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Mathematics Syllabus – Primary cycle P1-P5

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1. General Objectives

The European Schools have the two objectives of providing formal education and of encouraging pupils' personal development in a wider social and cultural context. Formal education involves the acquisition of competences (knowledge, skills and attitudes) across a range of domains. Personal development takes place in a variety of spiritual, moral, social and cultural contexts. It involves an awareness of appropriate behaviour, an understanding of the environment in which pupils live, and a development of their individual identity.

These two objectives are nurtured in the context of an enhanced awareness of the richness of European culture. Awareness and experience of a shared European life should lead pupils towards a greater respect for the traditions of each individual country and region in Europe, while developing and preserving their own national identities.

The pupils of the European Schools are future citizens of Europe and the world. As such, they need a range of competences if they are to meet the challenges of a rapidly changing world. In 2006 the European Council and European Parliament adopted a European Framework for Key Competences for Lifelong Learning. It identifies eight key competences¹ which all individuals need for personal fulfilment and development, for active citizenship, for social inclusion and for employment:

1. Literacy competence
2. Multilingual competence
3. Mathematical competence and competence in science, technology and engineering
4. Digital competence
5. Personal, social and learning to learn competence
6. Civic competence
7. Entrepreneurship competence
8. Cultural awareness and expression competence

The European Schools' syllabuses seek to develop all of these key competences in the pupils.

2. Didactic Principles

2.1 General

In the description of the learning objectives, competences, connected to contents, play an important role. This position in the learning objectives reflects the importance of competences acquisition in actual education. Exploratory activities by pupils support this acquisition of competences, such as in experimenting, designing, searching for explanations and discussing with peers and teachers. In science education, a teaching approach is recommended that helps pupils to get acquainted with concepts by having them observe, investigate and explain phenomena, followed by the step to have them make abstractions and models. In mathematics education, investigations, making abstractions and modelling are equally important. In these approaches, it is essential that children observe and manipulate with the teacher a maximum of activities: teacher guidance is an essential contribution to targeted stimulation of pupils' activities.

¹ The eight key competences referenced here take part of the recommendation on key competences for lifelong learning adopted by the Council of the European Union in May 2018

2.2 Mathematics

Careful thought has been given to the contents and the structure to where topics are first met in a pupil's time learning mathematics in primary education. It is believed that this is a journey and if too much contents is met at one point, there is a risk that it will not be adequately understood and thus a general mathematical concept will not be fully appreciated. By limiting the contents of this syllabus (found in section 4.) each year more time can be used to develop core mathematical concepts that may have been met before or new mathematical concepts introduced are given ample time for extension.

Furthermore, to this point it is believed that with a focus on competences this syllabus can encourage pupils to have a greater enjoyment of mathematics, as they not only understand the contents better but understand the historical context (where it is expected a history of mathematics can be told over the cycles) and how the mathematics can be applied in other subjects, cross cutting. As such the syllabuses have specifically been designed with reflection to the key competences (section 1) and the subject specific competences (section 3.1).

One of the tasks in the pupil's learning process is developing inference skills, analytical skills and strategic thinking, which are linked to both the key and subject specific competences. This is the ability to plan further steps in order to succeed solving a problem as well as dividing the process of solving more complex problems into smaller steps. A goal of teaching mathematics is to develop pupil's intuitions in mathematics appropriate for their age. The ability to understand and use mathematical concepts is much more important than memorising formal definitions.

To ensure pupils have a good understanding of the mathematics the courses from P1 to P5 have been developed linearly with each year the work from the previous year is used as a foundation to build onto. The teacher is in the best position to understand the specific needs of the class and before beginning a particular topic it is expected that pupils have the pre-required knowledge. A refresh is always a good idea when meeting a concept for the first time in a while. It should be noted that revision is not included in the syllabus, however, as mentioned earlier about limiting new contents, there is time to do this when needed.

The use of technology and digital tools plays an important role in mathematics, which is reflected in this syllabus. The pupils should get the opportunity to work and solve problems with different tools or software that are available in the respective schools. Technology and digital tools should be used to support and promote pupils' understanding.

2.3 Problem solving

2.3.1 What's the nature of mathematics?

Mathematics could be defined as a study of properties, relationships, operations, algorithms and applications of numbers and spaces at the very basic levels and of abstract objects and concepts at more advanced levels. Mathematical objects and concepts and related knowledge and methods are products of insight, logical reasoning and creative thinking and are often inspired by problems that seek solutions. Abstractions are what make mathematics a powerful tool for solving problems. Mathematics provides within itself a language for representing and communicating ideas and results of the discipline.

Problem solving is an integral part of mathematics and is not a separate chapter in this syllabus. In each of the five chapters of the syllabus: Numbers, Operations, Measurement, Shape and Space, Data handling, the pupils have the opportunity to discover, construct and apply an elaborate mathematical reasoning which they can use in each domain. The key actions for problem solving are:

Understand and analyse - consider, select and retain data and steps to resolve the problem

Investigate - ask relevant questions, generate ideas, formulate a reasoning process and take decisions

Reason - describe, interpret, explain and use information to obtain the expected result

Verify and validate - learn to check result and approach, reconsider and evaluate the whole process

Communicate - learn to express the way of thinking and compare the results and actions to the others

Use technology appropriately in a wide range of situations

2.3.2 Numbers

Children's interest in numbers comes early. Even in early childhood, children develop an ability to count, and use numbers within simple contexts, i.e. 'I am 2 years old!' Even though the background of the understanding of numbers may not be common place. Numbers impact on many aspects of the curriculum, and without strong number understanding will lead to issues in other contents areas.

As pupils move through the primary education, they will build their understanding of numbers encountering larger integers each year. Starting within 20 in P1, this knowledge extends to 1 000 000 and beyond by the pupil enters P5. However, the skills to attain this knowledge do not differ, and the grasping of these concepts come via similar methods year on year repeated in a spiral way. When faced with a problem, pupils often have to deal with numbers that are made up of digits. Understanding the status of each digit in the number is important in solving the problem.

By performing number variations, they understand the mechanics of decimal numbering. A large four digit number, for example, can be expressed as a sum of products of powers of ten. The verification of the representation of a number can be carried out using an abacus, a grid or even a calculator.

Finally, it is by mastering the value of the digits composing a number that the pupil will be able to communicate the answer to the problem that he will have personally developed.

2.3.3 Operations

Mathematical operations are of primary importance in our daily lives. Life is punctuated by various mathematical operations. A thorough understanding of the four operations helps children to develop essential skills.

Using precise vocabulary, understanding the priority of operations, manipulating decomposition, listening, sharing and understanding the reasoning of others will help pupils develop a variety of strategies.

To solve a problem, the pupil must have a good command of the processes of operations and their properties. Neuroscience confirms that by automating mental arithmetic as far as possible, for example by memorising multiplication tables, long-term memory is used to a greater extent and free capacity in the working memory for reasoning.

It's a question of discovering the most economical and shortest process to carry out an operation. Then, when the pupil has discovered the mathematical structure hidden in the statement of the problem, he must estimate the plausible answer in relation to the situation but also in relation to the mobilized numbers. The response will thus be validated by resorting to the reverse operation or in relation to the estimate. Each step of the problem can be controlled.

Finally, it will be a question of communicating the answer clearly to the other pupils while respecting the conventions of mathematical writing.

2.3.4. Measurement and Units

Measurement is an important human activity. It is an essential tool of science and provides a useful link between a real world and mathematics. Children should develop concepts about measurement using their own non-standard units (measuring length using hand spans, footsteps, elbows, straws etc). A discussion of the need for a standard unit arises after measuring the same objects and arriving at different answers. Historically, all units were developed in this way. For example, cubit was used to measure cloth. However, different people have different lengths for the parts of the body. In order to stop cheating, it was eventually decided that metric standard units should be used. It is also important to teach at a later stage that there are two systems of standard measurement units that are used in Europe. The metric system of units (SI, abbreviated from the French *Système International d'Unités*) is the official system however in some countries, the traditional imperial system is still in general use outside of school.

Measurements are an inexhaustible source of mathematical problems in real life. The first step is to become aware of what sort of object to be measured is present in the problematic situation. Choosing the right instrument and the right unit of measure is important. Once this done, it's a question of estimating the order of size of the object to be measured. We can also compare the different sizes of objects of the same category and order them in ascending order. These measurements must then be processed by applying a conversion to the common term or by combining them using an arithmetic operation. To check its measurement, it may be necessary to repeat the operation using another unit of measurement or by applying a formula. Finally, it will be necessary to adequately and precisely communicate to the other pupils the measurement process used and the answer using the correct unit.

2.3.5. Shape and Space

This chapter includes the various perceptual skills that are important for solving mathematical tasks. Visual perception is the basis for mathematical thinking and action. It leads to spatial orientation, which enables children to grasp positional relationships, shapes and solids, lines and angles, patterns and mosaics, and symmetry.

Shape and space is an interesting area of mathematics to explore because the problems that can arise often suggest reasoning without being hampered by a lack of mastery of numbers, operations and units of measurement. Identifying, classifying, tracing, reproducing, transforming shapes or spotting remarkable properties motivate the pupil's reasoning process. They must determine the characteristics of the observed shapes: polygon or not, regular or not, number of sides, isometric sides, parallel or perpendicular sides, base and height, angles, axes of symmetry.

They should be able to check their observations or constructions by associating it with a similar figure or by using measuring instruments. Finally, it will be a question of communicating their findings and approaches by using the mathematical vocabulary.

2.3.6. Data handling

Data handling is an introduction to Primary School statistics. Thus, this chapter deals with an essential and quite common part of practical life. Indeed, we are frequently presented with data in various contexts which we need to analyse, evaluate, and interpret.

Children learn about how to collect, organise, present, interpret and discuss data in pictograms, tally charts, block diagrams, bar charts, Venn- and Carroll diagrams, line graphs and pie charts.

An important target of this section is about developing the ability to look for patterns and generalities or to make simple predictions.

Moreover, the chapter provides an ideal opportunity to practise critical thinking skills. At the end of primary school, children should be able to check the accuracy of information. In addition, the first notions of probability calculation, in particular the vocabulary of likelihood and chance, and the concept of the mean (average), should be understood. The chapter also offers good opportunities to work on online data and easy-to-use software.

Data processing is the privileged chapter to exercise the logical thinking and structuring of concrete or abstract objects. This is the area where the communication dimension in problem solving is the most frequent because it allows to appreciate the way of sequencing, sorting, organizing the elements of a set of data in a consistent and presentable way. The pupils must understand that the situation needs criteria in order to group and arrange raw data. Once the criterion has been defined according to the particularity of the set of objects, pupils reorganize this set to avoid confusion, contradiction and ambiguity. In particular, they take care not to withhold superfluous data. They test the consistency of their approach by reviewing the quality or quantity of their data. Finally, they present their approaches in a form of a diagram or a table that can be read and evaluated by others.

3. Learning Objectives

3.1 Competences

The following are the list of subject specific competences for mathematics. Here the key vocabulary is listed so that when it comes to reading the tables in section 4.2. the competency being assessed can be quickly seen. Please note that the list of key vocabulary is not exhaustive, and the same word can apply to more than one competency depending on the context.

Further information about assessing the level of competences can be found in section 5.1. Attainment Descriptors. The key concepts here are those we expect the pupils to attain.

	Competency	Key concepts	Key vocabulary
1.	Knowledge and comprehension	Demonstrates satisfactory knowledge and understanding of straightforward mathematical terms, symbols and principles	Compare, identify, know, name, order, read, recall, recognise, round, simplify, understand, verify, write
2.	Methods	Carries out mathematical processes in straightforward contexts, but with some errors	Apply, calculate, construct, convert, draw, locate, manipulate, match, measure, place, plot, practise, record, represent, round, simplify, use
3.	Problem solving	Translates routine problems into mathematical symbols and attempts to reason to a result	Combine, develop, explore, find, investigate, partition, solve, study
4.	Interpretation and evaluation	Attempts to draw conclusions from information and shows limited understanding of the reasonableness of results	Calculate, conduct, create, develop, display, estimate, evaluate, interpret, investigate, justify
5.	Communication	Generally presents reasoning and results adequately using some mathematical terminology and notation	Conduct, describe, discover, discuss, display, explore, indicate, interpret, investigate, present, represent
6.	Digital competence	Uses technology satisfactorily in straightforward situations	Calculate, carry out, check, correct, display, draw, identify, manipulate, perform, present, record, represent, use, solve

3.2 Cross-curricular concepts

Cross-curricular concepts encourage pupils to explore the connections between different subjects. Their introduction develops deeper understanding and transferring pupils' knowledge across subject boundaries and into the real world. Wherever possible, mathematics should be taught through the relevant, realistic context. Links to the transdisciplinary themes should be explicitly made and developing comprehension of these links will contribute to the pupils' awareness of mathematics in the world and of the relationship with other subjects. These themes can enrich the curriculum without overloading it through the introduction of additional teaching subjects and facilitate interdisciplinary thinking and collaborative learning, i.e. within Discovery of the World.

4. Contents

4.1 Topics

This section contains the tables with the learning objectives and the mandatory contents for P1 to P5 in Mathematics.

4.2 Tables

How to read the tables on the following pages? The mandatory contents are described in the second column. The third column describes the learning objectives which are the curriculum goals. These include the key vocabulary, highlighted in bold, that are linked to the specific mathematics competences found in section 3.1. of this syllabus.

YEAR P1

YEAR P1	TOPIC: NUMBERS	
Subtopic	Contents	Learning objectives
Whole numbers	Counting	Calculate to 20 by counting forwards and backwards, starting at any point
		Count to 100 in intervals of 1, 2, 5, 10 and 20
		Count a given number of objects
		Write whole numbers from 0-20 and to 100 in multiples of 10 and units
	Representation of numbers	Match quantities to numbers to 20
		Represent numbers through illustrations and on a number line
	Using and applying	Use numbers in real life contexts
	Estimation	Estimate the number of objects before counting
Odd and even numbers	Discover the concept of zero, odd and even numbers to 20	
Partitioning	Manipulate, partition and combine numbers to 20	
Comparing and ordering	Ordering numbers	Use the vocabulary of ordering numbers (smaller, bigger, less than, more than, the same, equal)
		Order numbers (increasing and decreasing) using a number line and a number track to 20
		Identify and place a number to 20 on a number line
	Ordinal numbers	Use the language of ordinal numbers, from first to tenth
Place value	Use of manipulatives	Manipulate and explore place value using base 10 to 20
	Tens and units	Read and write numbers on a place value chart
		Understand the place value of each digit in a two digit number
Fractions, decimals and percentages	Mathematical vocabulary	Use vocabulary of double and half in real life contexts
	Doubling and halving	Find half of shapes and sets of objects
		Discover the relationship between halving and doubling
Patterns and sequences	Patterns and sequences of numbers	Explore, recognise and record patterns and sequences using numbers to 20 with a variety of intervals
YEAR P1	TOPIC: OPERATIONS	
Subtopic	Contents	Learning objectives
Addition and subtraction	Mathematical vocabulary	Explore the concepts of addition and subtraction through play and practical tasks and by using concrete materials
		Use the vocabulary and symbols of calculations (add, subtract, plus, minus, equals, +, -, =)
	Operations	Calculate operations with answers to 20, with and without manipulatives
		Create operations with answers to 20, using formal notation

	Inverse operations	Understand that addition and subtraction are inverse operations
	Number bonds	Use pairs of numbers with a total of 10 and work out the corresponding subtraction facts
		Use the knowledge of pairs of 10 to learn the pairs to 20
	Doubles and halves	Determine the doubles and corresponding halves of all numbers to 20
	Commutative law	Recognise the principle of the commutative law of addition
Multiplication and division	Modelling	Explore the concepts of multiplication and division by grouping and sharing through play and practical tasks
YEAR P1	TOPIC: MEASUREMENT and UNITS	
Subtopic	Contents	Learning objectives
Length and perimeter	Language of length	Use the vocabulary of length (wide, high, long, short, tall, equal)
	Non-standard units of length	Estimate, measure, compare and record length using non-standard units
		Recognise non-standard measuring units and objects and use appropriately
	Standard units of length	Use a ruler to draw lines and line segments
		Measure length in centimetres
		Compare lengths of line segments in centimetres
Investigate standard units in their environment (metre, centimetre)		
Capacity and volume	Language of capacity	Understand and use the vocabulary of capacity (fill, pour, full, empty)
	Non-standard units of capacity	Estimate, measure, compare and record capacity using non-standard units
		Identify non-standard measuring units and objects and use appropriately
	Standard units of capacity	Be aware of standard units in their environment (litre)
Mass(weight)	Language of weight	Understand and use the vocabulary of weight (heavier, lighter, balance, scales, weigh, equal)
	Non-standard units of weight	Identify non-standard units of weight
		Estimate, measure, compare and record weight using non-standard units
	Standard units of weight	Investigate standard units in their environment (kilogram and gram)
Time	Non-standard units of time	Estimate, measure and describe the passage of time using non-standard units
	Language of time	Understand and use the vocabulary of time (hour, day, month, year)
	Clocks	Represent the time to the hour and half hour on analogue clocks
		Tell the time to the hour and half hour
	Calendar	Name the days of the week, months and the seasons of the year
		Order familiar events in the cycle of a day and a week

		Explore the calendar as a tool to read the date and observe how many nights/days remaining until a certain event within a short period
Money	Value of money	Understand and use the vocabulary of European monetary system (euro, cent)
		Distinguish between euros and cents
		Recognise all the coins and notes and be aware of their value
		Order coins by value
		Manipulate euros in play using replica coins and notes
		Manipulate coins and notes to make different amounts to 20 euros
YEAR P1	TOPIC: SHAPE and SPACE	
Subtopic	Contents	Learning objectives
Spatial awareness	Mathematical vocabulary	Understand and use the vocabulary of spatial awareness, position and directions (left, right, over, under/ below, beside, between, etc.)
	Direction and location	Develop their own sense of spatial awareness
		Follow and give simple directions to move
		Locate places or objects on a simple map
2 D and 3 D shapes	Patterns and tessellation	Recognise, describe, copy and extend patterns in colour, shape and quantity
		Manipulate shapes and objects to investigate patterns, symmetry and tessellation
	2 D shapes	Understand, identify and use the vocabulary of 2 D shapes (side, corner, square, rectangle, triangle, circle, semi-circle)
		Sort, name and describe 2 D shapes
		Identify 2 D shapes in real life contexts
		Identify the basic properties of 2 D shapes
		Construct and draw 2 D shapes
		Use 2 D shapes to create other shapes
	3 D shapes	Understand, identify and use the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramids)
		Identify 3 D shapes in real life contexts
Identify the basic properties of 3 D shapes		
Transformations	Symmetry	Recognise examples of symmetry in their environment
		Identify reflective symmetry in simple 2 D shapes and letters
	Symmetry lines	Draw a line of symmetry in simple 2 D shapes
		Complete the missing half of a shape, picture or pattern, using either a vertical or a horizontal line of symmetry

YEAR P1		TOPIC: DATA HANDLING
Subtopic	Contents	Learning objectives
Collection, interpretation and representation of data	Collecting data	Collect and organise data in a systematic way
		Describe real life situations and pictures from a child's environment to collect data
		Sort and classify objects by one or two criteria
	Bar graphs and pictograms	Understand that bar graphs and pictograms are simple ways to represent data
		Represent data using bar graphs and pictograms
		Represent and interpret bar graphs in both horizontal and vertical forms
		Create a story using information from a bar graph or a pictogram

YEAR P2

YEAR P2		TOPIC: NUMBERS
Subtopic	Contents	Learning objectives
Whole numbers	Counting	Calculate to 100 by counting forwards and backwards, starting at any point
		Count to 100 in intervals of 1, 2, 5, 10 and 20
		Count within 1 000 in intervals of 100
		Count a given number of objects
		Recall and write whole numbers to 100
	Representation of numbers	Match quantities to numbers to 100
		Represent numbers through illustrations
	Using and applying	Use numbers in real life contexts
Estimation	Estimate the number of objects before counting	
Odd and even numbers	Recall the concept of zero and discover odd and even numbers to 100	
Partitioning	Manipulate, partition and combine numbers to 100	
Comparing and ordering	Ordering numbers	Understand and use the vocabulary of ordering numbers (smaller, bigger, less than, more than, the same, equal)
		Order numbers (increasing and decreasing) using a number line and a number track to 100
		Identify and place a number to 100 on a number line
		Use mathematical symbols (>, <, =) to compare numbers
	Ordinal numbers	Use the language of ordinal numbers, from first to tenth
Place value	Use of manipulatives	Manipulate and explore place value using base 10 to 100
	Hundreds, tens and units	Read and write numbers on a place value chart
		Understand the place value of each digit in a three digit number

	Partitioning	Partition numbers to 100
	Rounding	Round numbers to the nearest 10
Fractions, decimals and percentages	Mathematical vocabulary	Understand and use the vocabulary of double, half and quarter in real life contexts
	Doubling and halving	Identify half of shapes and sets of objects Discover the relationship between halving and doubling
Patterns and sequences	Patterns and sequences of numbers	Explore, recognise and record patterns and sequences using numbers to 100 with a variety of intervals
YEAR P2	TOPIC: OPERATIONS	
Subtopic	Contents	Learning objectives
Addition and subtraction	Mathematical vocabulary	Understand and use the vocabulary and symbols of addition and subtraction
		Explore the concepts of addition and subtraction through play and practical tasks and by using concrete materials
	Operations	Create addition and subtraction calculations with answers to 100 using formal notation
		Make operations including those bridging multiples of ten
		Write and calculate sums with two digit numbers with answers to 100
	Inverse operations	Write and calculate differences with two digit numbers
		Recall that addition and subtraction are inverse operations
	Number bonds	Discover pairs of numbers that total 100 and work out the corresponding subtraction facts
		Use the knowledge of pairs of 10 to learn the pairs to 100
Make operations using doubling and halving		
Commutative law	Apply the principle of the commutative law of addition	
Mental calculation	Learn and apply appropriate strategies to support mental calculations	
Multiplication and division	Mathematical vocabulary	Explore the concepts of multiplication and division by grouping and sharing through play and practical tasks
		Understand and use the vocabulary and symbols of operations (multiply, divide, times, share equally, \times , \div)
	Operations	Understand that multiplication is repeated addition
		Learn multiplication tables to 10 by rote
		Explore the relationship between multiplication tables (doubling, halving)
	Inverse operations	Understand that multiplication and division are inverse operations
Doubles and halves	Calculate halve and double of a given number	
Commutative law	Recognise the principle of the commutative law of multiplication	
YEAR P2	TOPIC: MEASUREMENT and UNITS	
Subtopic	Contents	Learning objectives
Length and perimeter	Language of length	Extend the vocabulary of length (wide, high, long, short, equal)
		Estimate, measure, compare and record length using non-standard units

	Non-standard units of length	Recognise non-standard measuring units and objects and use appropriately
	Standard units of length	Use a ruler to draw lines and line segments
		Measure length in centimetres
		Compare lengths of line segments in centimetres
Capacity and volume	Language of capacity	Understand and use the vocabulary of capacity (fill, pour, full, empty)
	Standard units of capacity	Estimate, measure, compare and record capacity using non-standard units
		Identify non-standard measuring units and objects and use appropriately
		Be aware of standard units in their environment (litre)
Mass (weight)	Language of weight	Understand and use the vocabulary of weight (heavier, lighter, balance, scales, weigh, equal)
	Standard units of weight	Identify non-standard units of weight
		Estimate, measure, compare and record weight using non-standard units
		Investigate standard units in their environment (kilogram and gram)
Time	Standard units of time	Estimate, measure and describe the passage of time using non-standard units
		Understand and use the vocabulary of time (hour, day, month, year)
	Clocks	Represent the time to the hour and half hour on analogue clocks
		Review the time to the hour and half hour
	Calendar	Name the days of the week, months and the seasons of the year
		Order familiar events in the cycle of a day and a week
Explore the calendar as a tool to read the date and calculate how many nights/days remaining until a certain event		
Money	Value of money	Understand and use the vocabulary of European monetary system (euro, cent)
		Distinguish between euros and cents
		Recognise all the coins and notes and be aware of their value
		Order coins by value
		Manipulate euros in play using replica coins and notes
Manipulate coins and notes to make different amounts to 100 euros		
YEAR P2	TOPIC: SHAPE and SPACE	
Subtopic	Contents	Learning objectives
Spatial awareness	Direction and location	Consolidate and extend the vocabulary of shapes (semi-circle, oval, curved, straight, sides, corners, round, flat, faces)
	Patterns and tessellation	Recognise, describe, extend and create patterns

2 D and 3 D shapes		Review the manipulation of shapes and objects to investigate patterns, symmetry and tessellation
	Lines and angles	Recognise vertical and horizontal lines
		Recognise forms, right angles and relate them to shape and the environment
	2 D shapes	Sort, name and describe the properties of 2 D shapes
		Identify 2 D shapes in real life and discuss their use
	3 D shapes	Sort, name and describe the properties of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramids)
Introduce the new shapes oval and semi-circle		
Identify 3 D shapes in real life contexts and discuss their use		
Transformations	Symmetry	Recognise examples of symmetry in their environment and in drawings and objects
	Symmetry lines	Explore and recognize reflective symmetry in shapes through practical activities (by folding, cutting and manipulating objects)
		Draw a line of symmetry in 2 D shapes
		Complete the missing half of a shape, picture or pattern, using either a vertical or a horizontal line of symmetry
YEAR P2	TOPIC: DATA HANDLING	
Subtopic	Contents	Learning objectives
Collection, interpretation, and representation of data	Tally charts, frequency tables, bar charts	Recall block graphs and pictograms
		Understand and use tally charts, frequency tables and bar charts as a method of collecting data
		Read and interpret data from bar charts
		Use different scales on axis
		Describe real life situations presented in tally charts, frequency tables or bar charts
	Technological tool	Use data from Internet to make a bar chart (Easy online data bases)

YEAR P3

YEAR P3	TOPIC: NUMBERS	
Subtopic	Contents	Learning objectives
Whole numbers	Counting	Read, recall and write whole numbers to 1 000
		Calculate to 1 000 by counting forwards and backwards, starting at any point
		Count in multiples of 100 and 1 000 to 10 000
		Count to 1 000 in intervals of 1, 2, 5, 10, 50 and 100
		Read and write numbers to 10 using Roman Numerals
	Match quantities to numbers in a variety of situations	
	Representation of numbers	Understand how to match numbers to a variety of situations
Using and applying	Use large numbers in real life contexts	
Estimation	Develop and use estimation strategies (comparing and grouping)	
Comparing and ordering	Ordering numbers	Order numbers (increasing and decreasing) on using a number line and a number track to 1 000
	Comparing numbers	Compare, locate and place numbers on a number line and in a hundred square
		Locate and identify the multiples of 10 and 100 that lie either side of a number
		Use mathematical symbols (>, <, =) to compare numbers
Place value	Use of manipulatives	Manipulate, explore and identify place value using base 10 to 1 000
	Thousands, hundreds, tens and units	Understand the place value of each digit in a four digit number
		Partition, manipulate and combine four digit numbers
Rounding	Round numbers to the nearest 10, 100 and 1 000	
Fractions, decimals and percentages	Mathematical vocabulary	Understand and use the vocabulary of fractions (numerator, denominator)
	Fractions	Read and write proper fractions, using denominators to 10
		Identify and recognise fractions of different shapes
		Manipulate and use the fraction wall to compare simple fractions and understand equivalence
Patterns and sequences	Patterns and sequences of numbers	Explore, recognise and record patterns and sequences using numbers with a variety of intervals to 1 000
		Discover patterns within multiplication tables to 10 and find links between them
		Recognise multiples of 2, 5, 10 and 100 to 1 000

YEAR P3	TOPIC: OPERATIONS	
Subtopic	Contents	Learning objectives
Addition and subtraction	Mathematical vocabulary	Use the vocabulary and symbols of addition and subtraction
	Operations	Add and subtract three digit numbers
		Calculate combination of addition and subtraction calculations
		Write addition and subtraction using informal and standard written methods including those bridging multiples of tens and hundreds
	Mental calculation	Apply appropriate strategies to support mental addition and subtraction to 1 000 (bridging tens and hundreds, halving and doubling, partitioning)
	Estimation	Estimate before calculating and checking the answer
	Calculator	Use a calculator to check and correct answers
Multiplication and division	Mathematical vocabulary	Use the vocabulary and symbols of multiplication and division
	Operations	Apply the understanding that multiplication is repeated addition
		Recall multiplication tables to 10 and associated division facts at speed and in any order
		Determine all factors of numbers within the multiplication tables
		Explore the relationships between the multiplication tables
		Multiply a two digit number by 10 or 100 and understand the impact on place value
		Divide a three digit multiple of 10 by 10
		Write and calculate products (two digit or three digit numbers by a one digit number)
		Write and calculate quotients (two and three digit numbers by a one digit number)
	Understand what a remainder is when dividing	
	Inverse operations	Apply the understanding that multiplication and division are inverse operations
	Commutative law	Apply the principle of the commutative law of multiplication
	Mental calculation	Develop mental calculation strategies for multiplication and division (transposing the knowledge of simple multiplication and division facts to multiples of 10 and 100, partitioning)
		Calculate the half and the double of a given number to 100 and of significant multiples to 1 000
	Estimation	Estimate before calculating and check the validity of the estimate
	Fractions	Calculate and record a simple fraction of a given quantity
Understand the relationship between fractions and division		
Calculator	Check and correct answers by using a calculator	

YEAR P3	TOPIC: MEASUREMENT and UNITS	
Subtopic	Contents	Learning objectives
Length and perimeter	Language of length	Understand and use the vocabulary of length (width, height, perimeter, near and far, scale, is equal to, distance)
	Standard units of length	Identify kilometres and decimetres
		Understand the relationships between km-m, m-dm, m-cm, m-mm, dm-cm, cm-mm
		Convert km-m, m-dm, m-cm, m-mm, dm-cm, cm-mm
		Estimate, measure, compare and record lengths of a wide variety of objects using appropriate instruments and metric units (m, dm, cm, mm)
	Use a ruler to measure and draw line segments to the nearest millimetre	
Perimeter as a length of a two-dimensional shape	Measure the perimeter of polygons	
	Calculate the perimeter of a square and a rectangle using formulae	
Area	Non-standard units of area	Estimate and measure in squares the area of regular and irregular shapes
		Use squares or part squares to draw shapes of a given area
Capacity and volume	Language of capacity	Consolidate and extend the vocabulary of capacity (decilitre, centilitre, millilitre)
	Standard units of capacity	Estimate, measure, compare and record the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
		Understand the relationships between l-dl, l-cl, l-ml
Mass (weight)	Standard units of weight	Convert l-dl, l-cl, l-ml
		Extend the vocabulary of weight (tonne)
		Estimate, measure, compare and record the weight of a variety of objects using appropriate instruments and metric units (t, kg, g)
Time	Standard units of time	Understand the relationships between t-kg, kg-g
		Convert kg-g and t-kg
	Clocks	Understand and use units of time and know the relationships between them (second, minute, hour, day, week, month, year and century)
Convert seconds into minutes and seconds, minutes into hours and minutes, days into weeks and days		
Calendar	Clocks	Read and record the time to the exact minute on analogue and digital clocks
		Read and record the time using the 24-hour clock
Calendar		Read a calendar, know what a leap year is and recognise the number of days in each month

	Timetables	Read a simple timetable
		Calculate finish time, duration and start time
Money	Value of money	Convert euros into cents and vice versa
		Combine coins and notes to make exact amounts
		Record amounts of money using symbols and decimal notation
	Give change in multiples of 10 cents	
	Currencies	Discover different monetary systems in Europe
YEAR P3	TOPIC: SHAPE and SPACE	
Subtopic	Contents	Learning objectives
Spatial awareness	Direction and location	Follow and give instructions involving position, direction and movement
		Locate a position on a plan or map including using simple grid references
		Describe movement or position using the four points of the compass
2 D and 3 D shapes	Patterns and tessellation	Consolidate and extend the vocabulary (2 D shape surface polygon pattern, fit together without gaps or spaces without overlapping combination)
		Recognise, describe, extend and create tessellated patterns
	Lines and angles	Identify and describe vertical, horizontal, parallel, perpendicular and intersecting lines
		Classify angles as greater than, less than or equal to a right angle and relate them to shape and the environment
		Recognise acute, right and obtuse angles and relate them to real life situations
	Mathematical vocabulary	Consolidate and extend the vocabulary of 2 D shapes (parallel, perpendicular, angle, right angle, vertices, regular, irregular)
		Consolidate and extend the vocabulary of 3 D shapes (parallel, perpendicular, angle, right angle, vertices, edges, faces, regular, irregular)
	2 D shapes	Review, sort, name and describe the properties of 2 D regular shapes as well as irregular shapes (parallelogram, rhombus, trapezium and other quadrilaterals, right angled triangle)
3 D shapes	Review, sort, name and describe the properties of 3 D shapes (cube, cuboid, and pyramids)	
	Explore 3 D shapes and investigate their relationship with 2 D shapes	
Transformations	Symmetry	Identify reflective symmetry in 2 D shapes and in the environment
		Complete the missing half of a shape, picture or pattern, using vertical and horizontal lines of symmetry
		Discover and draw all lines of symmetry in 2 D shapes
	Translation and rotation	Translate a simple shape horizontally or vertically on a grid
		Rotate a simple shape around one of its vertices

YEAR P3	TOPIC: DATA HANDLING	
Subtopic	Contents	Learning objectives
Collection, interpretation, and representation of data	Venn and Carroll diagrams	Know and apply Venn and Carroll diagrams (two-way tables) to sort data and objects
	Pictograms and bar graphs	Recall pictograms, bar graphs as methods to present data
		Identify and interpret data shown on pictograms, bar graphs (including bar graphs with scales of different amplitudes)
		Collect, organise, and represent data using pictograms and bar graphs (including bar graphs with scales of different amplitudes)
		Create mathematical representations from real-life and play situations
		Recall using different scales on axis
	Technological tool	Collect data to make a data table on a software program
		Construct a bar graph using a software program
		Explain and conclude data constructed using a software program

YEAR P4

YEAR P4	TOPIC: NUMBERS	
Subtopic	Contents	Learning objectives
Whole numbers	Counting	Read and write whole numbers from 0 to 100 000
	Representation of numbers	Match quantities to numbers in a variety of situations (on a number line, a hundred square)
		Read and write numbers to 2 000 using Roman Numerals
		Use large numbers in real life contexts
	Estimation	Use and apply estimation strategies (comparing and grouping)
Partitioning	Partition, manipulate and combine numbers to 100 000	
Comparing and ordering	Ordering numbers	Order numbers (increasing and decreasing) on a number line and a number track to 100 000
	Comparing numbers	Compare, locate and place numbers on a number line and in a hundred square Identify the significant multiples of 10, 100, and 1000 that lie either side of a number
Place value	Use of manipulatives	Manipulate, explore and identify place value using 10 to 100 000
	Ten thousands, thousands, hundreds, tens, units and tenths	Understand the place value of each digit in a five digit number
		Partition, manipulate and combine numbers to 100 000
		Identify place value in decimal numbers to one decimal place
Rounding	Round numbers to the nearest 10, 100, 1000 and 10 000	
Fractions, decimals and percentages	Mathematical vocabulary	Use the vocabulary of fractions (numerator, denominator, proper fraction, improper fraction, mixed number)
	Fractions and decimals	Read and write proper fractions, improper fractions, mixed numbers and decimal numbers (up to one decimal place)
		Identify and represent proper fractions, improper fractions and mixed numbers in shapes and diagrams
		Locate and place mixed numbers on a number line
		Manipulate and use the fraction wall to compare fractions and understand equivalence
		Simplify fractions to the lowest form
		Recognise decimal numbers in real life contexts
Understand the equivalence between the decimal and fraction forms of half, quarter, three quarters and tenths		
Patterns and sequences	Patterns and sequences of numbers	Explore, recognise and record patterns and sequences using numbers with a variety of intervals, and that use more than one operation
		Discover patterns within multiplication tables to 10 and find links between them.
		Recognise and count multiples of 2, 5, 10, 100 and 1 000 to 10 000

YEAR P4	TOPIC: OPERATIONS	
Subtopic	Contents	Learning objectives
Addition and subtraction	Mathematical vocabulary	Understand and use the vocabulary and symbols of addition and subtraction
	Operations	Add and subtract whole numbers and numbers to one decimal place
		Combine addition and subtraction calculation
		Write addition and subtraction calculations using standard and informal written methods
	Mental calculation	Apply appropriate strategies to support mental calculation
	Estimation	Estimate before calculating and check the exact result found by sums and differences
	Fractions	Add and subtract fractions with the same denominator
Calculator	Perform calculations with large numbers	
Multiplication and division	Mathematical vocabulary	Understand and use the vocabulary and symbols of multiplication and division
	Operations	Determine all factors of numbers within the multiplication tables
		Write multiplication calculations using standard and informal written methods (two digit/ three digit by a one digit/ two digit number)
		Write simple division calculations using informal methods with and without remainders (two and three digit numbers by a one digit number)
		Calculate the remainder when dividing
		Be aware of simple algebraic equations
	Mental calculation	Use, compare and discuss various mental strategies
	Estimation	Estimate before calculating and then check the exact result found by products and quotients
Fractions	Calculate a fraction of a given quantity	
Calculator	Perform multiplications and divisions with large numbers	
YEAR P4		
TOPIC: MEASUREMENT and UNITS		
Subtopic	Contents	Learning objectives
Length and perimeter	Language of length	Understand and use the vocabulary of length
	Standard units of length	Estimate, measure, compare and record lengths of a wide variety of objects, using appropriate instruments and metric units
		Understand the relationship between mm, cm, dm, m, dam, hm and km
		Convert between mm, cm, m and km
	Perimeter as a length of a two-dimensional shape	Measure and calculate the perimeter of polygons
	Scale	Understand and use the vocabulary of scale (scale, scale length, actual length)
Find actual length when given a corresponding scale length		
Area	Standard units of area	Draw shapes of a given area

		Understand the relationships between units of area km^2 , ha, a, m^2 , dm^2 , cm^2 , mm^2
		Convert km^2 , ha, a, m^2 , dm^2 , cm^2 , mm^2
	Area of a rectangle	Discover the formula for the area of a rectangle
		Calculate the area of rectangles and compound shapes using mm^2 , cm^2 , dm^2 and m^2
Capacity and volume	Language of capacity	Consolidate and extend the vocabulary of capacity (decilitre, centilitre, millilitre)
	Standard units of capacity	Estimate, measure, compare and record the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
		Understand the relationships between l-dl, l-cl, l-ml, dl-cl, cl-ml
		Convert l-dl, l-cl, l-ml, dl-cl, dl-ml, cl-ml
Mass (weight)	Language of weight	Consolidate the vocabulary of weight (gram, decagram, kilogram, tonne)
	Standard units of weight	Estimate, measure, compare and record the weight of a wide variety of objects using appropriate instruments and metric units (t, kg, dag, g)
		Discover milligrams
		Convert t-kg, kg-dag, kg-g, dag-g and g-mg
Time	Standard units of time	Understand and use units of measurement of time (second, minute, hour, day, week, month, year, century and millennium)
		Convert seconds into minutes and seconds, minutes into hours and minutes, days into weeks and days, months into years and months
YEAR P4	TOPIC: SHAPE and SPACE	
Subtopic	Contents	Learning objectives
Spatial awareness	Direction and location	Read, follow and give instructions involving position, direction and movement
		Visualise, locate and plot a position using grid references and coordinates in the first quadrant, naming the x and y axis
		Use the eight points of the compass to describe movement or position
2 D and 3 D shapes	Patterns and tessellation	Recognise, describe, extend and create tessellated patterns, combining regular and irregular polygons
	Lines and angles	Identify, describe and use a ruler/squared paper to draw vertical, horizontal, parallel, perpendicular and intersecting lines
		Know that angles are measured in degrees and that one whole turn is 360° , a straight angle is 180° , a right angle is 90°
		Recognise and draw acute, right and obtuse angles and relate them to shape and the environment
		Estimate, measure and construct angles to the nearest 5° , using a protractor and a ruler
		Use notation of angles (α , β , γ)
Consolidate and extend the vocabulary of lines and angles		

	2 D shapes	Consolidate and extend the vocabulary of 2 D shapes
		Sort, name, describe and classify regular and irregular 2 D shapes
	3 D shapes	Consolidate and extend the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramid)
		Explore the main characteristics of 3 D shapes
		Sort, name, describe and classify regular and irregular 3 D shapes
		Explore the relationships between 3 D shapes (perpendicular, parallel faces and edges)
		Identify and make nets of common 3 D shapes
Use a set square and compasses to create geometrical drawings		
Transformations	Symmetry	Investigate symmetry in art, architecture and nature
		Draw all lines of symmetry in polygons
		Complete the missing half of a shape, picture or pattern, using vertical, horizontal and diagonal lines of symmetry
	Translation, rotation and enlargement	Draw the position of a shape after rotation around one of its vertices
		Translate a shape horizontally and vertically on a grid
		Enlarge or reduce a shape using a grid
YEAR P4	TOPIC: DATA HANDLING	
Subtopic	Contents	Learning objectives
Collection, interpretation and representation of data	Pie charts, line graphs, Venn and Carroll diagrams	Read and interpret data from pie charts and line graphs
		Recall pictograms, block graphs, bar graphs, Venn and Carroll diagrams as methods to present data
		Connect between bar graphs and line graphs
		Explain which type of representation should be used, or if more can be used to present data
	Technological tool	Use data from Internet to make a line graph and a pie chart
		Explain, organise, and present data
Probability and chance	Likelihood and chance	Identify and record outcomes of random processes
		Use vocabulary of likelihood and chance: impossible, unlikely, even chance, likely, certain
		Order events in terms of likelihood of occurrence

YEAR P5

YEAR P5	TOPIC: NUMBERS	
Subtopic	Contents	Learning objectives
Whole numbers	Representation of numbers	Read and write whole numbers to and beyond 1 000 000
		Use and apply numbers to and beyond 1 000 000 in real life contexts
		Discover the concept of negative numbers through real life examples
		Recall numbers to 2000 using Roman Numerals
	Estimation	Use and apply various estimation strategies
Comparing and ordering	Ordering numbers	Order numbers (increasing and decreasing) irrespective of size
	Comparing numbers	Compare, locate and place numbers on a number line and in a hundred square
		Identify the whole numbers that lie either side of a decimal number to two decimal places
		Identify the significant multiples of 10, 100, 1000, 10 000 and 100 000 that lie either side of a decimal number to two decimal places
Place value	Use of manipulatives	Manipulate, explore and identify place value using base 10 to 1 000 000 and beyond.
	Millions, hundred thousands, ten thousands, thousands, hundreds, tens, units, tenths and hundredths	Understand the place value of each digit in a six digit number and beyond, and in decimal numbers to two decimal places
		Partition numbers into multiples of 10 000, 1 000, 10 and 1, 1/10 and 1/100
		Identify place value in decimal numbers to two decimal places
	Rounding	Round whole numbers and decimals to the nearest whole number 10, 100, 1 000, 10 000, 100 000 and 1 000 000
Fractions, decimals and percentages	Mathematical vocabulary	Use the vocabulary of fractions
	Fractions and decimals	Read and write proper fractions, improper fractions, mixed numbers and decimal numbers (to two decimal places)
		Convert improper fractions to mixed numbers and vice-versa
		Find equivalent fractions
		Simplify fractions to the lowest term
		Recognise and use decimal numbers in real life contexts
		Understand the equivalence between the decimal and fraction forms of half, third, quarter, three quarters, tenths and hundredths
	Identify the whole numbers that lie either side of a decimal number up to two decimal places	
Percentages	Identify percentages in real life (limited to 100%, 75%, 50%, 25%, 10% and 1%)	

		Understand the relationships between fractions, decimals and percentages (limited to 100%, 75%, 50%, 25%, 10% and 1%)
Patterns and sequences.	Patterns and sequences of numbers	Explore, recognise and record patterns and sequences using numbers with a variety of intervals, including with fractions and decimal numbers
		Explore and understand triangular and square numbers
YEAR P5	TOPIC: OPERATIONS	
Subtopic	Contents	Learning objectives
Addition and subtraction	Mathematical vocabulary	Consolidate and use the vocabulary and symbols of addition and subtraction
	Operations	Add and subtract whole numbers and numbers to two decimal places
		Write addition and subtraction calculations using standard and informal written methods
		Use and develop simple algebraic equations using addition and subtraction
		Perform addition and subtraction with brackets
		Apply the rules of the order of addition and subtraction and brackets
	Mental calculation	Use mental strategies for addition and subtraction
	Estimation	Estimate before calculating and check the exact result found by sums and differences
Fractions	Add and subtract fractions and mixed numbers	
Calculator	Carry out one-step and two-step calculations involving addition and subtraction	
Multiplication and division	Mathematical vocabulary	Consolidate and use the vocabulary and symbols of multiplication and division
	Operations	Determine factors of larger numbers
		Identify prime numbers to 100
		Write multiplication and division calculations using informal and standard written method
		Understand and use simple ratios, proportions and scales
		Use and develop simple algebraic equations using multiplication and division
		Perform multiplications and divisions with brackets
		Apply the rules of the order of multiplication and division and brackets
	Mental calculation	Use mental strategies including multiplying and dividing by 10 and 100 and 1000
	Estimation	Estimate before calculating and check the exact result found by products and quotients
	Fractions	Calculate a fraction of a given quantity
		Calculate simple percentages of a given quantity (100%, 75%, 50%, 25%,10%,1%)
		Multiply a fraction by a one digit number
	Divide a simple fraction by a one digit number using diagrams	
Calculator	Carry out one-step and two-step calculations involving all four operations	

YEAR P5	TOPIC: MEASUREMENT and UNITS	
Subtopic	Contents	Learning objectives
Length and perimeter	Language of length	Consolidate the vocabulary of length
	Standard units of length	Estimate, measure, compare and record lengths of a wide variety of objects, using appropriate instruments and metric units (including fractions and decimal numbers)
		Convert mm, cm, m, dam, hm and km
	Perimeter as a length of a two-dimensional shape	Estimate and measure the perimeter of regular and irregular polygons
	Scale	Consolidate the vocabulary of scale (scale, scale length, actual length)
Create scale drawings		
Read and interpret maps using scale		
Area	Standard units of area	Convert units of area km ² , ha, a, m ² , dm ² , cm ² , mm ²
	Area of a rectangle	Calculate the area of compound shapes consisting of rectangles and right-angled triangles using m ² and cm ²
Capacity and volume	Language of capacity	Consolidate the vocabulary of capacity
		Estimate, measure, compare and record the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
	Standard units of capacity and volume	Convert hl, l, dl, cl, ml
		Introduce the vocabulary of volume (cubic centimetre, cubic decimetre, cubic metre)
		Understand the relationship between volume and capacity (dm ³ -l)
Calculate the volume of cubes and cuboids using m ³ , dm ³ , cm ³		
Mass (weight)	Language of weight	Consolidate the vocabulary of weight
	Standard units of weight	Estimate, measure, compare and record the weight of a wide variety of objects using appropriate instruments and metric units (t, kg, dag, g, mg)
		Convert t, kg, dag, g, mg
Time	Standard units of time	Convert and calculate with units of time
	Clocks	Practise reading and recording the time to the exact minute on analogue, digital and 24-hour clocks
		Explore international time zones
	Timetables	Practise the calculation of duration, start time and finish time including using data from timetables
	Time, distance and speed	Knowing two quantities out of three (time, distance or speed), calculate the third quantity
Money	Value of money	Calculate change
	Currencies	Convert the euro and other currencies

YEAR P5	TOPIC: SHAPE and SPACE	
Subtopic	Contents	Learning objectives
Spatial awareness	Direction	Read, follow and give instructions and directions using coordinates
	Location	Visualise, locate and plot a position using integer coordinates in the first quadrant as well as other grid reference systems (longitude and latitude)
2 D and 3 D shapes	Patterns and tessellation	Investigate the geometric properties of tessellations
		Recognise, describe, extend and create tessellated patterns and other designs which combine regular and irregular 2 D shapes
	Lines and angles	Identify, describe and use instruments to draw parallel, perpendicular and intersecting lines
		Name and classify all kinds of angles and relate them to shape and the environment
		Estimate, measure and construct angles to the nearest degree, using a protractor and a ruler
	2 D shapes	Use a set square and compasses to create geometrical drawings
		Sort, name, describe and classify regular and irregular 2 D shapes, including equilateral, scalene, isosceles triangles, and identify their properties
		Explore the relationships between 2 D shapes (lines of symmetry and angles)
	3 D shapes	Identify the properties of a circle and construct a circle of a given radius/diameter
		Consolidate and extend the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone, pyramid and prism, hollow, solid)
Sort, name, describe and classify regular and irregular 3 D shapes and identify their properties		
Transformations	Symmetry	Visualise, identify and make nets of common 3 D shapes
		Investigate symmetry in art, architecture and nature
		Draw all lines of symmetry in polygons
	Translation, rotation and enlargement	Draw the position of a shape after reflection using vertical, horizontal, diagonal and multiple lines of symmetry
		Draw the position of a shape after translation
		Draw the position of a shape after rotation using different centres of rotation
		Enlarge or reduce a shape by measurement
YEAR P5	TOPIC: DATA HANDLING	
Subtopic	Contents	Learning objectives
Collection, interpretation and representation of data	Pie charts and line graphs	Apply the concept of proportionality to interpret data presented in pie charts in terms of percentages or fractions
		Interpret line graphs (distance/time, a graph of pairs of numbers adding to a given number)
	Summary on representations	Use data and representations to make informed decisions and predictions
		Discuss examples of inappropriate representations of data from newspaper, whether certain representations are misleading
Technological tool		Construct line graphs and pie charts from real life situations, using a spreadsheet (Excel and other online tools)

Probability and chance	Mean (average) of a set of data	Study the meaning of average in real-life situations
		Recognise the three related quantities in a set of data: average, total value, number of data
		Understand and apply the formula to determine the mean
		Knowing two quantities out of three (average, total value, number of data), calculate the third quantity
	Technological tool	Calculate and interpret the mean manipulating data in real life-situations, using a spreadsheet, (Excel and other online tools)

4.3 Suggested time frame

The following topics are given only an estimated number of weeks to be reviewed by the teacher depending on the class.

The designated weeks include assessments, time needed for practice and revision, mathematics projects, school projects, and so on.

Class	P1 – P5
Topic	Weeks
Numbers	12
Operations	12
Measurement and Units	5
Shape and Space	5
Data handling	2
Total	36

5. Assessment

Assessment is not something you do at fixed moments in time, but it's an on-going process which involves different stakeholders: teachers, pupils and parents, and which reflects pupils' progression over time. Together, the stakeholders use a wide range of tools. These tools are important because they guarantee a certain level of objectivity. The different stakeholders use different tools, corresponding to their role in education and the needs of the pupils.

Assessment is formative when either formal or informal procedures are used to gather evidence of learning during the learning process and are used to adapt teaching to meet pupil's needs. The process permits teachers and pupils to collect information about pupil's progress and to suggest adjustments to the teacher's approach to instruction and the pupil's approach to learning.

Assessment is summative when it is used to evaluate pupil's learning at the end of the instructional process or of a period of learning. The purpose is to summarise the pupil's achievements and to determine whether, and to what degree, the pupil has demonstrated understanding of that learning.

Pupils' self-assessment is a fundamental part of formative assessment to help children to develop their learning to learn competence.

Systematic communication with parents and official meetings are important aspects of the assessment process. Sharing information about a pupil's development through parents/teacher meetings is very important. The pupil's presence at the request of the teacher is highly recommended.

For each level there are attainment descriptors linked to the competences, which give an idea of the level that pupils should reach at the end of the respective school year.

With the competences are verbs that give an idea of what kind of assessment can be used to assess that goal. In the table with learning objectives these verbs are used and put bold, so there is a direct link between the competences and the learning objectives.

Assessing knowledge, skills and learning attitude, can be done by oral and written questions where the pupils should respond on. Competences as constructing explanations and engaging in argument as well as the key competences as communication and mathematical competence need open questions or other ways of assessing.

Pupils have to be able to do an experimental inquiry. An inquiry should be part of the assessments. Assessing designing and inquiry can be combined with other subjects, i.e. Discovery of the World.

Digital competence can be assessed by gathering information from internet, measuring data, or comparing the outcomes of a model with measured data. It is recommended to combine this with other assessments where this competence is needed.

A portfolio is an integral part of assessment in the Primary School and is a systematic compilation of pupil's works that exhibit the pupil's efforts, progress, and achievements. It is essential that the teacher leads pupils through the recording of their mathematical development through the respective school year. The portfolio should be evidence of the learning journey taken through mathematics in line with the key competencies and attainment descriptors. A portfolio helps a pupil set goals for learning, review their goals periodically and assume responsibility for their own learning.

The pupil chooses material to be put in the portfolio. This process is fundamental for the development of self-evaluation. It would be recommended that a teacher asks pupils why they choose a specific piece of work. The pupil's developing ability to self-assess requires the support of the teacher, who, will sensitively provide guidance and support.

Teachers will need to help the pupil to build their own portfolio, acting as a guide and critical friend, helping the pupil make reasoned choices about what to include.

5.1. Attainment Descriptors

P1 – P5	+	++	+++	++++
Knowledge and comprehension	Shows little or no knowledge and understanding of mathematical terms, symbols, and principles	Shows sufficient knowledge and understanding of straightforward mathematical terms, symbols, and principles	Shows good knowledge and understanding of mathematical terms, symbols, and principles in all areas of the syllabus	Shows comprehensive knowledge and understanding of mathematical terms, symbols, and principles in all areas of the syllabus
Methods	Does not carry out or carries out mathematical processes in straightforward contexts, but makes frequent errors	Carries out mathematical processes in straightforward contexts, but with some errors	Successfully carries out mathematical processes in a variety of contexts	Successfully carries out mathematical processes in all areas of the syllabus
Problem solving	Does not translate or translates routine problems into mathematical symbols and attempts to reason to a result only with help	Translates routine problems into mathematical symbols and attempts to reason to a result	Translates routine problems into mathematical symbols and reasons to a correct result	Translates complex non-routine problems into mathematical symbols and reasons to a correct result; makes and uses connections between different parts of the syllabus
Interpretation and evaluation	Makes little or no attempt to interpret an information and evaluate a result	Attempts to draw conclusions from information and shows limited capacity to evaluate the reasonableness of results	Draws relevant conclusions from information and attempts to evaluate reasonableness of results	Draws full and relevant conclusions from information; evaluates reasonableness of results and recognises own errors
Communication	Displays insufficient reasoning and use of mathematical terms	Generally, presents reasoning and results adequately, using some mathematical terminology and notation	Generally, presents reasoning and results clearly using mathematical terminology and notation correctly	Consistently presents reasoning and results in a clear, effective, and concise manner, using mathematical terminology and notation correctly
Digital competence	Does not use technology sufficiently or uses it only to a very limited extent	Uses technology sufficiently in straightforward situations	Uses technology appropriately most of the time	Uses technology appropriately and creatively in a wide range of situations

Annex 1

Examples of learning objectives related to competences

	Numbers	Operations	Measurement	Shape and Space	Data handling
Understand and analyze	Represent a large number with an abacus	Represent a division with remainder (Euclidian division)	Choose the most appropriate units to express an area	Classify triangles	Organise data in increasing order
Investigate	Investigate if all multiples of 3 are multiples of 6	Simplify a mental calculation	Measure a perimeter of regular polygon	Identify axis of symmetry of 2D-shape	Record daily temperatures and represent them on diagram
Reason	Check if a number is a multiple of 9 without dividing	Use borrowing / regrouping in a mental subtraction	Convert units of lengths, areas, volume	Calculate surface area of a solid	Use different processes to calculate the average (mean) of simple data
Verify and validate	Compare 2 numbers using a number line	Verify result of an operation	Verify and validate the perimeter of a rectangle using formulae	Check that the net corresponds to a 3D-shape	Choose useful data to solve a problem having a lot of information including irrelevant data
Communicate	Find all integer sided rectangles with the area 48	Estimate a result before performing operation	Draw to scale	Compare the properties of 2 quadrilaterals	Use a table to represent a set of data

The concept of *inquiry-based learning* (IBL) refers to these approaches. An overview of useful literature on this can be found in the *PRIMAS guide for professional development providers*.

http://primas-project.eu/wp-content/uploads/sites/323/2017/10/PRIMAS_Guide-for-Professional-Development-Providers-IBL_110510.pdf

Annex 2

List of learning objectives divided into chapters and grades P1 – P5

YEAR P1		
<p><u>NUMBERS</u></p> <p>Calculate to 20 by counting forwards and backwards, starting at any point</p> <p>Count to 100 in intervals of 1, 2, 5, 10 and 20</p> <p>Count a given number of objects</p> <p>Write whole numbers from 0-20 and to 100 in multiples of 10</p> <p>Match quantities to numbers to 20</p> <p>Represent numbers through illustrations and on a number line</p> <p>Use numbers in real life contexts</p> <p>Estimate the number of objects before counting</p> <p>Discover the concept of zero, odd and even numbers to 20</p> <p>Manipulate, partition and combine numbers to 20</p> <p>Use the vocabulary of ordering numbers (smaller, bigger, less than, more than, the same, equal)</p> <p>Order numbers (increasing and decreasing) using a number line and a number track to 20</p> <p>Identify and place a number to 20 on a number line</p> <p>Use the language of ordinal numbers, from first to tenth</p> <p>Manipulate and explore place value using base 10 to 20</p> <p>Read and write numbers on a place value chart</p> <p>Understand the place value of each digit in a two digit number</p> <p>Use vocabulary of double and half in real life contexts</p> <p>Find half of shapes and sets of objects</p> <p>Discover the relationship between halving and doubling</p> <p>Explore, recognise and record patterns and sequences using numbers to 20 with a variety of intervals</p>	<p><u>OPERATIONS</u></p> <p>Explore the concepts of addition and subtraction through play and practical tasks and by using concrete materials</p> <p>Use the vocabulary and symbols of calculations (add, subtract, plus, minus, equals, +, -, =)</p> <p>Calculate operations with answers to 20, with and without manipulatives</p> <p>Create operations with answers to 20, using formal notation</p> <p>Understand that addition and subtraction are inverse operations</p> <p>Use pairs of numbers with a total of 10 and work out the corresponding subtraction facts</p> <p>Use the knowledge of pairs of 10 to learn the pairs to 20</p> <p>Determine the doubles and corresponding halves of all numbers to 20</p> <p>Recognise the principle of the commutative law of addition</p> <p>Explore the concepts of multiplication and division by grouping and sharing through play and practical tasks</p>	<p><u>MEASUREMENT and UNITS</u></p> <p>Use the vocabulary of length (wide, high, longer, shorter, taller, equal)</p> <p>Estimate, measure, compare and record length using non-standard units</p> <p>Recognise non-standard measuring units and objects and use appropriately</p> <p>Use a ruler to draw lines and line segments</p> <p>Measure length in centimetres</p> <p>Compare lengths of line segments in centimetres</p> <p>Investigate standard units in their environment (metre, centimetre)</p> <p>Understand and use the vocabulary of capacity (fill, pour, full, empty)</p> <p>Estimate, measure, compare and record capacity using non-standard units</p> <p>Identify non-standard measuring units and objects and use appropriately</p> <p>Be aware of standard units in their environment (litre)</p> <p>Understand and use the vocabulary of weight (heavier, lighter, balance, scales, weigh, equal)</p> <p>Identify non-standard units of weight</p> <p>Estimate, measure, compare and record weight using non-standard units</p> <p>Investigate standard units in their environment (kilogram and gram)</p> <p>Estimate, measure and describe the passage of time using non-standard units</p> <p>Understand and use the vocabulary of time (hour, day, month, year)</p> <p>Represent the time to the hour and half hour on analogue clocks</p> <p>Tell the time to the hour and half hour</p> <p>Name the days of the week, months and the seasons of the year</p> <p>Order familiar events in the cycle of a day and a week</p> <p>Explore the calendar as a tool to read the date and observe how many nights/days remaining until a certain event within a short period</p> <p>Understand and use the vocabulary of European monetary system (euro, cent)</p> <p>Distinguish between euros and cents</p> <p>Recognise all the coins and notes and be aware of their value</p> <p>Order coins by value</p> <p>Manipulate euros in play using replica coins and notes</p> <p>Manipulate coins and notes to make different amounts to 20 euros</p>

YEAR P1

SHAPE and SPACE

Understand and **use** the vocabulary of spatial awareness, position and directions (left, right, over, under/ below, beside, between, etc.)

Develop their own sense of spatial awareness

Follow and **give** simple directions to move

Locate places or objects on a simple map

Recognise, describe, copy and **extend** patterns in colour, shape and quantity

Manipulate shapes and objects to investigate patterns, symmetry and tessellation

Understand, identify and **use** the vocabulary of 2 D shapes (side, circle, semi-circle, square, rectangle, triangle, sphere, square, cuboid, sides, corners)

Sort, name and **describe** 2 D shapes

Identify 2 D shapes in real life contexts

Identify the basic properties of 2 D shapes

Construct and **draw** 2 D shapes

Use 2 D shapes to create other shapes

Understand, identify and **use** the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramids)

Identify 3 D shapes in real life contexts

Identify the basic properties of 3 D shapes

Recognise examples of symmetry in their environment

Identify reflective symmetry in simple 2 D shapes and letters

Draw a line of symmetry in simple 2 D shapes

Complete the missing half of a shape, picture or pattern, using either a vertical or a horizontal line of symmetry

DATA HANDLING

Collect and **organise** data in a systematic way

Describe real life situations and pictures from a child's environment to collect data

Sort and **classify** objects by one or two criteria

Understand that bar graphs and pictograms are simple ways to represent data

Represent data using bar graphs and pictograms

Represent and **interpret** bar graphs in both horizontal and vertical forms

Create a story using information from a bar graph or a pictogram

YEAR P2

NUMBERS

Calculate to 100 by counting forwards and backwards, starting at any point
Count to 100 in intervals of 1, 2, 5, 10 and 20
Count within 1 000 in intervals of 100
Count a given number of objects
Recall and **write** whole numbers to 100
Match quantities to numbers to 100
Represent numbers through illustrations
Use numbers in real life contexts
Estimate the number of objects before counting
Recall the concept of zero and **discover** odd and even numbers to 100
Manipulate, partition and **combine** numbers to 100
Understand and **use** the vocabulary of ordering numbers (smaller, bigger, less than, more than, the same, equal)
Order numbers (increasing and decreasing) using a number line and a number track to 100
Identify and **place** a number to 100 on a number line
Use mathematical symbols (>, <, =) to compare numbers
Use the language of ordinal numbers, from first to tenth
Manipulate and **explore** place value using base 10 to 100
Read and **write** numbers on a place value chart
Understand the place value of each digit in a three digit number
Partition numbers to 100
Round numbers to the nearest 10
Understand and **use** the vocabulary of double, half and quarter in real life contexts
Identify half of shapes and sets of objects
Discover the relationship between halving and doubling
Explore, recognise and **record** patterns and sequences using numbers to 100 with a variety of intervals

OPERATIONS

Understand and **use** the vocabulary and symbols of addition and subtraction
Explore the concepts of addition and subtraction through play and practical tasks and by using concrete materials
Create addition and subtraction calculations with answers to 100 using formal notation
Make operations including those bridging multiples of ten
Write and **calculate** sums with two digit numbers with answers to 100
Write and **calculate** differences with two digit numbers
Recall that addition and subtraction are inverse operations
Discover pairs of numbers that total 100 and **work out** the corresponding subtraction facts
Use the knowledge of pairs of 10 to learn the pairs to 100
Make operations using doubling and halving
Apply the principle of the commutative law of addition
Learn and **apply** appropriate strategies to support mental calculations
Explore the concepts of multiplication and division by grouping and sharing through play and practical tasks
Understand and **use** the vocabulary and symbols of operations (multiply, divide, times, share equally, \times , \div)
Understand that multiplication is repeated addition
Learn multiplication tables to 10 by rote
Explore the relationship between multiplication tables (doubling, halving)
Understand that multiplication and division are inverse operations
Recognise the principle of the commutative law of multiplication
Calculate halve and double of a given number

MEASUREMENT and UNITS

Extend the vocabulary of length (wide, high, longer, shorter, taller, equal)
Estimate, measure, compare and **record** length using non-standard units
Recognise non-standard measuring units and objects and **use** appropriately
Use a ruler to draw lines and line segments
Measure length in centimetres
Compare lengths of line segments in centimetres
Investigate standard units in their environment (metre, centimetre)
Understand and **use** the vocabulary of capacity (fill, pour, full, empty)
Estimate, measure, compare and **record** capacity using non-standard units
Identify non-standard measuring units and objects and **use** appropriately
Be aware of standard units in their environment (litre)
Understand and **use** the vocabulary of weight (heavier, lighter, balance, scales, weigh, equal)
Identify non-standard units of weight
Estimate, measure, compare and **record** weight using non-standard units
Investigate standard units in their environment (kilogram and gram)
Estimate, measure and **describe** the passage of time using non-standard units
Understand and **use** the vocabulary of time (hour, day, month, year)
Represent the time to the hour and half hour on analogue clocks
Review the time to the hour and half hour
Name the days of the week, months and the seasons of the year
Order familiar events in the cycle of a day and a week
Explore the calendar as a tool to read the date and **calculate** how many nights/days remaining until a certain event
Understand and **use** the vocabulary of European monetary system (euro, cent)
Distinguish between euros and cents
Recognise all the coins and notes and **be aware** of their value
Order coins by value
Manipulate euros in play using replica coins and notes
Manipulate coins and notes to make different amounts to 100 euros

YEAR P2

SHAPE and SPACE

Consolidate and **extend** the vocabulary of shapes (semi-circle, oval, curved, straight, sides, corners, round, flat, faces)

Recognise, describe, extend and **create** patterns

Review the manipulation of shapes and objects to investigate patterns, symmetry and tessellation

Recognise vertical and horizontal lines

Recognise forms, right angles and **relate** them to shape and the environment

Sort, name and **describe** the properties of 2 D shapes

Identify 2 D shapes in real life and **discuss** their use

Sort, name and **describe** the properties of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramids)

Introduce the new shapes oval and semi-circle

Identify 3 D shapes in real life contexts and **discuss** their use

Recognise examples of symmetry in their environment and in drawings and objects

Explore and **recognize** reflective symmetry in shapes through practical activities (by folding, cutting and manipulating objects)

Draw a line of symmetry in 2 D shapes

Complete the missing half of a shape, picture or pattern, using either a vertical or a horizontal line of symmetry

DATA HANDLING

Recall block graphs and pictograms

Understand and **use** tally charts, frequency tables and bar charts as a method of collecting data

Read and **interpret** data from bar charts

Use different scales on axis

Describe real life situations presented in tally charts, frequency tables or bar charts

Use data from Internet to make a bar chart (Easy online data bases)

YEAR P3

NUMBERS

Read, recall and **write** whole numbers to 1 000
Calculate to 1 000 by counting forwards and backwards, starting at any point
Count in multiples of 100 and 1 000 to 10 000
Count to 1 000 in intervals of 1, 2, 5, 10, 50 and 100
Read and **write** numbers to 10 using Roman Numerals
Match quantities to numbers in a variety of situations
Understand how to match numbers to a variety of situations
Use large numbers in real life contexts
Develop and **use** estimation strategies (comparing and grouping)
Order numbers (increasing and decreasing) using a number line and a number track to 1 000
Compare, locate and **place** numbers on a number line and in a hundred square
Locate and **identify** the multiples of 10 and 100 that lie either side of a number.
Use mathematical symbols (>, <, =) to compare numbers
Manipulate, explore and **identify** place value using base 10 to 1 000
Understand the place value of each digit in a four digit number
Partition, manipulate and **combine** four digit numbers
Round numbers to the nearest 10, 100 and 1 000
Understand and **use** the vocabulary of fractions (numerator, denominator)
Read and **write** proper fractions, using denominators to 10
Identify and **recognise** fractions of different shapes
Manipulate and **use** the fraction wall to compare simple fractions and **understand** equivalence
Explore, recognise and **record** patterns and sequences using numbers with a variety of intervals to 1 000
Discover patterns within multiplication tables to 10 and **find** links between them
Recognise multiples of 2, 5, 10 and 100 to 1 000

OPERATIONS

Use the vocabulary and symbols of addition and subtraction
Add and **subtract** three digit numbers
Calculate combination of addition and subtraction calculations
Write addition and subtraction using informal and standard written methods including those bridging multiples of tens and hundreds
Apply appropriate strategies to support mental addition and subtraction to 1 000 (bridging tens and hundreds, halving and doubling, partitioning)
Estimate before calculating and checking the answer
Use a calculator to check and correct answers
Use the vocabulary and symbols of multiplications and divisions
Apply the understanding that multiplication is repeated addition
Recall multiplication tables to 10 and associated division facts at speed and in any order
Determine all factors of numbers within the multiplication tables
Explore the relationships between the multiplication tables
Multiply a two digit number by 10 or 100 and **understand** the impact on place value
Divide a three digit multiple of 10 by 10
Write and **calculate** products (two digit or three digit numbers by a one digit number)
Write and **calculate** quotients (two and three digit numbers by a one digit number)
Understand what a remainder is when dividing
Apply the understanding that multiplication and division are inverse operations
Apply the principle of the commutative law of multiplication
Develop mental calculation strategies for multiplication and division (transposing the knowledge of simple multiplication and division facts to multiples of 10 and 100, partitioning)
Calculate the half and the double of a given number to 100 and of significant multiples up to 1 000
Estimate before calculating and **check** the validity of the estimate
Calculate and **record** a simple fraction of a given quantity
Understand the relationship between fractions and division
Check and **correct** answers by using a calculator

MEASUREMENT and UNITS

Understand and **use** the vocabulary of length (width, height, perimeter, near and far, scale, is equal to, distance)
Identify kilometres and decimetres
Understand the relationships between km-m, m-dm, m-cm, m-mm, dm-cm, cm-mm
Convert km-m, m-dm, m-cm, m-mm, dm-cm, cm-mm
Estimate, measure, compare and **record** lengths of a wide variety of objects using appropriate instruments and metric units (m, dm, cm, mm)
Use a ruler to measure and **draw** line segments to the nearest millimetre
Measure the perimeter of polygons
Calculate the perimeter of a square and a rectangle using formulae
Estimate and **measure** in squares the area of regular and irregular shapes
Use squares or part squares to **draw** shapes of a given area
Consolidate and **extend** the vocabulary of capacity (decilitre, centilitre, millilitre)
Estimate, measure, compare and **record** the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
Understand the relationships between l-dl, l-cl, l-ml
Convert l-dl, l-cl, l-ml
Extend the vocabulary of weight (tonne)
Estimate, measure, compare and **record** the weight of a variety of objects using appropriate instruments and metric units (t, kg, g)
Understand the relationships between t-kg, kg-g
Convert kg-g and t-kg
Understand and **use** units of time and know the relationships between them (second, minute, hour, day, week, month, year and century)
Convert seconds into minutes and seconds, minutes into hours and minutes, days into weeks and days
Read and **record** the time to the exact minute on analogue and digital clocks
Read and **record** the time using the 24-hour clock
Read a calendar, **know** what a leap year is and **recognise** the number of days in each month
Read a simple timetable
Calculate finish time, duration and start time
Convert euros into cents and vice versa
Combine coins and notes to make exact amounts
Record amounts of money using symbols and decimal notation
Give change in multiples of 10 cents
Discover different monetary systems in Europe

YEAR P3

SHAPE AND SPACE

Follow and **give** instructions involving position, direction and movement

Locate a position on a plan or map including using simple grid references

Describe movement or position using the four points of the compass

Consolidate and **extend** the vocabulary (2 D shape surface polygon pattern, fit together without gaps or spaces without overlapping combination)

Recognise, describe, extend and **create** tessellated patterns

Identify and **describe** vertical, horizontal, parallel, perpendicular and intersecting lines

Classify angles as greater than, less than or equal to a right angle and **relate** them to shape and the environment

Recognise acute, right and obtuse angles and **relate** them to real life situations

Consolidate and **extend** the vocabulary of 2 D shapes (parallel, perpendicular, angle, right angle, vertices, regular, irregular)

Consolidate and **extend** the vocabulary of 3 D shapes (parallel, perpendicular, angle, right angle, vertices, edges, faces, regular, irregular)

Review, sort, name and **describe** the properties of 2 D regular shapes (parallelogram, rhombus, trapezium, right angled triangle, quadrilateral) as well as irregular shapes

Review, sort, name and **describe** the properties of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramids)

Explore 3 D shapes and **investigate** their relationship with 2 D shapes

Identify reflective symmetry in 2 D shapes and in the environment

Complete the missing half of a shape, picture or pattern, using vertical and horizontal lines of symmetry

Discover and **draw** all lines of symmetry in 2 D shapes

Translate a simple shape horizontally or vertically on a grid

Rotate a simple shape around one of its vertices

DATA HANDLING

Know and **apply** Venn and Carroll diagrams (two-way tables) to sort data and objects

Recall pictograms, bar graphs as methods to present data

Identify and **interpret** data shown on pictograms, bar graphs (including bar graphs with scales of different amplitudes)

Collect, organise, and represent data using pictograms and bar graphs (including bar graphs with scales of different amplitudes)

Create mathematical representations from real life and play situations

Recall using different scales on axis

Collect data to make a data table on a software program

Construct a bar graph using a software program

Explain and **conclude** data constructed using a software program

YEAR P4

NUMBERS

Read and **write** whole numbers from 0 to 100 000
Match quantities to numbers in a variety of situations (on a number line, a hundred square)
Read and **write** numbers to 2 000 using Roman Numerals
Use large numbers in real life contexts
Use and **apply** estimation strategies (comparing and grouping)
Partition, manipulate and **combine** numbers to 100 000
Order numbers (increasing and decreasing) on a number line and a number track to 100 000
Compare, locate and **place** numbers on a number line and in a hundred square
Identify the significant multiples of 10, 100, and 1000 that lie either side of a number
Manipulate, explore and **identify** place value using 10 to 100 000
Understand the place value of each digit in a five digit number
Partition, manipulate and **combine** numbers to 100 000
Identify place value in decimal numbers to one decimal place
Round numbers to the nearest 10, 100, 1000 and 10 000
Use the vocabulary of fractions (numerator, denominator, proper fraction, improper fraction, mixed number)
Read and **write** proper fractions, improper fractions, mixed numbers and decimal numbers (up to one decimal place)
Identify and **represent** proper fractions, improper fractions and mixed numbers in shapes and diagrams
Locate and **place** mixed numbers on a number line
Manipulate and **use** the fraction wall to compare fractions and **understand** equivalence
Simplify fractions to the lowest common term
Recognise decimal numbers in real life contexts
Understand the equivalence between the decimal and fraction forms of half, quarter, three quarters and tenths
Explore, recognise and record patterns and sequences using numbers with a variety of intervals, and that use more than one operation
Discover patterns within multiplication tables to 10 and **find** links between them.
Recognise and **count** multiples of 2, 5, 10, 100 and 1 000 to 10 000

OPERATIONS

Understand and **use** the vocabulary and symbols of addition and subtraction
Add and **subtract** whole numbers and numbers to one decimal place
Combine addition and subtraction calculation
Write addition and subtraction calculations using standard and informal written methods
Apply appropriate strategies to support mental calculation
Estimate before calculating and **check** the exact result found by sums and differences
Add and **subtract** fractions with the same denominator
Perform addition and subtraction with large numbers
Understand and **use** the vocabulary and symbols of multiplication and division
Determine all factors of numbers within the multiplication tables
Write multiplication calculations using standard and informal written methods (two digit/ three digit by a one digit/ two digit number)
Write simple division calculations using informal methods with and without remainders (two and three digit numbers by a one digit number)
Calculate the remainder when dividing
Be aware of simple algebraic equations
Use, compare and **discuss** various mental strategies
Estimate before calculating and **check** the exact result found by products and quotients
Calculate a fraction of a given quantity
Perform multiplications and divisions with large numbers

MEASUREMENT and UNITS

Understand and **use** the vocabulary of length
Estimate, measure, compare and **record** lengths of a wide variety of objects, using appropriate instruments and metric units
Understand the relationship between mm, cm, dm, m, dam, hm and km
Convert mm, cm, m and km
Measure and **calculate** the perimeter of polygons
Understand and **use** the vocabulary of scale (scale, scale length, actual length)
Find actual length when given a corresponding scale length
Draw shapes of a given area
Understand the relationships between units of area km^2 , ha, a, m^2 , dm^2 , cm^2 , mm^2
Convert km^2 , ha, a, m^2 , dm^2 , cm^2 , mm^2
Discover the formula for the area of a rectangle
Calculate the area of rectangles and compound shapes using mm^2 , cm^2 , dm^2 and m^2
Consolidate and **extend** the vocabulary of capacity (decilitre, centilitre, millilitre)
Estimate, measure, compare and **record** the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
Understand the relationships between l-dl, l-cl, l-ml, dl-cl, cl-ml
Convert l-dl, l-cl, l-ml, dl-cl, dl-ml, cl-ml
Consolidate the vocabulary of weight (gram, decagram, kilogram, tonne)
Estimate, measure, compare and **record** the weight of a wide variety of objects using appropriate instruments and metric units (t, kg, dag, g)
Discover milligrams
Convert t-kg, kg-dag, kg-g, dag-g and g-mg
Understand and **use** units of measurement of time (second, minute, hour, day, week, month, year, century and millennium)
Convert seconds into minutes and seconds, minutes into hours and minutes, days into weeks and days, months into years and months

YEAR P4

SHAPE and SPACE

Read, follow and **give** instructions involving position, direction and movement

Visualise, locate and **plot** a position using grid references and coordinates in the first quadrant, naming the x and y axis

Use the eight points of the compass to describe movement or position

Recognise, describe, extend and **create** tessellated patterns, combining regular and irregular polygons

Identify, describe and **use** a ruler/squared paper to draw vertical, horizontal, parallel, perpendicular and intersecting lines

Know that angles are measured in degrees and that one whole turn is 360° , a straight angle is 180° , a right angle is 90°

Recognise and **draw** acute, right and obtuse angles and **relate** them to shape and the environment

Estimate, measure and **construct** angles to the nearest 5° , using a protractor and a ruler

Use notation of angles (α , β , γ)

Consolidate and **extend** the vocabulary of lines and angles

Consolidate and **extend** the vocabulary of 2 D shapes

Sort, name, describe and **classify** regular and irregular 2 D shapes

Consolidate and **extend** the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone and pyramid)

Explore the main characteristics of 3 D shapes

Sort, name, describe and **classify** regular and irregular 3 D shapes

Explore the relationships between 3 D shapes (perpendicular, parallel faces and edges)

Identify and **make** nets of common 3 D shapes

Use a set square and compasses to create geometrical drawings

Investigate symmetry in art, architecture and nature

Draw all lines of symmetry in polygons

Complete the missing half of a shape, picture or pattern, using vertical, horizontal and diagonal lines of symmetry

Draw the position of a shape after rotation around one of its vertices

Translate a shape horizontally and vertically on a grid

Enlarge or **reduce** a shape using a grid

DATA HANDLING

Read and **interpret** data from pie charts and line graphs

Recall pictograms, block graphs, bar graphs, Venn and Carroll diagrams as methods to present data

Connect between bar graphs and line graphs

Explain which type of representation should be used, or if more can be used to present data

Use data from Internet to make a line graph and a pie chart

Explain, organise, and **present** data

Identify and **record** outcomes of random processes

Use vocabulary of likelihood and chance: impossible, unlikely, even chance, likely, certain

Order events in terms of likelihood of occurrence

YEAR P5

NUMBERS

Read and **write** whole numbers to and beyond 1 000 000
Use and **apply** numbers to and beyond 1 000 000 in real life contexts
Discover the concept of negative numbers through real life examples
Recall numbers to 2 000 using Roman Numerals
Use and **apply** various estimation strategies
Order numbers (increasing and decreasing) irrespective of size
Compare, locate and **place** numbers on a number line and in a hundred square
Identify the whole numbers that lie either side of a decimal number to two decimal places
Identify the significant multiples of 10, 100, 1 000, 10 000 and 100 000 that lie either side of a decimal number to 2 decimal places
Manipulate, explore and **identify** place value using base 10 to 1 000 000 and beyond
Understand the place value of each digit in a six digit number and beyond, and in decimal numbers to two decimal places
Partition numbers into multiples of 10 000, 1 000, 10 and 1, 1/10 and 1/100
Identify place value in decimal numbers to two decimal places
Round whole numbers and decimals to the nearest whole number 10, 100, 1 000, 10 000, 100 000 and 1 000 000
Use the vocabulary of fractions
Read and **write** proper fractions, improper fractions, mixed numbers and decimal numbers (to two decimal places)
Convert improper fractions to mixed numbers and vice-versa
Find equivalent fractions
Simplify fractions to the lowest common term
Recognise and **use** decimal numbers in real life contexts
Understand the equivalence between the decimal and fraction forms of half, third, quarter, three quarters, tenths and hundredths
Identify the whole numbers that lie either side of a decimal number up to two decimal places
Identify percentages in real life (limited to 100%, 75%, 50%, 25%, 10% and 1%)
Understand the relationships between fractions, decimals and percentages (limited to 100%, 75%, 50%, 25%, 10% and 1%)
Explore, recognise and **record** patterns and sequences using numbers with a variety of intervals, including with fractions and decimal numbers
Explore and **understand** triangular and square numbers

OPERATIONS

Consolidate and **use** the vocabulary and symbols of addition and subtraction
Add and **subtract** whole numbers and numbers to two decimal places
Write addition and subtraction calculations using standard and informal written methods
Use and **develop** simple algebraic equations using addition and subtraction
Perform addition and subtraction with brackets
Apply the rules of the order of addition and subtraction and brackets
Use mental strategies for addition and subtraction
Estimate before calculating and **check** the exact result found by sums and differences
Add and **subtract** fractions and mixed numbers
Carry out one-step and two-step calculations involving all four operations
Consolidate and **use** the vocabulary and symbols of multiplication and division
Determine factors of larger numbers
Identify prime numbers to 100
Write multiplication and division calculations using informal and standard written methods
Understand and **use** simple ratios, proportions and scales
Use and **develop** simple algebraic equations using multiplication and division
Perform multiplications and divisions with brackets
Apply the rules of the order of multiplication and division and brackets
Use mental strategies including multiplying and dividing by 10 and 100 and 1 000
Estimate before calculating and **check** the exact result found by products and quotients
Calculate a fraction of a given quantity
Calculate simple percentages of a given quantity (100%, 75%, 50%, 25%, 10% and 1%)
Multiply a fraction by a one digit number
Divide a simple fraction by a one digit number using diagrams
Carry out one-step and two-step calculations involving all four operations

MEASUREMENT and UNITS

Consolidate the vocabulary of length
Estimate, measure, compare and **record** lengths of a wide variety of objects, using appropriate instruments and metric units (including fractions and decimal numbers)
Convert mm, cm, m, dam, hm and km
Estimate and **measure** the perimeter of regular and irregular polygons
Consolidate the vocabulary of scale (scale, scale length, actual length)
Create scale drawings
Read and **interpret** maps using scale
Convert units of area km², ha, a, m², dm², cm², mm²
Calculate the area of compound shapes consisting of rectangles and right-angled triangles using m² and cm²
Consolidate the vocabulary of capacity
Estimate, measure, compare and **record** the capacity of a wide variety of receptacles and metric units (l, dl, cl, ml)
Convert hl, l, dl, cl, ml
Introduce the vocabulary of volume (cubic centimetre, cubic decimetre, cubic metre)
Understand the relationship between volume and capacity (dm³-l)
Calculate the volume of cubes and cuboids using m³, dm³, cm³
Consolidate the vocabulary of weight
Estimate, measure, compare and **record** the weight of a wide variety of objects using appropriate instruments and metric units (t, kg, dag, g, mg)
Convert t, kg, dag, g, mg
Convert and **calculate** with units of time
Practise reading and recording the time to the exact minute on analogue, digital and 24-hour clocks
Explore international time zones
Practise the calculation of duration, start time and finish time including using data from timetables
Knowing two quantities out of three (time, distance or speed), **calculate** the third quantity
Calculate change
Convert the euro and other currencies

YEAR P5

SHAPE and SPACE

Read, follow and **give** instructions and directions using coordinates
Visualise, locate and **plot** a position using integer coordinates in the first quadrant as well as other grid reference systems (longitude and latitude)

Investigate the geometric properties of tessellations

Recognise, describe, extend and **create** tessellated patterns and other designs which combine regular and irregular 2 D shapes

Identify, describe and **use** instruments to draw parallel, perpendicular and intersecting lines

Name and **classify** all kinds of angles and **relate** them to shape and the environment

Estimate, measure and **construct** angles to the nearest degree, using a protractor and a ruler

Use a set square and compasses to create geometrical drawings

Sort, name, describe and **classify** regular and irregular 2 D shapes, including equilateral, scalene, isosceles triangles, and identify their properties

Explore the relationships between 2 D shapes (lines of symmetry and angles)

Identify the properties of a circle and construct a circle of a given radius/diameter

Consolidate and **extend** the vocabulary of 3 D shapes (cube, cuboid, cylinder, sphere, cone, pyramid and prism, hollow, solid)

Sort, name, describe and **classify** regular and irregular 3 D shapes and identify their properties

Visualise, identify and **make** nets of common 3 D shapes

Investigate symmetry in art, architecture and nature

Draw all lines of symmetry in polygons

Draw the position of a shape after reflection using vertical, horizontal, diagonal and multiple lines of symmetry

Draw the position of a shape after translation

Draw the position of a shape after rotation using different centres of rotation

Enlarge or **reduce** a shape by measurement

DATA HANDLING

Apply the concept of proportionality to interpret data presented in pie charts in terms of percentages or fractions

Interpret line graphs (distance/time, a graph of pairs of numbers adding to a given number)

Use data and representations to make informed decisions and predictions

Discuss examples of inappropriate representations of data from newspaper, whether certain representations are misleading

Construct line graphs and pie charts from real life situations, using a spreadsheet (Excel and other online tools)

Study the meaning of average in real life situations

Recognise the three related quantities in a set of data: average, total value, number of data

Understand and **apply** the formula to determine the mean

Knowing two quantities out of three (average, total value, number of data), **calculate** the third quantity

Calculate and **interpret** the mean manipulating data in real life-situations, using a spreadsheet, (Excel and other online tools)