

Without mathematics,  
there's nothing you can do.

Everything around you  
is mathematics.

Everything around you  
is numbers.

-Shakuntala Devi



## Maths- The St. John's Approach

At St. John's, we promote a love of maths alongside developing a fluency of key skills, an ability to reason and the drive and resilience to tackle problems.



### Vision

At St John's Church of England Academy, we will excite, engage and inspire pupils with a relevant, inclusive and memorable maths curriculum that encourages our children to develop a love of mathematics! At the heart of their maths learning, children will develop our core values, that will allow them to shine both now and in their future.

Our curriculum covers statutory objectives from the National Curriculum with the key knowledge, skills and understanding mapped out in a spiral approach to allow solid foundations to be built upon and encourage a mastery approach.

Our maths curriculum also helps to develop our children into self-regulating learners with the metacognitive skills to plan, monitor, evaluate and regulate their approach to maths and the way they are thinking about a given problem .

Children will leave St John's with a range of strategies to help them continue their maths learning in the future: a fluency of fundamental key skills, an ability to reason and explain their thinking and a resilience when problem solving.

### Rationale– Why we do what we do...

**The views of our stakeholders (children, staff, governors and parents) have been at the root of all decision making.**

All stakeholders agreed that they wanted their curriculum to be fun, exciting, creative, interesting, hands-on, linked to our values and inspiring. As a result of our stakeholders' views...

In May 2020, we created a curriculum vision which is inclusive of all subjects.

From the curriculum vision, we created our vision for the teaching and learning of Maths.

In a recent pupil voice survey (Spring 2022), in which a sample of children of different abilities across all year groups were interviewed, 100% said they enjoy maths, are making progress and that Key Skills and Star Challenges are helping them get better at maths.

### How is maths taught?

#### Timetabling

In Reception, like the rest of the school, maths is taught daily. It is taught through whole class, small group and 1:1 learning with a mixture of adult-led learning and child-initiated learning with sustained shared thinking. Mathematical opportunities are available daily in the wider classroom environment for children to access independently and through their 'star challenge' directed learning task.

Across the rest of the school, maths is taught daily for one hour. All year groups, including Reception, have a 'Key Skills' session at the start of their lesson to encourage overlearning of key facts. In Years 1-6, children also take part in a weekly key skills challenge known as 'Star Challenge' in which children develop their quick and accurate recall of previously learnt facts.

#### Curriculum design

Our mathematics curriculum is designed with the 3 areas of the National Curriculum at the centre of all learning: fluency, reasoning and problem solving. We have carefully designed our curriculum so that it is progressive and builds upon prior learning and provides full coverage of the National Curriculum. We also ensure that prior learning is revisited to activate children's long term memories and provide 'overlearning' of fundamental key skills to allow children to develop their confidence and accuracy. Our curriculum and calculation policy have been inspired by White Rose and then designed by our maths lead and evaluated alongside our teachers, senior leaders and governors to ensure it is tailored for the needs of our children.

#### CPA

Our curriculum is designed to introduce new, abstract topics using the 'Concrete, Pictorial, Abstract' (CPA) approach. We have chosen to follow this approach as research shows it is a highly effective way of developing a deep and sustainable understanding of mathematics. Children are introduced to new mathematical concepts through the use of concrete resources. When children are comfortable solving problems with physical aids, they move on to the pictorial approach and use picture representations of the concrete resources. Finally, when children have a secure understanding, they are moved on to the abstract approach.

#### Planning

Our long term and medium term plans have been inspired by White Rose and then adapted for the needs of our learners. We have designed our plans very carefully to enable prior knowledge to be built upon. Teachers then adapt these plans to the individual needs of their class and produce PowerPoint/Flipchart planning as aids to delivering quality first teaching to allow children master each objective. At St John's, we chose not to follow a set 'scheme' of learning but instead allow teachers to hand pick purposeful activities from a variety of resources in order to meet the individual needs of their class and hone in on what will engage and excite them in their learning!

#### Varied fluency

A key aspect of our mathematics curriculum is to develop children's fluency of fundamental skills. As a result, we aim to provide many opportunities to see questions presented in a variety of ways. We implemented 'Key Skills' sessions at the start of every maths lesson from Reception to Year 6 to provide more opportunities for varied fluency practice. These short, regular session focus on fluency of key number skills, such as number bonds, times tables and arithmetic skills, and provide children with opportunities to consolidate their learning by seeing these questions presented in a variety of formats. Once a week, children from years 1-6 also participate in 'Star Challenges' to provide another opportunity to develop fluent recall and overlearn key skills.

#### Reasoning and problem solving

In all year groups from Reception to Year 6, children are encouraged to develop their reasoning and problem solving skills in every maths lesson. We provide regular opportunities for 'maths talk' to develop children's reasoning and problem solving skills. This includes teachers modelling using a 'think out loud' strategy in which teachers verbalise their reasoning while modelling how to solve a problem. We also provide many opportunities for 'partner talk' and encourage children to verbalise their thinking with a partner. At St John's, we encourage children to follow the 'APE' approach when reasoning which breaks down their answers into: 'Answer it', 'Prove it' and 'Explain it'. This approach helps scaffold children's thinking and encourages them to justify and prove their answers.

## Supporting all learners

When teaching mathematics at St John's, we intend to provide a curriculum which caters for the needs of all individuals. Our first and foremost strategy is to provide inclusive, quality first teaching for all and have high expectations to ensure all children make good progress.

A strategy which we use to support all learners is 'learning partners'. We do not group/set children as research shows this does not encourage children to make progress and can lower children's aspirations. We encourage children to develop our values of Teamwork and Stewardship and by seating children in mixed ability pairings we provide them with opportunities to learn from each other. Teachers are also encouraged by our Pupil Premium Champion to think carefully about the seating position of Pupil Premium children to ensure they arrange effective learning partners.

Another way in which we support all learners is through differentiation. In our lessons, we provide structures and scaffolds to support our children as well as higher order questions and mastery challenges to extend our more able learners. We use a 'bronze, silver, gold' differentiation system in which children are encouraged to self-select their appropriate starting level and regulate their learning to encourage they have selected a suitable challenge. We aim to develop children's metacognitive skills to self-select independently; although, we are aware of some of our learners who made need some guidance before they are able to choose a sufficiently challenging task. We also provide differentiation through support and carefully designed deployment of adults.

Our bespoke 'Shine Time' strategy also provides numerous opportunities to support our children with their mathematical learning. Through skilful AFL strategies, teachers can recognise those with misconceptions or those who haven't confidently understood an objective and plan Shine Time opportunities to enable them to close the gap with their peers. This may be in many forms but could include a 'pre-teach' before the following lesson or a same day intervention with a teacher/teaching assistant to consolidate their understanding. The teacher may also plan in a regular Shine Time session for a learner to develop particular skills. Shine Time sessions are also a great opportunity for teachers to stretch more able learners and extend their thinking in order to master a skill.

## Maths Overviews EYFS

### Reception

At St John's we recognise how vitally important our Early Years maths curriculum is as it provides the first building blocks of a life long love of mathematics and lays the foundations for all subsequent learning. Our Reception practitioners support children's understanding of maths in a broad range of contexts in which children can explore, enjoy, learn, practise and talk about their understanding. Our children are encouraged to learn more about maths through playing and exploring, being active through creative and critical thinking both indoors and outside.

Therefore, we ensure maths is a part of children's daily learning in five key areas: a daily mathematics group time session, a daily maths 'star challenge', mathematical opportunities in the wider environment, purposeful displays in the Reception classroom and outdoor area to provide links to prior learning and threaded throughout their daily routines.

	<u>Week 1</u>	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Getting to know you Baseline assessments			Match and sort	Compare amounts, size, mass and capacity	Exploring pattern	Representing, comparing and composition of 1,2,3	Circles and triangles	Positional language	Representing numbers to 5	One more and one less	Time	Shapes with 4 sides	Consolidate and assess
Spring	Introducing Zero and comparing numbers to 5	Comparison of 4 and 5	6,7,8	Making pairs	Combining 2 groups	Length and height	Time	9 and 10	Comparing numbers to 10	Number bonds to 10	3D shape	Pattern	Consolidate and assess	
Summer	Building numbers beyond 10	Counting patterns beyond 10	Spatial reasoning 1 and 2	Adding more	Taking away	Doubling	Sharing and grouping	Even and odd	Spatial reasoning 3 and 4	Deepening understanding pattern and relationships	Consolidate and assess			

## Maths Overviews KS1

### KS1

Our KS1 curriculum is designed to provide a smooth transition from Early Years into the National Curriculum. Our Reception and Year 1 teacher work very closely to ensure that children are provided with continuity and a firm grounding on which their learning can be built upon.

In Year 1, we have placed a large emphasis on Place Value, an area which they will focus on heavily in the autumn term and revisit four times throughout the year. We recognise the importance of developing number sense and an understanding of our number system early on in order to provide a strong foundation for further learning.

Throughout KS1, we focus on developing confidence and fluency with whole numbers and encourage children to apply their learning in other strands of mathematics and in the wider curriculum.

In Year 2, children continue to develop upon the foundations they have built in Year 1 and begin to apply these more confidently through reasoning and problem solving opportunities.

### Year 1

	<u>Week 1</u>	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	
Autumn	Number: Place value 1			Number: Addition and subtraction 1						Geometry: Shape	Geometry: Position and direction	Number: Place value 2	Consolidate and assess		
Spring	Number: addition and subtraction 2			Measures: length and height	Measures: Weight and volume		Number: Place value 3			Measurement: Time		Consolidate and assess			
Summer	Number: Place value 4	Number: Multiplication and division			Fractions			Number: Consolidate addition and subtraction 3		Measures: Money	Consolidate and assess				

### Year 2

	<u>Week 1</u>	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number: Place value			Number: Addition and subtraction				Money			Multiplication and division			Consolidate and assess
Spring	Multiplication and division	Fractions			Time		Length and height		Mass, capacity, temperature		Position and direction	Consolidate and assess		
Summer	Shape	Revision		Y2 SATs	Statistics		Consolidation: - Times tables - Written methods -			Consolidate and assess				

## Maths Overviews LKS2

### LSK2

In Year 3 and 4, we continue to build children’s confidence and fluency and encourage them to build upon their learning in KS1 with increasingly large numbers. Children are encouraged to explain their reasoning more coherently and develop their skills to form logical arguments to explain their thinking.

In LKS2, children also spend a considerable amount of time developing a solid understanding of written methods for the four operations moving through the CPA approach. In order to access multiplication and division methods, as well as many other areas of mathematics, we place a large emphasis on learning times tables in LKS2. Knowing the times tables (and their associated division facts) supports mathematical learning and understanding and those children who have a strong grasp of them tend to be more self-assured when learning new concepts and will be able to access new methods in UKS2 more easily.

### Year 3

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number: Place value			Number: Addition and subtraction				Number: Multiplication and division				Measures: money	Consolidate and assess	
Spring	Number: Multiplication and division			Fractions				Statistics		Geometry: property of shape		Consolidate and assess		
Summer	Measures: Time			Measures: Length and perimeter		Measures: Mass and capacity			Number: 4 operations		Consolidate and assess			

### Year 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Number: Place value			Number: Addition and subtraction			Multiplication and division						Consolidate and assess	
Spring	Fractions			Decimals					Measures: Money		Statistics	Consolidate and assess		
Summer	Measures: Time		Measures Length and perimeter		Measures: Area	MTC	Geometry: properties of shape		Geometry: position and direction		Consolidate and assess			

## Maths Overviews UKS2

### USK2

In Year 5 and 6, we aim for children to have solid foundations in the fundamentals in mathematics so that they can use their knowledge and strategies they have learnt to access more difficult problems with increasingly large numbers. Children also use what they have already learnt to make links and connections such as between multiplication and division with fractions, decimals, percentages and ratio.

We encourage our UKS2 children to reason effectively and justify their ideas. They should be able to explain their thinking giving a complete logical argument using words like 'because/therefore/and so' to prove why their answer must be correct.

By UKS2, we aim for children to have developed metacognitive self-regulation strategies to plan, monitor and evaluate their own learning. Children are encouraged to reflect on why they have chosen a particular strategy and evaluate and compare their approach with others to find increasingly efficient and accurate methods.

### Year 5

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Place value			Addition and subtraction		Multiplication and division 1 (Methods)			Measures converting units		Measures perimeter, <u>area</u> and volume		Consolidate and assess	
Spring	Recovery unit: Y4 Measures: money	Multiplication and division 2 (Factors, multiples)			Fractions						Decimals and percentages		Consolidate and assess	
Summer	Decimals (Calculating with decimals)			Geometry properties of shape			Recovery unit: Y4 position and direction	Geometry position and direction		Statistics		Consolidate and assess		

### Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14	
Autumn	Place value	Addition, subtraction, <u>multiplication</u> and division					Fractions				Decimals		Percentages	Consolidate and assess	
Spring	Percentages	Algebra		Ratio		Converting units		Perimeter, <u>area</u> and volume		Statistics	Geometry properties of shape		Consolidate and assess		
Summer	Geometry properties of shape	Revision		SATs	Problem solving and investigations						Consolidate and assess				

### Developing our school values through mathematics

Our school values are at the heart of our curriculum and everything we do at St John's and children are encouraged to apply them in all subjects, including maths, as well as outside of school.

Opportunities to develop our values through mathematics	
Drive	We encourage our pupils to show 'drive' in mathematics and be hungry to discover more. This may be through open ended investigations, puzzles and challenges in which children have a hunger to solve a problem.
Excellence	Our children are encouraged to always try their best. This includes ensuring they always try their hardest to produce their best work, correcting and learning from mistakes and taking pride in their presentation.
Teamwork	Our maths lessons provide excellent opportunities for collaboration with others. Every maths lesson, has opportunities for children to work with their learning partner and discuss ideas and effective strategies in order to help each other to achieve our best.
Character	?
Stewardship	As part of our cross curricular approach, children have the opportunity to use their maths skills to aid them in raising money for a selection of designated charities.
Identity	?

### Enrichment

Enrichment opportunities within and across all areas of the curriculum are important to the stakeholders at our school. Our research shows that although lots of children have been exposed to visits, the quality of these visits vary. We have designed these enrichment opportunities to help children to develop a love of mathematics and recognise how mathematics can be applied in other curriculum areas.

Year	Enrichment	Topic
Reception	Reception will have responsibility for the Reception outdoor area including watering the plants and looking after the environment. This provides lots of opportunities for real life application of measures work.	Let's Explore
Year 1	?	
Year 2	In their topic Saving the World, children will raise money to adopt an endangered animal and for the Aid2Africa charity which provides opportunities for money work.	Saving the world
Year 3	As part of their Set in Stone topic, children will create their own bread. This will provide opportunities for children to use their measures learning in a real life context.	Set in Stone
Year 4	In their topic White Water Adventure, children will raise money for Water Aid which provides opportunities for money work.	White Water Adventure
Year 5	In their topic, children will raise money for the Young Minds charity which provides opportunities for money work. Children will be encouraged to calculate their outgoing costs and profit margins.	On your marks, get set, go!
Year 6	In their topic, children will raise money for the Disaster Emergency Committee which provides opportunities for money work. Children will be encouraged to calculate their outgoing costs and profit margins.	Catastrophe

The whole school will also take part in a 'Maths Day' to excite, motivate and challenge them and encourage a love of mathematics.

### Assessing Outcomes in maths

Children in Reception are assessed in accordance with the EYFS curriculum against the Early Learning goals through ongoing observations.

In KS1 and KS2, teachers ensure they use a range of AFL strategies to identify where the children are currently and how to move them forward in their learning. One strategy we use is through high quality questioning to assess children's current understanding and drive forward the learning. Teacher's differentiate their questioning using Blooms taxonomy to effectively pitch their questions to all children's abilities.

Teachers also provide children with regular feedback, both verbal and written, both at the point of the learning and after the lesson.

As part of our maths assessment, we also have half termly summative assessments to evaluate children's understanding away from the point of teaching, to track progress and to inform future planning and next steps. These summative assessments may include a 'hot task' linked to the previous term's learning or a test.