



Lawley Primary School  
Discovery unites us!

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.

### Our Aims

We aim to provide the pupils with a mathematics curriculum which will produce individuals who are literate, creative, independent, inquisitive, enquiring and confident. We also aim to provide a stimulating environment so that pupils have considerable experience with concrete equipment, in all areas of the maths curriculum. Classrooms are enriched with resources that children are encouraged to select independently and cross-curricular links are always encouraged, thereby allowing children to apply their maths skills in other areas of the Primary curriculum. These practical experiences support the children as they learn and develop more abstract ways of recording. Children are encouraged and helped to see themselves as mathematicians and to understand how maths is used in the world around them. Consequently, teachers spend quality time exploring real-life, contextual problems that engage and excite the children and enable them to develop an awareness of the maths that surrounds them. They are often given choices and encouraged to select their own methods of working. Teachers then explore children's reasoning for their approaches to these problems and discuss their application of knowledge. This allows for good assessment and continually develops a child's understanding of this subject.

At Lawley we aim to set appropriately high expectations of all children; encourage children to enjoy and become confident in mathematics; and to meet the needs of all children, with appropriately differentiated but challenging activities so ensuring good progress.

Our policy for teaching calculation reflects the progression of the New Primary Curriculum for Mathematics. Mental calculation is taught to all year groups and informal, then standard written methods that build on mental calculation. The school's written calculation policy has been revised to meet the expectations of the New Primary Curriculum for Mathematics.

Lawley Primary School has a numerate environment where mathematical risk-taking, creativity and logical thought are encouraged in order to develop independence.

We aim to:

- Give all children equal access to the whole mathematics curriculum
- Ensure that all children experience success
- Enable each child to achieve their potential
- Develop mathematical thinking
- Develop knowledge, skills and understanding through real life situations and contexts
- Enable each child to work cooperatively and independently
- Use assessment of children's progress to enable future planning
- Ensure that resources are available and accessible
- Ensure that resources are appropriate for the age and needs of pupils.

This content needs to be set in situations where children learn new mathematical ideas and use and apply what they know in practical tasks and real life situations. It is important that children develop the skills of Numeracy and are able to apply them in different situations across the curriculum and in daily living outside school.

Children should be given opportunities to:

- Explain their thinking
- Ask questions and follow a range of alternative methods to develop their mathematical reasoning.
- During lessons, be given the opportunity to discuss with a partner, or in small group, their understanding of the concepts being taught.
- Encounter different teaching strategies that encourage speaking and listening.

### Mathematics at Lawley

"Excellent teaching gives children the life chances they deserve... Enjoyment is the birthright of every child. But the most powerful mix is the one that brings the two together. Children learn better when they are excited and engaged - but what excites and engages them best is truly excellent teaching."

Excellence and enjoyment: a strategy for primary schools, May 2003

Mathematics at Lawley is based on the three main aims of the 'New Primary Mathematics Curriculum 2014' from Foundation Stage to Year 6. These aims are listed below:

### AIMS

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.

Jennifer Olenik-Pritchard Maths Co-ordinator 2014

- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **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.

### School curriculum

The new programmes of study for mathematics are set out year-by-year for key stages 1 and 2. Schools are, however, only required to teach the relevant programme of study by the end of the key stage. Within each key stage, schools therefore have the flexibility to introduce content earlier or later than set out in the programme of study. In addition, schools can introduce key stage content during an earlier key stage, if appropriate.

### Attainment targets

Pupils are expected to know, apply and understand the matters, skills and processes specified in their appropriate year programme of study. The objectives for each year group can be found at the end of this document, appendix A.

### Planning

There are three levels of planning based on assessment and age appropriate guidance.

- Long-term planning
- Medium-term planning
- Short-term planning

### Long term planning

Long term planning has been provided to all teachers at Lawley Primary school and provides the objectives to be covered within each term. These objectives ensure we are addressing the requirements of the National Curriculum and at the same time providing a range of activities, which will ensure progression across the full range of mathematical skills and practices.

See appendix B.

### **Medium Term planning**

Medium term planning has been supported by the maths consultant for Telford and Wrekin and provides a week-by-week account of what should be taught within the term to ensure coverage and appropriate progression. It has been designed with flexibility in mind however, allowing teachers to move weeks around, in order to make links with other topics in the curriculum where possible.

Our medium term planning ensures that progression is maintained over the whole year and that learning objectives are systematically revisited from term to term. This common planning format will allow consistency in the way in which mathematical learning objectives are met. Consolidation will be achieved naturally and progress made in secure steps.

Medium term plans, specific to each year group, are available on the Workgroup (T drive). The agreed termly plans for mathematics will be the subject of regular review and amended as and when required.

### **Short term planning**

Lawley Primary School has adopted the Whole Brain Learning Cycle approach to its teaching and learning. There is a daily dedicated mathematics session. Plans emanate directly from the medium term plans and are structured following the 'Whole Brain Learning Cycle' adopted by the School.

The 'Whole Brain Learning Cycle' includes the following stages:

- Create the Learning Environment
- Connect the Learner
- The Big Picture
- The Learning Outcomes (LO and SC)
- Input / Introduction (teacher input)
- Activity (work as class, whole group, pairs, individually).
- Demonstrate
- Review and Preview (sort out misconceptions)

Maths sessions will incorporate presenting information through as many of the senses as possible, to optimise teaching and learning.

Within this structure the children receive a mental and oral starter; a main teacher led input and opportunity to demonstrate their knowledge. The review and preview session ensures misconceptions, extension activities and summarising of key facts are achieved.

### **Organisation**

Mathematics lessons should be enjoyable for both teachers and pupils. Maths should be fun!

A range of organisation should be planned; times for whole class teaching, times when groups of children work with the teacher, times where groups of children work together and where each child works alone. The most effective teaching will make use of a range of organisational strategies in a purposeful manner. Pupils

should be party to regular daily sessions of whole class interactive teaching especially in the rehearsal of strategies and mathematical facts, the teaching input at the beginning of the main part of the session and during the review and preview sessions. Teachers will develop effective Blooms questioning as part and parcel of their teaching strategies. This will enable a more appropriate pace to be developed in many lessons. The use of both open and closed questions will build in variety to the lessons and encourage pupils to manipulate numbers to a greater degree.

## PROCEDURES

### CLASSROOM MANAGEMENT GUIDELINES

Staff are aware of these factors and that effective classroom management is crucial for children to succeed in Mathematics. Staff create an effective learning environment by planning for these elements of classroom organisation using the following elements:

- There is a three - part structure to the daily maths lesson.
- This consists of an oral and mental starter, followed by a main teaching activity, and finally the plenary.
- The first and final parts of the lesson will almost always involve work with the whole class using the 'talking curriculum' approaches.
- The main teaching activity can be organised in different ways, depending on the age of the children, the stage of the work being taught, and what the teacher wants the class to achieve.
- The lesson will last from 45 - 60 minutes, depending on the age of the children.
- Staff determine the times for each part of the lesson, since these depend on their objectives for the lesson and the activities they have chosen for the children to do.
- There will be opportunity for self-assessment and peer-mentoring at the end of the lesson where appropriate.

| Section of lesson       | What it comprises  | Content may include...   |
|-------------------------|--|--|
| Oral and Mental starter | <ul style="list-style-type: none"> <li>• Mental maths warm - ups</li> <li>• Usually number work</li> <li>• Sometimes related to the main teaching activity and sometimes not directly related</li> <li>• Marking and assigning new homework on a Friday</li> </ul> | <ul style="list-style-type: none"> <li>• Counting (in 1s, 10s,100s, 0.1s,2s, 3s, 4s, etc)</li> <li>• Practising previously taught mental strategies</li> <li>• Recalling number facts</li> <li>• (+,-,x,--)</li> <li>• Imagining and talking about numbers, shapes...</li> <li>• Developing vocabulary</li> <li>• Pictorial 'Maths Mat' learning or</li> </ul> |

|                        |  |   |
|------------------------|--|---|
|                        |  | display challenges  |
| Main teaching activity | <p>One or more of these:</p> <ul style="list-style-type: none"> <li>• Whole-class introduction to topic, with some paired work</li> <li>• Follow up teaching to the whole class or a group</li> <li>• Group work - usually three groups at most</li> <li>• Brief individual practice</li> <li>• Whole class investigation in pairs, 'sage and scribe' and talking teams.</li> <li>• Key concepts recorded in a strategy book.</li> </ul> | <p>Based on objectives from the new curriculum 2014 for the appropriate year/s, one or more of:</p> <ul style="list-style-type: none"> <li>• Introducing new work</li> <li>• Extending or consolidating previous work</li> <li>• Using and applying what has been learned</li> <li>• Assessing what has been taught</li> <li>• Revising and further practice</li> </ul> |
| Plenary                | <ul style="list-style-type: none"> <li>• Pupil self-assessment of the learning taken place and whether a peer mentor is needed to help them.</li> <li>• Short reports from groups who have been working independently</li> <li>• Reflection on the lesson and summary of key facts and ideas</li> <li>• Explanation of what the class will do next</li> </ul>  | <ul style="list-style-type: none"> <li>• Identifying and putting right common errors or misunderstandings</li> <li>• Identifying what to remember</li> <li>• Making links to other work</li> <li>• Giving work to do out of class or at home</li> </ul>   |

### **Cross Curricular Work**

Making links between curriculum subjects and areas of learning deepens children's understanding by providing opportunities to reinforce and enhance learning. Ensuring a cross curricular approach in the teaching and learning of Mathematics, ensures a broad and more enjoyable experience of mathematics and an easier placement in real life context.

### **Stages of development in calculations**

PLEASE SEE CALCULATION POLICY appendix C.

### **Vocabulary**

The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum - cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a

mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

At Lawley Primary School we use a range of mathematical vocabulary during our daily sessions. The Mathematical Vocabulary book and dictionaries should be used to ensure the correct age appropriate use within year groups. It is important that mathematical vocabulary is used from Reception to ensure word recognition is commonplace to pupils.

### **Resources**

Everyday resources are kept in each class. These should be stored neatly with correct labels in order to allow children to become independent in their choice of appropriate resources.

Topic based resources e.g. balances, 3D shapes are stored in Wrekin Block.

### **Equal Opportunities and S. E. N**

We incorporate mathematics into a wide range of cross-curricular subjects and seek to take advantage of multi-cultural aspects of mathematics e.g. Islamic patterns in RE.

All children have equal access to the curriculum regardless of their gender. This will be monitored by analysing pupil performance throughout the school to ensure that there is no disparity between groups.

Children who have specific learning difficulties may be supported by a teaching assistant during the mathematics sessions, this may be for part of the lesson or whole of the lesson. The teaching assistant should be under direct instruction from the class teacher about the learning objectives for a particular child or group of children and ultimately the class teacher is responsible for the teaching and assessment of these children.

Children should find a degree of mathematical challenge, whatever their mathematical ability.

Support programmes are available throughout a child's primary experience in the form of the Springboard and Wave 3 intervention programmes. For more able pupils, access to materials such as 'Problem Solving for More Able Pupils' are available from the Workgroup.

### **Mathematics and ICT**

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

At Lawley we encourage the use of audio-visual aids, computer programmes and various ICT resources to support the teaching of mathematics. These should be incorporated where and when appropriate. This can be as a whole class, or a large group, small groups, pairs and individually, utilising the computer suite, block based computers and portable laptops or i-pads in our lessons. Resources can be taken

from the Standards Site (Interactive Teaching Programmes - ITPs), the Telford and Wrekin Intranet Telford and Wrekin Torch and various Internet sites. There are also many interactive websites which are useful for children and teachers.

### **The role of calculators**

Calculators should not be used as a substitute for good written and mental arithmetic. They should therefore only be introduced near the end of key stage 2 to support pupils' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure.

### **Presentation**

- Children work in pencil.
- Children should be given lessons in setting out and presenting maths work.
- From KS1, for reasons of place value the children's numbers should be lined up in columns appropriately.
- A short date e.g.: 01.04.08 or 01/04/08
- A Learning objective and Success criteria - stickers in years 1-3; written in years 4-6.
- If a mistake is made children should neatly cross out with a ruler or neatly rub out pencil marks.

### **Marking**

- Most marking in KS1 and KS2 is completed by the teacher, ideally with the child.
- Individual/partner marking occurs for mental arithmetic.
- All children to develop self and peer-assessment. All children will self-assess against their success criteria.
- Work which is recorded by the children should be marked. This may be jottings or more formal diagnostic marking. Close the gap marking to occur at least once a week.
- Books/work from children who have worked in the teacher focus group do not need to be marked diagnostically as the class teacher will have spent significant time discussing the work with the pupil. Work from independent groups may be marked diagnostically and followed up the next day. Class teachers will use their judgement in this. It is not expected that all children's work can be marked in the same depth each day.
- Marking should be done in green pen with a  $\surd$  for a positive comment, a  $\rightarrow$  for next step and CTG for 'close the gap'.
- Time should be given within the day for children to respond to comments and next steps.
- As a proportion of the activities children participate in is not recorded, especially in Key Stage 1, annotated photographs and other evidence can be

taken, and put in the portfolio of work kept by the co-ordinator. Short-term planning is also evidence of practical work carried out.

- Support assistants may also provide valuable notes and comments on children's work to inform the teacher of children's knowledge, skills and understanding.

### **Record keeping**

- Teachers to follow the Medium Term Planning.
- The child's book is an ongoing record of work. Examples of these are kept at the end of the academic year for reference purposes.
- Each book will contain the objectives for the year at the front and the back of the book. Learning objectives and success criteria will be taken from these documents and annotated to support assessment throughout the year.
- End of year SATs and interim test results are stored on Brom-com and input onto tracking grids and step grids. Children who are below and above age related expectations are identified and grouped accordingly. At the end of the academic year the Mathematics Coordinator analyses test data and identifies areas for whole school improvement.

### **Target Setting**

Targets are specific to individual needs of the children and are taken from the assessment sheet at the front of their books. There will always however be a focus on mental recall of multiplication facts, associated division facts and number bonds.

### **Assessment**

Assessment should be:

Informative

Useful

Manageable

Mental progress is monitored by the use of regular mental maths tests, which will assess strategies, knowledge and skills.

Statutory end of Key Stage 1 and Key Stage 2 tests are administered in Y2 and Y6.

On-Entry assessment is used to assess children entering school.

Assessment weeks are carried out during each term.

### **Assessment for Learning**

**Observation:**

How well pupils perform when engaged in mathematical activities. It is appropriate to target a small number of pupils (3 or 4) and assess their performance e.g. their attainment of targets, their response to oral questions, their involvement in image activities and demonstrations. Targets can be recorded on class or pupil progress charts and responsiveness/involvement can

be the subject of mental or short notes. In the main parts of lessons pupils would be observed undertaking set tasks.

**Discussion:**

Oral parts of Numeracy sessions are vital to the progress. Individual, group or class discussions provide teachers with many opportunities to assess mathematical facts, understanding of the number system (e.g. place value), calculation skills and mathematical language acquisition and use. Much of this work is informal but the situations can often give rise to individual target setting and the issuing of set-to-learn tasks.

**Questioning:**

We can usefully assess children with the use of open and closed questions developed using the Blooms Taxonomy. Questions should challenge individual pupils who possess varying abilities in mathematics. Oral questions occur mainly at the start of sessions. In the main parts of sessions questions also arise as the teacher monitors children's progress and in review sessions teachers focus on key 'threshold' questions which often directly relate to the main learning objectives of the session. The use of response cards provides instant assessment opportunities to allow teachers to gauge the effectiveness of a lesson or series of lessons.

**Tests:**

- Lawley Primary School uses a variety of tests for mathematics including:
- On-entry assessments
- End of Key Stage Tests and Optional Key Stage 2 Tests
- Times tables tests
- Mental maths tests

All of the above tests inform judgements on the performance in mathematics of:

- Individual pupils
- Cohorts of pupils (Year Groups)
- Small groups of pupils

**Games and investigations:**

These provide useful assessment opportunities to assess the progress of targeted groups of pupils.

**Children's work:**

This provides teachers with regular opportunities to recognise achievement, praise good work in mathematics, raise self-esteem and take children to the next point via mathematical comments and mini-targets.

**Monitoring**

Maths planning is monitored on a termly basis by the Coordinator and Headteacher.

Lesson observations and book scrutiny are conducted on a rolling programme in line with the School and Numeracy Development Plans. Children's progress will be recorded on Brom-com.

### **The role of the Maths Co-ordinator**

The over-riding task is to provide support for all who teach mathematics and leadership to improve the quality and continuity of mathematics teaching and learning throughout the school.

- To keep up-to-date by attending courses and feedback sessions organised by LEA, Cluster groups or other colleagues.
- To provide guidance and support in implementing NC.
- To assist with diagnosis and remediation of learning difficulties.
- To encourage and assist in-service training.
- To offer specialist advice and knowledge for special needs and gifted pupils.
- To advise the Headteacher of action required (e.g. resources, standards etc.).
- To encourage ways of involving parents in their children's learning.
- To purchase, organise and maintain teaching resources.

### **Future Developments**

The School Development Plan and Raising Attainment Plan identifies key leadership focuses and management issues. This is produced annually in order to keep a focus on the role of numeracy with the school.

## **APPENDICES**

**See attached folders**

### **Appendix A**

Yearly objectives for the new curriculum 2014

### **Appendix B**

Long term planning objectives

### **Appendix C**

Calculation policy 2014 New Curriculum

