


How we Plan, Teach and Assess

Maths

How Maths is Taught and Why

A close-up photograph of a child with long blonde hair, seen from behind, writing on a piece of paper with a white marker. The child is wearing a dark blue long-sleeved shirt. The paper has some handwritten numbers and symbols, including '12/10' and '11/10/12'. In the background, there is a blue folder with the word 'Strategic' visible on it. The scene is set on a blue desk surface.

The way Maths is planned and taught is innovative and reflects the school's drive to be at the forefront of education. When planning, we follow a 'Teaching for Mastery' approach which places conceptual understanding at the heart of every lesson.

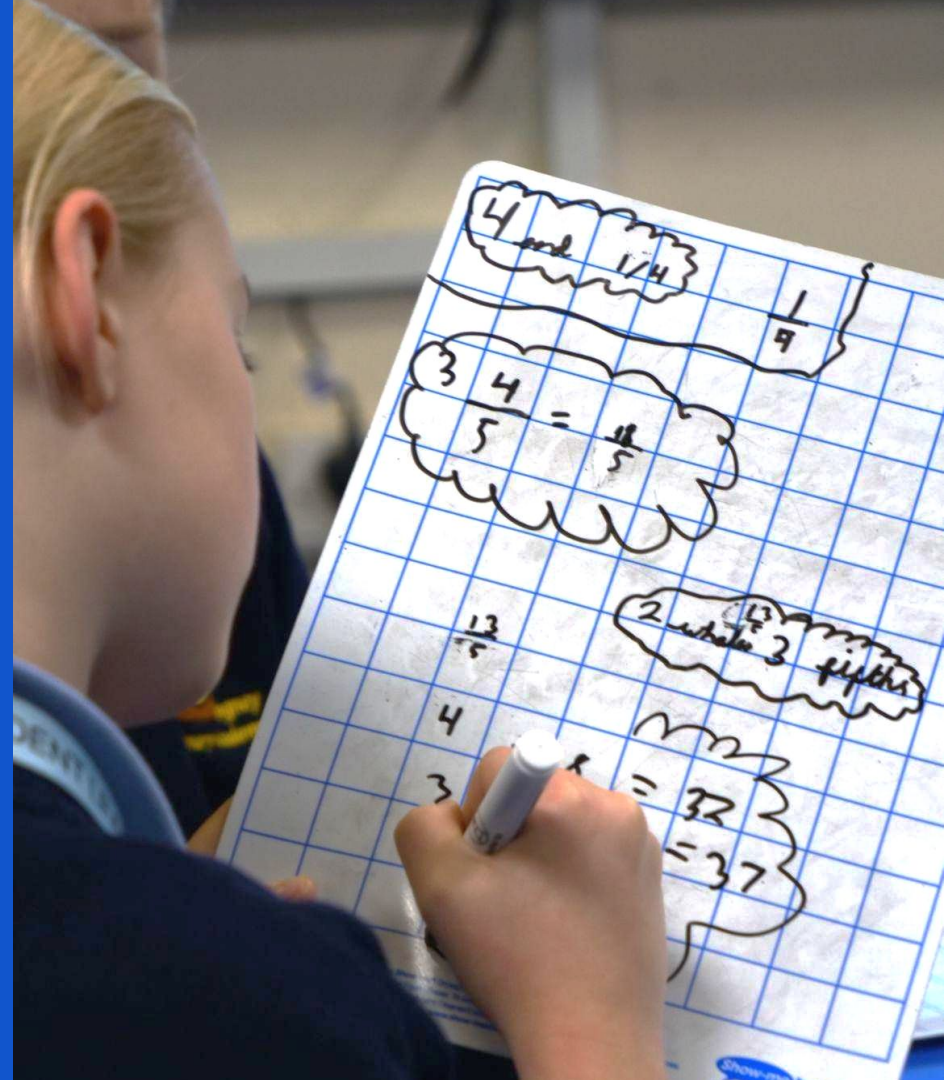
We design lessons which provide ongoing opportunities for our children to demonstrate a depth of learning and we continually encourage our pupils to question their own knowledge and understanding.

Mathematics in EYFS

In Reception, Maths is taught through exploration and discovery, where child-centred learning is at the heart of every planned lesson and activity. There are four focused lessons each week, which are teacher-led and focus on a particular area of Maths (e.g. counting, measuring, ordering). During these lessons, the children are introduced to visuals, vocabulary and resources which underpin the new concept they are learning.

Over the course of the week, practical and stimulating activities are set up around the classroom to reflect and promote this specific area of learning; the children manipulate resources and experiment with numbers visually and practically. Throughout the week the teachers and teaching assistants ensure they observe and assess every child in the class engaging independently with these activities.

Children in Reception develop a strong foundation in number because they focus on their understanding of the 'numberness' of different values. Significant emphasis is placed on subitising and our Reception children understand what the number 3, for example, means because they experiment with it through different representations (counters, pictures, toys) before they learn how to record it on paper.



Planning Mastery

Years One to Six

The 'Teaching for Mastery' approach is underpinned by the belief that all children can achieve in Maths and lessons at Langney are planned with this notion in mind. Throughout the planning process, teachers are supported by quality resources from:

- Power Maths (a teaching for Mastery scheme of work, approved by the Department for Education);
- White Rose (materials created by a teaching for Mastery hub, working alongside the NCETM)
- The NCETM itself (the National Centre for Excellence in the Teaching of Maths)

In Key Stages One and Two, Maths lessons are planned in clear blocks, as suggested by both Power Maths and White Rose. Within each block, lessons are planned using a sequence of small steps, which address the end of year expectations set out in the National Curriculum. This 'small-step' approach, gives our children the opportunity to explore Maths concepts in depth; we give our children the time to develop a conceptual understanding of their learning through exposure to different representations.





Planning CPA

Years One to Six

When planning a sequence of lessons, teachers at Langney use a range of concrete resources to support their children's enactive understanding. Our children manipulate practical resources such as place value counters, numicon, base 10, as they explore the concept they are being taught. Alongside these concrete representations, children are then exposed to models and images shown pictorially. Using iconic representations such as the bar model or the part-whole model alongside practical resources, helps our children to bridge their understanding from the concrete to the pictorial.

The final representation our children are presented with when learning new concepts, is the abstract, symbolic algorithm. Again, this is done alongside concrete resources and pictorial models, so that our children can see how the three representations are linked, resulting in a stronger understanding of the concept. With this enhanced understanding, our children are then able to apply their knowledge of particular concepts to different contexts.

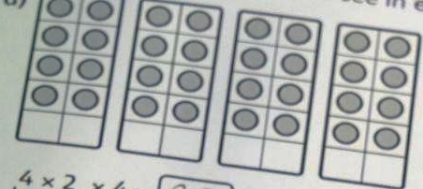
Through problem solving, investigations and regular opportunities to reason and justify their Maths, our children can demonstrate a greater depth of understanding.

Planning Scaffolding

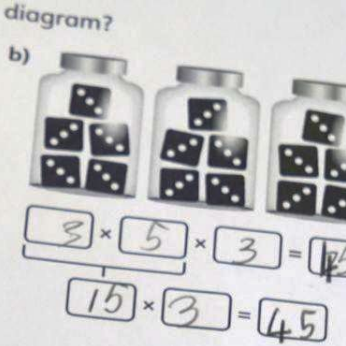
Years One to Six

Differentiation in lessons is achieved through careful and deliberate scaffolding. This could take the form of a particular concrete or pictorial resource, additional adult guidance or through the use of peer support or mentoring; differentiation could be achieved through the planning of additional questions which would encourage a child to take a small step back in their practise of a concept. In addition to this, through thoughtful, targeted questioning, teachers can regularly assess the understanding of their children during lessons and can encourage their pupils to develop their learning by asking them to explain, reason and justify their answers.

Furthermore, differentiation is also achieved through the use of 'Stretch challenges' - our children are given the opportunity to apply their understanding of the lesson concept to a different context. This application could take the form of a misconception which the children have to explain and then correct; the children could be given two mathematical statements which they need to justify. Within these 'stretch challenges', teachers provide their children with the opportunity to explain and reason about the Maths concept they have been taught.



$$\begin{array}{l} 4 \times 2 \times 4 = 32 \\ \boxed{8} \times 4 = 32 \end{array}$$



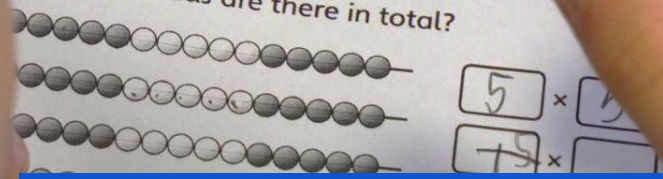
There are 11 plates with 5 cakes on each plate.
All the cakes are the same.

How many candles are there in total?
 $\boxed{1} \times \boxed{5} \times \boxed{1} = \boxed{10}$

There are $\boxed{10}$ candles in total.



How many beads are there in total?



As illustrated above, through thoughtful and targeted scaffolding, the 'Teaching for Mastery' approach ensures the needs of the majority of the children in the class are met; through immediate, same-day intervention, our children are encouraged to 'keep up, rather than catch up.'

The Maths Lesson

Monday to Thursday

At Langney, across Key Stages One and Two, we have adopted a clear, consistent structure to our Maths lessons. This structure provides our children with ample opportunity to explore and practise concepts independently, whilst also giving teachers the time to explicitly model and share their approaches.



A typical Maths lesson in Year 1, would follow this structure:

Fluency Practice

Each lesson starts with a five minute activity to develop the children's' mathematical fluency. For two days of the week, pupils work through four arithmetic-style questions and spend time discussing the efficient methods they have used to answer them. On the other two days, this fluency is developed through short, practical activities, which could include the chanting of number sequences, using a counting stick or times table recall.

Discover

The pupils are shown an 'anchor task' or image to introduce them to the concept being taught in the lesson. The children are given a short time to discuss what they can see with their partner and what they feel they may be learning about. During this initial part of the lesson, where the children are engaging in self-discovery and investigation, practical resources are available and easily accessible, should the children wish to use them.

We are learning to (WALT)

The WALT is shared with the class. This may be given by the teacher or could be offered by one of the children. At this point, the key vocabulary and the stem sentence or generalisation could, also, be shared. A generalisation is a mathematical truth, whilst a stem sentence is a concise statement with gaps for the children to fill.

Active Learning

During this part of the lesson, the children explore the key concept through active learning. Every opportunity is taken to ensure learning is interactive and kinaesthetic, through the use of an effective concrete-pictorial-abstract approach. Evidence of learning is captured daily and is done so in a variety of different ways: *photos and comments; post-it notes reflecting student voice; appropriate worksheets generated by the teachers or written work from the children.*

Stretch

Pupils are given the opportunity to deepen their understanding through a challenge.

The Maths Lesson

Monday to Thursday

In years 2-6, the structure of a Maths lesson is similar to year 1, but a 'stretch and fix' model is used, as the lesson is built around an assembly.

A typical Maths lesson in Years 2 to 6, would follow this structure:

Fluency Practice

Each lesson starts with a five-minute activity to develop the children's' mathematical fluency. For two days of the week, pupils work through four arithmetic-style questions and spend time discussing the efficient methods they have used to answer them. On the other two days, this fluency is developed through short, practical activities, which could include the chanting of number sequences, using a counting stick or times table recall.

Discover

The pupils are shown an 'anchor task' or image to introduce them to the concept being taught in the lesson. The children are given a short time to discuss what they can see with their partner and what they feel they may be learning about. During this initial part of the lesson, where the children are engaging in self-discovery and investigation, practical resources are available and easily accessible, should the children wish to use them.

We are learning to (WALT)

The WALT is shared with the class. This may be given by the teacher or could be offered by one of the children. At this point, the key vocabulary and the stem sentence or generalisation could, also, be shared. A generalisation is a mathematical truth, whilst a stem sentence is a concise statement with gaps for the children to fill.

Share

This is the main teaching input. The teacher will model the concept of learning being taught, using concrete-pictorial-abstract representations effectively to consolidate children's understanding. After the teacher has demonstrated the learning, the children are given the opportunity to go back and apply this new understanding to the anchor task from the 'discover' part of the lesson.

Think Together

Pupils are given opportunities to actively practise what has been taught through a 'ping-pong' approach. The 'ping-pong' approach is based on repetition and allows the children to manipulate concrete and pictorial resources to solve the problem. Any misconceptions are addressed at this point to improve understanding.

Activity (Intelligent Practise)

The pupils work through an activity, either collaboratively with peers, or independently.

Stretch and Fix

During Whole-School Assembly

Teachers look at the work the children have completed so far and along with their ongoing, live assessment from the lesson, decide on the individual child's next steps. There are three possible next steps:

1 - FIX

The child needs further input from the class teacher or teaching assistant to secure understanding of the concept taught. This step is crucial in our mastery approach to Maths, as it allows quick and immediate intervention, helping our children to 'keep up, rather than catch up.' During this 'fixing' step, an adult can immediately address a misunderstanding or misconception, rather than letting a day or two pass before having that crucial discussion with a child.

2 - CONSOLIDATE

The child needs to continue with the work started as more evidence of understanding is needed.

3 - STRETCH

The child has demonstrated a secure understanding of the concept taught and should take their learning to a greater depth through the 'Stretch Challenge.' As mentioned earlier, these challenges provide our children with rich, thoughtful contexts to apply and demonstrate their understanding. During these challenges, our children are given the opportunity to reason about the Maths they have been learning; they are given the opportunity to prove or disprove an idea; they are given the opportunity to demonstrate a breadth and depth of learning.

After assembly, the children return to class and continue with their next steps.

Working Walls

Across the school, Working Walls are used to support our children's understanding and consolidation of the concepts they are taught.

A new 'Wall' is started for each unit of work and is added to as each new concept - or learning point - is covered. The concepts are numbered, so that the children can clearly see the 'small steps' they have taken in the journey of that particular unit.

Relevant models and images are attached to the wall or drawn by teachers, so that the children have these resources to refer to during lessons. In addition to this, worked examples are a feature of most walls, along with a bank of key vocabulary, to support our children with their explanations and reasoning.

You can...
if the numerator and denominator can both be divided by a number.

$15 = \frac{3}{5}$

an improper fraction is when the numerator is greater than or equal to the denominator.

multiply by the whole

add the numerator.

$3 \frac{4}{5} \times 5 = 15 + 4 = 19$

1.3×2.15

$3 \frac{4}{5} = \frac{19}{5}$

$\frac{9}{5}$ $\frac{7}{7}$ $\frac{6}{4}$

10 11

The Fluency Lesson

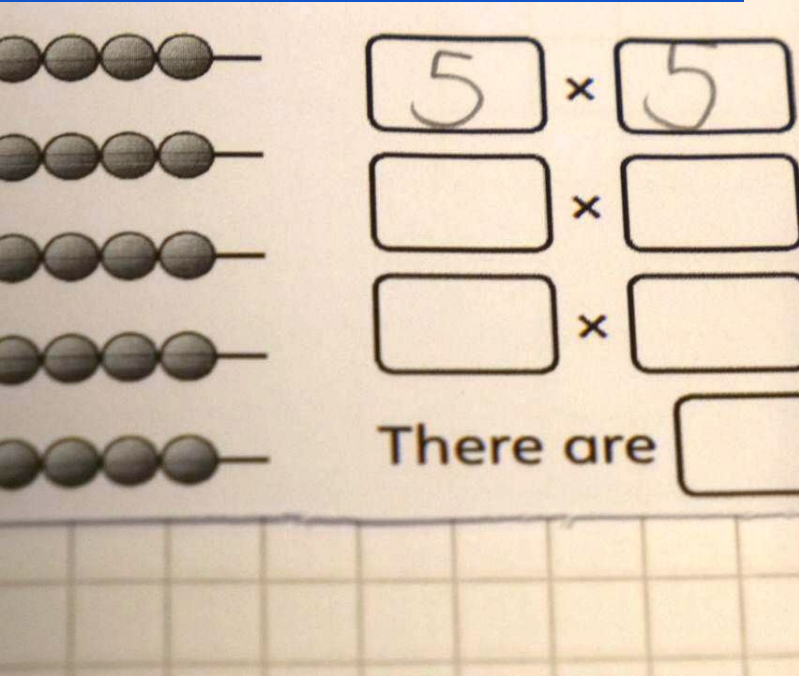
Friday

During the Friday Maths lesson, teachers across Key Stages One and Two plan practical, interactive activities, which are aimed at developing children's mathematical fluency. Through games, puzzles, competitions and investigations, pupils work collaboratively or independently, to improve their fluency.



How Maths is Assessed

Maths, across the school, is assessed against the end of year expectations for each specific year group, outlined in the National Curriculum.



Assessment in the Early Years is continuous and is used to provide effective feedback to help facilitate next steps in learning. Key observations are recorded on Tapestry allowing parents to see breakthrough or significant learning experiences. Evidence of Maths is also recorded in the children's 'Learning Journey' folders.

The Curriculum has been developed using Development Matters 2020, Birth to 5 Matters and the Statutory Framework for Early Years Foundation Stage 2021. Assessment across the year looks to see if a child is on track to achieve the Early Learning Goal in each area.

In Maths there are two Early Learning Goals:

- Number
- Numerical Pattern

When assessing if an individual child is at the expected level of development, teacher's draw on their knowledge of the child and their own expert professional judgement - they are not required to prove this through a collection of physical evidence. Assessment is always a best fit judgement.

Formative Assessment

In Years One to Six

Daily assessments of each Maths lesson take place through the use of our formative assessment sheets. These sheets are organised by Maths strand:

- Number and Place Value
- Addition and Subtraction
- Multiplication and Division
- Ratio and Proportion (Year 6 only)
- Algebra (Year 6 only)
- Fractions (including decimals and percentages for Years 4 to 6)
- Measurement
- Geometry – Properties of Shape
- Geometry – Position and Direction
- Statistics (Years 2 to 6)

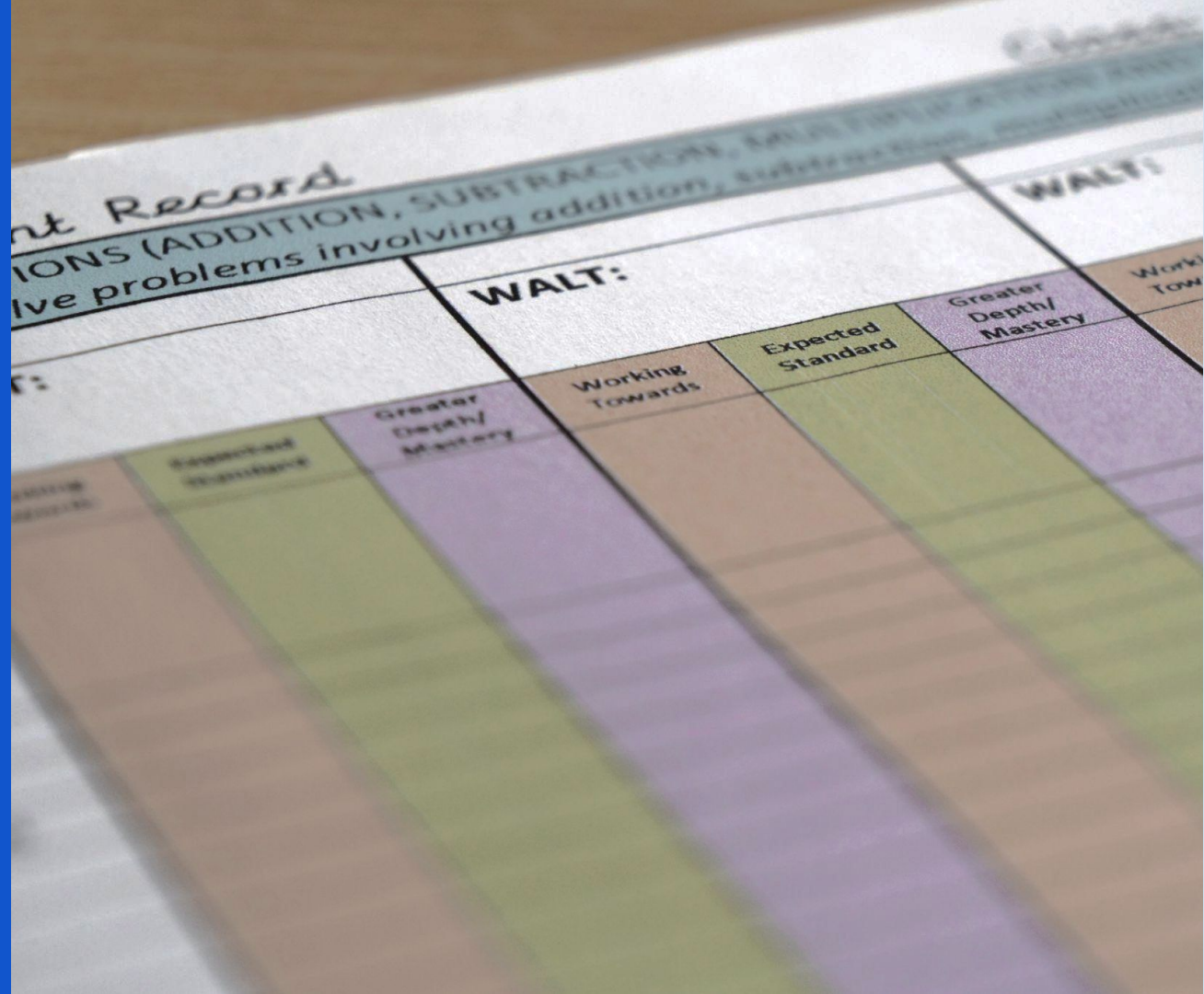
On each sheet, the 'small steps' of learning are recorded. At the end of a lesson when a small step has been taught, teachers identify those children who are 'Working Towards' the construct being taught; those children who have reached the 'Expected' level of understanding of the construct and those children who have taken their understanding of the construct to a 'Greater Depth.'



Formative Assessment

In Years One to Six

When a sequence of lessons has been completed and an end of year expectation has been taught in its entirety, teachers use their formative assessment sheets to make an overall judgement on the extent to which a child has met the overall objective. This overall judgement is then recorded on O-Track - our online assessment tracker - to track the progress of our children. From this information, summative judgements in Maths are made.

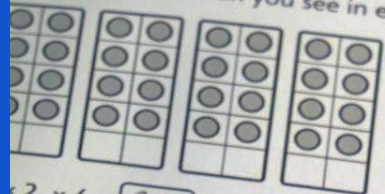


Standardised Testing


Years Two to Six

In addition to the Year 2 and 6 statutory assessment tests undertaken in term 5, standardised NFER tests are used at the end of Years 3, 4 and 5 as a tool to triangulate final teacher assessment judgements, support transition and inform the teaching of Mathematics for the following year.

... you see in each diagram?




$2 \times 4 = 32$
 $4 \times 4 = 32$

b) 

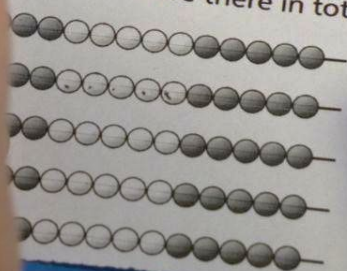
$3 \times 5 \times 3 = 45$
 $15 \times 3 = 45$

... 11 plates with 5 cakes on each plate.
... cakes are the same.

... candles are there in total?
... are 10 candles in total.



... many beads are there in total?



$5 \times \square$
 $7 \times \square$
 $\square \times \square$
There are \square