



## Appleton Primary School Maths Policy

**At Appleton C of E Primary School, our vision is “Building wisely for life”. Our vision is to be: A happy and welcoming school community where we learn to build wisely for life by following Jesus’ example of love and care, and by aiming to be the best we can for ourselves and the good of others.**

**We have three core Christian values: Respect: We recognise and respect the uniqueness of each individual Kindness: We show kindness by loving others as ourselves, making a difference to our community and the world around us through our words and actions Responsibility: We are responsible for fulfilling our potential, believing in ourselves and making our own wise choices.**

We believe that the development of maths skills is central to a child's life. All of our children should be confident and capable at maths by the time they leave primary school.

At Appleton Primary School, children carry out maths or maths activities every day, using a variety of resources which stimulate interest. Their progress in all areas is carefully assessed and recorded. We engage with parents, sharing information on their child’s progress as well as how they can help their children to improve. Our consistent, whole school approach, based on the latest research and best practice, encourages children to enjoy maths learning. We gather evidence to evaluate the quality of maths teaching throughout the school using lesson observations, work scrutiny, reviews of planning and feedback from children and parents/carers. Lesson planning is always reflective and responsive.

### Aims

We aim to teach children to be confident and independent in their maths, both by building fluency in a variety of situations as well as developing secure reasoning and problem solving skills.

- We aim for children to develop an efficient, reliable, formal written method of calculation for all operations.
- We aim for children to use calculation methods accurately with confidence and understanding.
- Children should understand important concepts and make connections within mathematics.
- Children should show high levels of fluency in performing written and mental calculations.
- We aim for children to have solid mental maths skills, both in their times tables and related division facts, as well as manipulating numbers in addition, subtraction, multiplication and division.
- We expect children to be active in their learning, assimilating information and making use of it in their own work rather than merely gaining knowledge.

- We aim for children to have a range of written methods to solve calculations, including jotted methods.
- We aim to develop enthusiastic independent learners who possess perseverance and a willingness to explore problems.
- We aim to enable children to discuss their maths learning and different approaches to problem solving.
- We aim for children to justify and explain their reasoning.
- We aim to develop our pupils' learning by making links clear to maths in real life.

## Teaching and Learning

Effective planning provides for a classroom where children feel sufficiently encouraged and secure to be able to express and explore their feelings, thoughts and emotions. Teachers base their planning on the White Rose Hub schemes of learning, using “small steps” to move learning on.

Mastery is an approach where all children can achieve at a high standard in mathematics. It is a teaching and learning approach: challenge is provided by going deeper rather than accelerating in to new content. It means being able to use knowledge appropriately, flexibly and creatively and to apply it in new and unfamiliar situations, through problem solving, questioning and deep mathematical thinking. It is important that children have the time and opportunity to master facts, procedures and concepts in mathematics. As a result, teachers will prioritise areas of weakness through their teaching and target time appropriately. Mastery of mathematics is not a fixed state, but a continuum where children are always striving towards something new. It is built continually throughout school and is a valuable tool for life.

## Lesson Design

At Appleton C of E Primary School we believe in quality first teaching, ensuring that children have the very best teaching possible in order for them to make the most out of each and every lesson. Teachers plan lessons carefully to meet the needs of all of the children, considering prior knowledge, confidence and intended outcomes, in order to ensure that children make rapid and sustained progress in their maths. We use a variety of different pedagogical approaches in our maths lessons, such as:

- Whole class together – we teach mathematics to whole classes and all children are encouraged to believe that by working hard they can succeed in maths. Lessons are planned based on formative assessment of what is already known and we include all children in learning mathematical concepts. At the planning stage, teachers consider what scaffolding may be required for children who may struggle to grasp concepts in the lesson and suitable challenge questions for those who may grasp the concepts rapidly. Decisions are not made about who these children may be prior to the lesson.
- Longer and deeper – in order to address the aims of the National Curriculum, our planning has been adjusted to allow longer time to be spent on topics. Each lesson or group of lessons focuses on one key conceptual idea, a “small step”, and connections are made across mathematical topics. It may appear that the pace of the lesson is slower, but

progress and understanding is enhanced. Our assessment procedures recognise that the aims of the curriculum are addressed through depth within a topic.

- Key learning points are identified during planning (collaboratively in key stages) and a clear journey through maths is shown in lessons and also reflected on working walls. Questions will probe pupil understanding throughout and responses are expected in full sentences, using precise mathematical vocabulary.
- Difficult points and potential misconceptions are identified during the planning process and used as opportunities for learning. Children are then supported through these.
- Fluency – We recognise that ‘fluency’ is not just about remembering facts and we aim to develop all aspects of fluency through lessons. As a school we are focusing on developing instant recall of key facts, such as number bonds, multiplication table and addition facts. Increasing fluency in basic facts allows children to free working memory and solve more complex problems.

## **Lesson Structure**

We use a range of techniques in maths lessons to deepen understanding and explore mathematical concepts, such as:

- 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. This type of reasoning question is often open-ended.
- Develop reasoning and deep understanding – problems are usually set in real life contexts, carefully chosen representations (manipulatives and images) are used by all to explore concepts. The use of practical resources, pictorial representations and recording takes place in most lessons following the Concrete Pictorial Abstract approach (CPA).
- Structuring - the teacher will organise the findings of the exploration, comparing and contrasting strategies to guide toward the most efficient strategy (or the one being learned that day).
- Step by step approach – developing a journey through the mathematics, steps may appear small especially at the beginning of a lesson. There are also points when suddenly a jump appears to have been made, or an extra challenge is introduced.
- Questions to challenge thinking – teachers use questioning throughout every lesson to check understanding, and a variety of questions are used to foster different levels of thinking e.g. 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 further challenge children who have grasped the concept.
- Discussion and feedback – children have opportunities to talk to their partners and explain/clarify their thinking throughout the lesson. They 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.
- Practising - not drill and practice, but intelligent practice characterised by variation.
- Learning through play – in Foundation Stage and Year 1 in particular, children will learn through carefully structured play opportunities, as well as by using songs/rhymes etc. This also happens in some lessons throughout the school. We believe that fostering this

curiosity and sense of fun around maths is vital to ensure that maths is both enjoyed and understood.

At Appleton C of E Primary School we nurture a Growth Mindset ethos. We have high expectations of all children and believe that everyone can achieve in mathematics. Challenge is provided through problem solving to achieve a greater depth of understanding. We also recognise that some children may need longer to grasp concepts and require careful scaffolding or extra time and support. We celebrate children who show resilience and learn from their mistakes.

### Calulcation Strategies

We follow the White Rose Maths hub guidance for our calculation strategies. This can be summarised as:

	EYFS/Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Addition	Combining two parts to make a whole: part whole model  Starting at the bigger number and counting on- using cubes.  Regrouping to make 10 using ten frame.	Adding three single digits.  Use of base 10 to combine two numbers.	Column method- regrouping.  Using place value counters (up to 3 digits).	Column method- regrouping.  (up to 4 digits)	Column method- regrouping.  Use of place value counters for adding decimals.	Column method- regrouping.  Abstract methods.  Place value counters to be used for adding decimal numbers.
Subtraction	Taking away ones  Counting back  Find the difference  Part whole model  Make 10 using the ten frame	Counting back  Find the difference  Part whole model  Make 10  Use of base 10	Column method with regrouping.  (up to 3 digits using place value counters)	Column method with regrouping.  (up to 4 digits)	Column method with regrouping.  Abstract for whole numbers.  Start with place value counters for decimals- with the same amount of decimal places.	Column method with regrouping.  Abstract methods.  Place value counters for decimals- with different amounts of decimal places.

<b>Multiplication</b>	<p>Recognising and making equal groups.</p> <p>Doubling</p> <p>Counting in multiples Use cubes, Numicon and other objects in the classroom</p>	<p>Arrays- showing commutative multiplication</p>	<p>Arrays</p> <p>2d × 1d using base 10</p>	<p>Column multiplication- introduced with place value counters.</p> <p>(2 and 3 digit multiplied by 1 digit)</p>	<p>Column multiplication</p> <p>Abstract only but might need a repeat of year 4 first (up to 4 digit numbers multiplied by 1 or 2 digits)</p>	<p>Column multiplication</p> <p>Abstract methods (multi-digit up to 4 digits by a 2 digit number)</p>
<b>Division</b>	<p>Sharing objects into groups</p> <p>Division as grouping e.g. I have 12 sweets and put them in groups of 3, how many groups?</p> <p>Use cubes and draw round 3 cubes at a time.</p>	<p>Division as grouping</p> <p>Division within arrays- linking to multiplication</p> <p>Repeated subtraction</p>	<p>Division with a remainder- using lollipop sticks, times tables facts and repeated subtraction.</p> <p>2d divided by 1d using base 10 or place value counters</p>	<p>Division with a remainder</p> <p>Short division (up to 3 digits by 1 digit- concrete and pictorial)</p>	<p>Short division</p> <p>(up to 4 digits by a 1 digit number including remainders)</p>	<p>Short division</p> <p>Long division with place value counters (up to 4 digits by a 2 digit number)</p> <p>Children should exchange into the tenths and hundredths column too</p>

We use a variety of different approaches, starting with concrete examples in all year groups. Using counters, Dienes etc allows children to understand the concepts in depth, rather than just being able to follow instructions for a column method. We build on this using pictorial representations, especially the use of drawing Dienes or place value counters. Once this is secure, we move on to more formal written methods, such as the column methods for addition/subtraction/multiplication and long/short division.

Children are encouraged to round and estimate answers and to use the inverse operation in order to solve problems and to check their answers.

### The Maths Learning Environment

Our maths learning environment includes:

- For Foundation Stage and KS1, appropriate child-led and carefully-planned adult initiated maths activities, which build confidence and basic maths skills.
- Maths working walls in all classrooms, including appropriate resources such as number lines. This resource is built up over time by the class as they move through the different areas of learning.
- In all classes, resources such as numicon, Dienes, bead strings, counters etc, which can be freely accessed by the children at any time.

### Long and Short Term Planning

Long term planning follows the White Rose Scheme of Learning for that year group. We feel that this gives children better quality learning than more “spiral” curricula, as topics are covered in depth, giving us the chance to really consolidate the children’s learning and address misconceptions as they arise. Medium term planning includes National Curriculum objectives for that year group, mapped against the White Rose small steps. In the short term, teachers plan

lessons based on the “small steps”, using a range of different resources in order to teach the concept in a variety of ways, allow the children to explore the concept and make links with other concepts, and also to talk and discuss the concept. We always use both varied fluency and reasoning/problem solving questions, in order to build both parts of children’s mathematical understanding.

### **Assessment**

Teachers use a range of informal, formal, standardized and statutory assessments to monitor pupil progress over the year. These will help teachers to set targets for groups and individuals, which are shared with the children involved. At key points in the year progress will be assessed against National Curriculum key performance indicators. At the end of each year, children’s achievement should be matched against expected attainment and targets set.

### **Parents and Carers**

The role of parents and carers in helping to develop their child’s mathematical knowledge and understanding is incredibly important. We expect that parents will help their children to learn times table and related division facts, as well as other facts such as number bonds. Parents can also help by teaching children how to tell the time using the analogue clock. In Key Stage 1 that can be to 5 minute intervals, and to the nearest minute in Key Stage 2. Parents can also help by discussing maths in everyday life, such as bus timetables and using maths in activities such as shopping or cooking.

Review October 2020