



Maths at St Andrew's CE VA Infant School

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Maths Policy

Intent

At St Andrew's Infant School, we deliver a broad and balanced curriculum that allows each child to reach their fullest potential. We aim to provide children with a powerful set of tools with which to calculate, reason and solve problems, not just at school but in everyday life.

Aims

At St Andrew's we aim to:

- promote enjoyment and enthusiasm for learning through practical activity, cross-curricular learning, exploration and discussion,
- develop mathematical skills and knowledge and quick recall of basic facts in line with the National Curriculum Mathematics Programmes of Study,
- promote confidence and competence with numbers and the number system,
- develop the ability to think mathematically: solve problems by applying their mathematical knowledge and reasoning in a range of contexts,
- develop a practical understanding of the ways in which information is gathered and presented,
- explore features of shape and space, and develop measuring skills in a range of contexts,
- develop communication skills,
- develop both independence and co-operation,
- leave primary school with an efficient, reliable, compact written method of calculation for each operation,
- understand the importance of mathematics in everyday life and promote mathematical thinking as a life skill.

Mathematics is an interconnected subject in which pupils need to be able to move fluently between mathematical ideas. The programmes of study are, by necessity, organised into distinct areas, but pupils will make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They will also apply their mathematical knowledge to science and other subjects.

The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress will always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly will be challenged through being offered rich and sophisticated problems that encourage them to apply their knowledge horizontally. We aim to teach a mastery curriculum with some revisiting and consolidation of skills. Those who are not sufficiently fluent with earlier material will consolidate their understanding, including additional practice, before moving on. We will not teach the curriculum for the year above.

Organisation

In the Foundation Stage, we teach mathematics guided by the requirements and recommendations in the Early Years Foundation Stage 'Development Matters' document. All children are given ample opportunity to develop their understanding of mathematics in both the classroom and outside area. Learning happens through varied activities and challenges that allow children to use, enjoy, explore, practise, problem solve and talk confidently about maths.

In Key Stage 1, there is a daily maths lesson usually lasting for 45 minutes to 1 hour. Each lesson usually contains the elements of fluency, reasoning and problem solving. These lessons are planned in two to four week blocks using the AET Mathematics Scheme. Teachers use White Rose Maths, Classroom Secrets along with other resources to ensure lessons provide each child with an equal opportunity to develop their mastery, reasoning and problem solving skills.

In addition to the maths lesson, there is a daily fluency lesson based on the Snappy Maths programme for all children in school. Children also complete Lego Targets, which are designed to provide a clear structure and support to help embed children's counting and number bond recall. More information can be found on page 11.

Mathematical language and vocabulary

Teachers will refer to the New National Curriculum and the glossary of terms when planning, to ensure that they are teaching the children the correct mathematical terms and language. The relevant vocabulary will be clearly displayed within the classroom so that the children can see and refer to it. Children will be encouraged to use the correct mathematical language and terminology to discuss their mathematics and to explain their reasoning.

Resources

Every classroom has a variety of resources available and children are encouraged to choose independently the relevant equipment, depending on their needs. Additional Mathematics resources are kept centrally in the curriculum store next to the Treetops.

Assessment

The children are assessed at the beginning of a new topic using the AET 'Show me what you know' documents. Teachers analyse the children's individual scores against each statement. This provides a clear baseline assessment. At the end of every topic, the children are reassessed based on teacher judgement which is influenced by the work produced in Maths books. Furthermore, there are three 'Stop the clock' assessments which are carried out once every term, 3 per academic year. Staff members also complete assessment sheets based on Key Performance Indicators; these are in line with the National Curriculum. Teachers complete end of year judgements based on the Age Related Expectations (ARE); children are judged to be 'below ARE', 'working at ARE' or 'exceeding ARE'. Year 2 assessments will be made by referring to the 'Teacher Assessment Frameworks for 2020-2021'.

Calculation Policy

As a school it is very important that all staff follow the calculation policy (which shows progression through KS1 and KS2) to ensure that there is a consistent approach to mathematics and methods used across the school. The policy shows progression through each operation and offers concrete, pictorial and abstract ways to answer questions that relate to the NC strands. If children are not ready for pictorial or abstract ways of learning maths, then it is important that the concrete stage is covered again to help them achieve the objectives, regardless of their age.

Intent, Implementation and Impact

Intent

At St Andrew's Infant School, we deliver a broad and balanced curriculum that allows each child to reach their fullest potential. We aim to provide children with a powerful set of tools with which to calculate reason and solve problems, not just at school but in everyday life.

Implementation

The National Curriculum for Mathematics describes what must be taught in each year group. At St Andrew's Infant School, Years 1 and 2 follow the National Curriculum using the school's long term plan that covers the objectives. Our Curriculum in our Reception Classes ensures that all children receive their entitlement to the Early Years Foundation Stage (EYFS) Framework. Children need to master key mathematics skills, rather than striving to solely achieve the next objective year on year. The aim of the curriculum is to instil a deeper understanding of mathematics, such that it can be applied to different contexts.

It is important to create a whole school approach, of which staff, children, parents and governors have a clear understanding. Understanding the relationships and patterns that form between numbers is important for pupils to solve problems, within their education as well as their everyday life. Therefore it is imperative that a positive attitude towards maths is encouraged amongst all of our pupils, in order to nurture self-confidence and a sense of achievement. To help create this attitude, we teach through a concrete, pictorial, abstract approach that develops a deep and sustainable understanding of maths.

Impact

The outcomes of pupils will be monitored by the class teacher, subject lead and SLT through book scrutiny, learning walks and pupil interviews. The Maths lead ensures the staff are updated with relevant CPD by liaising with the Junior School's Maths lead, attending the Maths Co-ordinator network meetings.

Timetable

EYFS Timetable (2 maths objectives per week)

<u>Day(s)</u>	<u>Monday</u>	<u>Tuesday</u>	<u>Wednesday</u>	<u>Thursday</u>	<u>Friday</u>
AM	Whole class introduction (5-10 minutes)	Whole class introduction (5-10 minutes)	Whole class introduction (5-10 minutes)	Whole class introduction (5-10 minutes)	Whole class introduction (5-10 minutes)
	Focus activity (15-20 minutes per group)	Focus activity (15-20 minutes per group)	Focus activity (15-20 minutes per group)	Focus activity (15-20 minutes per group)	Focus activity (15-20 minutes per group)
	Continuous provision (inc. Rainbow challenge)	Continuous provision (inc. Rainbow challenge)	Continuous provision (inc. Rainbow challenge)	Continuous provision (inc. Rainbow challenge)	Continuous provision (inc. Rainbow challenge)
AM/PM	Maths-based outdoor learning	Maths-based outdoor learning	Maths-based outdoor learning	Maths-based outdoor learning	Maths-based outdoor learning
PM	Number of the day	Number of the day	Number of the day	Number of the day	Number of the day
	Snappy maths	Snappy maths	Snappy maths	Snappy maths	Snappy maths

KS1 Timetable

<u>Monday</u>	<u>Tuesday</u>	<u>Wednesday</u>	<u>Thursday</u>	<u>Friday</u>
1 hour lesson	1 hour lesson	1 hour lesson	1 hour lesson	1 hour lesson (Y1 only)
Snappy maths	Snappy maths	Snappy maths	Snappy maths	Snappy maths
				Magical Maths (Y2 only)

Maths Lessons

Lessons are taught following the AET Mathematics scheme. Each lesson begins with a starter, such as counting in multiples of 5, then the teacher models the days learning. Children are then given the opportunity to answer a number of questions as given by the teacher to show their understanding. Children that are confident are then sent to their tables to begin the days task(s). Children that are less confident stay on the carpet for further input from the teacher. The children then complete their work independently, following the 'do', 'think', 'explain' and 'solve' stickers.

Snappy Maths

To develop pupil fluency in Mathematics, the whole school must do daily Snappy Maths. This is a 5-minute quick recall programme that is aimed at raising children's rapid recall of number bonds and times tables facts. The repetition aids the children's recall of basic facts.

Magical Maths

In addition to Snappy Maths, Year Two do Magical Maths once a week. This programme is aimed at raising pupil's written fluency in general arithmetic.

Planning

When planning for your maths lessons, KS1 should refer to the National Curriculum 2014 and the year group's AET Mathematics Medium Term Plan. When planning for maths in EYFS, teachers refer primarily to the Early Years Outcomes and supplement this with the White Rose Maths guidance.

Routemap: This helps to plan for progression. Each year's outcomes are ordered in difficulty moving from the bottom and moving upwards. Each child must be taught these and priority should be placed on pupils being masters in these areas. Once pupils have achieved the bold statements they can be moved to the tier above. The top tier of each year group indicates the end of year expectations where the majority of pupils should end up.

If pupil/s are not meeting the bottom statement for your year group then refer to the number on the left and the previous year group's expectations. This should only be the case for those children who do not have the foundations from the previous year group.

EYFS

Name: _____

September	October	December	February
March	April	May	

Number Recognition at random

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

I can correctly form my numbers

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20

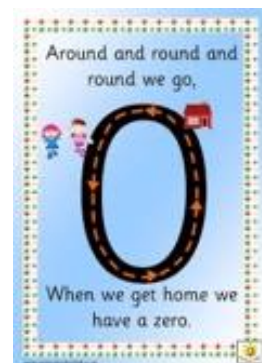
Children are reassessed each half which is highlighted in a different next steps in their learning, this **Essence graph**. Throughout the observations on children using I-children are doing in provision independently to the EYFS statements.



In Reception children are **baselined** within the initial weeks of starting school. Teachers assess children through observations and assessment of key skills using Development Matters and the school's baseline assessment. term using the same document colour to show groups/individuals is uploaded onto the **Early** year EYFS staff capture Pads, staff will record what

Assessment for learning

Each week, EYFS staff meet to reflect on the previous weeks learning and discuss what needs recapping, repeating and discuss any follow up steps to deepen learning. At the start of the week, teacher's introduce a skill/concept to the class, it is then differentiated for groups of pupils determined on their understanding. The weekly planning is a working document and EYFS staff will indicate who has understood the concept, who has exceeded the objective and who needs to revisit this. Revisiting and extending of different skills may happen through questioning (Bloom's Taxonomy questions), continuous/enhanced provision, a revisit or repeat of the concept. In EYFS, we have dedicated time each day to teach a number of the week, within this pupils have the opportunity to understand what the number looks like in different formats using addition, subtraction, halving, doubling and subitising the number. Teachers also use the '**Communication4all**' number formation rhymes to help children know how to correctly form their numbers when beginning to formally record. This gives children meaningful and concrete opportunities to apply their skills and knowledge about number.



5 things to do before the end of... (EYFS only)

In EYFS, children are set five things to do before the end of each half term; these cover all seven areas of learning and development. The targets are based on cohort assessment and reflect how pupils are able to achieve steps towards meeting the Early Learning Goals e.g. I can count back from 20 to 0, I can add two groups together using objects I have found at home. The targets are sent home on a certificate to practice at home with an adult. Targets are then assessed at school and acknowledged with a sticker/stamp.

Continuous and enhanced provision

In both EYFS classrooms, they have a dedicated maths provision area and working wall. It is set out in an organised and clear way displaying relevant maths equipment. Mathematical opportunities are also added to other continuous provision areas e.g. weighing scales in the home corner,

measuring cups in the water areas. Each half term, provision is enhanced with games, activities books and characters for children to embed essential mathematical knowledge. Daily 'Rainbow Challenges' are set to challenge children whilst in continuous provision this might be to recap, embed and inform future skills.

Children are able to access meaningful maths opportunities in the outdoor area which are adapted through children's interests and adult interaction. This includes collecting and sorting natural objects, measuring huge areas using non-standard measures such as strides, moving really heavy objects together or playing hunting games for escaped dinosaurs or missing mini-beasts. Outdoor maths should offer DIFFERENT skills and experiences to what indoor learning is. They may follow a similar learning intention e.g. repeating patterns with beads and pegs indoors, the outdoor focus might be rubbing leaves to make patterns, creating obstacle courses – e.g. tyre, crate, tyre, crate.

Natural resources help children to learn maths through all their senses, including touch, smell, sound and taste.

- Explore empty and full using big containers – use wet sand, pebbles, branches and boulders.
- Investigate measures – look at tiny seeds, then measure the height of runner bean plants or tall sunflowers or balance leeks, marrows, potatoes and tomatoes.
- Collect, sort and count natural objects outdoors – leaves, twigs, stones, pebbles, fir cones and flowers.

Playing games outdoors offers numerous opportunities for teachers and children to explore elements of mathematics together. Teachers plan and introduce a small number of games initially, and spend a long time modelling them. Once children become familiar and confident, they can take some of those ideas and 'rules' to develop their own games.

- Hopscotch
- Duck, duck, goose
- What's the time, Mr Wolf?

Maths mark making outdoors

The outdoor area offers unique opportunities for children to explore mark making in ways that are less threatening and more appealing than indoors – with chalks on paving slabs, with buckets of water and huge brushes or sticks in mud. Scoring offers a 'real purpose' for recording numbers that is sometimes lacking indoors, and can attract children who avoid pencil and paper activities. Teachers' are able to support children's mathematical graphics and recording outdoors:

- Modelling tallying – drawing four lines and a fifth line through to show a group of five; or with younger children, using symbols to record scores – three circles to represent three beanbags in a bucket

- Providing a 'have a go' environment where all children's mathematical graphics are valued and children have opportunities to experiment and practise recording in a variety of ways. Give children lots of time to explore recording so that they can become increasingly familiar and confident with mark making. Use encouragements to record: "How can we remember that?"
- Encourage children to talk about what they are doing and why – they need lots of time to talk about their recordings and think through how effective they are.

Marking:

Teachers are expected to provide live marking to ensure children are given constant and up to date feedback. This impacts positively on their learning and addresses any misconceptions.

Assessment

Target Tracker needs to be updated on a half termly basis for maths. Children are to be baselined at the start of a new unit using the 'Show Me What You Know' assessment. Teachers are to record this data onto the stickers in maths books. Once the unit has been taught, teachers are to re-assess the children's knowledge based on the work that has been produced in books and teacher judgement. This must be recorded onto the stickers in maths books. Teachers should then complete the end of unit assessment and identify those that have not met the statements (1) and those that have confidently met the statements (3). Teachers must use this data to identify those who have not met the statements (1) and implement any gaps identified into future planning and teaching.

Lego Targets (KS1 only)

Lego targets have been set individually per child based on their fluency in Maths. Lego Targets have been designed to provide a clear structure and support to help embed children's counting and number bond recall. Each child should have a current Lego target that they are working on at home. Once confident on their current target, children can ask to be 'challenged' in school. Once the child can confidently recite their current target, e.g. number bonds to 10, they progress to the next Lego brick and the teacher or TA will give them their new Lego target to practise at home.

What does Greater Depth look like at St Andrew's Infant School?

In the last few years, mathematics teaching and learning has changed. Mastery approaches, higher standards and depth (rather than coverage) are paving way for greater conceptual understanding in mathematics for children of all ages.

Traditional differentiation, based on levels is out. Now mathematics focuses on challenge which provides pupils with opportunities to demonstrate depth of understanding. There are many ways differentiation can be achieved including access to concrete, pictorial and abstract resources. This offers all children the same starting point and subsequently varying tasks as the lesson progresses.

What do we mean by 'Greater Depth' in maths?

It is important to understand that working at greater depth doesn't mean that children are fluent in their mathematics ability and that they should be able to solve problems and reason well. The National Curriculum states that those are the aims for all pupils:

Aims

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

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, 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 an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Whilst children working at greater depth will be fluent and will solve problems and reason mathematically, those indicators shouldn't define 'Greater Depth' in maths. The National Curriculum also states that 'pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content'. For children working at greater depth, we should provide 'rich and sophisticated problems' and we shouldn't just be getting the children to move onto the next year group's work.

The best way to increase complexity of maths but continuing to work within the expectations for the year group is to present the problems differently and in as many ways as possible. The AET planning supports this well. The more children are exposed to problems presented in new ways, the more confidently they will approach maths problems in general.

Mastery in Early Years

When it comes to maths teaching in the early years, it's important that children begin to develop a sense of the underlying concepts and structures of maths. Some children may come to school already fluently counting to 10 and beyond - but do they really, deeply understand what these numbers mean? Children should be challenged to show a variety of representations for each number, using real-life objects, maths equipment, drawings, sound and movement. EYFS planning should focus on developing reasoning and problem-solving skills, which helps to ensure children in EYFS gain mastery of these early concepts.

Concrete, Pictorial, Abstract

Using concrete resources in maths comes naturally in the EYFS. Being able to touch, feel and manipulate in maths is a good way to develop an understanding of the underlying concepts.

The next step is to move children from that solid starting point to a pictorial approach. Teaching children how to represent objects is a good starting point. For example, asking the children to represent the number 3 using 3 toy cows. Moving from a representation with a clear link (such as toy versions of the animals) to representation with something less obviously linked (such as counters or part-whole model) ensures children develop an understanding of representation, building a firm foundation for later success in maths. In order to really achieve mastery, children should begin to develop an abstract way of thinking. For example, clapping and asking the children how many claps they heard. Activities like this ensure children are not relying solely on visual cues.


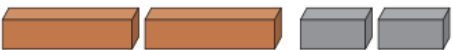
Mastery through play

Setting up mathematical activities for children to explore independently is a great way to reinforce concepts during free-flow time. Every time maths is built into an everyday activity, it helps embed and reinforce understanding of the concept:


- Create displays of seasonal objects for children to count, sort and explore.
- Try setting some mathematical rules, such as allowing only three children to play with sand at a time. This can lead to opportunities for discussion such as, how many children are there now? Is there room for one more? Are there enough spades for each child?
- Suggest activities such as setting the table for four teddy bears in the home corner.

NCETM Teaching for Mastery

The NCETM Teaching for Mastery documents contain a wide range of complex problems under the heading 'Primary Assessment Materials'. These provide a great starting point for teachers to begin thinking outside the box with their maths questioning. Here's an example from the Year 1 document:

Mastery	Mastery with Greater Depth
<p>LENGTH</p> <p>Which line is longer?</p> <p>Explain your reasoning.</p> 	<p>A long brick is twice the length of a short brick.</p> <p>Which is longer:</p> <p>2 long bricks or 3 short bricks?</p> <p>3 long bricks or 5 short bricks?</p> 

Here's an example of the Year 2 document:

Mastery	Mastery with Greater Depth
<p>Holly uses a £1 coin to buy a pack of stickers. Here is the change she was given.</p>  <p>How much did the pack of stickers cost?</p>	<p>I spend £2 on a drink and sandwich. The sandwich costs 80p more than the drink. How much does the sandwich cost?</p>

In Summary

Children who are working at greater depth would confidently and independently:

- Access maths problems presented in a wide range of different, complex ways.
- Be able to justify and prove their conjectures when reasoning.
- Ask their own mathematical questions and follow their own lines of enquiry when exploring an open-ended maths problem.

In order to make provision for children working at greater depth we must:

- Model higher-level reasoning skills and encourage children to use them.
- Model mathematical questioning during open-ended maths problems and encourage children to ask them.
- Provide complex maths problems (open and closed) with a variety of contexts and support children initially to access these, until they can do them independently.
- Motivate children to be confident and resilient enough to do the above.

Lesson Resources

Classroom equipment: use as practical, concrete resources and ensure that you think about resources you could use when you are planning.

Classroom Secrets: a website full of learning resources that are differentiated, have teaching/learning powerpoints and interactive activities . Each set of resources has fluency, reasoning and problem solving questions. The website also has discussion questions that can be used in problem solving lessons. There are homework and extension questions also that can be used as an extension or assessment.

Twinkl: lots of mastery and challenge resources available as well as pre assessment and bar modelling examples.

White Rose Hub: great fluency, problem solving and mastery questions that can be used in learning or as think pink, explain or solve challenges. Also good planning ideas and good termly assessments that cover the objectives.

Nrich/NCETM): these sites are useful for helping to understand maths terminology and how maths is taught. There are also problem solving resources that have different levels and encourage problem solving and the use of mathematical language.

Maths Everyday www.mathseveryday.com: a website that has many maths problems on, apparently there is a new one everyday!

Numeracy/mathematics Shed (<http://www.mathematicshed.com>): a variety of resources for teaching and for children to use.

Topmarks (<https://www.topmarks.co.uk/maths-games>): a website with a variety of maths games aimed at children of different ages.