Pewsey Primary School

Mathematics Policy

The National Curriculum (2014) states that: "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

The King Alfred Trust considers maths as a multi-discipline, cross curricular and interconnected subject. We want pupils to see mathematics as being relevant to their world and applicable to everyday life as well as being a skill they will need as they move on through their school life and ultimately to the world of employment. To that end, it is our intention to provide pupils with a high-quality, inter-related and creative maths experience that develops their ability to think mathematically and apply the strategies that they have learnt in a variety of ways. Emphasis is placed on enabling pupils to develop:

- a positive attitude towards mathematics.
- competency and confidence in mastering mathematical skills and concepts.
- an ability to solve problems, to reason and explain, to think logically and to work systematically and accurately.
- resilience, initiative and an ability to work both independently and in cooperation with others, making decisions and taking risks.
- an ability to use and apply mathematics across the curriculum and in real life.
- an ability to communicate mathematics both orally and in writing.

Objectives

King Alfred Trust employs a Concrete, Pictorial, Abstract (CPA) approach to maths. We want to ensure that pupils are able to use concrete manipulatives from early on in maths so that they are able to visualise the maths, create models and images and develop methods and approaches to solving increasingly abstract problems. Our aim is to allow children to explore different models and images in varied fluency, develop confidence to talk about and reason with mathematical concepts taught and master the maths covered in order to apply it to a range of problems.

- **Concrete representation**: a pupil first introduced to an idea or skill by acting it out with real objects. This is a 'hands on' component using real objects and is a foundation for conceptual understanding.

- **Pictorial representation**: a pupil has sufficiently understood the 'hands on' experiences performed and can now relate them to representations, such as a diagram or picture of the problem.

- **Abstract representation**: a pupil is now capable of representing problems by using mathematical notation, for example 12 x 2 = 24. It is important that conceptual understanding, supported by the use of representation, is secure for all procedures.

To ensure consistency and progression across schools, King Alfred Trust uses the White Rose maths scheme (including premium resources) to teach mathematics and provide children the knowledge and skills they need to become confident mathematicians. The Trust has also adopted the White Rose Calculation Policies.

The White Rose mathematics scheme of learning is designed to support a mastery approach to teaching and learning and is consistent with the aims and objectives of the National Curriculum (2014). At the centre of the mastery approach to teaching maths is the belief that all children have the potential to succeed. All pupils are encouraged by the belief that by working hard at maths they can succeed. True mastery aims to develop all children's mathematical understanding at the same pace. As such, as much as possible pupils are taught through whole-class interactive teaching. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.

Teachers will also utilise resources from Classroom Secrets, NCETM spine materials, Testbase and NRICH to support application of reasoning and problem solving.

The White Rose Calculation Policy has been broken down into addition and subtraction, and multiplication and division. At the beginning of each policy, there is an overview of the different models and images that can support the teaching of different concepts. These provide explanations of the benefits of using the models and show the links between different operations. Each operation is then broken down into skills and each skill has a dedicated page showing the different models and images that could be used to effectively teach that concept. There is an overview of skills linked to year groups to support consistency throughout school. A glossary of terms is provided at the end of the calculation policy to support understanding of the key language used to teach the four operations.

Differentiation

Differentiation should primarily be through targeted support, scaffolding and opportunities to explore the curriculum content in greater depth. Similarly, with calculation strategies, children must not simply rote learn procedures, but demonstrate their understanding through the use of concrete materials and pictorial representations. Manipulatives in particular must not be presented as a resource to support the less confident or lower attaining pupils. Rather, pupils of all abilities should have access to a range of manipulatives with which they are familiar with to support their mathematical thinking at the deep level required to support their conceptual understanding.

Manipulatives

The use of resources such as bead strings, counters, Numicon, hundred squares and number lines is of great value. Initially, resources help a child visualise what they are being asked to calculate. As a child progresses through the stages, the need for resources should diminish as they become more confident at showing their calculations on number lines or in columns. It is important however to recognise that children will understand mathematics in different ways and visual, practical resources may be necessary to support children in later years. We encourage the use of 'bar methods' to support problem solving. It is important to understand that these help a child visualise a problem and determine the steps needed to solve it. These methods do not aid actual calculating: formal methods must still be used.

Stem Sentences
Consistency in language is essential for pupils to understand the concepts presented in mathematics. Knowledge and understanding of this mathematical language will support pupils in later education and when they enter their future occupations. Teachers promote and encourage discussion in maths lessons to broaden the depth of understanding and develop reasoning and explanation skills. In order to achieve this teachers and pupils require a common vocabulary. As such, we encourage pupils across our schools to answer questions using STEM sentences where appropriate. STEM sentences include accurate mathematical vocabulary which pupils can utilise to communicate their ideas with clarity.

Multiplication
King Alfred Trust recognises the importance of having a thorough knowledge and understanding of times table facts. Multiplication is a key area of mathematics and is vital to educational success within the subject, as the conceptual understanding of multiplication runs through many other areas of the subject. Multiplication facts are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts. Poor knowledge of these facts has a negative impact on the learning of more complex calculation strategies and may lead to low confidence in mathematics lessons. Children will be taught to count in multiples, learn facts in order and facts out of order to secure their knowledge of these times tables.

By the end of KS1, pupils should become competent with the 2, 5 and 10 times tables, know the abstract symbol for multiplication and demonstrate the commutative property of multiplication (5×4 = 4×5). Multiplication in KS2 maths focuses on having pupils build on their understanding of multiplication from Key Stage 1; using the times tables they have already learnt to explore more complex multiplication facts. Pupils in Year 4 will participate in a multiplication tables check in June. The purpose of the check is to determine whether children can fluently recall their times tables up to 12, which is essential for future success in mathematics. It will also help identify pupils who may require additional support. All pupils will be provided with access to Purple Mash where they can practise their times table skills and further develop their knowledge.

Assessment and Monitoring
Regular assessment of pupil progress will be made through marking and pre and post teach assessments by the class teacher. Focused and targeted feedback will be provided to pupils to support their understanding and enable them to develop mastery of a skill or key concept. Specific guidelines for feedback are given in the Trust's marking policy. Pupil attainment and progress will be tracked through the use of the school's PAG (Prior Attainment Groups) system. PAG action plans will be produced for any pupil who appears to be vulnerable to underachievement. If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.

Equal Opportunities
King Alfred Trust recognises the right of all children to learn mathematics in a safe and secure environment regardless of their background. It is the responsibility of the class teacher to ensure all children are included in mathematics lessons and activities with all learning styles catered for.

Where applicable, children's Individual Education Plans will incorporate objectives related to mathematics and these should be borne in mind when planning activities for children with Special Educational Needs and Disabilities (SEND). Where it is clear, and has been agreed by the SENDCO, that a pupil is unable to access maths at the expected level for their year group, a personalised maths curriculum will be planned for the child.

Children with English as an additional language (EAL) will be supported to engage with mathematics learning by:

- pre and post teaching (clarify specific vocabulary)
- utilising the CPA approach, building on the pupil's existing knowledge and introducing abstract concepts in a concrete and achievable way.

Homework

Homework is an essential way to encourage children to practise work they have learnt, play mathematical games and keep parents up to date with work being carried out in class. The class teacher is expected to set homework in line with the Home Learning Policy. Pupils in KS2 are also expected to learn multiplication facts at home in line with the times tables covered in the class and should use Purple Mash to do this.

Parental Involvement

We welcome and encourage parental involvement in the teaching of mathematics. Mathematics guidance evenings feature in the school calendar to help equip parents so that they can support their children with their mathematics homework. Information on a child's progress will be given to parents at Parent Evening consultations. A report of a child's progress and attainment will be made at the end of each year.

Governing Body

A link Governor is responsible with the Head Teacher and Mathematics Leader for the provision and monitoring of mathematics within the school. They will meet on a regular basis with the Mathematics Leader, may observe mathematics lessons being taught and report back to the Local Governing Body on developments within the mathematics subject area. This policy will be reviewed every two years by the Maths Lead. At every review, the policy will be shared with the Governing Body.