Mathematics Policy

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AIMS

At Brackenfield, we recognise the importance of mathematics as a functional skill for lifelong learning. Mathematics enables us to understand and appreciate relationships and patterns in both the world around us and in everyday life. It helps us to make sense of the world around us through developing the skills for calculating, problem solving and reasoning. Through their growing knowledge and understanding, beginning with exploration and navigation of environments and time, leading to meaningful problem-solving strategies, we want our pupils to use mathematical skills to help them access and confidently explore the world.

We want our pupils:

- To have enjoyment in and enthusiasm for learning through practical experiences, exploration and discussion
- To use problem solving skills to support navigation and functionally access the world around them and develop transferrable skills for lifelong learning
- To functionally access the world around them
- To develop transferrable mathematics skills
- To recognise and access purposeful and aspirational opportunities

We recognise the important role that staff play in the development of mathematical skills, and as such the staff at Brackenfield are committed to their development for all pupils, in the belief that it will support their learning, increase and enhance opportunities and reduce vulnerabilities in adulthood.

Teaching staff will:

- Provide a wide range of opportunities for problem solving and exploration in a range of contexts
- Ensure learning opportunities and resources are appropriate to pupils' age, ability and interests.
- Ensure observations and assessments are used appropriately to ensure pupils are sufficiently challenged in the development of mathematical skills.
- Provide opportunities to develop and transfer life skills in multiple contexts
- Recognise and promote success and achievements

Leaders ensure that staff fully understand their role in the development of calculating, problem-solving and reasoning skills and ensure that staff have access to relevant CPD in order to support this (see appendix 3).

We understand that the acquisition of mathematical skills is a process and that our learners are all at different stages on this journey. For our cohort their stage is defined by their specific communication and cognition needs rather than by their age. Pupils are all baselined to give a developmental stage against the national curriculum to support how

their learning opportunities can best be planned and sequenced to support the development of numerical and problem solving skills. (See appendix 1)

CURRICULUM

Mathematics Intent

Mathematics teaches children how to make sense of the world around them through developing their ability to calculate, reason and solve problems.

We see teaching for mastery in maths as allowing the pupils to gain a deep understanding of maths, allowing them to acquire a secure and long-term understanding of maths that allows them to make continual progress to move onto more complex topics.

We teach by breaking down maths objectives into the smallest steps, so that every pupil is secure in every new concept before moving on. We focus upon teaching for fluency, reasoning and problem solving.

Following baseline assessment (see appendix 1), we consider our children's maths skills in terms of three stages:

- Pre-maths skills
- Emerging maths skills
- Functional maths skills

Pre- maths Intent

Pupils are learning to investigate the world and engage with the precursor concepts: exploring and noticing attributes, comparison, patterns and change. They are learning to show awareness of the passing of time through events, and beginning to notice objects around them in others. They are learning to notice and respond to numbers e.g. in songs and rhymes and through play.

Emerging maths Intent

Pupils are learning to recognise and use number names e.g. in finger rhymes, and developing counting skills such as saying numbers in sequence, pointing to demonstrate one-to-one correspondence and demonstrating some knowledge of cardinality and ordinality. They are developing problem solving skills through play and activities such as those which involve changing amounts/groups or noticing and arranging objects in patterns. They are learning to show awareness of the language of time and comparison by responding to terms such as now, next, later, first, big and small. They are learning to engage with mathematical and problem solving skills for specific purposes e.g. sharing items or building with shapes.

Functional maths Intent

Pupils are learning to apply their mathematics skills in different contexts to help them solve problems. They are learning about numbers, counting and place value and using these to solve calculations and problem solve. They are learning to understand and use money. They are learning navigate time to help them manage routines. They are learning to use measures to help manage self-care i.e. cooking, medicine, cleaning etc.

Concrete, Pictorial (or representational), Abstract Approach

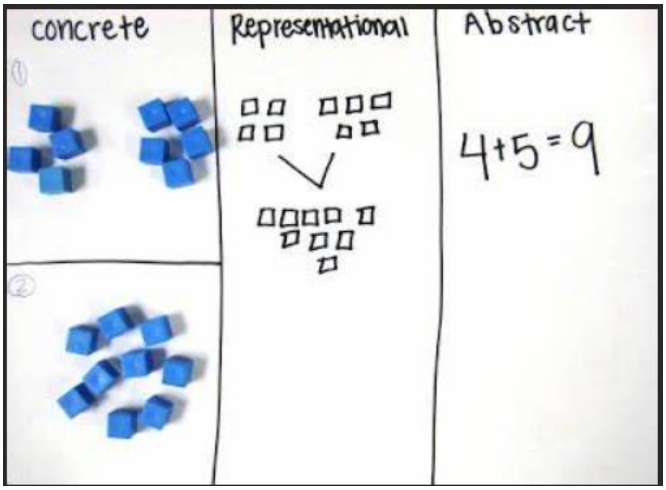
The Concrete Pictorial Abstract approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Concrete – students should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial – students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

Abstract – with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

Using this approach allows pupils to become familiar with new concepts by making use of their existing knowledge and experiences by providing them with a real-world entry point to new learning. This aids a better understanding of the relationship between numbers and the real world, and helps secure understanding of the mathematical concept being learned, enabling it to be better used them to aid functionality, understanding and problem solving.



Embedding Across the Curriculum

Maths skills are taught through the use of the Maths for Life scheme, which provides a differentiated approach to the maths curriculum that lays down solid foundations, is framed in practical understanding and delivers the essential maths needed for life. It starts right at the beginning with prenumber skills. The differentiated approach is designed for pupils with additional learning needs, and the approach is based on securing understanding and functional application of skill on an incremental and independent basis before moving on. Progress is individual with no associated timescales, meaning pupils are given time to think deeply about the maths and really understand concepts at a relational level rather than as a set of rules or procedures.

Each stage of the programme covers the same mathematical topics:

1. Using Numbers and the Number system
2. Using Common Measures, Shape and Space
3. Handling Data and information.

This ensures that the programme delivers the breadth of understanding across all topics that are needed to deliver the essential maths skills for life while ensuring that it provides opportunities to learn in smaller, incremental steps to secure the knowledge, understanding and application of a topic. (see appendix 2)

A 'little and often' approach is encouraged which suits the needs of many of our learners.

Each concept is presented with information to support the adult in understanding the objective, identifying prior knowledge and gives ideas for practical activities to engage the learner using the concrete, pictorial, abstract approach. Pictorial resources attached to the scheme have been carefully designed to be age-neutral to be appropriate for any age of learner and provide multiple questions for each concept. These are presented in ways that encourage approaching the concept in different ways to ensure opportunities for overlearning with a focus on developing the full range of maths skills – fluency, problem solving and reasoning, so that pupils can apply these in real life situations.

In order to support pupils with visual impairment, teachers have access to resources such as talking scales, talking pens and magnifying domes. Staff are aware that fatigue is high for VI students, meaning that learning using a 'little and often' approach is best.

Pre-number/maths

For our pre-maths learners (approximately up to B Level 8) the emphasis is on providing opportunities to engage with fundamental concepts that are essential to provide firm foundations on which to build the growth of further mathematical ideas. These are known as the precursor concepts and are:

- **Attributes: exploring the properties or qualities that enable us to describe and classify the world around us.**
    - We perceive attributes of the world around us through our senses.
    - Attributes can be used to group.
    - Language allows us to describe attributes with increasing precision.
- **Comparison: noticing sameness and difference.**
    - Comparison depends on recognizing attributes.
    - Recognising attributes makes it possible to notice sameness and difference.
    - Noticing sameness and difference allows for matching, sorting, ordering and problem-solving.
- **Pattern: involving rhythm, sequence and regularity that allows for prediction.**
    - A pattern involves a set of defining elements.
    - Regularity occurs when the defining elements recur in sequence.
    - When a regular sequence begins, there is an expectation that it will include the defining elements.
- **Change: when something becomes different**
    - Change may be qualitative or quantitative.
    - The difference may be the result of joining, separating, or of transforming.
    - To respond to change, the difference between the initial condition and the changed condition must be recognized.

At the earliest stages, opportunities for maths learning will occur as an integral part of the pupils' holistic curriculum. Pupils will have opportunities to engage with the precursor concepts through their exploration, play and interactions. As these concepts become embedded, their provision will begin to include invitations to investigate and play to support in the development of more clearly defined maths concepts such as:

- combine objects e.g. stacking cups or blocks, putting objects inside others and taking them out again
- notice patterns and arrange things in patterns.
- organise objects into groups – 'sharing'
- compare amount e.g. 'lots', 'more' or 'same'.
- compare sizes, weights etc. using gesture and language - 'bigger/little/smaller', 'high/low', 'tall', 'heavy'
- know and take part in some finger rhymes with numbers.
- talk about, explore and play with shapes and show awareness of their properties in play e.g. building with cubes/cuboids, rolling spheres/cylinders
- investigate small groups of objects and react to changes of amount in these groups
- combine and separate groups of objects; be encouraged to 'share equally'
- regularly say counting sequences in playful contexts and songs and rhymes

Emerging maths

For our emerging maths (approximately B-Level 9- B-Level 18), learners the emphasis is still very much on learning through exploration and play, although they will have access to some adult-led activities and interactions that support them in developing their understanding of appropriately identified specific maths concepts such as:

- **Number:** counting and cardinality, subitising, exploring patterns in number, understanding problems involving all 4 operations.
- **Shape, Space and Measure:** comparing objects using gesture and language of size (e.g. 'bigger/little/smaller', 'high/low', 'tall', 'heavy') and , begin to measure and record lengths, weights, capacity and volume, explore and recognise a range of 2D and 3D shapes and demonstrate understanding of their properties through play and discussion, sequence and order events and recognize units of time, describe position and movement and begin to recognise and know the value of some coins and notes.

Functional maths

Functional maths learners (approximately B-Level 19+), who require a more formal approach to thinking and problem solving, will have access to timetabled formal sessions; breaking down maths objectives into the smallest steps, so that the learner is secure in every new concept before moving on. In addition, they should have opportunities to apply their skills in real-life and cross-curricular situations as they occur incidentally, in order that learning is functional and supports the development and generalisation of skills.

Maths for Life resources support staff in planning activities and learning appropriate for all children, regardless of their stage of learning.

Activities at Home

The following suggestions are functional activities which can be built into routines at home:

- Count - steps up the stairs, money into a money box etc
- Ask children to say how many without counting (5 or less)
- Play games using a dice and encourage child to say how
- Ask children to set the table with enough knives, forks and microwaves, clocks, registration plates, doors
- Ask children to think of their own representations for numbers e.g. one of them, two hands, three bears, four eels on a car, five toes, six sides on a dice, seven dwarves, eight legs on an octopus etc.
- Deliberately make mistakes. Children need to understand mistakes are normal and everyone makes them e.g. get mixed up when counting, muddle two numbers when ordering them
- Watch Numberblocks on CBeebies. This programme is written by maths specialists to model maths concepts and represents number brilliantly.
- Hide numbers around the house or garden for children to find.
- Play outdoor maths games like hopscotch and skittles. Even better, let children make up their own games and decide how to score points
- Read books with maths concepts e.g. The Very Hungry Caterpillar, One is a snail, ten is a crab, What's the time, Mr Wolf?
- Draw attention to more and less
- Ask questions such as "How many more?", "How many altogether?", "How many would I have if…"

APPENDICES

APPENDIX 1

Baseline Assessments

All pupils have 'at the moment' statements written against the subject intent. All pupils are also baselined on the B-Levels for mathematics. These baseline judgements are used to inform embedded mathematics through personalised learning intentions. B-levels judgements are used to categorise pupils into groups as below:

B-Level Assessment of Maths Skills
• Below B8 (0 – 2y8m) – Pre Maths • B9 – B18 (3- 6yrs) – Emergent Maths • B19 (6y) and above - Functional Maths

Pre Maths B0 (0yrs old)- B8 (2y 8m)	Emerging Maths B9 (3y) -B18 (6yrs)			Functional Maths B19+ (6yrs+)		
Pre-skills	Foundation skills (MFL)	Stage 1 (MFL)1	Stage 2 (MFL)	Stage 3 (MFL)	Stage 4 (MFL)	Accredited learning

B-Level Standardised Equivalents

		School Year	EYFS Development Matters 2012	EYFS Development Matters 2020	Pre and Key Stage Standards	National Qualifications Framework
Pre-formal / Informal	B1		0 – 11 months	Birth to 3 Years		
	B2		0 – 11 months			
	B3		8 – 20 months			
	B4		8 – 20 months			
	B5		16 – 26 months			
	B6		16 – 26 months			
	B7		22- 36 months			
Semi-Formal / Informal	B8		22 – 36 months	3 – 4 Years	Standard 1 Writing Standard 1 Maths	Vocational Pathway Qualifications (Entry 1 Continuum)
	B9		30 – 50 months			
	B10		30 – 50 months		Standard 1 Reading	
	B11		30 – 50 months		Standard 2 Maths	
	B12		40 – 60 months	Reception	Standard 2 Reading Standard 2 Writing	
	B13	Reception	40 – 60 months		Standard 3 Writing Standard 3 Maths	
	B14	Reception	40 – 60 months			
	B15	Reception	Early Learning Goal		Standard 3 Reading Standard 4 Writing	
Formal	B16	1			Standard 4 Reading Standard 4 Maths	Entry Level 1
	B17	1				
	B18	1			Standard 5 Writing	
	B19	2			Standard 5 Maths Standard 5 Reading	
	B20	2				
	B21	2			End of Key Stage 1 Standard 6	
	B22	3				Entry Level 2
	B23	3				
	B24	3				
	B25	4				
	B26	4				
	B27	4				
	B28	5				Entry Level 3
	B29	5				
	B30	5				
	B31	6				
	B32	6				
	B33	6			End of Key Stage 2	

From here, pupils who are identified as emerging or functional mathematicians are then selected for standardised testing using the Sandwell Early Numeracy Test for Maths.

Data is triangulated; age, B-level, standardised test result (including language comprehension age for maths) which informs the curriculum offer and classroom approaches.

Evidence of learning is tracked through functional application of the mathematics skill in order to see holistic, generalised and maintained progress. This is done through BOOP, where different skills are tagged in posts. See BOOP for tags.

For more information on the use of assessment to inform teaching and track progress, see the Teaching, Learning and Outcomes Policy.

APPENDIX 2

Staff CPD

New staff have a thorough induction covering all aspects of the school curriculum, including mathematical approaches.

Staff are taken through how to baseline pupils for maths, using standardised testing, at the moment statements and b-level data. Staff are shown how to write maths targets taking into account pupil skillset and trajectory. These targets are added to BOOP. All pupils have embedded maths tagged. Staff are shown how to do this as part of their induction.

Maths refresher sessions are voluntary and held through the staff CPD calendar. STLAs have additional CPD to support assessment and intervention delivery.

Teachers and support staff have access to training on the Maths for Life programme, including sessions with the programme founder - Karen McGuigan - to ensure they have a thorough understanding of how the scheme supports the development of functional maths skills. Training also provides an overview of how the sessions should be delivered and appropriately differentiated for pupils.

For standardised testing, staff attend training first and are then guided through the stages to ensure standardised testing is completed accurately and in a timely manner. Staff are taken through the results, how to convert to age equivalencies and how this relates to the EHCP outcomes of pupils, where appropriate.

Teachers and STLAs can be assigned as mentors to support performance of new or under-performing staff in maths delivery. This is written into performance management documentation and tracked through the quality assurance cycle.

APPENDIX 3

Maths Long Term Plan / Objectives

Topic 1: Using Numbers and The Number System				
Pre- number	**Foundation**	**Level 1**	**Level 2**	**Level 3**
• Make simple comparison • Identify the same and different • Matching • Simple classification	• Rote count the numbers from 1 to 10 • Conservation of number • One-to-one correspondence when counting • Stable order when counting 1 to 10 • Cardinality - the last number counted is the total amount • Understand 'zero' • Subitising - visual spotting, understanding the wholeness of a number • Recognise numerals from 0 to 10 • Know the value of numerals from 0 to 10 • Write numbers 0 to 10 • Read numbers 0 to 10 • Order and compare numbers up to 10 • Use whole numbers to count reliably up to 10 items including zero • Count on from a number other than 1 • Count backwards from 10 to zero • Compare two given numbers of objects in groups of up to ten • Use ordinal numbers from first to tenth, when describing position in a sequence of numbers • Simple whole number addition up to a value of 10	• Read, write, order and compare numbers up to 20 • Use whole numbers to count up to 20 items including zero • Add numbers which total up to 20, and subtract numbers from numbers up to 20 • Recognise and interpret the symbols +, - and = appropriately	• Count reliably up to 100 • Read, write, order and compare numbers up to 100 • Understand place value of tens and ones • Recognise odd and even numbers up to 100 • Understand and recognise ordinal numbers up to hundredth • Add two numbers which total up to 100 • Subtract one- and two-digit numbers from numbers up to 100 • Group numbers by 2, 3, 4, 5 and 10 • Count on in 2s, 3s, 4s, 5s and 10s • Understand multiplication as repeated addition • Multiply numbers by 2, 3, 4, 5 and 10 • Share numbers by 2, 3, 4, 5 and 10 • Count back in 2s, 3s, 4s, 5s, and 10s • Understand division as repeated subtraction • Divide numbers up to 100 by 2, 3, 4, 5 and 10 • Recognise and interpret the symbols +, -, x, ÷ and = appropriately	• Read, write, order and compare numbers up to 1000 • Understand place value of hundreds, tens and ones • Estimate by rounding to the nearest 10 and 100 • Add numbers which total up to 1000 • Subtract one-, two- and three-digit numbers from numbers up to 1000 • Group numbers by 6, 7, 8 and 9 • Count on in 6s, 7s, 8s and 9s • Multiply numbers by 6, 7, 8 and 9 • Use and create a multiplication square to calculate up to 10x10 times table • Share numbers by 6, 7, 8 and 9 • Count back in 6s, 7s, 8s and 9s • Divide numbers up to 100 by 6, 7, 8 and 9 • Use a multiplication square to calculate the related division facts for up to 10x10 times table • Translate a word problem into a number sentence using symbols +, -, x, ÷ and = appropriately

	• Simple whole number subtraction from numbers up to 10 • Recognise and interpret the symbols +, - and = appropriately			
• B-Levels: B6-8 • EYFS	• B-Levels: B9 – 12 • EYFS	• B-Levels: B13– 18 • EYFS – Reception / KS1 • Accredited Outcome: Entry Level 1	• B-Levels: B19 – 21 • KS1 • Accredited Outcome: Entry Level 2	• B-Levels: B22 – 24 • KS2 (Y3) • Accredited Outcome: Entry Level 3

Topic 2: Using Common Measures, Shape and Space			
Foundation	**Level 1**	**Level 2**	**Level 3**
• Recognise coins and notes and write them in numbers with the correct symbols (£ & p), where these involve numbers up to 10 • Understand the relative duration of a second, a minute and an hour • Understand the parts of the day - morning, afternoon, evening, night • Understand what a day is and recognise the names of days • Understand the concept of today, yesterday and tomorrow • Understand the relative duration of a day, a week, a month and a year • Describe and compare marked differences in size between two items using simple comparative vocabulary such as large, big, small • Describe and compare marked differences in lengths and heights of two items using simple comparative vocabulary such as long, short, tall • Describe and compare marked differences in weights of two items using simple comparative	• Recognise coins and notes and write them in numbers with the correct symbols (£ & p), where these involve numbers up to 20 • Read 12 hour digital and analogue clocks in hours • Know the number of days in a week, months, and seasons in a year; Be able to name and sequence • Describe and make comparisons in words between measures of items including size, length, width, height, weight and capacity • Identify and recognise common 2-D and 3-D shapes including circle, cube, rectangle (incl. square) and triangle • Use everyday positional vocabulary to describe position and direction including left, right, in front, behind, under and above	• Recognise, order and understand the value of all coins and notes in the context of the real world • Calculate money with pence up to one pound (p) • Calculate money in whole pounds up to £100 (£) • Know that there are 60 seconds in 1 minute • Know that there are 60 minutes in 1 hour • Read 12 hour digital and analogue clock in digital time • Read and record common date formats • Navigate an annual calendar in days, weeks and months forward and back • Read and use simple scales to the nearest labelled division • Use metric measures of length including millimetres, centimetres, metres and kilometres • Use measures of weight including grams and kilograms • Use measures of capacity including millilitres and litres • Use measures of positive temperatures in degrees • Recognise and name 2-D and 3-D shapes including	• Recognise the relative value of all coins and notes • Recognise money using decimal notation - pounds and pence as £0.00 • Round amounts of money to the nearest pound • Know that there are 24 hours in 1 day • Read 24-hour digital time • Read and record time using AM and PM in the context of 24 hour digital time • Simple time calculations with minutes and hours • Know the number of days per calendar month • Simple time calculations with days, weeks and months • Select and use a suitable instrument to measure length, weight, capacity and temperature • Compare metric measures of length including millimetres, centimetres, metres and kilometres • Compare measures of weight including grams and kilograms • Compare measures of capacity including millilitres and litres • Compare measures of positive temperatures

vocabulary such as heavy, light • Describe and compare marked differences in capacity and quantity of two items using simple comparative vocabulary such as full, empty, holds more, holds less, has more, has less • Recognise basic 2-D shapes • Recognise basic 3-D shapes • Identify and select a variety of shapes to make simple pictures, patterns and models • Use familiar and simple vocabulary to describe shape and size, such as straight, curved, flat, larger, smaller • Understand and apply simple positional vocabulary, including in / out, under / over, front / back, in front of / behind • Understand and apply direction of movement, including up / down		pentagon, hexagon, cylinder, cuboid, pyramid and sphere • Describe the properties of common 2-D and 3-D shapes in the context of real life application • Use appropriate positional vocabulary to describe position and direction	• Read and record linear scales • Describe the properties of common 2-D and 3-D shapes including numbers of sides, corners, edges, faces and bases • Use appropriate positional vocabulary to describe position and direction using four compass points North, South, East, and West
• B-Levels: B9 – 12 • EYFS • Accredited Outcome:	• B-Levels: B13– 17 • EYFS – Reception / KS1 • Accredited Outcome: Entry Level 1:	• B-Levels: B18 – 21 • KS1 • Accredited Outcome: Entry Level 2	• B-Levels: B22 – 24 • KS2 (Y3) • Accredited Outcome: Entry Level 3

Topic 3: Handling Information and Data

Foundation	Level 1	Level 2	Level 3
• Recognise and describe list of up to five items • Sort and classify objects using a single criterion • Use simple representations or diagrams for counting numbers up to 10	• Read numerical information from lists • Sort and classify objects using a single criterion • Read and draw simple charts and diagrams including a tally chart, block diagram / graph	• Extract information from lists, tables, diagrams and bar charts • Make numerical comparisons from bar charts • Sort and classify objects using two criteria • Take information from one format and represent the information in another format	• Extract information from lists, tables, diagrams, charts and simple line graphs • Interpret simple information, to make comparisons and record changes, from different formats including bar charts and simple line graphs • Organise and represent simple information in appropriate ways including tables, diagrams, bar charts and simple line graphs

• EYFS • Accredited Outcome:	• EYFS – Reception / KS1 (Year2) • Accredited Outcome: Entry Level 1:	• KS1 – Year 2 • Accredited Outcome: Entry Level 2	• KS2 (Y3/4) • Accredited Outcome: Entry Level 3

Brackenfield SEND School Maths Journey

Functional Mathematicians

B19 (6yrs 4months) — Approximately → **B33 (11years)**

Pupils at this level require a more formal approach to thinking and problem solving. They are learning about numbers, counting and place value and using these to solve calculations and problem solve. They are learning to understand and use money. They are learning navigate time to help them manage routines. They are learning to use measures to help manage self-care i.e. cooking, medicine, cleaning etc. Thay are learning to apply their mathematics skills in different contexts to help them solve problems. They will have access to timetabled formal sessions; breaking down maths objectives into the smallest steps, so that the learner is secure in every new concept before moving on. In addition, they should have opportunities to apply their skills in real-life and cross-

Emergent Mathematicians

Approximately

B9 (3 yrs) → **B18 (6yrs)**

For pupils working at this level, the emphasis is still very much on learning through exploration and play, although they will have access to some adult-led activities and interactions that support them in developing their understanding of appropriately identified maths concepts. They are learning to recognise and use number names e.g. in finger rhymes, and developing counting skills such as saying numbers in sequence, pointing to demonstrate one-to-one correspondence and demonstrating some knowledge of cardinality and ordinality. They are developing problem solving skills through play and activities such as those which involve changing amounts/groups or noticing and arranging objects in patterns. They are learning to show awareness of the language of time and comparison by responding to terms such as now, next, later, first, big and small. They are learning to engage with mathematical and problem solving

Pre- Maths

B0 (birth) — Approximately → **B8 (2yrs 8m)**

Pupils working at this level are using their senses to perceive and make sense of the world around them. Through opportunities to engage with a range of resources and activities in their environment, they develop fundamental concepts that are essential to provide firm foundations on which to build to growth of further mathematical ideas. These are known as the precursor concepts and are:

- Attributes: exploring the properties or qualities that enable us to describe and classify the world around us.
- Comparison: Noticing sameness and difference.
- Pattern: Involving rhythm, sequence and regularity that allows for prediction
- Change: when something becomes different.

At the earliest stages, opportunities for maths learning will occur as part of the pupils' holistic curriculum. Pupils will have opportunities to engage with the precursor concepts through their exploration, play and interactions. As these concepts become embedded, their provision will begin to include invitations to investigate and play to support in the development of more clearly defined maths concepts.