



Oundle CE Primary School

Mathematics Policy

Agreed by (Committee/FGB):	
Review date:	August 2019
Review period:	Every three years or statutory change
Next review date:	August 2022

Rationale:

The National Curriculum states: "Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject."

Aims and Objectives:

We aim to develop lively, enquiring minds encouraging pupils to become self-motivated, confident and capable in order to solve problems that will become an integral part of their future.

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 have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.

- **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.

The content and principles underpinning the mathematics curriculum reflect that of a 'mastery' methodology. The principles and features that characterise this 'mastery' approach are:

- Teachers reinforce an expectation that all pupils are capable of achieving high standards in mathematics.
- The large majority of pupils progress through the curriculum content at the same pace.
- Differentiation is achieved by emphasising deep knowledge and through individual support and intervention.
- Teaching is underpinned by methodical curriculum design and supported by carefully crafted lessons and resources to foster deep conceptual and procedural knowledge.
- Practice and consolidation play a central role. Carefully designed variation within this builds fluency and understanding of underlying mathematical concepts in tandem.
- Teachers use precise questioning in class to test conceptual and procedural knowledge, and assess pupils regularly to identify those requiring intervention so that all pupils keep up.

Mathematics Curriculum:

Foundation Stage

In the Early Years Foundation Stage (EYFS), we relate the mathematical aspects of the children's work to the Development Matters statements and the Early Learning Goals (ELG), as set out in the EYFS profile document. Mathematics development involves providing children with opportunities to practise and improve their skills in counting numbers, calculating simple addition and subtraction

problems, and to describe shapes, spaces, and measures. The profile for mathematics areas of learning are number (ELG 11) and shape, space and measures (ELG 12). We continually observe and assess children against these areas using their age-related objectives, and plan the next steps in their mathematical development through a topic-based curriculum.

Years 1 to 6

- Through Years 1 to 6 we use a coherent programme of high-quality materials and exercises, which are structured with great care to build deep conceptual knowledge alongside developing procedural fluency.
- Our KS1 and KS2 teachers use textbooks and workbooks from the 'Maths - No Problem!' series, to support their teaching. These books and resources align with the National Curriculum 2014, to support the planning and delivery of mathematics teaching.
- The 'Maths - No Problem!' textbooks and workbooks are arranged in chapters and, over the course of the academic year, all units of the National Curriculum 2014 are covered.
- Short term planning is done weekly, with teachers planning learning objectives, identifying possible misconceptions, key vocabulary and ways to challenge pupils.

A Typical Lesson:

Lessons last approximately one hour and 15 minutes and are taught daily in the morning. Pupils start the lesson with an 'In Focus' problem, which they discuss in mixed ability partners. This is a problem-solving activity, which prompts discussion and reasoning. These problems are almost always presented with objects (concrete manipulatives) for children to use. Teachers use careful questions to draw out pupils' discussions and their reasoning. Once a week, an 'In Focus' activity should be presented on a sticker for the children to solve in their maths journal.

The class teacher then leads pupils through strategies for solving the problem, including those already discussed. At this part of the lesson, the children might need to write down their strategy in their 'Maths Journal'. The strategies may be displayed in the classroom on the 'working wall' or whiteboard.

The class then try some questions in 'Guided Practice'. Carefully designed variation in these questions builds fluency and deep understanding. When they are ready to apply their learning independently, the children answer questions in their own workbook. If some children are not ready by this point, they will continue to work with the teacher in a focus group.

If some pupils are advanced in this area of mathematics and have completed the questions independently (or may not need to at all depending on their level of competency), they will be given extension tasks to consolidate and deepen their learning, which they will complete in their 'Maths Journal'. These journal activities will be differentiated in three ways beginning with red, moving to amber and then to green (see [appendix 1](#) for an example of how these tasks should be presented). All children, whatever their level, should complete at least one journal activity in their journal each week. Some children may complete more than one challenge a week but they do not need to begin with red. Advanced pupils can begin with green and additional activities must be prepared if necessary.

Every Friday, Years 2-6 will complete a times table challenge which is completed in a booklet given to the children at the beginning of each new term (these are available on the L: drive). The first and final score of each term must be recorded and the difference calculated. The child with the largest

increase in percentage and the child with the largest increase in time will receive a certificate during the celebration assembly at the end of term. These certificates will be completed by class teachers, signed and laminated ready for the assembly.

Calculation Policy:

As a school we believe that all children, when introduced to a key new concept, should have the opportunity to build competency in this topic by using the CPA approach (Concrete, Pictorial, and Abstract).

Concrete - students should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

Pictorial - students should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.

Abstract - with the foundations firmly laid, students should be able to move to an abstract approach using numbers and key concepts with confidence.

See *appendix 2* for example of how the CPA approach might be talked through the four operations.

Resources:

The use of mathematical resources is integral to the CPA approach and thus planned into our learning and teaching. Resources such as number lines, Numicon, multi-link cubes, dienes, hundred squares, shapes, etc. are located within individual classrooms. Resources within individual classes are accessible to all pupils who should be encouraged to be responsible for their use. Further resources (often larger items shared by the whole school) are located in the large maths cupboard which is situated next to Pollock classroom in the blue zone.

A range of mathematics related software is also available and this is accessible via the shared server, which children can access when projected onto the Interactive Whiteboards in each classroom; by using individual iPads or by using the ICT suite. Teachers are encouraged to use the school playgrounds as an outdoor classroom when possible, for example, when teaching length, area or perimeter.

Display:

We recognise the importance of a stimulating learning environment. The school provides an environment which is rich in a wide variety of print, pictures, diagrams, charts, tables, models and images. Each classroom has a mathematical display area, which includes a working wall and a challenge area with mathematical vocabulary (see *appendix 3* for a comprehensive guide to mathematical vocabulary), visual aids and interactive activities where appropriate.

Contribution of Maths to teaching in other curriculum areas:

Mathematics is a tool for everyday life. It is a network of concepts and relationships and is used to analyse and communicate information and ideas in practical tasks and problems. By making links to other subjects at the initial planning stage we aim to provide real context in which to apply skills taught during the maths lessons. Mathematics should also be used to support learning in other lessons such as; using data through science, measuring in design technology and scaling in art.

Assessment:

Teachers will use AFL through each lesson to pick up on misconceptions and address them as soon as possible. Children who, after guided practice, still have misconceptions or gaps in their learning will become the focus group and work with the class teacher through the rest of the lesson.

After completion of each topic, teachers will update our school's assessment tracker (Educator) with teacher assessment based on what they have seen through the children achieve through the course of the topic.

Three times a year, at the end of the autumn, spring and summer terms, children will complete a PUMA assessment. This information should then tie in with the information gathered on Educator. Careful data analysis will then be completed to check for trends and misconceptions.

Homework - Maths Whizz:

We are committed to making sure that each child has the opportunity to engage with our Maths Whizz computer based learning programme in school. Half a lesson (approximately 45 minutes) will be committed to this each week. We recommend that the following times are also spent on the programme at home.

- FS - non-compulsory and at parents discretion
- Year 1 - 15 minutes
- Years 2 and 3 - 20 minutes
- Years 4, 5 & 6 - 30 minutes.

In doing so, the children will be rewarded with a merit in school every Friday when results are checked by the class teacher and shared with the children. Children's efforts will also be rewarded with class and individual awards at our termly awards assembly.

In some cases, advanced Year 5 & 6 pupils may complete all levels of work on the Maths-Whizz programme. If this is the case these children must be supplied with additional homework such as Primary Maths Challenge past papers or extension work from the Alpha, Beta, Gamma series.

Inclusion:

In line with the School's Inclusion Policy each child has an equal entitlement to all aspects of the Maths curriculum and to experience the full range of Maths activities. Therefore, in delivering Maths, care will be taken to ensure that all learning needs are met to ensure all children keep up with the learning and catch up needs are also met. Intervention groups will take place both within the Maths lesson and outside of it. These sessions may be delivered by the teacher or learning support assistant and may involve individual or small group work and may include extending the most able mathematicians as well as supporting learners who require additional practise of skills.

Monitoring and review:

Monitoring of the standards of the children's work and of the quality of teaching in mathematics is the responsibility of the Mathematics Subject Leader in cooperation with the Head Teacher and senior leadership team. The work of the Subject Leader also involves supporting colleagues in the teaching of mathematics and being informed about current developments in the subject. The Head Teacher and Subject Leader provide the strategic lead and direction for the subject in the school.

Roles and responsibilities:

The Subject Leader is responsible for:

- Monitoring the teaching of mathematics throughout the school
- Scrutiny of work
- Advising staff
- Resourcing

Tracy Tracey - August 2019

Appendix 1:

An example of an extension journal task.

W.B 08/01/2019 Journal Task 5A.2 L.O: To calculate using fractions.

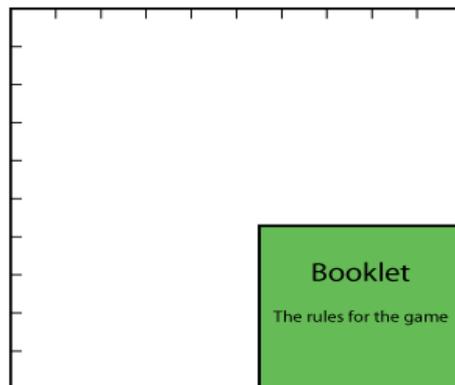
Green Challenge/ Challenge 3

Fractions in a Box

Stage: 2 ★ ★

We have a game which has a number of discs in seven different colours. These are kept in a flat square box with a square hole for each disc. There are 10 holes in each row and 10 in each column. So, there would be 100 discs altogether, except that there is a square booklet which is kept in a corner of the box in place of some of the holes.

We haven't drawn a grid to show all the holes because that would give the answer away!



There is a different number of discs of each of the seven colours.

Half ($\frac{1}{2}$) of the discs are red, $\frac{1}{4}$ are black and $\frac{1}{12}$ are blue.



One complete row (of 10 holes) of the box is filled with all the blue and green discs.



One of the shortened rows (that is where the booklet is) is exactly filled with all the orange discs.



Two of the shortened rows are filled with some of the red discs and the rest of the red discs exactly fill a number of complete rows (of 10) in the box.

There is just one white disc and all the rest are yellow.



How many discs are there altogether?

What fraction of them are orange?

What fraction are green? Yellow? White?

Appendix 2:

CPD approach to the four rules – calculation policy.

Appendix 3:

Mathematical vocabulary.