Coalway Community Infant School
Maths Curriculum Intent

Whole school Vision:

- We will nurture our children to become happy, independent, confident and valued individuals who will be able to make healthy, happy relationships with a range of people. They will develop positive personal traits, values and attitudes, which will prepare them for later life experiences.
- We will ensure all of our children experience a broad, rich curriculum, tailored to the unique needs of each individual child.
  Our children will have developed knowledge, understanding and skills across the curriculum by the time they leave us, ensuring that they have the skills necessary for their future success.

  We will focus in particular on supporting the development of our children's early communication and language skills, early reading and early mathematics skills, to accelerate their progress and prepare them for the next stage of their education.

- We will enable our children to believe in themselves and be aspirational, to achieve the highest possible standards and be successful.
- We will help our children develop a love of and enthusiasm for learning, where they are proud of themselves and celebrate everyone's achievement.
- We will care for and support everyone within our 'Coalway family', establish good communication and relationships, and work together to provide the best outcomes for all of our children. We will continue to develop the children's understanding of their belonging within the community and the wider world and strive to develop strong successful partnerships beyond the school.
- We will ensure that all children try new things, perform in a show, learn outdoors, including within our beautiful Forest of Dean setting, have experiences within the local community, visit new places and have the opportunity to learn to swim.
  Our children will leave Coalway Infants with positive, happy memories, having had a wealth of experiences and a range of academic, creative, sporting, cultural and spiritual opportunities.

Mathematics Vision

We want our pupils to love mathematics and fully participate in maths learning. As an infant school, we understand the importance of a firm foundation of number and mathematical concepts so that the pupils are ready for the next stage of their mathematical learning. A well sequenced curriculum and systematic teaching and opportunities for practice, help pupils to become proficient in mathematics. This leads to success and motivation in the subject. We aim for our pupils to recall facts and methods to a level of automaticity so that they have the strategies to solve problems. We want our pupils to begin to develop critical thinking skills that will prepare them for KS2 curriculum.

How is Maths taught?

The maths curriculum is delivered using the National Curriculum 2014 and the Early Years Foundation Stage Profile. These are followed to ensure continuity from the Foundation Stage through to KS1. Maths is taught through the **CanDoMaths** scheme of learning.

EYFS: Mathematics is a **specific** area

At KS1 children's learning will be structured with the following topics:

. Number and place value
. Addition and subtraction
. Multiplication and division
. Fractions
. Measurement
. Geometry – properties of shapes

. Geometry – position and direction
. Statistics (Year 2)

Staff use the CanDoMaths scheme of work, which develops fluency, reasoning and problem solving to support the planning of lessons. We focus on the use of manipulatives for all children to support our mastery approach to mathematics.

All lessons have a key learning point which focuses on small steps within the unit of work so as each lesson builds on prior knowledge. We focus on maths vocabulary, learning from misconceptions and the use of STEM sentences so that children can apply their learning to different contexts.

All lessons start with sharing the learning point (WALT) so that children know what they are learning. Each lesson is made up of three parts: 'I do, We do, You do', focused teaching with the teacher, scaffolded teaching with the teacher and independent pupils practice. Fluency (do it), reasoning (solve it) and problem solving (challenge it) are the three steps of the pupil tasks. All children have access to practical resources and manipulatives throughout the lesson to support their understanding and demonstrate their reasoning.

The maths timetable

EYFS – Pupils receive daily, whole class, teaching from the class teacher which is followed by a smaller focused teaching group. This direct teaching focuses on mathematical vocabulary, reasoning and developing problem solving. Continuous provision allows pupils to explore each concept more fully through play and child led learning. Teachers and teaching assistants interact with the children through their play, developing their understanding further through targeted questioning. Math learning is also part of the outdoor provision.

KS1 – Daily maths lessons are structured through a PowerPoint to ensure a consistent, effective and efficient approach across the year group and throughout the school. Maths Buster is a separate daily maths lesson focusing on the daily/weekly retrieval and practice of arithmetic, deliberate practice of previously taught units, number bonds, times tables and focused KPIs identified from previous terms assessment.

Mastery in maths

A teaching for mastery approach is used in our school in order to work towards the National Curriculum aims. The key elements for a mastery approach are:

- Belief that all pupils are able to understand and do maths, given sufficient time. With good teaching, appropriate resources, effort and a 'can do' attitude, all children can enjoy and achieve in maths.
- Pupils are taught through whole year group interactive teaching where the focus is on all pupils working together on the same lesson content at the same time. This aim is to ensure that all can master concepts before moving on to the next part of the curriculum sequence (keep up not catch up).
- If a pupil is unable to grasp a concept, this is identified quickly and they join a 'scoop group' to ensure the pupil is able to move on with the whole class in the next lesson.
- Procedural fluency and conceptual understanding are developed together because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice used is intelligent practice that both reinforces pupils' procedural fluency and develops their conceptual understanding.
- Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils' deep learning can be sustained.

Planning a coherent journey

Effective planning for mastery should involve the planner to think deeply about the manageable steps needed to be taken to enable all pupils to succeed and meet objectives. Planning should ensure that the teacher is confident in the delivery of content as it has been well thought out.

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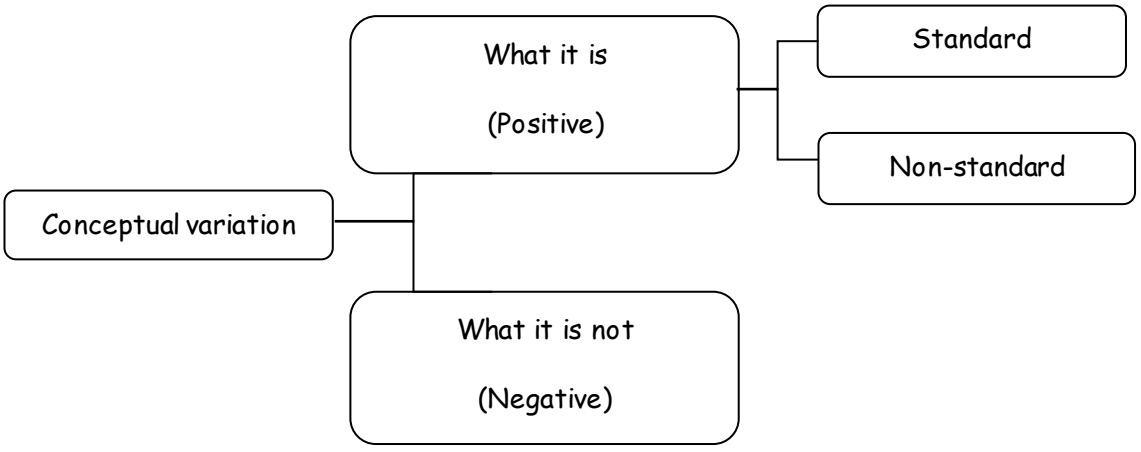
Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points (possible misconceptions) and a carefully sequenced journey through the learning. In a typical lesson, the teacher leads a back and forth interaction, including questioning, short tasks, explanation, demonstration and discussion. **CanDoMaths** sets out a coherent path of progression for pupils. It includes small steps planning for each lesson, revisiting previous learning, using the correct vocabulary through stem sentences, focused teaching on misconceptions, which allows teachers to respond to pupils' needs. Pupils 'see the maths' through the use of concrete and pictorial representations. Low stake quizzes and talk partners set the expectation for collaboration and discussion so they can 'talk the maths'.

Representation and structure
A skill of the teacher is to be able to represent the maths in a way which provides insight for the children. Concrete materials, different contexts, drawings and diagrams all play a role. These are discussed through opportunities for pupil and pupil-teacher talk, to develop reasoning, flexibility and adaptability in mathematical thinking. Representation, used well, enable pupils to develop an internal representation. Teachers use representations from CanDoMaths materials to support this.

Variation- Conceptual and procedural
Variation theory has several dimensions including use of multiple representations of what a concept is, and what it is not. It is characterised by carefully constructed small steps through the learning, paying attention to what is kept the same and what changes. This is so children can reason, make connections and build deep conceptual knowledge. Variation is applied to practice questions where attention is paid to the selection and order of the examples, often changing just one aspect but keeping the others the same. The intention is to avoid mechanical repetition but instead to promote thinking to make connections. This is also known as 'intelligent practise'.
e.g. LP: Multiply 2 digit numbers by 10
Fluency- 2 x 10 =
20 x 10 =
6 x 10 =
26 x 10 =

<u>Conceptual variation</u>
Provides the opportunity to work on different representations for the same mathematical idea or can be the same mathematical idea- different problem.



<u>Procedural variation</u>
Provides the opportunity:
- For practise (intelligent rather than mechanical)
- To focus on relationships, not just the procedure
- To make connections between problems
- To use one problem to work out the next
- To create other examples of their own

Types of procedural variation include:
- Varying example to exposure and underlying structure to the concept
- Same method, different problem
- Same problem, different method

Stem sentences and generalised statements
Teaching children precise mathematical language and insisting upon its use, supports children's ability to think about the concept. Stem sentence structures often express conceptual ideas and provide a framework to embed conceptual knowledge and build understanding. These are used throughout the lesson.

Fluency
This is more than memorisation of procedures. Computational fluency has been defined as the ability to carry out mathematical computations 'efficiently, accurately and flexibly' (Russell, 2000).

Efficiency implies that the student does not get bogged down in too many steps or lose track of the logic of the strategy. An efficient strategy is one that the student can carry out easily, keeping track of sub problems and making use of intermediate results to solve the problem.

Accuracy depends on several aspects of the problem solving process, among them careful recording, knowledge of number facts and other important number relationships.

Flexibility requires the knowledge of the problem solving process. The careful recording of number facts and other important number relationships.

Reasoning
Careful planning of questioning and activity design is needed to develop reasoning. This includes:
- Odd one out
- What's the same or different
- Convince me
- Always, sometimes, never
- Give me another example, and another…
- Spot the mistake
- True or false

Problem solving
A variety of problem solving skills are considered and planned for as part of each lesson. These may include
- Working systematically
- Trial and improvement
- Logical reasoning
- Spotting patterns
- Visualising
- Working backwards

The Maths curriculum is planned and implemented using the mastery approach so that pupils' learning and achievement is not limited. Pupils are set three tasks each lesson: Fluency (do it), reasoning (challenge it) and problem solving (deepen it). The teacher uses formative assessment in the lesson to determine which pupils need additional support for each small step in learning. These children are identified within the lesson and are supported with 1:1 or small group input. Similarly, children who grasp the 'small step' rapidly are encouraged to deepen their understanding through the challenge it and/or by explaining their understanding using Concrete/Pictorial/Abstract representations.

Intervention:

Throughout the school we use formative assessment within lessons to teach 1:1 or small groups of children who require extra support.

Where children are identified as needing further support, they will spend some time with a TA or teacher to ensure they meet the small steps necessary in order for them to be able to engage with their year group expectations. In most instances, children are given work that has been adapted to match their individual needs but this is not used to replace year group teaching completely. Tasks may be heavily scaffolded or teachers will use small steps modelling.

In some circumstances, children may follow a previous year group long term plan and teaching resources in maths. This is a very rare occurrence and all other avenues should be tried before this takes place.

Why maths is taught in this way?

The vision for maths in the school embraces the aims of the national curriculum and promotes a 'can do' attitude. We strongly believe that ability is not fixed and everyone is able to and expected to achieve ARE. This belief is passed onto the children in our school.

The mastery approach also instils in our staff that we do not label children as the dynamics of the maths class can change daily. We see time and time again that children that would have previously not been exposed to maths of their year group are able to flourish in the mastery classroom.

Staff actively promote the 'Can do' attitude in maths and use the words 'I can't do it yet'. We use mistakes as learning opportunities and develop and celebrate perseverance to help pupils overcome challenges. Pupils are encouraged to ask questions during teacher input and to explain and discuss their thinking with talk partners when faced with challenges. We value this depth of understanding over speed.

Teaching assistants are encouraged to move around the class and work with all abilities depending on their need for a particular 'small step'. Teaching assistants are not assigned to particular children.

The fluency, reasoning and problem solving tasks provide opportunities for ALL children to achieve which is the essential idea behind the 'teaching for mastery' in mathematics. The design of the tasks allows pupils to develop the depth and rigor they need to make secure and sustained progress over time. STEM sentences enable children to develop their mathematical vocabulary and encourage them to use this when reasoning.

CanDoMaths resources support the teachers with planning for progression, skills and knowledge because it provides the staff with a baseline which can be developed. CanDoMaths matches the NC closely, and breaks it down into **small, manageable steps**. The steps are carefully sequenced to ensure curriculum coverage and so children build upon knowledge throughout the unit of work. There is also an emphasis on mathematical talk, and precise use of vocabulary which makes it easy for all members of staff to pick up.

We use the CanDoMaths long term plan to ensure NC coverage over the year. This provides teachers with termly mapping of units of work that are to be taught and the order in which to teach them. This ensures that there is consistency across the school and that children acquire a sufficient grasp of mathematics relevant to their year group. We also use the CanDoMaths calculation policy to ensure consistency of the four operations.

EYFS – During allocated maths time, EYFS children access the areas of the provision that relate directly to the ARE in maths. This approach allows teachers to go deeper into reasoning and conceptual understanding, the continuous provision activities are available for the whole week for children to access and practise these skills. The focus on number helps them to make links with their understanding of the world around them and contextualises their learning.

KS1 – Whole year group teaching fits the intent of our curriculum which ensures that every child has the right

to learn to at least ARE.

Maths across the curriculum

The importance of maths is emphasised across many of the foundation subjects at Coalway Infant School. This may be in science when children measure the growth of plants, use bar charts to plot data, pictographs to represent data, using non-standard units to compare strength of magnets; DT when we weigh ingredients, calculate times for cooking, measuring length for bridges; History such as chronology of timelines; Geography line graphs and bar charts to compare temperature, rainfall and daylight hours; Art when we explore patterns, symmetry and so on. This ensures that links are not tenuous and that skills are practised across the foundation subjects.

How does Maths meet our curriculum intent?

Raising self-esteem/self-confidence – year group teaching ensures all children work together and have the opportunity to thrive and learn from one another. Children are encouraged to take on challenges, question and explain their mathematical understanding. We celebrate perseverance and learn from mistakes and common misconceptions. We support children using varied representations and intervention within the lesson. Children are challenged through questioning, by explaining their reasoning and through applying their learning to problem solving questions.

Focus on the core skills of reading/writing/maths – Maths is a school priority. We use Maths Buster sessions to review learning that is based on number, place value and a recap of the four operations to ensure children retain these core elements of maths.

Developing speech and language – children are challenged to answer reasoning questions in full sentences, often using STEM sentences for support. There is a focus on precise mathematical vocabulary which is used to support children's depth of knowledge, Children are also expected to use mathematical vocabulary correctly.

Raise aspirations and set high expectations – Whole class teaching ensures all children are exposed to ARE and therefore there is no cap on learning. Children are challenged to complete problem solving for each small step. Our planned small steps allow all children to achieve in maths as we are able to pick up on misconceptions quickly. This ensures that children can become the mathematician they aspire to be.

Develop life skills/social skills – Mathematics is a core skill for learning in our school. Children are encouraged to work together to discuss their understanding, to explain their reasoning and problem solving. We focus on learning life skills such as telling the time and the four operations.

Golden threads

- Immerse our pupils in concrete, meaningful experiences that are hands on, investigative and play based
- Provide opportunities and experiences within our local area for outdoor learning opportunities
- Clear, precise communication and language is a focus throughout daily mathematical teaching

Subject Leader driver 2023-24

- Embed the concrete-pictorial-abstract concepts across the school
- Continue to improve and embed an efficient and effective lesson delivery
- Subject lead to continue to attend professional development so that they aim to become a mathematics specialist and thus support all staff to improve maths teaching and learning
- Enjoy mathematical research to improve practice
- Continue to embed the Mastery approach through attending CPD
- Attend GLOW Maths, CanDoMaths, NCETM CPD