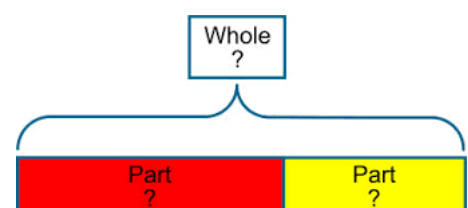
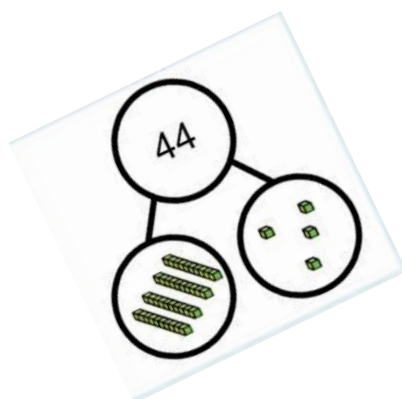


Mathematics Handbook

Love one another



Updated Summer 2023

Mathematics



Curriculum Vision

At St John Vianney Catholic Primary School, we recognise that mathematics is a creative and highly inter-connected discipline. It is essential to everyday life, critical to science, technology and engineering, necessary for financial literacy and a requirement of most forms of employment.

We aim to deliver a high-quality mathematics education which provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the power of mathematics, and a sense of enjoyment and curiosity about the subject.

In line with the aims of the Mathematics curriculum (2014), we endeavour to ensure that all children become fluent in the fundamentals of mathematics; can reason mathematically and can solve problems by applying their mathematical knowledge and skills.

Curriculum Intent

At St John Vianney Catholic Primary School, we recognise that Mathematics is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. We aim to provide a high-quality mathematics education with a mastery approach so that all children: become fluent in the fundamentals of mathematics; reason mathematically and can solve problems by applying their mathematics.

(National Curriculum 2014)

Our intent for Mathematics is to teach a rich, balanced and progressive curriculum using Maths to reason, problem solve and develop fluent conceptual understanding in each area. Staff are supported and aided in their roles, ensuring confidence in the skills and facts which they are required to teach. Lessons are child focused and Maths is kept fun and current in school.

Our curriculum allows children to better make sense of the world around them relating the pattern between mathematics and everyday life. Our policies, resources and schemes support our vision e.g. our calculations policy linked to our Mastery Text Book resource, Power Maths, which is based on White Rose Maths, and NCETM Teaching for Mastery.

The mapping of Mathematics across school shows clear progression in line with the Early Years and Foundation Stage Statutory Framework age-related expectations and the National Curriculum.

Mathematics in our school is enhanced by our focus on additional practise of key mathematics skills through Assertive Mentoring Weekly Skills Checks and our focus on key instant recall facts (KIRFs). We promote and encourage over learning of key facts through our use of Numbots and TT Rockstars competitions. We constantly seek to improve our provision and we are proud of enhancements made through our collaboration with partner schools within our M.A.C. and our work to develop our mastery approach to Mathematics through our involvement with the Origin Maths Hub.

Mathematics



Implementation

At St John Vianney, Mathematics teaching and learning follows the Mastery Maths approach with the five 'Big Ideas' for Mastery consistent across school. These are:

Coherence – small steps of learning (within lessons, units, year groups and scheme)

Coherence

- Microscopic steps (within a lesson, unit, year, scheme)
- Focused, key learning objectives
- Careful sequencing of steps within a lesson, building to generalisation
- Pre-empting misconceptions
- Opportunities for fluency, reasoning and problem solving with each objective

What does this mean?

$8 + 3 = 11$

In which order should concepts be introduced?

What understanding is required to access this?

How might it be misunderstood?

Representation and Structure – CPA: Concrete, Pictorial and Abstract approach used meaningfully across school

Representation & Structure

- CPA used meaningfully across school
- Representations expose the structure of the problem or calculation
- Linguistic representations (emphasis on vocabulary and using stem sentences)
- Representations must be carefully selected and used in a meaningful order

...

$3 + 2$

Variation – Activating the thinking process and avoiding mechanical repetition

Variation

- Activating the thinking process and avoiding mechanical repetition
- Ensure the steps taken within a lesson are small, logically ordered and connected
- Prepare learners to recognise Maths in unfamiliar contexts

conceptual variation

procedural variation

7×4
 70×4
 70×8
 14×4
 140×40

Mathematics



Implementation

Mathematics teaching and learning follows the Mastery Maths approach with the five 'Big Ideas' for Mastery consistent across school. These are:

Mathematical Thinking – Reasoning as a part of every lesson with questions to deepen understanding

Mathematical Thinking

- The answer is just the beginning
- Reasoning as a regular part of each lesson
- Questioning to deepen understanding and give access to all students

Is this sometimes,
always or never
true?

How is this the
same? How is it
different?

Can you
prove this?

Fluency – Teaching procedural and factual knowledge to develop students' automaticity, thus freeing the mind to focus on the concept

Fluency

- Teaching procedural and factual knowledge develops students' automaticity
- Automaticity frees the mind to focus on the concept

999×8	
$\begin{array}{r} 999 \\ \times 8 \\ \hline 7992 \end{array}$	$\begin{array}{r} 1000 \times 8 - 8 \\ 8000 - 8 \\ \hline 7992 \end{array}$

Which method
demonstrates fluency?

Mathematics



Implementation

The curriculum hours for mathematics are non-negotiable and followed by all staff.

Teachers plan five lessons each week, a number of classes plan three or four lessons with a number focus per week and one or two lessons linked to either geometry, statistics or measures. This is to enable classes with a combination of teaching personnel to take ownership of particular elements of Mathematics teaching and learning.

Knowledge organisers linked to each of the mathematical areas, support the children with their learning.

High quality teaching responds to the needs of children. Teachers use questioning well and aim to identify and address any misconceptions at an early stage.

Planning: Lessons are planned and sequenced so that new knowledge and skills build on previous learning. Staff refer to the Calculation Policy when teaching formal methods but also understand that sometimes children find their own efficient methods along the way. Number bonds and times tables practice take place weekly to give children the opportunity to practise and improve their rapid recall of key mathematics facts.

Teaching: At St John Vianney we employ a variety of teaching styles and opportunities for children to learn and develop their Mathematical skills and competencies, both individually and collaboratively.

Our pupils are encouraged to physically represent mathematical concepts. Objects and pictures are used to demonstrate and visualise abstract ideas, alongside numbers and symbols.

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

Pictorial – children then build on this concrete approach by using pictorial representations, which can then be used to reason and solve problems.

Abstract – With the foundations firmly laid, children can move to an abstract approach using numbers and key concepts with confidence.

Mathematics is taught daily in every class. The objectives are taken from the Early Years Foundation Stage Statutory Framework (Nursery and Reception) and from the National Curriculum (Year 1-Year 6). There are daily opportunities to count in a range of ways in EYFS and Key Stage 1. In EYFS the outside learning reflects Mathematics learning inside the classroom.



Mathematics



Impact

Impact

The impact of our mathematics curriculum is that children understand the relevance of what they are learning in relation to real world concepts. We have fostered an environment where Maths is fun and where it is accepted that sometimes we will make errors on our journey to finding an answer. The children understand that learning from mistakes is a key skill.

The children's Mathematics books demonstrate the use of a range of activities and show evidence of fluency, reasoning and problem solving. Positive verbal and written feedback and early intervention support the children to strive to be the best mathematicians they can be and ensure that a greater proportion of children are on track.

The Mathematics leader, in collaboration with the Senior Leadership Team, takes responsibility for the monitoring of the Mathematics curriculum and the standards achieved by the children.

The Mathematics leader monitors for appropriate pitch and progression at least once every half term. This monitoring takes the form of:

Lesson observations with written feedback;

Learning walks and pupil voice conversations;

Planning scrutiny followed by support where necessary;

Book scrutiny per term;

Termly data analysis;

Moderation and collaboration with other Mathematic Subject Leaders with the M.A.C.

Data is collected half-termly and reported to SLT. All teachers contribute to a termly Pupil Progress Meetings, where the data is analysed to highlight those pupils not meeting expectations. The meetings focus on target setting and identifying the next steps to support the children to make good or better progress.



Mathematics



Non-Negotiables



Daily Mathematics Lessons

Mathematics teaching and learning must take place daily in all classes. Assertive Mentoring is an additional session and should not take the place of a daily Mathematics lesson. Where educational visits disrupt the usual timetable, please try to ensure that Mathematics lessons are not omitted.

A range of counting opportunities must take place daily in EYFS/Foundation Stage and Key Stage 1.

Using WRM Power Maths

At St John Vianney, we use the **WRM Power Maths** scheme of work as a resource to teach Mastery Mathematics. This is used alongside a range of other sources in order to deliver teaching and learning and to achieve the aims and statutory requirements of the National Curriculum. EYFS follow the objectives and outcomes set out in Development Matters and use a range of resources including White Rose Maths to .

The Power Maths scheme follows the Mastery Mathematics approach, beginning with an anchor task in the **Discover** section, followed by an opportunity to **Share** strategies, approaches and ideas. The children then have an opportunity to **Think Together** before embarking on individual tasks which can be adapted to support those working towards age related expectations.

During the time allotted for the anchor task, please allow those who have completed this quickly, to progress to the **Think Together** tasks. This will ensure that our most confident and able Mathematicians are not waiting for extended periods whilst other learners take longer to complete the initial problems set.



Mathematics



Non-Negotiables

Planning

The Long Term Plan for Mathematics shows the broad areas and units covered by each year group throughout the year.

Medium Term plans are completed by teaching staff each half term to show the teaching and learning objectives, broken down each week.

Short term planning (weekly plan) will be sought from Trainee Teachers, ECTs and staff requiring support to improve performance. These include the Fast Five, objective, brief notes re: the main teaching points/questions, brief notes re: main tasks/activities including any support or extension and Afl (Assessment for Learning).

(Appendix 1)

Power Maths

Our main Mathematics resource is Power Maths. This scheme is government approved as a Mastery approach to Mathematics. The approach involves:

Discover – an anchor task with problems to tune the children in to the lesson;

Share - an opportunity to unpick the problem using strategies which the children will practise;

Think Together – usually three problems to complete: teacher-led task; learning partner or group task; individual task;

Independent Tasks – Opportunities for the children to put their learning into practice using fluency, reasoning and problem solving.

During the time allotted for the anchor task, please allow those who have completed this quickly, to progress to the Think Together tasks. This will ensure that our most confident and able Mathematicians are not waiting for extended periods whilst other learners take longer to complete the initial problems set. Alternatively, similar types of tasks can be used to ensure that children have adequate challenge during this time.

The Power Maths materials can be accessed online using the school login details.

(Appendix 2)



Mathematics



Non-Negotiables

Class teachers will complete weekly plan for Mathematics. Lessons should include **concrete experiences** and **pictorial representations** in addition to the abstract (procedural) calculations/equations.

See image on Mathematics Weekly Plan as reminder:

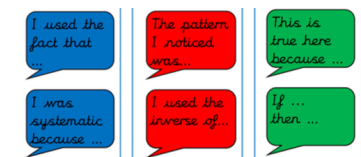


Each lesson will begin with a '**Fast Five**' – five age-appropriate arithmetic questions, which take a maximum of five minutes to complete. These could be provided on the board as the children enter the classroom at the beginning of the day or printed and stuck into the children's books each day. Additional questions in a Fast Five + will be provided as further challenge. These will be marked with the children at the beginning of the daily Mathematics lesson. See Fast Five/Fast Five + sample (Appendix 3) These can be linked to the **KIRFs** for each half term.



The '**Big Picture**' must be stuck into the children's book at the beginning of each week, to be completed by the child at the end of the week or at the beginning of the next week. (Appendix 4)

Stem sentence starters (I think this because...I know that... I agree/disagree that... because...etc.,) should be incorporated into Mathematics lessons to give pupils the opportunity to respond in the form of a complete sentence and to encourage them communicate their thinking effectively.



Each week, the **Assertive Mentoring Skills Check** should be completed by each child in a session outside the daily Mathematics lesson. In the first week, the child will complete the Skills Check with support and using the Knowledge Organiser. During the second week, the children will complete the same Skills Check without support or the use of the Prompt Sheet. Each week, before the children complete the Skills Check, choose a maximum of five questions on which to focus (adapt from the original question to use as an example) in order to practise the skill.

Results are recorded onto a simple class list. These will be collected with assessment data each half term.

Mathematics



Non-Negotiables

KIRFs - Key Instant Recall Facts

Each class from Year 1 onwards (Autumn 2), has a set of facts to know by heart by end of each half term. Children should be encouraged to work on these at home and school. Rapid recall of each set of facts aids number fluency.
(Appendix 5)

Next Stage Ready

Teachers should use the Specific Guidance for their year group to ensure that pupils are ready to progress to the next stage of their learning. Teachers should use the teaching guidance and assessment questions to gauge whether children are next stage ready.

Presentation/Marking & Feedback

Please encourage the children to write one digit in each square within their Mathematics

Books. Remember: use open four: $\begin{smallmatrix} 4 \\ \hline \end{smallmatrix}$ and write seven as: $\begin{smallmatrix} 7 \\ \hline \end{smallmatrix}$ Please correct closed four and French 7 if written as such by the children.

Encourage the children to write the number of the task followed by a comma rather than a dot, such as: 1) 2) 3) This is to avoid ambiguity when decimals are introduced.

Correction of Errors: Please encourage the children to write the answer again where an error has been made. If a child makes a number of errors, select one or two and write the question/calculation out for the child and ask them to complete the corrections set.

Next step questions are questions or challenges which take the child's learning on further. Please set next step questions occasionally with this in mind, providing opportunities for children to take on additional challenge.

Sharing Assessment Results

Please do not share children's test results verbally in front of others. Results should be shared with children sensitively, returned to the children individually and discussed on a one-to-one basis, if necessary. Children must have a choice with regard to sharing their results and should do so themselves if they choose to. Staff should emphasise the importance of progress made and each child will be encouraged to beat their own score. No child's score should be compared to any other child's score in class.



Mathematics



Non-Negotiables

Assessment

PiXL Assessments are completed by children in Key Stage 1 and Key Stage 2. These are marked by class teachers, with data collection completed on excel spreadsheets. Children working significantly below age expected standards will complete assessments at a stage appropriate standard.

Data must then be used to target children who require additional support with suitable pre-teach or intervention sessions to raise progress and attainment.

Interventions

Interventions may take the form of additional sessions to boost confidence, support development of knowledge and understanding whilst also providing extra opportunities for children to practise their skills or methods. We advocate pre-teach sessions, which are an effective method of tuning into a lesson or series of lessons. These may take place before school, after school or during school day. Children cannot be deprived of their quality first teaching input in order to 'catch up'.

Completion of Tasks

The children in Reception to Year 6 will complete their work in their Mathematics books. The children should write one digit in each square. When writing an answer which is incorporated into a sentence, the children should write as they normally do without separating letters into squares.

(Examples of work in books – Appendix)

When labelling calculations or questions, numbers should be separated by a comma, not a dot. This is to avoid ambiguity when children progress to decimals.

Reception Class, Key Stage 1 books and Key Stage 2 Mathematics books differ, with the size of square decreasing as the children's pencil control improves.

Each piece of work should include the date and Learning Objective. In KS2, a title may also be included. Dates and titles should be underlined with a pencil and ruler.

In Reception and in Year 1 (Autumn Term), the date and L.O. may be printed onto stickers to be stuck onto work. As the year progresses, Year 1 children should be able to copy the date and L.O. from the class whiteboard.



Mathematics



Useful Websites

- <https://www.bbc.co.uk/bitesize>
- <https://nrich.maths.org/teacher-primary>
- <https://mathszone.co.uk/>
- <https://www.ncetm.org.uk/>
- <https://classroomsecrets.co.uk/category/maths/>
- <http://www.primaryresources.co.uk/maths/maths.htm>
- <https://www.stem.org.uk/primary-maths>
- <https://garyhall.org.uk/primary-maths-resources.php>
- <https://whiterosemaths.com/resources/>
- <https://mathsticks.com/my/>
- <http://www.mathematicshed.com/warm-up-shed.html>
- <https://www.teachitprimary.co.uk/maths-resources>
- <https://ttrockstars.com/>



Mathematics



Long Term Plan

	Year N	Year R	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn 1/2	Number - Recite numbers past 5 Link numerals and amounts Compare quantities	Number - Numbers to 5	Number - number and place value (Numbers to 10)	Number - Numbers to 100	Number - Place value within 1000	Number - Place value 4-digit numbers (1)	Number - Place value within 1000000	Number - Place value within 10000000
			Number - number and place value (Part/whole within 10)	Number - Addition and subtraction (1)		Number - Place value 4-digit numbers (2)	Number - Place value within 1000000	Number - Four operations (1)
	Shape/Space and Measures - Talk about and explore 2D and 3D shapes	Shape/Space and Measures - Sorting	Number - addition and subtraction (within 10)		Number - Addition and subtraction (1)	Number - Addition and subtraction	Number - addition and subtraction	Number - Four operations (2)
			Number - Addition and subtraction within 10 (within 10)	Number - Addition and subtraction (2)	Number - Addition and subtraction (2)		Statistics	Number - Fractions (1)
Spring 1/2	Shape/Space and Measures - Develop fast recognition of up to 3 objects, without having to count them individually ('subitising')	Number - Comparing groups within 5	Geometry - properties of shape (2D and 3D shapes)	Measurement - Money	Number - multiplication and division (1)	Measure - Perimeter	Number - Multiplication and division (1)	Geometry - Position and direction
			Number - number and place value (Numbers to 50)	Number - Multiplication and division (1)		Number - Multiplication and division (1)	Measurement - Area and perimeter	Measurement - Imperial and metric measures
	Shape/Space and Measures - Make comparisons between objects relating to size, length, weight and capacity	Shape/Space and Measures - Time	Number - addition (Addition within 20)	Number - Multiplication and division (2)	Number - Multiplication and division (2)	Number - Multiplication and division (2)	Number - Multiplication and division (2)	Number - Fractions (2)
			Number - subtraction (Subtractions within 20)	Statistics	Measurement - Money	Measurement - Area	Number - Fractions (1)	Number - Decimals
	Number - Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle')	Number - Numbers to 10	Number - number and place value (Numbers to 100)	Measurement - Length and height	Statistics	Number - Fractions (1)	Number - Fractions (2)	Number - Percentages

Mathematics



Long Term Plan

	Shape/Space and Measures - Talk about and explore 2D and 3D shapes	Number - Addition to 10	Measurement - Length and Height	Geometry - Properties of shape	Measurement - Length	Number - Fractions (1)	Number - Fractions (2)	Number - Fractions (3)	Measurement - Perimeter, area and volume
	Shape/Space and Measures - Understand position through words alone - for example, "The bag is under the table," - with no pointing. Discuss routes and locations, using words like 'in front of' and 'behind'. Describe a familiar route.	Number - Number bonds to 10	Measurement - Weight and Volume	Number - Fractions	Number - Fractions (1)	Number - Decimals (1)	Number - Decimals (2)	Number - Decimals and Percentages	Algebra
Summer 1/2	Number - Say one number for items in order (one-to-one correspondence) Solve real world mathematical problems with numbers up to 5	Shape/Space and Measures - Shape and space	Number - Multiplication	Geometry - Position and direction	Number - Fractions (2)	Number - Decimals (2)	Measurement - Money	Geometry - Properties of shapes (1)	Geometry - Properties of shapes
	Shape/Space and Measures - Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then', 'next'	Number - Counting on and counting back	Number - Fractions (Halves and Quarters)	Measurement - Time	Measurement - Time	Measurement - Time	Statistics	Geometry - Properties of shapes (2)	Number - Problem solving
	Number - Compare quantities using language: 'more than', 'fewer than'	Number - Numbers to 20	Geometry - Position and Direction	Measurement - Time	Measurement - Time	Statistics	Statistics	Geometry - Position and direction	Statistics
	Number - Link numerals and amounts for example, showing the right number of objects to match the numeral, up to 5	Number - Numerical patterns	Number and Place Value - Numbers to 100	Measurement - Weight, volume and temperature	Geometry - Angles and properties of shapes	Geometry - Angles and 2D shapes	Measurement - Converting units	Measurement - Volume and capacity	Statistics
	Number - Develop fast recognition of up to 3 objects, without having to count them individually ('subitising')	Number - Numerical patterns	Measurement - Time	Measurement - Weight, volume and temperature	Measurement - Mass	Geometry - Position and direction	Measurement - Volume and capacity	Transition Unit - Using a calculator	Transition Unit - Algebra
	Shape/Space and Measures - Discuss routes and locations, using words like 'in front of' and 'behind'. Describe a familiar route.	Shape/Space and Measures - Measure	Measurement - Money	Measurement - Weight, volume and temperature	Measurement - Mass	Geometry - Position and direction	Measurement - Volume and capacity	Transition Unit - Using a calculator	Transition Unit - Algebra
	Shape/Space and Measures - Make comparisons between objects relating to size, length, weight and capacity	Shape/Space and Measures - Measure	Measurement - Money	Measurement - Weight, volume and temperature	Measurement - Mass	Geometry - Position and direction	Measurement - Volume and capacity	Transition Unit - Using a calculator	Transition Unit - Algebra