charts, frequency tables, pictograms and bar charts to represent results; use ICT to construct a simple bar chart.	Predict the outcomes of experiments and test predictions; summarize the results and use them to predict future events; express the probability of an event as a fraction; use the language of probability to compare events explaining the choice of language.	Describe and interpret results and solutions to problems using the mode, median and mean.
Answer a question by recording information in lists, tables and charts and by presenting outcomes using pictures, block graphs or pictograms.	Use Venn and Carroll diagrams to sort data and objects using more than one criterion.		Describe and compare events using the language of probability; predict outcomes of experiments, test predictions based on theoretical probability with experimental results; express the probability of an event as a fraction, decimal or percentage.

ISZL Mathematics Scope and Sequence

Strand: Measurement

Phase 1	Phase 2	Phase 3	Phase 4
Overall Reporting Expectations			
<p>Students will develop an understanding of how measurement involves the comparison of objects and the ordering and sequencing of events.</p> <p>They will be able to identify, compare and describe attributes of real objects as well as describe and sequence familiar events in their daily routine.</p>	<p>Students will understand that standard units allow us to have a common language to measure and describe objects and events, and that while estimation is a strategy that can be applied for approximate measurements, particular tools allow us to measure and describe attributes of objects and events with more accuracy.</p> <p>Learners will develop these understandings in relation to measurement involving length, mass, capacity, money, temperature and time.</p>	<p>Students will continue to use standard units to measure objects, in particular developing their understanding of measuring perimeter, area and volume.</p> <p>They will select and use appropriate tools and units of measurement, and will be able to describe measures that fall between two numbers on a scale.</p> <p>The learners will be given the opportunity to construct meaning about the concept of an angle as a measure of rotation.</p>	<p>Students 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.</p> <p>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.</p> <p>To demonstrate their understanding of angles as a measure of rotation, the learners will be able to measure and construct angles.</p>
Conceptual Understandings			
<p>Measurement involves comparing objects and events.</p> <p>Objects have attributes that can be measured using non-standard units.</p> <p>Events can be ordered and sequenced.</p>	<p>Standard units allow us to have a common language to identify, compare, order and sequence objects and events.</p> <p>We use tools to measure the attributes of objects and events.</p> <p>Estimation allows us to measure with different levels of accuracy.</p>	<p>Objects and events have attributes that can be measured using appropriate tools.</p> <p>Relationships exist between standard units that measure the same attributes.</p>	<p>Accuracy of measurements depends on the situation and the precision of the tool.</p> <p>Conversion of units and measurements allows us to make sense of the world we live in.</p> <p>A range of procedures exists to measure different attributes of objects and events.</p>

ISZL Mathematics Scope and Sequence

Learner Outcomes Measurement			
Phase 1	Phase 2	Phase 3	Phase 4
Develop the mathematical language of measure.	Know, calculate and compare the value of coins and simple notes of Swiss currency; make exchanges between coins.	Use decimal notation in the context of measures and money.	Select and use standard metric units of measure and convert between units using decimals to two places, e.g. 3.75 litres to 3750ml, or vice versa.
Use everyday language related to time; order and sequence familiar events and measure short periods of time.	Estimate, compare and measure lengths, weights, and capacities using standard units and measuring tools.	Interpret a reading that lies between two unlabelled divisions on a scale.	Read and interpret scales on a range of measuring instruments; compare readings on different scales, e.g. when using different instruments.
Estimate, measure and compare objects using non-standard and standard units; identify standard measuring tools.	Tell and show the time to the nearest hour, half hour and quarter hour on an analogue and digital clock; extend to using minutes and seconds.	Read the time to the nearest minutes; use am, pm and 12-hour clock notation; choose units of time to measure time intervals; calculate time intervals from clocks and timetables.	Estimate, measure and draw angles; calculate angles in a triangle or around a point.
Use vocabulary related to time, order days of the week and months.	Know the relationships between km and m, m and cm, kg and g, l and ml; choose and use appropriate units to estimate and measure; use thermometers to measure temperatures to the nearest degree (Celsius).	Draw rectangles and measure, and calculate their perimeters; find the area of rectilinear shapes.	Calculate the perimeter and areas of rectilinear shapes.
Explore the concept of money through play.	Read, to the nearest division and half division, scales that are numbered or partially numbered; use the information to measure and draw a suitable level of accuracy.	Interpret intervals and divisions on partially numbered scales and record readings accurately, where appropriate to the nearest tenth of a unit; compare the impact representations where scales have differing step size.	

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	Read the time on a 12 hour digital clock and to the nearest 5 minutes on an analogue clock; calculate time intervals; interpret calendar dates.	Read, choose, use and record standard metric units to estimate and measure length, weight and capacity to an appropriate degree of accuracy.	
		Draw and measure lines to the nearest millimetre; measure and calculate the perimeter of regular and irregular polygons; use the formula for the area of a rectangle to calculate the areas of rectilinear shapes	
		Choose and use standard metric units and their abbreviations when estimating, measuring and recording length, weight and capacity.	
		Read time and timetables using 24-hour notation; use a calendar to calculate time intervals.	
Phase 1	Phase 2	Phase 3	Phase 4
Learner Outcomes Measurement cont.			

ISZL Mathematics Scope and Sequence

Strand: Shape and Space

Phase 1	Phase 2	Phase 3	Phase 4
Overall Reporting Expectations			
<p>Students will understand that shapes have characteristics that can be described and compared.</p> <p>They will understand and use common language to describe paths, regions and boundaries of their immediate environment.</p>	<p>Students will continue to work with 2D and 3D shapes, developing the understanding that shapes are classified and named according to their properties.</p> <p>They will understand that examples of symmetry and transformations can be found in their immediate environment.</p> <p>Learners will interpret, create and use simple directions and specific vocabulary to describe paths, regions, positions and boundaries of their immediate environment.</p>	<p>Students will sort, describe and model regular and irregular polygons, developing an understanding of their properties.</p> <p>They will be able to describe and model congruency and similarity in 2D shapes.</p> <p>Learners will continue to develop their understanding of symmetry, in particular reflective and rotational symmetry.</p> <p>They will understand how geometric shapes and associated vocabulary are useful for representing and describing objects and events in real-world situations.</p>	<p>Students will understand the properties of regular and irregular polyhedra.</p> <p>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.</p> <p>Learners will develop their understanding of the use of scale (ratio) to enlarge and reduce shapes.</p> <p>They will apply the language and notation of bearing to describe direction and position.</p>
Conceptual Understandings			
<p>Shapes can be described and organized according to their properties.</p> <p>Objects in our immediate environment have a position in space that can be described according to a point of reference.</p>	<p>Shapes are classified and named according to their properties.</p> <p>Some shapes are made up of parts that repeat in some way.</p> <p>Specific vocabulary can be used to describe an object's position in space.</p>	<p>Changing the position of a shape does not alter its properties.</p> <p>Shapes can be transformed in different ways.</p> <p>Geometric shapes and vocabulary are useful for representing and describing objects and events in real-world situations.</p>	<p>Manipulation of shape and space takes place for a particular purpose.</p> <p>Consolidating what we know of geometric concepts allows us to make sense of and interact with our world.</p> <p>Geometric tools and methods can be used to solve problems relating to shape and space.</p>

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Learner Outcomes Shape and Space			
Phase 1	Phase 2	Phase 3	Phase 4
Develop the mathematical language of shape.	Recognise and use whole, half and quarter turns, clockwise and anticlockwise; know that a right angle is a quarter turn.	Draw polygons and classify them by identifying their properties, including reflective symmetry.	Describe, compare and classify 2D and 3D shapes using appropriate geometric terms; identify congruent figures and describe their properties; understand that 2D representations of 3D objects can be used to visualise and solve problems.
Identify, visualize, sort, compare and name common 2D and 3D shapes describing their properties.	Visualise, identify, sort and compare 2D and 3D shapes including circles, triangles, rectangles, spheres, cylinders, prisms, pyramids, cones and cubes.	Visualise 3D objects from 2D drawings and make nets of common solids.	Use coordinates in the first quadrant to draw, locate and complete shapes that meet given properties; visualise and draw on grids where a shape will be after reflection, translation or after rotation through 90 degrees or 180 degrees about its centre or one of its vertices.
Use common language to describe position and direction, e.g. inside, outside, next to, above, in front of, etc.	Identify reflective symmetry in patterns and 2D shapes including drawing lines of symmetry in shapes.	Know that angles are measured in degrees and that one whole turn is 360 degrees, compare and order angles.	
	Interpret and create simple directions, describing paths and boundaries and positions in the immediate environment.	Locate features on a grid using coordinates; draw and understand maps of familiar locations, follow paths on a map using directional terms, give and follow directions using directional terms.	
	Relate 2D and 3D shapes to drawings of them; describe, visualize, classify, draw and make the shapes.	Identify, visualise and describe properties of 2D and 3D shapes; use knowledge of properties to draw 2D shapes and draw nets of 3D shapes	
	Recognize, explain and create symmetrical designs. Identify lines of reflective symmetry.	Read and plot coordinates in the first quadrant; recognise parallel and perpendicular lines in grids and shapes.	
	Use a set square to draw right angles and identify right angles in 2D shapes; compare angles with right angles and recognize that a straight line is equivalent to two right	Estimate, draw and measure acute and obtuse angles using a protractor to a suitable degree of accuracy.	

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	angles.		
	Read and record the vocabulary of position, direction and movement, using the four compass directions to describe movement about a grid.	Complete patterns with up to two lines of reflective symmetry; draw the position of a shape after reflection or translation.	
Phase 1	Phase 2	Phase 3	Phase 4
Learner Outcomes Shape and Space cont.			

ISZL Mathematics Scope and Sequence

Strand: Pattern and Function

Phase 1	Phase 2	Phase 3	Phase 4
Overall Reporting Expectations			
<p>Students will understand that patterns and sequences occur in everyday situations.</p> <p>They will be able to identify, describe, extend and create patterns in various ways.</p>	<p>Students will understand that whole numbers exhibit patterns and relationships that can be observed and described, and that the patterns can be represented using numbers and other symbols.</p> <p>As a result, learners will understand the inverse relationship between addition and subtraction, and the associative and commutative properties of addition.</p> <p>They will be able to use their understanding of pattern to represent and make sense of real-life situations and, where appropriate, to solve problems involving addition and subtraction.</p>	<p>Students will analyse patterns and identify rules for patterns, developing the understanding that functions describe the relationship or rules that uniquely associate members of one set with members of another set.</p> <p>They will understand the inverse relationship between multiplication and division, and the associative and commutative properties of multiplication.</p> <p>They will be able to use their understanding of pattern and function to represent and make sense of real-life situations and, where appropriate, to solve problems involving the four operations.</p>	<p>Students will understand that patterns can be represented, analysed and generalized using algebraic expressions, equations or functions.</p> <p>They will use words, tables, graphs and, where possible, symbolic rules to analyse and represent patterns.</p> <p>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.</p> <p>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.</p>
Conceptual Understandings			
<p>Patterns and sequences occur in everyday situations.</p> <p>Patterns repeat and grow.</p>	<p>Whole numbers exhibit patterns and relationships that can be observed and described.</p> <p>Patterns can be represented using numbers and other symbols.</p>	<p>Functions are relationships or rules that uniquely associate members of one set with members of another set.</p> <p>By analysing patterns and identifying rules for patterns it is possible to make predictions.</p>	<p>Patterns can often be generalized using algebraic expressions, equations or functions.</p> <p>Exponential notation is a powerful way to express repeated products of the same number.</p>

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Learner Outcomes Pattern and Function			
Phase 1	Phase 2	Phase 3	Phase 4
Use developing mathematical ideas and methods to solve practical problems and communicate thinking.	Present solutions to problems and puzzles in an organized way; explain decisions, methods and results in pictorial, written or spoken form using mathematical language and number sentences.	Solve one and two-step problems involving numbers, money or measures, including time; choose and use appropriate calculations, using calculator methods where appropriate.	Solve multi-step problems involving whole numbers, fractions, decimals and percentages; choose and use appropriate calculation strategies including the use of a calculator.
Talk about, recognise and recreate simple patterns.	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples.	Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols.	Explain reasoning and conclusions, using words, symbols or diagrams as appropriate.
Observe number relationships and patterns in the environment and use these to derive facts.	Use mathematical symbols to record and interpret number sentences involving all four operations; calculate the value of an unknown number in a number sentence.	Suggest a line of inquiry and the strategy needed to follow it; collect, organise, and interpret selected information to find answers.	Tabulate systematically the information in a puzzle or problem; identify and record the steps of calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy.
Solve problems involving addition and subtraction in contexts of numbers, measures or money.	Identify and record the information or calculation needed to solve a problem or puzzle.	Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement.	Suggest, plan and develop lines of inquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions.
Read and write expressions and number sentences using symbols; use vocabulary related to addition and subtraction.	Follow a line of enquiry and answer questions by choosing and using appropriate equipment and organizing and presenting information in lists, tables, charts and diagrams.	Represent a problem or a puzzle using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem.	Describe, create, represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols, e.g. the cost of c pens at 25 rappen each is $25c$ rp.
Describe patterns and relationships involving numbers and shapes.	Solve one- and two-step problems involving numbers, measures and money, including time, choosing appropriate calculations.	Represent a puzzle or a problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem.	

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Describe ways of solving puzzles and problems orally or using pictures.	Describe and explain methods, choices and solutions to puzzles and problems, orally, in writing, pictorially and using diagrams.	Explain reasoning using diagrams, graphs and text; refine ways of recording and using images and symbols.	
	Represent the information in a problem or puzzle using numbers, images or diagrams and use these to find a solution.	Explain reasoning using diagrams, graphs and text; refine ways of recording and using images and symbols.	
	Read, write and explain expressions and number sentences using mathematical symbols; use knowledge of number operations and corresponding inverses, including doubling and halving to estimate and check calculations.	Plan and pursue an inquiry; present evidence by collecting, organising and interpreting information; suggest inquiry extensions.	
	Identify patterns and relationships involving numbers and shapes and use these to solve problems.		
Phase 1	Phase 2	Phase 3	Phase 4
Learner Outcomes Pattern and Function cont.			

ISZL Mathematics Scope and Sequence

Strand: Number

Phase 1	Phase 2	Phase 3	Phase 4
Overall Reporting Expectations			
<p>Students will understand that numbers are used for many different purposes in the real world.</p> <p>They will develop an understanding of one-to-one correspondence and conservation of number, and be able to count and use number words and numerals to represent quantities.</p>	<p>Students will develop their understanding of the base 10 place value system and will model, read, write, estimate, compare and order numbers to hundreds or beyond.</p> <p>They will have automatic recall of addition and subtraction facts and be able to model addition and subtraction of whole numbers using the appropriate mathematical language to describe their mental and written strategies.</p> <p>Learners will have an understanding of fractions as representations of whole-part relationships and will be able to model fractions and use fraction names in real-life situations.</p>	<p>Students will develop the understanding that fractions and decimals are ways of representing whole-part relationships and will demonstrate this understanding by modelling equivalent fractions and decimal fractions to hundredths or beyond.</p> <p>They will be able to model, read, write, compare and order fractions, and use them in real-life situations.</p> <p>Learners will have automatic recall of addition, subtraction, multiplication and division facts.</p> <p>They will select, use and describe a range of strategies to solve problems involving addition, subtraction, multiplication and division, using estimation strategies to check the reasonableness of their answers.</p>	<p>Students 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.</p> <p>They will develop an understanding of ratios.</p> <p>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.</p> <p>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.</p>
Conceptual Understandings			
<p>Numbers are a naming system.</p> <p>Numbers can be used in many ways for different purposes in the real world.</p> <p>Numbers are connected to each other through a variety of relationships.</p> <p>Making connections between our experiences with number can help us to develop number sense.</p>	<p>The base 10 place value system is used to represent numbers and number relationships.</p> <p>Fractions are ways of representing whole-part relationships.</p> <p>The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.</p> <p>Number operations can be modelled in a variety of ways.</p> <p>There are many mental methods that can be applied for exact and approximate computations.</p>	<p>The base 10 place value system can be extended to represent magnitude.</p> <p>Fractions and decimals are ways of representing whole-part relationships.</p> <p>The operations of addition, subtraction, multiplication and division are related to each other and are used to process information to solve problems.</p> <p>Even complex operations can be modelled in a variety of ways, for example, an algorithm is a way to represent an operation.</p>	<p>The base 10 place value system extends infinitely in two directions.</p> <p>Fractions, decimal fractions and percentages are ways of representing whole-part relationships.</p> <p>For fractional and decimal computation, the ideas developed for whole-number computation can apply.</p> <p>Ratios are a comparison of two numbers or quantities.</p>

ISZL Mathematics Scope and Sequence

Learner Outcomes Number

Phase 1	Phase 2	Phase 3	Phase 4
Use number names in order, in familiar contexts such as number rhymes, songs, stories, games.	Order two-digit numbers and position them on a number line; use greater than and less than symbols.	Partition, round and order four-digit whole numbers, negative numbers in context, and position them on a number line.	Find the difference between a positive and negative integer or two negative integers in context.
Count reliably a set of everyday objects and know that numbers identify how many objects are in a set (subitizing).	Estimate a number of objects and round two-digit numbers to the nearest 10.	Position one-place and two-place decimals on a number line.	Use decimal notation for tenths, hundredths and thousandths; partition, round and order decimals with up to three places and position them on a number line; read, write and compare whole numbers to 1 000 000.
Estimate how many objects can be seen; check by counting.	Understand that subtraction is the inverse of addition and vice versa; use this to quickly derive related addition and subtraction number sentences.	Use knowledge of addition and subtraction facts and place value to derive sums and differences of pairs of multiples of 10, 100 or 1000.	Use knowledge of place value and multiplication facts to 10x10 to derive related multiplication and division facts involving decimals e.g. 0.7×0.9 , $5.4/6$.
Recognise numerals 0-9 and count aloud in ones or other steps e.g. twos, fives, tens.	Read numbered divisions on a scale and interpret unlabeled divisions between.	Add or subtract mentally pairs of two-digit numbers (e.g. $37 + 48$, $82-26$).	Calculate mentally with integers and decimals: $U.t \ +/- \ U.t$, $TU \times U$, TU/U , $U.txU$, $U.t/U$
Use symbols to represent mathematical ideas.	Use a ruler to draw and measure lines to the nearest centimetre.	Refine and use efficient informal written methods to add and subtract two-digit and three-digit whole numbers.	Use efficient written methods to add and subtract integers and decimals, to multiply and divide integers and decimals by one-digit integer, and to multiply two-digit and three-digit integers by a two-digit integer; use approximations, inverse operations and tests of divisibility to estimate and check results.
Begin to relate addition to combining two groups of objects and subtraction to 'taking away'.	Find half, quarter and three quarters of quantities and shapes.	Recall and derive multiplication facts from the 2, 3, 4, 5, 6, and 10 times tables and corresponding division facts.	Use knowledge of multiplication facts to quickly derive squares of numbers to 12x12 and the corresponding squares of multiples to 10.
In practical activities and discussion develop the vocabulary involved in adding and subtracting (including recognition of symbolic language).	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money.	Multiply and divide numbers to 1000 by 10 and 100 and understand the effect.	Express a larger whole number as a fraction of a smaller one; simplify fractions; order a set of fractions by converting them to fractions with a common denominator; express one quantity as a percentage of another; find equivalent percentages, decimals and fractions.

ISZL Mathematics Scope and Sequence

Learner outcomes Number cont.			
Phase 1	Phase 2	Phase 3	Phase 4
Share objects into equal groups and count how many in each group.	Recall and derive all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals to 100.	Identify the doubles of two-digit numbers and use these to calculate doubles of multiples of 10 and 100 and derive corresponding halves (e.g. $15+15=30$, $150+150=300$, $1500+1500=3000$).	Relate fractions to multiplication and division; find fractions and percentages of whole number quantities, e.g. $\frac{1}{2}$ of 56, 45% of 360 CHF.
Count reliably at least 20 objects, recognising that when rearranged the number of objects remains the same; estimate the number of objects that can be checked by counting.	Understand that halving is the inverse of doubling and recall and derive doubles of all numbers to 20 and their corresponding halves.	Develop and use written methods to record, support and explain multiplication and division of two-digit numbers by a one-digit number including divisions with remainders.	Solve simple problems involving direct proportion by scaling quantities up or down.
Connect number names and numerals to the quantities they represent; compare and order whole numbers to at least 20.	Count on and back in 1s, 2s, 5s, and 10s, up to/from 100 and beyond.	Use the vocabulary of ratio and proportion to describe the relationship between two quantities e.g. there are 2 yellow beads for every 3 blue beads.	Identify prime and composite numbers, factors and prime factors.
Read and write numbers to 20 and then beyond using knowledge of place value to position these numbers on a number line or track.	Read and write two- and three-digit numbers in figures and words, explaining what each digit represents.	Use knowledge of rounding, number operations and inverses to estimate and check calculations.	
Relate addition to counting on and that it can be done in any order; add a one-digit number or a multiple of 10 to a one-digit or two-digit number.	Continue number sequences.	Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths.	
Say the number that is one more or one less than any given number and 10 more or 10 less for multiples of 10.	Recognize odd and even numbers.	Use diagrams to identify equivalent fractions e.g. $\frac{6}{8}$ and $\frac{3}{4}$ or $\frac{7}{10}$ and $\frac{70}{100}$; interpret mixed numbers and position them on a number line; identify pairs of fractions that total 1.	
Understand subtraction as 'taking away' and 'finding the difference' by counting up; subtract a one-digit number from a one-digit or two-digit number and a multiple of 10 from a two-digit number.	Compare and order whole numbers to 100 and count up to 100 objects by grouping them in 2s, 5s and 10s.	Find fractions of quantities and shapes e.g. $\frac{1}{2}$ of 30 apples $\frac{1}{3}$ of a 6 by 4 rectangle.	
Use vocabulary of halves and quarters in contexts of quantities and movement e.g. quarter and half turns.	Partition two-digit numbers in different ways including 10s and 1s.	Solve problems involving proportions of quantities e.g. decrease/increase quantities in a recipe.	

ISZL Mathematics Scope and Sequence

Learner Outcomes Number cont..

Phase 1	Phase 2	Phase 3	Phase 4
Recall doubles of all numbers to at least 10.	Use knowledge of number facts and operations to estimate and check answers to calculations.	Find fractions using division, e.g. $1/100$ of 5kg and percentages of numbers and quantities e.g. 10%, 5% and 15% of 800 CHF.	
Derive and recall pairs of numbers with a total of 10 and addition facts for totals to at least 5 and corresponding subtraction facts.	Add or subtract mentally a one-digit number of multiple of 10 to or from any two digit number and use informal methods to add and subtract two-digit numbers.	Understand percentage as the number of parts in every 100 and express tenths and hundredths as percentages.	
	Read and write fractions, interpreting the denominator as the parts of the whole and the numerator as the number of parts.	Refine and use efficient written methods to multiply HTUxU, TUxTU, U.txU, HTU / U.	
	Identify and estimate fractions of shapes and quantities and find equivalent fractions.	Extend mental methods for whole number calculations for example to multiply TUxU (e.g. 14×8 using doubling, to multiply by 25 (e.g. $16 \times 25 = 1600/4 = 400$), to subtract one near multiple of 100 from another (e.g. $314-197$).	
	Find unit fractions of quantities (e.g. one third of 12).	Use understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000.	
	Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences.	Identify pairs of factors of two-digit whole numbers and find common multiples e.g. for 6 and 9.	
	Use practical and informal written methods to multiply and divide two digit numbers (14×3)	Recall quickly multiplication facts up to 10×10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts.	
	Multiply one-digit and two digit numbers by 10 and 100 and describe the effect.	Use efficient written methods to add and subtract whole numbers and decimals with up to two places.	

ISZL Mathematics Scope and Sequence

Learner Outcomes Number cont.

Phase 1	Phase 2	Phase 3	Phase 4
	Derive or recall multiplication facts from the 2,3,4,5,6 and 10 times table.	Explain what each digit represents in whole numbers up to at least 100 000 and decimals with up to two places, and partition, round and order these numbers.	
	Count forwards and backwards in steps of 1,2,3,4,5,6,10,25 and 100.	Count from any given number in whole numbers and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line.	
	Use informal written methods to record, support or explain addition and subtraction of two- and three-digit numbers.		
	Add or subtract mentally combinations of one- and two digit numbers; use the relationship of addition and subtraction to solve problems.		
	Partition three-digit numbers into multiples of 100, 10, and 1.		
	Read, write and order whole numbers to 1000 and position them on a number line; explore and understand place value.		