Building Blocks for Success

ENSURING A STRONG START FOR ALL LEARNERS: EARLY MATHS

Planning for learning through ensuring clarity in the curriculum

What do we want children to learn?

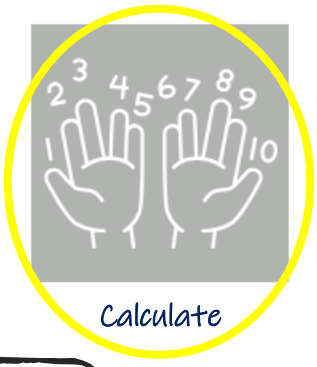
Early education should be ambitious for all, especially those who are disadvantaged. Early maths sets the foundations for learning, as mathematics gives children a range of transferable skills that they can use in everyday life including problem solving, reasoning, explaining and justifying. The learning environment supports children's growing mathematical understanding. At St Aloysius, we aim to equip all children, without fail, with the knowledge and skills they need to make progress in Reception, through Key Stage One and beyond.

Our early years education provides children with strong foundations so that they can successfully learn how to:

Communicate

Read

Write



Calculate

Executive function for learning and well-being

Physical, social, emotional readiness for learning

All children are entitled to a strong mathematical foundation, enabling them to show the characteristics of effective learning in mathematics. Early years teaching is underpinned by the belief that all children are effective mathematical learners, despite any previous experiences that may differ. In the early years of children's education, we have a commitment to:

- Develop practitioners' understanding of how children learn mathematics.
- Dedicate time for children to learn mathematics and integrate this throughout the day.
- Use manipulatives and develop understanding.
- Ensure that teaching builds on what children already know.
- Use high quality targeted support to help children learn mathematics.

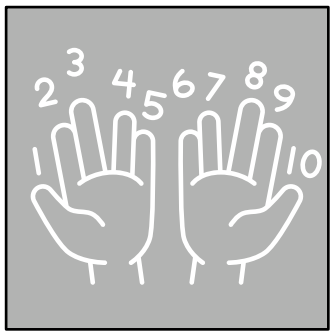
Education Endowment Foundation 2020

Number in Reception

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically.

Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built.

In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.



Calculate

Number

Numerical Patterns

Number

Children at the expected level of development will:

- Have a deep understanding of numbers to 10, including the composition of each number.
- Subitise (recognise quantities without counting) up to 5. Automatically recall (without reference to rhyme, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts

Numerical Patterns

Children at the expected level of development will:

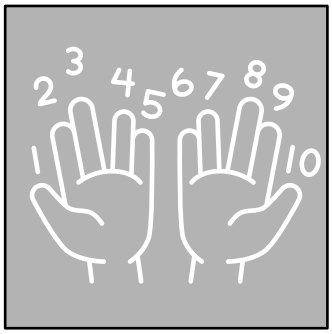
- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

As part of the EYFS Reforms (September 2021), Shape, Space and Measure was removed from the Mathematics area of learning within the EYFS Framework. Consequently, Shape, Space and Measure was also removed as an Early Learning Goal. Despite this, at St Aloysius, we recognise that Shape, Space, Measure and Pattern continue to be fundamental skills which impact on many other areas of learning. It remains important to ensure that children within EYFS are given a broad mathematics curriculum which provides them with the necessary skills and knowledge within shape, space, measure and pattern to access the KS1 curriculum in Year 1 and beyond.

Number in Key Stage One

The national curriculum for mathematics aims to ensure that all pupils:

- Become **fluent** in the fundamentals of mathematics, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing mathematical argument, justification or proof.
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication.



Calculate

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions

Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.

The principal focus of mathematics teaching in **Key Stage 1** is to ensure that pupils develop confidence and mental fluency with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including with practical resources.

By the **end of Year 2**, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practise at this early stage will aid fluency. Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at Key Stage 1.

The expectation is that most pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

How Children Learn Maths

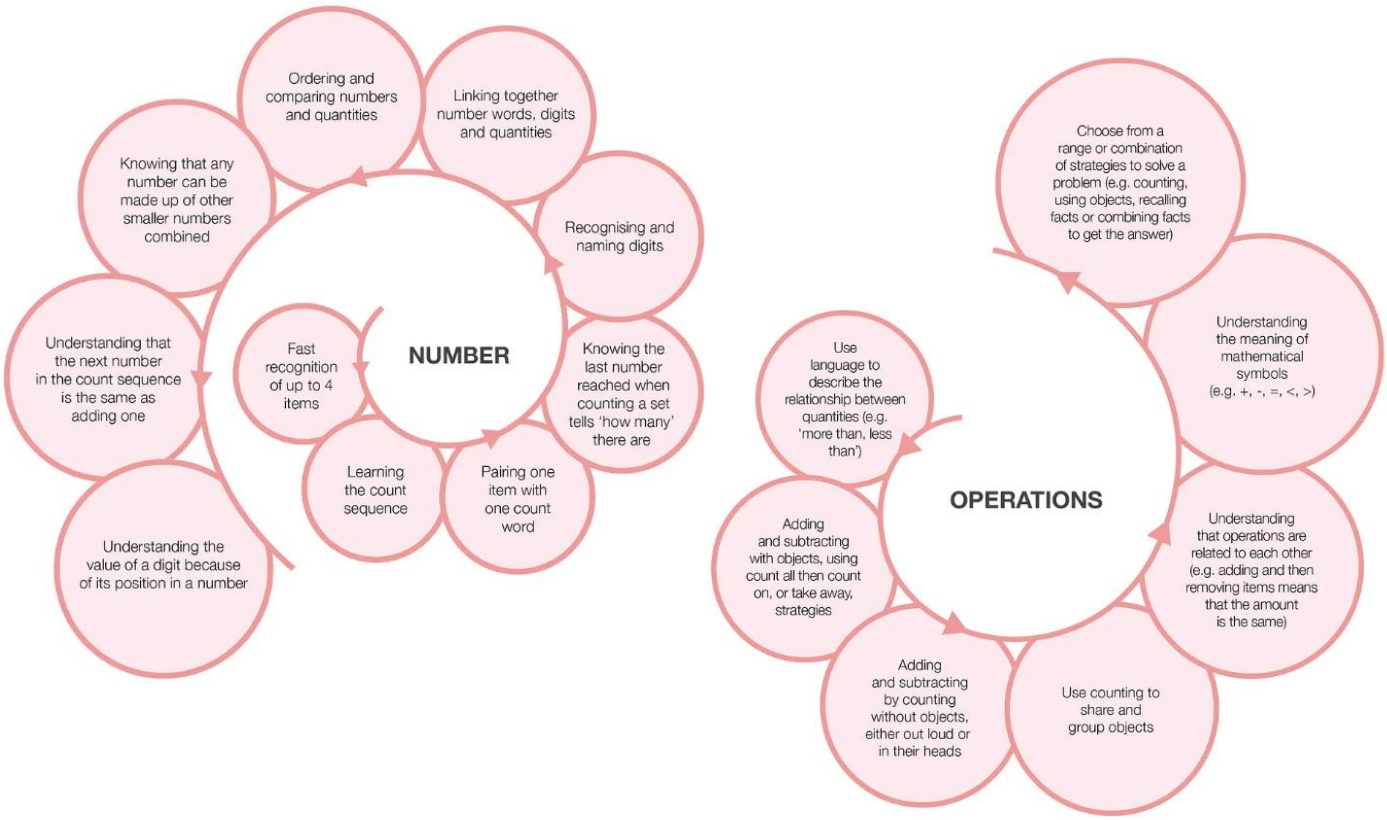
It is important that we invest time in developing our teachers own understanding of mathematics, their understanding of how children learn and how this relates to effective pedagogy. It is equally important to create a culture that supports children's curiosity, thinking, and problem-solving.

How children learn mathematical concepts is complex and developing a secure grasp of early mathematical ideas takes time. Confidence when reciting the count sequence of numbers does not necessarily mean that children have a full grasp of the underlying concepts (for example, the meaning of the numbers in the count sequence).

The rate of mathematical development does not rely only on specific mathematical knowledge and skills, but also on:

- **Executive functions** such as working memory (the ability to hold information in your mind and manipulate it) and self-regulation and metacognition skills
- **Language skills** that enable the effective communication of mathematical thinking, and a grasp of mathematical language important for the development of mathematical ideas.
- **Motor skills** which are required for a variety of mathematical activities e.g., counting objects and writing numerals.
- Children's **prior experiences** with mathematical materials and activities.
- Children's **interests, enjoyment, and attitudes** towards mathematics.

Development Progression



Education Endowment Foundation 2024

Development progression diagrams (EEF,2024) summarise what we know about number and operations development. The development of each skill or concept is not discrete, instead there is considerable overlap in development so children may develop several skills in parallel. Children may also move through the spiral in different orders.

NCETM

At St Aloysius, our maths leaders work with the Maths Hub and our curriculum is guided by the concept of teaching for mastery, using the Five Big Ideas.

Coherence:
Teaching is designed to enable a coherent learning progression through the curriculum, providing access for all pupils to develop a deep and connected understanding of mathematics that they can apply and communicate in a range of contexts.

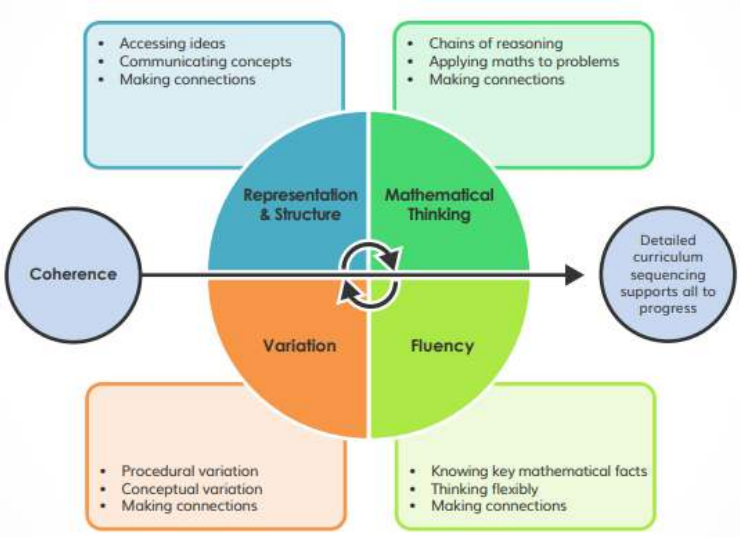
Representation and Structure:
Teachers carefully select representations of mathematics to expose mathematical structure. The intention is to support pupils in 'seeing' the mathematics, rather than using the representation as a tool to 'do' the mathematics. These representations become mental images that students can use to think about and discuss mathematics, supporting them to achieve a deep understanding of mathematical structures and connections.

Mathematical Thinking:
Central to how pupils learn mathematics and includes looking for patterns and relationships, making connections, conjecturing, reasoning, and generalising. Pupils should actively engage in mathematical thinking in all lessons, discussing and communicating their ideas using precise mathematical language.

Fluency:
Efficient, accurate recall of key number facts and procedures is essential for fluency, freeing pupils' minds to think deeply about concepts and problems, but fluency demands more than this. It requires pupils to have the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections, to explain their ideas and to choose appropriate methods and strategies to solve problems.

Variation:
The purpose of variation is to draw closer attention to a key feature of a mathematical concept or structure through varying some elements while keeping others constant. Through variation the teacher focuses thinking and discussion on the key feature in question.

- Conceptual variation involves varying how a concept is represented to draw attention to critical features. Often more than one representation is required to look at the concept from different perspectives and gain comprehensive knowledge.
- Procedural variation considers how the student will 'proceed' through a learning sequence. Purposeful changes are made in order that pupils' attention is drawn to key features of the mathematics, scaffolding students' thinking to enable them to reason logically and make connections.



Mastering Number

In Reception, our teachers plan lessons using the NCETM Mastering Number resources. In Year 1 and Year 2, alongside maths lessons, we also follow the NCETM 'Mastering Number 'programme. This is a daily teacher-led session of 10-15 minutes, designed to ensure that pupils develop fluency with, and understanding of, number that is crucial to future success in maths.

The programme aims to secure firm foundations in the development of good number sense for **all** children. The intention over time is that children will leave KS1 with fluency in calculation and a confidence, flexibility and fluidity with number. A key feature of the programme is also to develop children's ability to spot patterns, make connections and develop a 'can do' attitude.

Integrating Maths into Everyday Routines

In Early Years and Key Stage 1, there are opportunities throughout the day to learn about mathematics through the environment and through routines, as well as in dedicated teaching time. Throughout the day children should be exposed to mathematical language, both formal and informal, and adults should discuss mathematical ideas with children.

Plan daily activities targeting specific maths concepts and skills

Our teachers use whole-class, large and small groups to tailor instruction for children who need support on different aspects of content. Approaches will look different for children at different developmental stages.

Use story books to promote mathematical thinking and language

Mathematics is explored through different contexts, including books, puzzles, songs, rhymes, puppet play and games. Using storybooks to teach mathematics can be particularly effective, through providing an opportunity for mathematical talk and questioning.

Use games to promote mathematical thinking and language

Games can be an engaging way to practise and extend skills. They can build on children's mathematics knowledge, generate repeated practice in a motivating context, and give children and adults an opportunity to discuss strategies and ideas together.

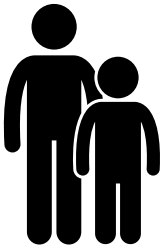
Create opportunities for discussion of mathematics in the everyday

Adults in school seize every opportunity to reinforce mathematical vocabulary—for example by making a comment about which child is standing 'first', 'second', or 'fourth' in line, which child has 'more than' or 'fewer' objects than another child, or helping children rephrase statements that use ambiguous, non-mathematical language, such as refining 'big' when the child means 'tall'.

Mathematics can be highlighted through daily routines, during play, and in other curriculum areas. Everyday routines such as registration time, snack time, and tidying up provide opportunities for counting and making comparisons, as well as addition, subtraction, sharing, and time problems.

Helping **ALL** pupils to learn

Whilst our work to ensure we are establishing strong foundations for later success will benefit all pupils, it is particularly important for those whose early learning has been limited. In doing so, we follow some key teaching principles.



Role of the adult in developing children's mathematical language and understanding:

Adults have an important role in scaffolding learning and extending the learning during play. Through observing children's play, practitioners will identify 'teachable moments' in which they can join the play to add to the discussion, reinforce mathematical vocabulary, and encourage problem-solving.

Adults at St Aloysius:

- Notice what children know and can do and intentional interact using mathematical questioning, challenging pupils to problem solve.
- Are knowledgeable about stories, rhymes and songs to promote mathematical understanding.
- Make the best use of opportunities throughout the day to engage in mathematical conversations with the pupils.

Every interaction is a teaching moment.

Role of routines:

Adults in school establish clear routines and take advantage of such time to support mathematical development.

Adults at St Aloysius:

- Use every day routines such as registration time, snack time, and tidying up provide opportunities for counting and comparison as well as addition, subtraction, sharing, and time problems.
- Skilfully use song to indicate transition points.
- Use actions and gestures to support mathematical understanding.

Routines

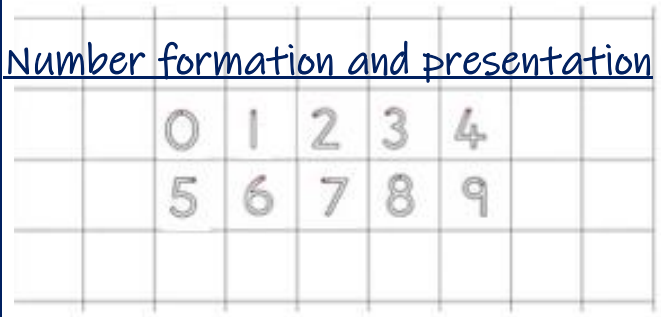
Parent Partnerships:

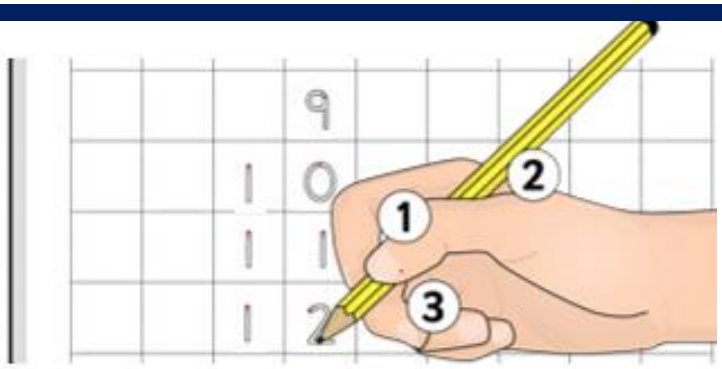
Involving parents, as the first educators of their child, is exceptionally important to us.

Adults at St Aloysius:

- Engage with parents, informing them of how they can best help their child to progress with their learning. Sharing clarity of expectations and strategies that will help rather than hinder pupil learning.
- Regularly communicate what the children are learning.

Number formation and presentation





Set children up with the skills for success:

Number formation requires frequent and discrete, direct teaching. Children should be taught to hold their writing implement easily and correctly. Prioritising the physical skill of writing numbers ensures that bad habits are avoided, particularly in relation to number reversal.

Adults at St Aloysius:

- Support children to correctly hold a pencil, noticing and correcting when incorrect pencil grip is being used.
- Model using squared books correctly, building muscle memory and making number formation smoother and more consistent.
- Teach children how to set out work with accuracy and clarity.

Plan for small steps, with enough teaching and practice:

Our curriculum clearly identifies important knowledge to learned by all children by key points. This helps our teachers know what to emphasise in their teaching and assessment.

Adults at St Aloysius:

- Use consistent learning sequences to provide children with the opportunity to build strong conceptual understanding of number before applying their knowledge to reasoning and problem solving.
- Provide sufficient teaching and practice so that children are confident with the steps they need to take to be successful in any given task.
- Know that those who are not sufficiently fluent need more time to practice and consolidate their learning before moving on.
- Prioritise effective mathematical talk, for all children, to develop their understanding of mathematical concepts.
- Notice those children who may be less involved and actively seek to bring them into the learning.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Nursery	Subitise up to 3 objects. Count and identify the total of sets of objects (cardinal principle)	Matching quantity to numerals up to 5. Comparing quantities. Experimenting with symbols/marks as well as numbers.	Use positional language. Select shape appropriately when building. Combine shapes to create new ones.	Matching quantity to numerals up to 5.	Identify and describe patterns. Extend a pattern.	Spot an error in a pattern. Solving real-world mathematical problems.
Reception	Number: Match and sort, comparing amounts MSST: Compare size, mass and capacity, explore patterns.	Number: Representing, comparing and composition of numbers to 1-5, represent numbers to 5, number bonds to 5, one more and one less. MSST: circles/triangles, positional language, squares/rectangles, time.	Number: Introduce 0, comparing and composition of numbers 4 and 5, recognise 0, 7, 8 and comparing 2 amounts. MSST: compare mass, compare capacity, length, height.	Number: Making pairs, counting to 9 and 10, comparing numbers to 10, number bonds to 10. MSST: time, 3D shapes, spatial awareness, patterns.	Numbers to 20, building numbers 10- 20, counting patterns 10-20, adding more, taking away. ST: spatial reasoning, matching, rotating, manipulating, composing and decomposing shapes/pictures	Number: counting, sharing/grouping, even and odd numbers, numerical patterns and relationships. ST: spatial reasoning, visualising and building, mapping.
Year 1	Place value within 10/Addition and subtraction within 10	Addition and subtraction within 10/Place Value within 20	Place Value within 20/ Addition and subtraction within 20	Place Value within 50/length and weight/Weight and volume	Weight and volume/Multiplication and division/Fractions/ Position and direction	Place value within 100/Money/Time
Year 2	Place Value up to 100/Addition and subtraction	Addition and Subtraction/Multiplication	Multiplication and division/Money/Fractions	Fractions/Shape/Position and Direction	Statistics/Length and weight SATs	Mass, capacity and temperature/Time

Day	Learning objective/s	Teaching	Independent Work Targeted activities to achieve:	Plenary
Day 1:	To sort objects.	***Input:*** Teachers will begin by using physical images of a character to sort and organise into groups based upon the characteristics such as the colour of their clothes, what they are wearing etc. Teachers will use questioning to check understanding and address any misconceptions. Ask children: how can we sort Alex by colour? How many have red shoes? How many are wearing jeans? **Activity:** Children complete the sticker activity using their knowledge of sorting objects by creating a sorting rule. **Activity 1:** Circle the objects by placing them into different groups. **Activity 2:** Sort the flowers into groups and name the groups. **Activity** 3: Complete the sentence by circling the word which describes the way the objects have been grouped. **Explain how children should set the work out in their books. Circling the objects to show the groups that can be made and writing on the lines to complete the sentences to complete their explanations.** **Children will complete independent sticker activities based on the input.**	**All children: SEN/LA with adult support:** children to sort the types of fruit into groups by drawing circles on the stickers. Children then sort shapes into groups b-sorting objects into 2 groups (by colour) and 3 groups (by type). **Activity 2:** **LA:** to sort the flowers into groups (circle in 2 different colours). **MA/HA:** to sort the flowers into groups (circle in 2 or 3 different colours). **Activity 3: LA:** to complete the sentence by circling the correct word (type or colour). **MA/HA**: to complete the sentences and explain how the objects can be grouped by circling the correct word (type, colour or position).	Use your head challenge as a class: true or false? Have these shapes been sorted by colour? (Yes they have been sorted into the colours of red and blue). Can these be sorted using a different sorting rule? Group and class discussion.
Day 2:	To count objects.	**Recap:** the teacher will begin by recapping how we can sort objects. Ask children: how can we sort objects? (colour, type, position etc). Display slide with buses which are both different colours and different sizes. Ask children: is it true that we can sort the buses by both colour and sizes? (True). **Input:** The teacher will explain that today we are going to be counting different objects. The teacher will emphasise that	**Practical activity:** children will have cubes and sorting groups. The teacher will say that they need to count a particular number. Teacher will model this at the front of the class before the children begin the activity in pairs. **Activity 1:**	Count the children in the class. -Small groups of children in the class. Pick out a characteristic and count those children. How many are wearing jumpers? How many boys/girls?