



St. Paulinus Catholic Primary School

"Inspiring all to live, learn and love in the light of Jesus."



(I am the light of the world; whoever follows me will never walk
in darkness but will have the light of life." cf John 8:12)

Mathematics Policy

Version control

Version number	Date	Revisions made	By who?	Approval date
V1	06/10/2020	Updated to be in line with Mathematics Mastery	R.Cameron	

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'An outstanding school, which is deeply committed to the Catholic mission... this school inspires all within this faith community to live life to the full.' Ofsted 2017

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Mathematics Policy

Mission Statement

Vision – scripture lead: John 8:12

Again Jesus spoke to them saying, “I am the light of the world. Whoever follows me will not walk in darkness, but will have the light of life.”

"Inspiring all to live, learn and love in the light of Jesus"

(cf John 8:12)

The Governors and staff of St Paulinus School, Dewsbury commit themselves to live as a community with Christ at its centre, characterised by living Gospel values within the Catholic Church. They commit themselves to provide the best possible education for every child in the school according to their needs and affirming their achievements.

This document is a statement of the aims, principles and strategies for the teaching and learning of mathematics at St. Paulinus Catholic Primary School.

Policy Statement

At St. Paulinus Catholic Primary School we believe that mathematics equips pupils with a uniquely powerful set of tools, through developing an ability to calculate, reason and problem solve. Mathematics enables children to understand and appreciate relationships and patterns in both number and space in their everyday lives. Through their growing knowledge and understanding, they also learn to appreciate the contribution made by many people to the development and application of mathematics.

Aim

At St Paulinus we aim 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
- become problem solvers, who can reason, **think logically**, **work systematically** and **apply their knowledge** of mathematics to a range of new situations
- develop an ability to **communicate** using mathematical language
- have a **positive attitude** and a **growth-mindset** towards learning mathematics

**Role of the Subject Leader:**

- To take the lead in policy development
- To support colleagues e.g. leading staff CPD, planning support, team teaching
- To monitor progress in Mathematics – this may be done through scrutiny of work, observations and analysis of formal assessment data
- To take responsibility for the choice, purchase and organisation of central resources for Mathematics, in consultation with colleagues
- To liaise with other members of staff to form a coherent and progressive scheme of work which ensures both experience of, and capability in, Mathematics
- To be familiar with current thinking concerning the teaching of Mathematics, and to disseminate information to colleagues

The subject leader will report on mathematics to the Headteacher and will liaise with the named link governors.

Role of the class teacher:

- Provide mathematics lessons that are accessible to all learners
- Ensure that mathematics is an enjoyable subject in which learners experience success
- Assess pupils appropriately using the correct assessment format
- Provide meaningful feedback that the children are able to act on in order to further enhance their mathematical understanding

Teaching and Learning

At St. Paulinus we follow the National Curriculum using the Mathematics Mastery programme of study. The 'mastery approach' to teaching mathematics enables children to build a deep conceptual understanding of concepts, which provide the opportunity for children to apply their learning to new, unfamiliar situations. Problem solving is at the heart of mathematics lessons and so sufficient time is dedicated to each new concept empowering children to acquire the reasoning they need to solve problems. The Mathematics Mastery programme of study is cumulative, meaning that each year begins with a focus on the concepts and skills that have the most links, which are then applied and connected throughout the school year. This enables children to 'master maths' by building on their previous learning.

Lessons follow a six-part structure to allow for continuous assessment for learning:

1) **Do Now** – each lesson starts with the opportunity for children to consolidate their learning from the previous lesson by completing their marking sticker. Children will have a 'Practise' question or a 'Going Deeper' problem to solve depending on their level of understanding. Some children will have 'Personal Next Steps' which identify a larger misconception and may require some adult support. Following this, children complete a Do Now task which reinforces previous learning or is used to pre-teach/assess upcoming topics.

2) **New Learning** – Here the 'Key Learning' is shared along with Star Words. Children are exposed to the concept they are learning about with teacher modelling



3) **Paired Talk Task** – Children are given the opportunity to discuss problems with a partner and work through them together following stem sentences and using concrete manipulatives. This activity is modelled first by adults in the classroom (depending on age/ability of children).

4) **Develop Learning** – Using knowledge and understanding from the lesson, children are faced with more complex scenarios that require them to apply their existing knowledge to new, less familiar situations

5) **Independent Work** – Children complete an independent activity which allows all children to achieve the Key Learning and be exposed to problem solving/reasoning style problems

6) **Plenary** – Children reflect on their learning and misconceptions are addressed (throughout the lesson – not necessarily at the end)

Maths Meetings are also timetabled regularly throughout school. These provide an opportunity to teach and revise 'general knowledge maths' which may not explicitly be covered during the maths lesson. It is recommended that they are carried out daily in KS1 (10 mins) and at least three times per week in KS2 (15-20 mins). This allows pupils to practise key concepts and skills on a regular basis meaning that they continually build on the mastery of these concepts.

Differentiation

We believe in enabling all our children, no matter their background or ability, to achieve their potential. We believe in allowing each and every child to have access to the learning for their age: supporting those who need extra help and further developing those who are ready to show their understanding in greater depth. As such, differentiation plays an important role in our daily maths lessons and work carried out beyond the maths lesson. At St. Paulinus, we employ some of the following methods of differentiation to help our children master maths concepts taught.

➤ **Scaffolding**

Strategy	Explanation
Partially completing examples	This could be the completion of a small number of examples to act as a model or reduce the demand of the task.
Completing all the examples	This level of scaffolding requires pupils to be well-trained so that they know what is expected of them if they are not calculating/completing the examples themselves. This may be more of a focus on multiple representations for conceptual understanding or, for example, an extended talk activity to develop their use of mathematical language.
Adding representations that support conceptual understanding	For tasks which require pupils to connect concrete manipulatives with abstract numerals, pictorial representations can be a supportive intermediate step. By giving pupils a <u>choice</u> of pictorial representations, you narrow down the number of options and support pupils' conceptual understanding.
Reducing number of examples	It is important to ensure that pupils complete enough examples to have had adequate practice and consolidation; however, some pupils work at a slower pace and will be overwhelmed if presented with too many



	questions.
Providing additional information that supports independent completion of tasks	For example, providing a brief glossary of key mathematical vocabulary or images linking concrete representations used by the teacher and the abstract or pictorial representations used on the task sheet.
Providing a scaffolded frame for pupils to record	<p>E.g. a blank table/partially completed table/equation frame</p>

➤ **Suggested strategies for removal of scaffolding from tasks**

Strategy	Explanation
Removing information	Remove numbers, symbols, words and/or images to create additional challenge. This strategy has a very diverse scope and challenge can be incrementally increased depending on the amount of information that is removed.
Require use of generalisation at an earlier point in the task	Where tasks have a general rule or pattern, it may be necessary for some pupils to complete a greater number of examples before they can generalise. Some pupils will be able to spot these patterns sooner, and by removing the scaffolding of the further unnecessary examples (because the pupil has already grasped the underlying principle), you enable the pupils to move on to, for example, generating their own examples which follow this same rule, or to investigate why the pattern occurs/rule works.
Require pupils to record independently	<p>E.g. removing scaffolded recording frames and requiring pupils to design their own methods of recording, for example, a table, chart or other representation</p> <p>There are three flowers in each pot. How many flowers are there altogether in four pots?</p>

• **Constraints**

Constraints are conditions that can be applied to a task to change its nature. They can both increase and decrease the difficulty level of a task, as well as shift its focus to a different Key Principle (mathematical thinking, conceptual understanding and language and communication). Adding a constraint changes the way pupils engage with tasks, and often increases the creativity needed to solve a problem. Constraints enable pupils to develop a deeper conceptual understanding within a content area, rather than moving onto the 'next' content.



Constraints can be built up incrementally, and changed throughout a lesson, responding to individuals' needs. By varying the constraints within one task, teachers can support pupils in understanding the underlying mathematical structures behind the problem they are solving, helping them to generalise and make stronger links between concepts.

Strategy	Explanation
Specifying a number range	This can increase or reduce challenge, depending on the nature of the task. Teachers should carefully consider the way in which a number range changes the task.
Setting a condition for one or more number/element	E.g. one of the numbers in the calculation must be odd/even etc. or the shape must have at least x number of sides or the mass must be at least double/half etc.
Specifying output criteria	E.g. the answer must be odd/prime/a multiple of x .
Specifying details of the strategy required	E.g. the addition/subtraction must require regrouping.

- **Groupings/Adult Support**

Part of independent work often involves some focused, targeted group work from the teacher. However groupings are 'fluid and flexible' based on the children's performance in a previous lesson or the beginning of that particular lesson.

Where Teaching Assistants are available, they are fully briefed before the lesson and use the same teaching methods modelled by the teacher to support individuals or groups. In some cases they may also model concepts to the class allowing the teacher to assess particular groups of children in more detail and identify their next steps.

Children with Special Educational Needs:

At St Paulinus we have a number of children who are working well below the year group expectations. We believe in the children being exposed to the learning for their year group but then it being differentiated down to the stage they are working on. In these cases the children are taught the skills they need to master their individual targets. A class teacher makes the judgement on how to best support the children in their class along with the support of the SENDCo as needed.

This may be evident in a variety of ways:

- Planning shows a different task for a group/ individual
- Different (but linked) key learning stickers
- Different task in books
- Different marking sticker
- Adult support in class
- Use of equipment to provide concrete materials to support access to the learning.
- Specific intervention work.
- Creating a focus group that regularly works with an adult.

**More Able:**

At St. Paulinus, we believe in challenging our more able, and enabling them to make good progress by helping them to show a greater depth of understanding. Teachers know who their more able children are through knowing their class and from Pupil Progress reviews and so even when sat in mixed ability groups, they can be a focus.

This may take the form of:

- Allow children to move on quickly to the pre-prepared challenge if they show a secure grasp and understanding of a key skill.
- Providing a daily challenge that is beyond solving word problems and allows children to apply their knowledge in a variety of situations.
- Pre-planning a greater depth challenge marking sticker.
- Using a variety of sources, including rising stars, NRICH, NCETM mastering maths booklets, to provide them with a rich and diverse number of problems to solve/ investigate.
- Always asking children to explain why, or how they know.
- Creating a focus group of more able children during the independent task.

Evidence of challenge can be seen in the planning and in the work in books – children will either write the word challenge with the work underneath or a challenge sticker could be stuck in.

Vocabulary and precision of language

Developing children's language and vocabulary is absolutely essential.

- In all lessons attention is given to whether key vocabulary has been learnt.
- Key vocabulary is listed during lessons and instantly added to as new words arise.
- Paired talk activities are used to encourage children to talk about their mathematics.
- Teachers insist that children mirror the language they hear the adults using.
- Where appropriate, children are encouraged to answer in full sentences.
- Adults mirror back alternative words for the same meaning to enrich children's range of vocabulary. E.g. Child says '3 times 5 is 15', teacher says, 'yes, the product of 3 and 5 is 15' or '3 multiplied by 5 equals 15'.
- Children are required to provide justification and reasoning for their answers. For example, 'I know the shape is a square because....'
- Teachers are required to have sound subject knowledge and understanding of the correct terminology and vocabulary and they refer to the school's glossary of maths terms if unsure. E.g. There is no such thing as a 'take away' sum (because 'sum' means 'add'). We use the terms 'calculation' or 'equation'.

Maths displays

All classrooms have a clear Maths display where models, vocabulary and visual images used in previous lessons are displayed and referred to. Children use these to support their learning.

- Concrete, Abstract and Pictorial examples are displayed according to the area of Maths covered that week along with problem solving questions relating to that area of Mathematics.



- Every classroom has an interactive maths area that can be accessed at any time where children can solve problems linked to the four operations, fluency and statistics
- Communal displays- 'We are thinking mathematically' are interactive displays that include both calculation and problem solving questions
- Maths Meeting Displays – In line with Mathematics Mastery, each classroom has a Maths Meeting Display. This shows a range of key concepts. The concepts shown may not link to the current unit being taught as they provide an opportunity to teach and revise 'general knowledge maths' to aid with the mastery of all units. A breakdown for each half term, for each year group, can be found on the Maths Mastery Toolkit

Assessment / Recording and Reporting

➤ Effective marking

- Using a marking sticker that includes practise/ going deeper/ personal next steps which is highlighted by teacher.
- Is often done while a task is being carried out through discussion between child and teacher.
- When personal next step is highlighted on the marking sticker for a small number of children who have found the lesson challenging, a same day intervention is created where the children can work as a group with an adult to re-do/ re-practise the skills taught in the lesson.
- Where a child is falling significantly behind or has a significant gap – class teachers create a more formal/ regular intervention for that child to complete in order to "plug the gap" and allow them to access the daily lessons with more ease- e.g. Rapid Maths interventions/pre-teach groups

➤ Ongoing Assessment for Learning

- The learning objective is referred to during the lesson to gauge progress and at the end of the lesson to assess progress. Children assess themselves against this using a 'smiley face' system which they colour in red, orange and green identifying what they have done well and how they could improve.
- Teachers monitor and assess children throughout the lesson, and through marking their work, identifying any misconceptions which need to be addressed.

➤ Formal Assessment

- Teachers grade all pupils towards each half term and at the end of the Summer Term using end of Key Stage SATs/ year group tests and Optional SATs/ year group tests. The results of formal assessments are recorded on individual pupil trackers on O'Track.

➤ Record Keeping

- Teachers use their own short assessment tasks. At the beginning of a unit children complete a pre- assessment and at the end a post- assessment. This can show progress within the unit. The work set, combined with a scrutiny of children's



recorded work over the previous weeks, helps to review how well children have taken in the topics taught and identifies any remaining misconceptions. Termly assessments using 'Rising Stars' and 'Test Base' tests are also used to assess using and applying skills, inform planning and identify learning gaps. Records of objectives achieved are also recorded on the school O'Track system.

➤ **Reporting to Parents**

- Parents are given the opportunity to discuss their child's progress on two official occasions (Parent's Evening – Autumn and Spring) but understand that the schools' 'open door' policy enables them to address concerns throughout the year.
- At Parent's Evening, termly reports are provided and discussed. These outline the end of year target, current grade and an effort grade.
- Written reports are completed before the end of the summer term.
- Teachers use the information gathered from their assessments to help them comment on individual children's progress.

Monitoring and Evaluation

The mathematics subject leader is given opportunities to work alongside other teachers. This time is used to monitor and evaluate the quality and standards of mathematics throughout the school and enables the subject leader to support teachers in their own classrooms.

Opportunities for teachers to review the mathematics policy are given on a regular basis during staff meetings.



Policy Monitoring and Review

This policy will be reviewed following the 3-year Policy Review Cycle of the school or when there are significant changes to the curriculum that warrant it. It may also be reviewed earlier should it no longer comply with school practice or the legal requirements of schools.



Appendices

Appendix 1 – Lesson Plan Template

Year 6 Maths planning Term 1A Week 2									
Key Learning	Star words:	Do now:	New learning	Talk task (paired learning)	Develop learning	Independent task:	Plenary	Marking sticker	

Appendix 2 – Key Learning Sticker Template

Key Learning: To read and write numbers to 10,000,000 and determine the value of each digit.

Appendix 3 – Marking Sticker Template

Practice	Going Deeper	Personal Next Steps																						
<p>5b. Write the number in digits in the place value grid below.</p> <p>Eight million, thirty-two thousand and four.</p> <table><tr><th>Millions</th><th>Hundred Thousands</th><th>Ten Thousands</th><th>Thousands</th><th>Hundreds</th><th>Tens</th><th>Ones</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table> <p>☆</p>	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones								<p>M ? ← Answer</p> <p>4b. Match the pairs of numbers in the grid below to create the target number.</p> <div>7,424,645</div> <table><tr><td>7,024,605</td><td>110,040</td><td>6,400,605</td><td>1,024,040</td></tr><tr><td>7,314,605</td><td>6,304,640</td><td>400,040</td><td>1,120,005</td></tr></table>	7,024,605	110,040	6,400,605	1,024,040	7,314,605	6,304,640	400,040	1,120,005	<p>Misconception:</p> <p>Intervention notes:</p>
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones																		
7,024,605	110,040	6,400,605	1,024,040																					
7,314,605	6,304,640	400,040	1,120,005																					

Appendix 4 – Going Deeper Clipart



<p>M</p> <p>? ← Answer</p> <p><u>'What's the question?'</u></p> <p>If this is the answer, what could the question have been?</p>	<p>M</p>  <p><u>'What's wrong with this?'</u></p> <p>Can you explain what is wrong and correct the error?</p>
<p>M</p>  <p>Draw a picture to explain or demonstrate what you have worked out.</p>	<p>M</p>  <p><u>'Find a pattern'</u></p> <p>Can you see a pattern? Describe the pattern.</p>
<p>M</p> <p>What's the same?</p>  <p>What's different?</p> <p>Can you find something that is the same? Now can you find something that is different?</p>	<p>M</p>  <p><u>'Tell a Story'</u></p> <p>Make up a real life story using your equation, numbers or shapes.</p>
<p>M</p> <p>Odd one out</p>  <p>Find an odd one out and explain why it doesn't fit. Could another one be the odd one out? Why?</p>	<p>M</p>  <p><u>'Reason it'</u></p> <p>Explain how you know using the correct mathematical vocabulary.</p>
<p>M</p>  <p>Convince me that you are right.</p>	<p>M</p>  <p><u>'Have you found all possibilities?'</u></p>