



## Oakridge Primary School Mathematics Policy

Adopted:	January 2021
Chair of Curriculum Committee:	Mrs Lewis
Next review date:	January 2023

### Mathematics vision statement:

To equip children with the knowledge and skills they need in order to develop into confident, enthusiastic and independent mathematicians who are able to calculate mentally, think critically, reason systematically and problem solve logically.

- Children can recall all + and – facts with 20.
- Children become ‘pattern sniffers’ and make connections in all areas of mathematics.
- Children recall all multiplication and corresponding division facts up to 12 x 12.
- Children use learnt strategies and written methods to solve challenging problems.

### Aims and objectives

Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives.

The aims of mathematics are to:

- 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
- **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.

### Teaching and learning style

The school uses a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop and enhance children's knowledge, skills and understanding in mathematics. We have a strong focus upon the recall of number facts and understanding of place value. We believe that these are the bed rock of mathematics and staff track and

assess children's progress carefully in these areas.

During lessons, we encourage children to ask as well as answer mathematical questions. They have the opportunity where appropriate to use a wide range of resources to support and enhance their understanding. Wherever possible, we encourage the children to use and apply their learning in everyday situations. We use a concrete- pictorial – abstract approach to achieve conceptual understanding in all areas of mathematics. Children begin exploring new concepts using a range of manipulatives which create a smooth transition into using pictorial images to further consolidate their learning. Children then apply this knowledge and experience to abstract approaches and algorithms, which in turn lead to conceptual and procedural fluency which ultimately achieves mastery.

When teaching mathematics we aim for children to master concepts. We therefore focus on the development of deep structural knowledge and the ability to make connections and spot patterns and relationships between numbers.

In all classes there are children of differing mathematical ability. We recognise this fact and provide suitable and appropriate learning opportunities for all children by matching the level of work to the ability of the child. We achieve this through a range of strategies - in some lessons through differentiated group work, and in other lessons by organising the children to work in pairs on open-ended problems or games. We also achieve differentiation through the types and styles of questions we ask whereby children are required to explain and prove their answers. Finally, we achieve differentiation through the use of challenge. We use classroom assistants to support some children and to ensure that work is matched to the needs of individuals. Children are encouraged to make choices about the level of work which they undertake as well as choosing who they work with and very often in a lesson children may start off with a simpler task but progress onto the more challenging work.

The school recognises the importance of incorporating variation within Maths teaching. We therefore aim to sequence similar but increasingly complex problems. This enables children to become familiar with the concept and identify any patterns arising. Variation can be achieved through, problem solving, written and mental calculations.

Lesson Structure – Lessons will often follow the structure below

- **Exploration** - instead of 'Let me teach you...' as a starting point, children are encouraged to explore a problem themselves to see what they already know. At the beginning of each lesson in our school this exploration is referred to as the '**anchor task**'.
- **Structured discussion** - the teacher will lead a discussion with the children in order to organise the findings of the exploration, compare/contrast strategies and guide toward the most efficient strategy (or the one being learnt that day).
- **Questions** to challenge thinking – teachers use questioning throughout every lesson to check understanding. Children are also encouraged to question each other frequently throughout the lesson; this aids the development of independent learners and deepens their understanding. A variety of questions are used, such as: How do you know? Can you prove it? Are you sure? Is that right? What's the same/different about? Can you explain that? What does your partner think? Can you imagine? Questions are also used to challenge children who have grasped the concept. Children are expected to listen to each other's responses and may be asked to explain someone else's ideas in their own words, or if they agree/disagree etc.

- **Discussion and feedback** – pupils have opportunities to talk to their partners and explain/clarify their thinking throughout the lesson, but are expected to complete written work independently (unless working in a guided group with the teacher)

## Mathematics curriculum planning

Mathematics is a core subject in the National Curriculum and we use this as the basis for implementing the statutory requirements of the programme of study for mathematics. We have adopted the 'Math's no Problem' approach which will also support and enhance teacher's planning.

Our Long-term mathematics planning ensures that all areas of mathematics are covered by the end of the academic year.

It is the mathematics class teacher who completes the daily plans for the teaching of mathematics. These daily plans list the specific learning objectives for each lesson and give details of how the lessons are to be taught. These plans are also kept on the School's Teaching drive, in order that the mathematics subject leader can monitor the Planning accordingly. Written feedback is provided for the individual teacher on the weekly short term planning, and the mathematics teacher and mathematics subject leader discuss feedback termly. On our planning sheets we record those pupils who fail to meet the learning objective, or who achieve more than was planned, so that we can take the needs of these pupils into account when planning for the next lesson. Where the majority of the class makes the planned progress, of course, there is no need to record this. We use our annotated lesson plans as a record of progress measured against learning objectives. We evaluate each lesson taught and record the aforesaid information in this evaluation.

## Teaching recall of key number facts

There is a high priority given to the teaching of recall of key number facts. During Early Years and key stage 1 this teaching focuses more upon addition and subtraction, with a strong emphasis on children being able to recall numbers bonds to 5, 10 and 20. In addition, we also ensure that children can confidently and accurately recall addition and subtraction facts within 5, 10 and 20 along with their bonds as this ensures that their understanding of number relationships is deeply embedded.

During Year 2, children begin to recall times table facts (x2, x5 and x10) and this continues throughout key stage 2.

All children within key stages 1 and 2 complete 3 timed maths recall activities each week. During key stage 2 these focus upon the quick and accurate recall of times tables. Every week, children are given opportunities to practice their mental recall skills and see their time decrease as the week progresses. This ensures that children stay motivated as they receive instant feedback and can see themselves progress. These are recorded at the back of morning maths books. In addition, the use of BGFL, numbergym and hit the button are used to provide extra learning opportunities and practice for children so that they can master their mental recall objectives.

From 8:45 when the school gates open until 9:05 when the registers close all children in KS1 and KS2 are engaged in morning maths. Three mornings per week focus on mental recall

linked to the progression planets and the children's next step, and two mornings per week focus on deliberate practice – either on current topic or previous topics. At the front of each morning math's book, children within key stage 2 may have a times table chart. This is a visual representation of the commutative law of mathematics. It allows children to see that the order in which a multiplication fact is presented does not affect the answer that is to be given. Children highlight the times table facts they know both horizontally and vertically with the intention that this motivates the children to continue as they can visually see the number of facts they need to learn decreasing.

Parents are made aware of the expectation of number fact recall through our annual learning meeting. They are informed of their child's ability to recall and whether this meets or exceeds age related expectation. Clear targets will be given for children who are still working towards age related expectation. Math's activities / ICT resources are shared with parents to enable them to help their child learn at home in memorable and fun way.

### **The teaching of mathematical language**

When delivering mathematics we teach precise content vocabulary and precise process vocabulary. Children will be introduced to words such as augend, addend, minuend, subtrahend, multiplicand, multiplier, dividend, divisor, numerator, denominator, vinculum, compare, estimate, regroup, partition, rearrange, exchange. Children will be expected to use this vocabulary during lessons when explaining and discussing mathematical concepts. Children are expected to answer in full sentences when they are verbalising their answers and explanations.

### **The Foundation Stage**

We teach mathematics in our reception class. As the class is part of the Foundation Stage of the National Curriculum, we relate the mathematical aspects of the children's work to the objectives set out in the Early Learning Goals, which underpin the curriculum planning for children aged three to five. We give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practice and talk confidently about mathematics. During the spring term we introduce a math's book for those children who are ready to formally record their work. They are also introduced to 'morning maths' when appropriate.

### **Contribution of mathematics to teaching in other curriculum areas**

#### **English**

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, we encourage children to read and interpret problems in order to identify the mathematics involved. The children explain and present their work to others during plenary sessions. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts.

Lessons are often interactive in order to promote speaking and listening skills and during

the main part of our teaching we often ask children to interact with each other, using the think-pair-share strategy.

### **Information and communication technology (ICT)**

Children use and apply mathematics in a variety of ways when solving problems using ICT. Children use it to produce graphs and tables when explaining their results or when creating repeating patterns, such as tessellations. When working on control, children use standard and non-standard measures for distance and angle. They use simulations to identify patterns and relationships.

### **Personal, social and health education (PSHE) and citizenship**

Mathematics contributes to the teaching of personal, social and health education, and citizenship. The work that children do outside their normal lessons encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present older children with real-life situations in their work on the spending of money. Children who are representatives of the School Council have further opportunities to develop this.

### **Spiritual, moral, social and cultural development**

The teaching of mathematics supports the social development of our children through the way we expect them to work with each other in lessons. We group children so that they work together, and we give them the chance to discuss their ideas and results.

### **Science and Design and Technology**

Mathematics contributes to the teaching of Science and technology through the application of data handling skills. Children use maths skills to collect and represent data. Aspects of measure are also applied when data is collected.

## **Teaching mathematics to children with special needs including G and T**

We teach mathematics to all children, whatever their ability. It is part of the school curriculum policy to provide a broad and balanced education to all children. We provide learning opportunities that are matched to the needs of children with learning difficulties. Work in mathematics takes into account the targets set for individual children in their Individual Education Plans (IEPs).

We track the children extremely carefully in mathematics to ensure that all our children achieve their full potential. For children who need additional support in mathematics, morning maths clubs are held to reinforce concepts that they have been taught in the classroom. We also provide children with maths games which support their recall skills and mental strategies in mathematics.

Our able children are also targeted and once again they have the opportunity to take home maths games as well as having targeted TA support where applicable. Children in Year 6 also have the opportunity to work with a maths teacher at the High school as well as with children from the other Primary schools in the pyramid developing their higher thinking skills in problem solving.

## Dyslexia Friendly

The school actively promotes a Dyslexia Friendly learning environment and is using teaching techniques suitable for all children to learn.

## Assessment and recording

We assess children's work in mathematics from three aspects (long-term, short-term and medium-term). We make short-term assessments, which we use to help us adjust our daily plans. These short-term assessments are closely matched to the teaching objectives.

At the end of a unit of learning we assess the key concepts taught during that unit and complete a gap analysis. We use our own assessment tracking system on Excel as the recording format for this. This level is recorded on our Teacher drive.

Pupils of differing abilities are assessed individually through conferencing termly on their mental strategies and place value skills.

We carry out long-term assessments mid-way through the year, before February half term and towards the end of the school year, and we use these to assess progress against school and national targets. We can then set targets for the next school year and make a summary of each child's progress before discussing it with parents. We pass this information on to the next teacher at the end of the year, so that *s/he* can plan for the new school year. We make the long-term assessments with the help of the mathsno problem end-of-year tests, and teacher assessments. We repeat these tests in September to ensure learning has been retained over the summer holiday. We use the national tests for children in Year 2 and Year 6.

Written mathematics work is recorded in the foundation stage from the spring term onwards. The agreed format for Key Stage 1 written recording of mathematics is in blue A4 books with 10mm squares. The agreed format for Key Stage 2 written recording of mathematics is in blue A4 books with 8mm squares. On 2 occasions each term, scanning of three mathematics books (top, middle and lower ability) takes place, for which written feedback is provided for the mathematics teacher/s.

Our own data tracking program using excel is used to track individual pupils and cohort progress. This data is analysed to target the most effective methods of pupil learning.

## Equal Opportunities and Inclusion

Through mathematics we ensure that the school meets the needs of all, taking account of gender, ethnicity, culture, religion, language, sexual orientation, age, ability, disability and social circumstances. It is important that in this school we meet the diverse needs of pupils to ensure inclusion for all and that all pupils are prepared for full participation in a multi-ethnic society. We also measure and assess the impact regularly through meetings with our SEN co-ordinator and individual teachers to ensure all children have equal access to succeeding in this subject.

## Resources

There is a range of resources to support the teaching of mathematics across the school. All classrooms in the Foundation Stage and KS1 have a number square and a wide range of appropriate small apparatus. In classes, there is also either a 'visual learning journey' or a 'learning quadrant'. The visual learning journey is used so that children can see their learning journey of mathematics, understand their next step and see how all their learning is connected. The learning quadrant is used so that children are able to see what concepts they got correct and what concepts they need to work on, again, reinforcing next steps. Calculators and a range of visual aids are available from the central storage area. In addition, particular resources are stored in the classroom to enable easy access to a range of appropriate manipulatives when needed. A range of software is available to support work with the computers.

## Monitoring and review

Monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the mathematics subject leader. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The mathematics subject leader gives the Headteacher an annual summary in which they evaluate strengths and weaknesses in the subject and indicate areas for further improvement. The curriculum committee is briefed with regards to the teaching of Maths.