



## **Lowca Community School**

### **Maths Policy.**

#### **May 2021**

**For Review: Sept 2022 (*especially White Rose content updates and EYFS framework and non-statutory guidance for 21/22*)**

### **Introduction**

Mathematics is a creative and highly interconnected language providing us with tools that have been developed over centuries, helping us to explore and discover solutions to some of life's most intriguing problems. It teaches children how to make sense of the world around them by developing their abilities to describe their world with numbers, calculate, reason, see patterns and solve problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. It enables children to understand and appreciate relationships and patterns in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

### **1. Aims and Objectives**

1.1 The aims of teaching mathematics are:

- To promote enjoyment of learning through practical activity, exploration and discussion;
- To promote confidence and competence with numbers and the number system;
- To develop the ability to solve problems through decision-making and reasoning in a range of contexts;
- To develop a practical understanding of the ways in which information is gathered and presented;
- To explore features of shape and space, and develop measuring skills in a range of contexts;
- To understand the importance of mathematics in everyday life;

- To become fluent in the fundamentals of mathematics, including through varied and frequent practise with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately;
- To reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language;
- To solve problems by applying their mathematics to a variety of routine and nonroutine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

1.2 The purpose of mathematics at Lowca is to develop:

- Positive attitudes towards the subject and awareness of the relevance of mathematics in the real world;
- Competence and confidence in using and applying mathematical knowledge, concepts and skills;
- An ability to solve problems, to reason, to think logically and to work systematically and accurately;
- Initiative and motivation to work both independently and in cooperation with others;
- Confident communication of maths where pupils ask and answer questions, openly share work and learn from mistakes;
- An ability to use and apply mathematics across the curriculum and in real life;
- An understanding of mathematics through a process of enquiry and investigation.

We aim to provide a stimulating and exciting learning environment that takes account of different learning styles and uses appropriate resources to maximise teaching & learning.

## **Teaching and Learning**

Programme of Study: Taken from White Rose Website

<https://whiterosemaths.com/resources/primary-resources/primary-sols/>

## Overview 2020/21



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12	Week 13	Week 14
Autumn	Getting to Know You			Just Like Me!			It's Me 1 2 3!			Light and Dark			Consolidation	
Spring	Alive in 5!			Growing 6, 7, 8			Building 9 and 10			Consolidation				
Summer	To 20 and Beyond			First Then Now			Find My Pattern			On The Move				

- We have divided the Reception Year into 10 Phases. Each phase roughly lasts 3 weeks long, allowing time for flexibility and consolidation.
- Each phase has a number focus and suggested links to measure, shape and spatial thinking.

## Key Stage 1 (Year 1)

WRM - Year 1 - Scheme of Learning 2.0s



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value (within 10)			Number: Addition and Subtraction (within 10)				Geometry: Shape	Number: Place Value (within 20)		Consolidation	
Spring	Number: Addition and Subtraction (within 20)			Number: Place Value (within 50) (Multiples of 2, 5 and 10 included)				Measurement: Length and Height	Measurement: Weight and Volume		Consolidation	
Summer	Number: Multiplication and Division (Reinforce multiples of 2, 5 and 10 to be included)			Number: Fractions	Geometry: Position and Direction	Number: Place Value (within 100)		Measurement: Money	Measurement: Time		Consolidation	

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## Key Stage 1 (Year 2)

WRM - Year 2 - Scheme of Learning 2.0s



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction				Measurement: Money	Number: Multiplication and Division			
Spring	Number: Multiplication and Division	Statistics		Geometry: Properties of Shape			Number: Fractions		Measurement: Length and Height	Consolidation		
Summer	Geometry: Position and Direction		Problem solving and efficient methods		Measurement: Time	Measurement: Mass, Capacity and Temperature		Investigations				

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## Lower Key Stage 2 (Year 3)

WRM – Year 3 – Scheme of Learning 2.0s



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction				Number: Multiplication and Division			Consolidation	
Spring	Number: Multiplication and Division			Measurement: Money	Statistics		Measurement: Length and Perimeter		Number: Fractions		Consolidation	
Summer	Number: Fractions			Measurement: Time		Geometry: Properties of Shape	Measurement: Mass and Capacity				Consolidation	

## Lower Key Stage 2 (Year 4)

WRM – Year 4 – Scheme of Learning 2.0s



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction			Measurement: Length and Perimeter	Number: Multiplication and Division			Consolidation	
Spring	Number: Multiplication and Division			Measurement: Area	Number: Fractions			Number: Decimals			Consolidation	
Summer	Number: Decimals	Measurement: Money		Measurement: Time	Statistics		Geometry: Properties of Shape		Geometry: Position and Direction		Consolidation	

## Upper Key Stage 2 (Year 5)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value			Number: Addition and Subtraction		Statistics		Number: Multiplication and Division		Measurement: Perimeter and Area		Consolidation
Spring	Number: Multiplication and Division			Number: Fractions						Number: Decimals and Percentages		Consolidation
Summer	Number: Decimals				Geometry: Properties of Shape		Geometry: Position and Direction	Measurement: Converting Units		Measurement: Volume	Consolidation	

## Upper Key Stage 2 (Year 6)

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition, Subtraction, Multiplication and Division				Number: Fractions				Geometry: Position and Direction	Consolidation
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shape		Problem Solving			Statistics		Investigations				Consolidation

### Lessons

## What Mathematics looks like at Lowca Community School...

### What a maths lesson looks like in our school:

- Mixed ability groupings / seating that allows children to work with different people over the course of time.

- Lots of talk – Reasoning, Mathematical Enquiry, Maths Talk, Use Mathematical Vocabulary, Talk Partners.
- Problem solving throughout – puzzles, investigations, misconceptions, corrections and mistakes discussed positively.
- Mini plenaries to share misconceptions, pose questions and challenge ideas.
- Free access to manipulatives/concrete resources.
- Feedback given to pupils at point of need, usually within the lesson – allowing teacher to adapt, extend, challenge or to support immediately then plan next steps.
- Balance of teacher directed tasks and free access to challenge cards.

#### **This is our philosophy:**

- All pupils can succeed
- All children will be challenged
- Mastery
- Concrete, Practical Abstract (CPA) approach
- Firm concept development
- Strong focus on problem solving and reasoning
- Cross-curricular links wherever possible

#### **This is how it works:**

- Focus on key mathematical language- key vocabulary displayed for children to see/teacher models use of key vocabulary/methods/strategies and pupils encouraged to use throughout lessons.
- Children’s talk/thinking incorporated into explanations.
- Prove it! Show me. Is it always true? What do you know?
- Children given time they need – may return to task the following lesson – not ‘compartmentalised’ session but fluid.
- Revisiting concepts to ensure learning becomes ‘hard-wired.’
- TA’s sometimes used to pre-teach a concept ahead of time.

#### **This is what we do:**

- Planning makes good use of, prior learning needed, cross curricular links and ensures national Curriculum coverage.
- Learning objectives and success criteria are identified and discussed by the end of the lesson.
- Positive use of mistakes/misconceptions in the learning environment.
- Regular book scrutiny, learning walks, planning audits, pupil perceptions/surveys.
- Whole school CPD.

#### **This is what you might typically see:**

- Teacher led introductions
- Open ended investigations- low threshold/high ceiling tasks balanced with explicit teaching Problems, puzzles, investigations, games, dances and songs
- Different representations of mathematical concepts
- Paired/group work

- Active maths where children move around the room
- Engagement and perseverance
- Children challenging themselves
- Children talking about, sharing and reflecting on their learning and making links
- Revisiting concepts, a month – six months later

**This is what differentiation looks like:**

- Effective and well-thought-out use of concrete resources
- Probing questions to support struggling learners
- Learners show more than one way of representing their ideas
- Well-thought-out learning environment, including placement of learners
- Children act as coach explaining to peers

**This is how we know how well our children are doing:**

- Tracking, whole school, highlighted 'end of year expectations' as mastered
- Teacher assessment, NFER, White Rose End of Block and End of term assessment papers, SATs
- Marking and feedback, live marking- misconceptions/corrections and teaching completed during lesson so progress is sustained
- Photo evidence of practical maths, annotated by child (KS2) or teacher (KS1)
- Targeted use of TA's, them noting and recording observations of individual children and using their spoken/unspoken interventions to move learning forward
- Scheduled TA – Teacher meetings

**This is the impact of the teaching:**

- Confident children who can talk about maths
- Maths is always in the top three lessons – a love of maths in surveys from children, along with comments noted during lessons by the teachers during lessons - "I love this!" and, "Oh, I get this now."
- Depth of understanding/application in different contexts across the year groups

**This is how we use intervention:**

- Targeted intervention for children identified through monitoring by TA/Teacher/SENCO
- Rapid intervention during the lesson by TA/Teacher to ensure learning does not stop and method and strategies discussed enable progress by a struggling pupil
- Intervention sessions

**This is how we challenge the higher attainers:**

- Problem solving, puzzles, investigations that promote perseverance and Growth Mindset in different contexts, designed games to practise a concept
- Further reasoning and justification – prove it, show me
- Generalising and testing rules
- Pupils being the teacher to explain to another pupil who is struggling with a concept, method or strategy (The Protégé Effect – Roman Philosopher, Seneca Scientists)

As you can see at Lowca, we use a variety of teaching and learning styles in mathematics lessons. Our principal aim is to develop children's knowledge, skills and understanding in mathematics. We do this through daily lessons that have a high proportion of whole-class and group-direct instruction/teaching. In all lessons, learning objectives and success criteria are clearly displayed or discussed. The emphasis in lessons is to make teaching interactive and lively and to engage all children, encouraging them to talk about mathematics.

Children use ICT in mathematics lessons where it will enhance their learning. We have a subscription to Sumdog which allows us to set and monitor tasks, assessments and homework and also join in with county and UK online maths competitions.

Wherever possible, we encourage the children to apply their learning to everyday situations.

### Pitch and Challenge

Our classes have mixed age children who have a wide range of mathematical abilities. We recognise this fact and provide suitable learning opportunities for all children by matching the challenge of the task 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 in different groups or together on open-ended problems or games. We use teaching assistants to support children, and to ensure that work is matched to the needs of individuals.

### Teaching Mathematics to Children With Special Needs

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 learners, especially children with learning difficulties. Work in mathematics takes into account the targets set for individual children in their SEN Support Plans.

We use a range of intervention resources as appropriate tailored to the individual child's needs. We have a central file of activities collected by our Maths lead as a starting point for interventions.

### Calculation

We introduce the children to the processes of calculation through practical, oral and mental activities. At Lowca, we consider a secure knowledge of number facts to be essential to all future learning in mathematics. Therefore, we place great importance on the mental and oral aspect of our lessons and on the learning of multiplication tables. We try to practise consistency in our approach to calculation strategies at each key stage.

## **Mathematics Curriculum Planning**

Mathematics is a core subject.

We carry out the curriculum planning in mathematics in three phases (long-term, medium-term and short-term).

- Long Term Planning

[The White Rose National Curriculum Progression](#), National Curriculum for Mathematics 2014, Statutory framework for the early years foundation stage 2020, Development Matters and the Early Learning Goals (Number, Shape Space & Measure) are used as the principal planning guides for mathematics taught in the school.

- Medium Term Planning

We use the White Rose Maths Hub schemes of learning as our medium-term planning documents. This scheme provides teachers with exemplification for maths objectives and are broken down into fluency, reasoning and problem solving. It is regularly updated to support a mastery approach to teaching and learning and has number at its heart. It ensures teachers stay in the required key stage and support the ideal of depth before breadth. They support pupils working together as a whole group and provide plenty of time to build reasoning and problem-solving elements into the curriculum.

- Short Term Planning

The White Rose schemes of learning support daily lesson planning. It is the class teacher who completes the weekly plans for the teaching of mathematics. These weekly plans list the specific learning objectives and expected outcomes for each lesson, and give details of how the lessons are to be taught. Activities from Twinkl, TES and other relevant resources may also be used as deemed appropriate by the class teachers.

All classes have a daily mathematics lesson where possible. In key stage one lessons are 45-60 minutes and in key stage two at least 60 minutes. Teachers of the EYFS ensure the children learn through a mixture of adult led activities and child-initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach.

### **Pupils' Records of Work**

Children are taught a variety of methods for recording their work and are encouraged and helped to use the most appropriate and convenient. Children are encouraged to use mental strategies and their own jottings before resorting to more formal written methods; this is typically achieved with mini whiteboards. Children's own jottings to support their work is encouraged throughout all year groups

### **Marking Strategy**

The most important activities for teachers are the designing and teaching of the lessons, looking for gaps in pupils' knowledge whilst teaching and spotting misconceptions that they can address. Marking and feedback strategies should be immediate and efficient with constructive harmonious dialogue and next steps given directly to the child by the adult and work partner. In Key Stage Two, as they become more independent the children are also beginning to recognise and identify their own next steps in mathematical learning.

**'Assessment as learning** develops and supports children's metacognitive skills. This form of assessment is crucial in helping children become lifelong learners as it focuses their efforts 'reflecting' on their own learning. It powers a growth mindset where they see their maths ability as something that can change and improve.'

Below are the points that staff are expected to know and do on a daily, weekly and termly basis.

- i. Books – Books must be neat and tidy and follow school protocol and staff will monitor this, the quantity and quality of the student's book work. Books are for preparation for topic and summative assessments. Students can peer and self-assess in green pen. Bookmarking is not as effective as 'live marking' and planning – this is in line with the NCETM methods that enable students to make the most progress. 'Mark as You Go' enables students to get instant feedback and allows staff to gauge learning levels.

*Teachers will assess students learning with the following techniques, with a marking code, if applicable (Red), to highlight when it was used. Pupils will annotate and correct in green:*

- Live marking (can be walking around the class and checking understanding with teacher's pen);
  - Verbal Feedback (typically examples, or breaks in the lesson to guide when a common slip is identified) - VF;
  - One-to-one work- 1-1
  - Teacher/TA led work – T/TA
  - Small group – Sm gp
  - Independent work – I
  - Peer assessment - PA;
  - Deep questioning (typically done during examples);
  - Carefully planned questions.
- ii. Pupil Premium Priority – teachers, throughout lessons using AFL and reviewing books will gauge when the majority of PP students have enough knowledge to attempt the assessment. The review of books and knowledge occurs on a lesson-by-lesson basis and will inform planning for teachers. Targeted Questioning allows teachers to monitor and assess progress on a lesson-by-lesson basis.*
- iii. End of Unit Assessments – These will take place after a topic has been delivered by a teacher (2-3 weeks) marked in Red Pen (staff) or self or peer assessed (green) and put on the assessment documents within the class groups.*
- iv. End of Term Assessment - We make long-term assessment 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 end-of-year tests and teacher assessments. We use the national tests for children in Year 2 and Year 6, plus the optional national tests for children at the end of Years 3, 4 and 5.*

Key documents:

- [NCETM - Assessment for Learning](#)
- [NCETM - Marking Guidance](#)

## **The Foundation Stage**

Maths is delivered to reception children through the Early Years Foundation Stage curriculum. We relate the mathematical aspects of the children's work to the objectives of problem solving, reasoning and numeracy as set out in the EYFSP assessment scales, 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, practise and talk confidently about mathematics.

## **Resources**

Each class has a stock of core resources that are age appropriate. Additional mathematical equipment and resources are stored centrally in Class 3/4.

## **Contribution Of Mathematics To Teaching In Other Curriculum Areas**

### Literacy

Mathematics contributes significantly to the teaching of literacy 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 rhymes that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when reading non-fiction texts.

### Computing

Children use and apply mathematics in a variety of ways when solving problems using IT. The Computing curriculum also provides opportunities to use maths e.g. controlling beebots on a maze or logic statements when programming using Scratch, EV-3 and Lego Spike.

Younger children use ICT to communicate results with appropriate mathematical symbols. Older 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.

### Science

In science, pupils apply their mathematical skills in a meaningful context as they decide which evidence to collect and what equipment to use. Children collect and handle real data as they make and record observations and measurements, identify patterns and make comparisons. Pupils also need to communicate their findings in a variety of ways and this relates directly to their mathematical skills. They draw and interpret tables, graphs and pictograms and they use ICT to record and manipulate their data.

## Physical Education

High quality PE activities require measurements of distance, time and force; skills involving shape and space; directional work and the use of mathematical language is also encouraged.

## History and Geography

In our cross-curricular work mathematics is used for example, to produce timelines, handle historical dates and it is very much part of our map work including the use of grid references and drawing plans.

We believe that mathematics also has a part to play in all our other subject areas including DT and Creative Afternoon.

### **Role of the Maths Subject Leader:**

- To lead in the development of maths throughout the school;
- To monitor the planning, teaching and learning of mathematics throughout the school;
- To help raise standards in maths;
- To provide teachers with support in the teaching of mathematics;
- To provide staff with CPD opportunities in relation to maths within the confines of the budget and the School Improvement Plan;
- To monitor and maintain high quality resources;
- To keep up to date with new developments in the area of mathematics.