Lingfield Education Trust

Maths Curriculum

A whole school approach to maths culture, curriculum, assessment, pedagogy and CPD… ***all of our children can be mathematicians!***

Lingfield Education Trust

Culture

All of our children can be mathematicians!

All of our children can be mathematicians!

At Lingfield Education Trust (LET), our maths **culture**, that underpins and informs all that we do, is based around our shared belief that ***all of our children can be mathematicians*** – and enjoy the journey of getting there! Our culture is one of **all** staff members being the best prepared possible to ensure **all** children can master **all** of maths. At LET, mastery means every stakeholder moving together to improve their maths – not just children.

This culture informs the **intent** of our maths **curriculum**: all children to factually fluent, procedurally fluent and flexibly fluent so that they can reason to solve problems. We know this intent will give them the best possible chance to master maths at secondary school and have confidence in the workplace and everyday life situations. We intend for our children to be life-long lovers of maths. Our curriculum is designed so that **all** children learn content in the right order and for the right amount of time.

To **implement** our curriculum, we base our **pedagogy** around a consistent lesson delivery model (LDM) that fuses together the best of cognitive science approaches and the mastery approach to maths. Our robust LDM has several benefits:

- It acts as daily CPD for our staff about the most effective way to help children learn mathematical content
- Allows predictability and consistency for children, especially those with SEND needs
- Acts as a daily induction model for new staff

Learning steps and units of learning last as long as they need for **all** children to have grasped a concept/area of maths – a proper mastery approach.

To ensure that our curriculum has the desired **impact**, we have a robust assessment, monitoring and **CPD** model that encompasses both pre and post-unit assessments, summative assessments, fluency checks along with ongoing checks for understanding in lessons. Running alongside this same day intervention is at the heart of our curriculum to ensure **all** children are ready for their new learning.

Lingfield Education Trust

Curriculum

All of our children can be mathematicians!

Main Maths Curriculum

Our curriculum is one aimed at ensuring our shared belief, that ***all of our children can be mathematicians***, becomes a reality.

We believe strongly that all children can learn their intended curriculum if it is sequenced correctly and affords children enough time to learn mathematical content. For that reason we have based our curriculum around the following materials:

- White Rose Maths
- NCETM Curriculum Prioritisation
- Oak National Academy
- NCETM Mastering Number EYFS
- Number Sense Fact Fluency
- DfE Teaching Children to Calculate Mentally

Where possible, statistics and measures are applied in the wider curriculum to give them a meaningful context and purpose. Skills learned in these areas are then built into our systematic spaced retrieval sessions. In order for connections to be built up between mathematical concepts and representations, maths other than the focus content is built into the varied fluency of maths lessons.

To ensure all children can access mathematical content, we apply the science of cognitive load theory to our curriculum so that children have the prerequisite knowledge for a unit. For example, formal written multiplication is only taught when multiplication table facts have been secured; column addition is only taught when addition/subtraction table facts have been secured.

Each year group's curriculum finishes with a consolidation unit that gives children the chance to practice key skills before the summer recess thus reducing the summer learning loss. This unit is vital as it acts as a buffer so that we can give units and lessons as long as they need for learning to be secured by all.

Learning sequences identify linked mental maths/fact fluency starters; where a dedicated practical lesson is required; where a problem-solving lesson fits; when assessment/pause/stretch should take place; and when a practice lesson is required to allow children to simply consolidate what they have learnt.

Main maths lessons are one hour daily. Retrieval is five minutes daily. Fact fluency is 10 minutes daily.

Curriculum Design Principles

To ensure **all** of our children have the best possible maths education, our maths curriculum meets all of the standards of **LET *curriculum design principles***.

Curriculum Design Principles

Mathematics

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this document is supported by the Mathematics Masterclass webinar, housed within the Trust CPD portal. The Trust also has an optional Mathematics curriculum available, which exemplifies each of the below design principles.

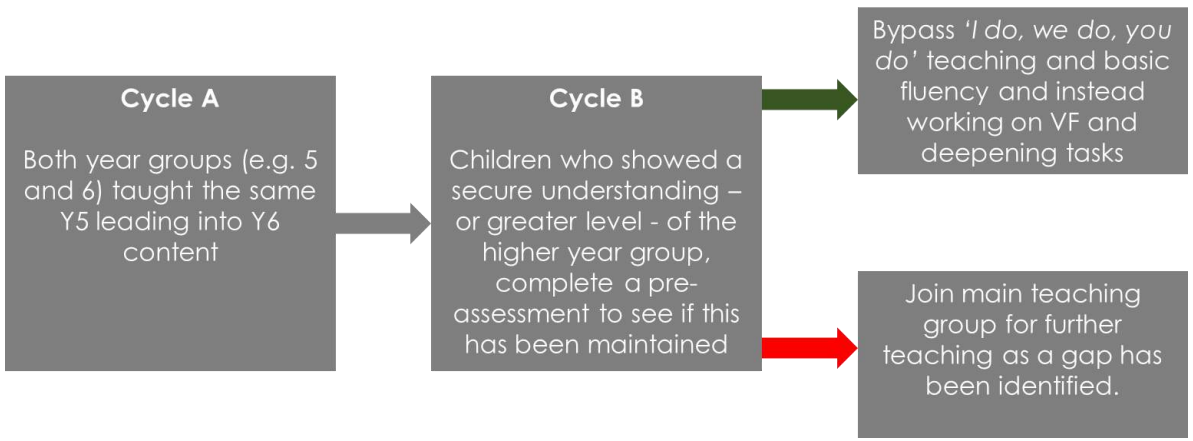
Each of our schools are required to ensure that the National Curriculum content for mathematics is adhered to, as a minimum. In line with National Curriculum guidance, schools are free to introduce new content at any point in the relevant key stage.

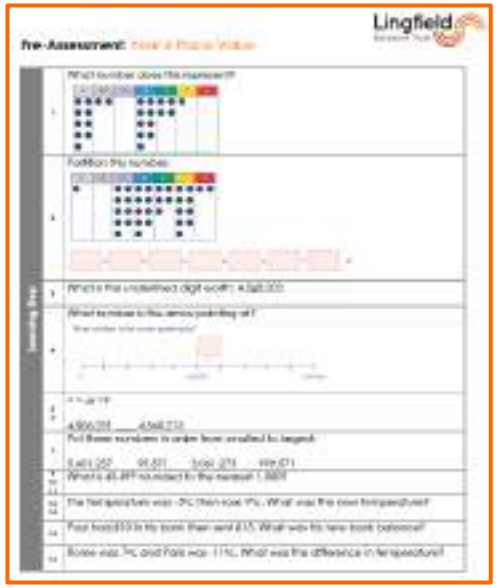
Overall Curriculum Considerations	
Is the curriculum a mastery curriculum that allows all pupils to move together securing fluency, reasoning and problem-solving?	
Early Years	
Does the EY curriculum have the same level of detail as KS1 and KS2?	
Does the EY curriculum plan for the teaching and practice of matching, sorting, ordering, comparing and patterning?	
Does the EY curriculum develop spatial awareness and spatial reasoning skills?	
Does the EY curriculum develop a secure understanding of subitising, counting and quantity?	
Does the EY curriculum develop a secure understanding of number composition to 10?	
Does the EY curriculum develop a secure understanding of pattern and patterns within the number system?	
Does the EY curriculum lead to automaticity in some add and take facts within 10?	
Fact Fluency	
Does the curriculum plan for the systematic teaching of a conceptual understanding of KS1 addition and subtraction facts?	
Does the curriculum plan for the assessment of addition and subtraction fact automaticity?	
Is there a systematic approach to the retention of KS1 addition and subtraction facts in LKS2?	
Is there a systematic approach to the remediation of KS1 addition and subtraction facts in LKS2?	
Does the curriculum plan for the systematic teaching of a conceptual understanding of multiplication and division facts?	
Does the curriculum plan for the assessment of multiplication and division fact automaticity?	
Is there a systematic approach to the retention of multiplication and division facts in UKS2?	
Is there a systematic approach to the remediation of KS1 multiplication and division facts in UKS2?	
Substantive Knowledge	
Is there a coherent approach to teaching all substantive knowledge by the end of the key stage?	
Does the curriculum lead to Year 6 children being taught all Year 6 curriculum content?	
Procedural Knowledge	
Does the curriculum equip all pupils with knowledge of how to calculate using a range of mental strategies?	
Does the curriculum equip all pupils with knowledge of how to lay out and complete formal algorithms?	
Conditional Knowledge: arithmetic	
Is there a systematic approach to teaching children how to decide upon the most efficient calculation strategy including mental strategies?	
Conditional Knowledge: reasoning and problem-solving	
Is there a systematic - reasoning hierarchy based - approach to teaching reasoning?	
Are all children taught to reason and given opportunities to reason?	
Is there a systematic approach to teaching all children to solve problems?	
Are all children taught to solve a wide range of problems?	
Greater Depth	
Does the curriculum plan for exposing children, who have grasped content rapidly, to rich and sophisticated problems?	
Mixed-Age	
Is there an effective, and fair to teachers, mixed-age curriculum with the same level of detail as non-mixed?	
Retrieval	
Is there a systematic and documented approach to retrieving prior learning from across the full curriculum?	
Intervention	
Does the curriculum explicitly build in same day intervention so no child encounters new learning without prior learning secure?	
Curriculum Documentation	
Is there a clear long term plan in place – which units are studied by which year groups in which term?	
Are units within the curriculum sequenced in an effective manner?	
Do medium term plans effectively sequence small steps of learning?	
Do unit designs act as sequences of learning that allow teachers to know when problem-solving and assessments should take place?	
Is there an effective calculation policy that is integrated into the curriculum?	
Is there an effective manipulatives policy that is integrated into the curriculum?	
Does the curriculum plan to expose children to mathematical careers?	
Does the curriculum plan to expose children to historical mathematicians and their legacy?	
Assessment	
Does the school have effective fact fluency checks for addition/subtraction and multiplication/division?	
Does the school have effective end of unit assessments that act as a diagnostic tool for determining what children have and have not learnt?	
Does the school have effective end of term summative assessments that find out if children can bring the different strands of the mathematics curriculum together?	
Are gaps identified from assessments addressed?	

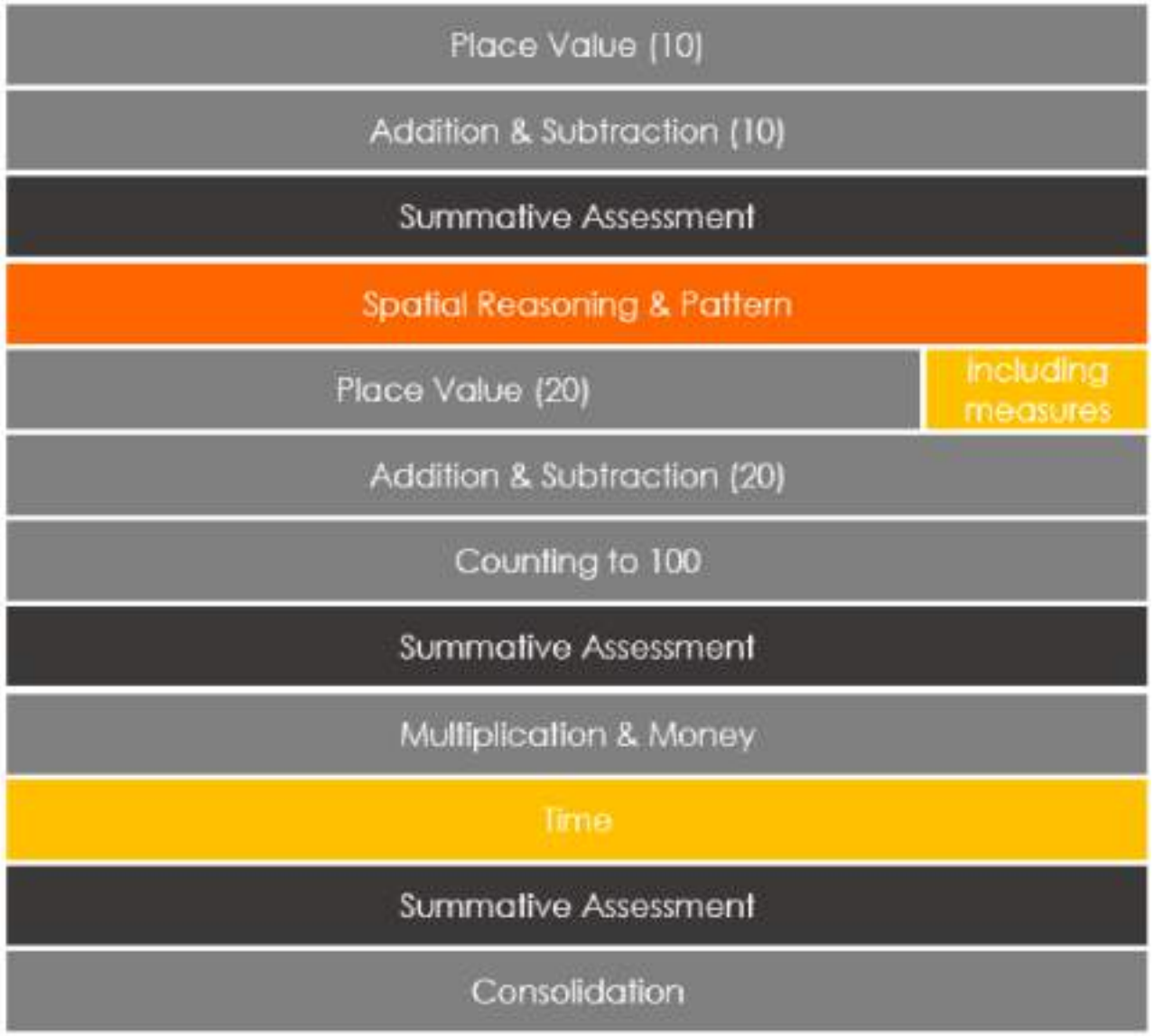
Mixed-Age Classes

Our approach to mixed-age planning:

- Only one input which moves from the lower year group content to the higher – for all.
- Year A and Year B cycle to allow for longer units to cover key skills from both year groups – where necessary.
- Anchor units of place value, addition & subtraction, multiplication & division and fractions are in both Year A and Year B.
- Other units are spaced over Year A and Year B with only one input which moves from the lower year group content to the higher – for all.
- In the second cycle, children who showed greater depth in the first cycle for anchor units, will complete a pre-assessment to identify if this level of understanding has been maintained.
- If it has they will bypass teacher input and basic fluency (our everyone on the bus task), and instead independently – or in a collaborative group – work on varied fluency and rich, sophisticated reasoning tasks.
- If the pre-assessment reveals, they have not maintained the earlier level of understanding they will join the main teaching to reinforce their earlier learning.
- NCETM CP sequencing have been used for these year groups, as it better caters for the younger year group.







Number, Place Value, Calculations, Fractions

Geometry

Measurement

Statistics

Assessment

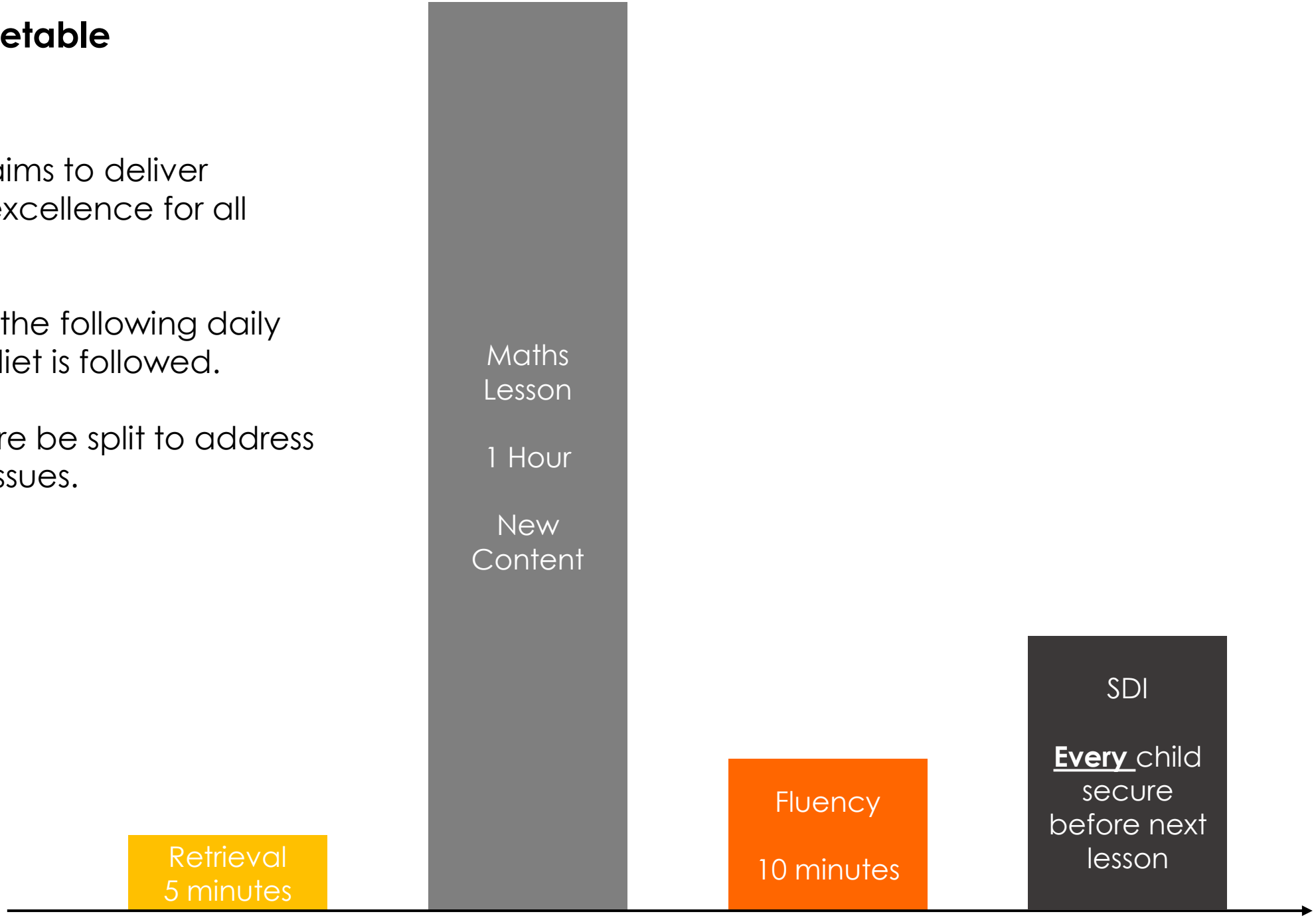
No time stipulations – units take as long as needed to be secured by **all** children.

Daily Maths Timetable

This curriculum aims to deliver mathematical excellence for all children.

For this happen the following daily mathematical diet is followed.

These sessions are be split to address cognitive load issues.



No time stipulations – lessons take as long as needed to be secured by **all** children.

Y3 Maths Plan

Unit Fractions

These are **NOT** lessons but learning steps and each one takes as long as it takes for **ALL** children to be secure.
Do **NOT** start the unit until **ALL** children have passed the prior learning check.
The unit takes as long as it takes for **ALL** children to pass the end of block assessment.
Do **NOT** move on to the next lesson until **ALL** children can do it.
Do **NOT** move onto the next unit until **ALL** children have passed the end of block assessment.

Learning Steps
Prior learning check & remediation/deepening of prior
Wholes, equal parts and unequal parts
Identify equal parts when they don't look the same
Identify unit fractions
Match fractions to division
Match fractions to fraction notation
Order unit fractions by size of denominator
Order unit fractions on a number line
Repeated addition of unit fractions to form a whole
Find unit fractions of amounts 1
Find unit fractions of amounts 2
PS Lesson: unit fractions (visual problems)
Assessment
Pause & Stretch: re-assessment & deepening as required
PS Skills Lesson: finding starting points

Spaced Retrieval Sessions

To ensure the content learnt in maths lessons is retained, all learning is built into our systematic, spaced retrieval plans.

This ensures that all key knowledge is regularly retrieved and that nothing is left out.

This also means maths lessons can focus on that year group's new content.

These sessions are daily for 15 minutes.

See appendices for full retrieval plans.

Week	Addition / PV	Subtraction / PV	Multiplication	Division	Fractions	GMS
1	PV: value of digits, partition, compare, order (Y3-4)		Multiplying with 1 and zero (Y2)	Dividing by 1 and itself (Y2)	Tenths – fractions & decimals (Y5)	Vertical, Horizontal, Parallel, Perpendicular (Y3-4)
2	PV: rounding (Y3-4)		Short Multiplication (Y5)	Short Division (Y5)	Hundredths – fract & decimals (Y5)	Mass & Capacity (Y3,4,5)
3	Decimal Place Value (Y5)		Moving Digits (Y3,4,5)	Moving Digits (Y3,4,5)	Multiply fractions (Y5)	2D-3D shape + symmetry (KS1+Y3-4)
4	Negative Numbers including temperature (Y3-4,5)		Scaled Facts (Y3-4)	Scaled Facts (Y3-4)	Multiply mixed numbers (Y5)	Length (Y3,4,5)
5	Mental Methods (Y3-4)	Mental Methods (Y3-4)	Multiplying with 1 and zero (Y2)	Dividing by 1 and itself (Y2)	Non-unit fractions of amounts (Y5)	2D & 3D shape + regular/ir (KS1+Y3-4)
6	Written Methods (Y3-4)	Written Methods (Y3-4)	Short Multiplication (Y5)	Short Division (Y5)	Equivalent fractions (Y5)	Pictograms & Bar/Line Charts (Y6)
7	Mental Methods inc decimals (Y5)	Mental Methods inc decimals (Y5)	Moving Digits (Y3,4,5)	Moving Digits (Y3,4,5)	Fraction-decimal basic equ (Y5)	Coordinates (Y5)
8	Written Methods inc decimals (Y5)	Written Methods inc decimals (Y5)	Scaled Facts (Y3-4)	Scaled Facts (Y3-4)	ID/compare/order unit/non-unit (Y3-4)	Pie Charts & Circles (Y6)
9	PV: value of digits, partition, compare, order (Y6)		Long Multiplication (Y6)	Short Division (Y5)	Mixed into improper & vice-versa (Y3-4)	Translations & Reflections (Y5)
10	PV: rounding (Y6)		Short Multiplication (Y5)	Short Division (Y5)	Fractions of amounts (Y5)	Reading Time (Y3-4)
11	Decimal Place Value (Y5)		Moving Digits (Y3,4,5)	Moving Digits (Y3,4,5)	Add/take fractions (Y3-4)	Angles (Y5)
12	Negative Numbers including temperature (Y3-4,5)		Scaled Facts (Y3-4)	Scaled Facts (Y3-4)	FDP Equivalence (Y5)	Area & Perimeter (Y3,4,5,6)
13	Mental Methods (Y3-4)	Mental Methods (Y3-4)	Long Multiplication (Y6)	Short Division (Y5)	Multiply fraction & WN (Y5)	Translations (Y5)
14	Written Methods (Y3-4)	Written Methods (Y3-4)	Moving Digits (Y3,4,5)	Moving Digits (Y3,4,5)	FDP Equivalence (Y5)	Volume (Y5,6)
15	Mental Methods inc decimals (Y5)	Mental Methods inc decimals (Y5)	Scaled Facts (Y3-4)	Scaled Facts (Y3-4)	Multiply mixed numbers (Y5)	Triangles (area, angles) Y6

Fact Fluency Sessions

Fact fluency – what we call *fingertip knowledge* – is what makes maths accessible for all. We know that without this children cannot access and enjoy the wider maths curriculum.

To ensure fact fluency is not a barrier for any child, we have dedicated daily fact fluency sessions that ensure children gain a deep conceptual understanding of these facts, which leads to automaticity.

These sessions are daily and last for 15 minutes in each year group.

KS1 focus on addition/subtraction tables.
LKS2 focus on multiplication/division tables.
UKS2 focus on applying these facts to wider mental strategies, thus retrieving the basic facts to working memory.

See appendices for full plans.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Addition Facts to 5	Addition Facts to 5	Addition Facts to 10 and from 10 to 20	Addition Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20
Year 2	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition Facts to 20 Bridging 10	Addition Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10
Year 3	Addition & Subtraction Facts to 20	Addition & Subtraction Facts to 20	x2, x10, x5 Multiplication Facts	x2, x10, x5 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts
Year 4	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12
Year 5	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts
Year 6	Application	Application	Application	Application	Application	Application

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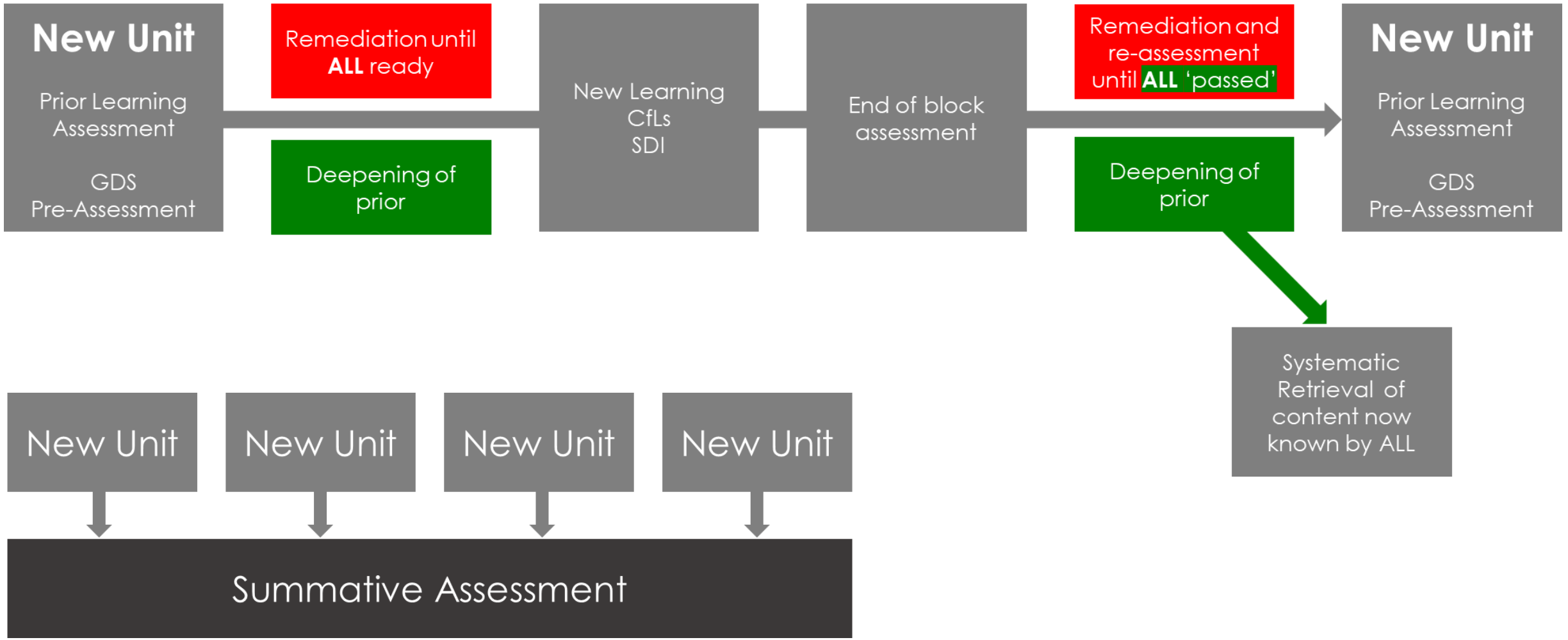
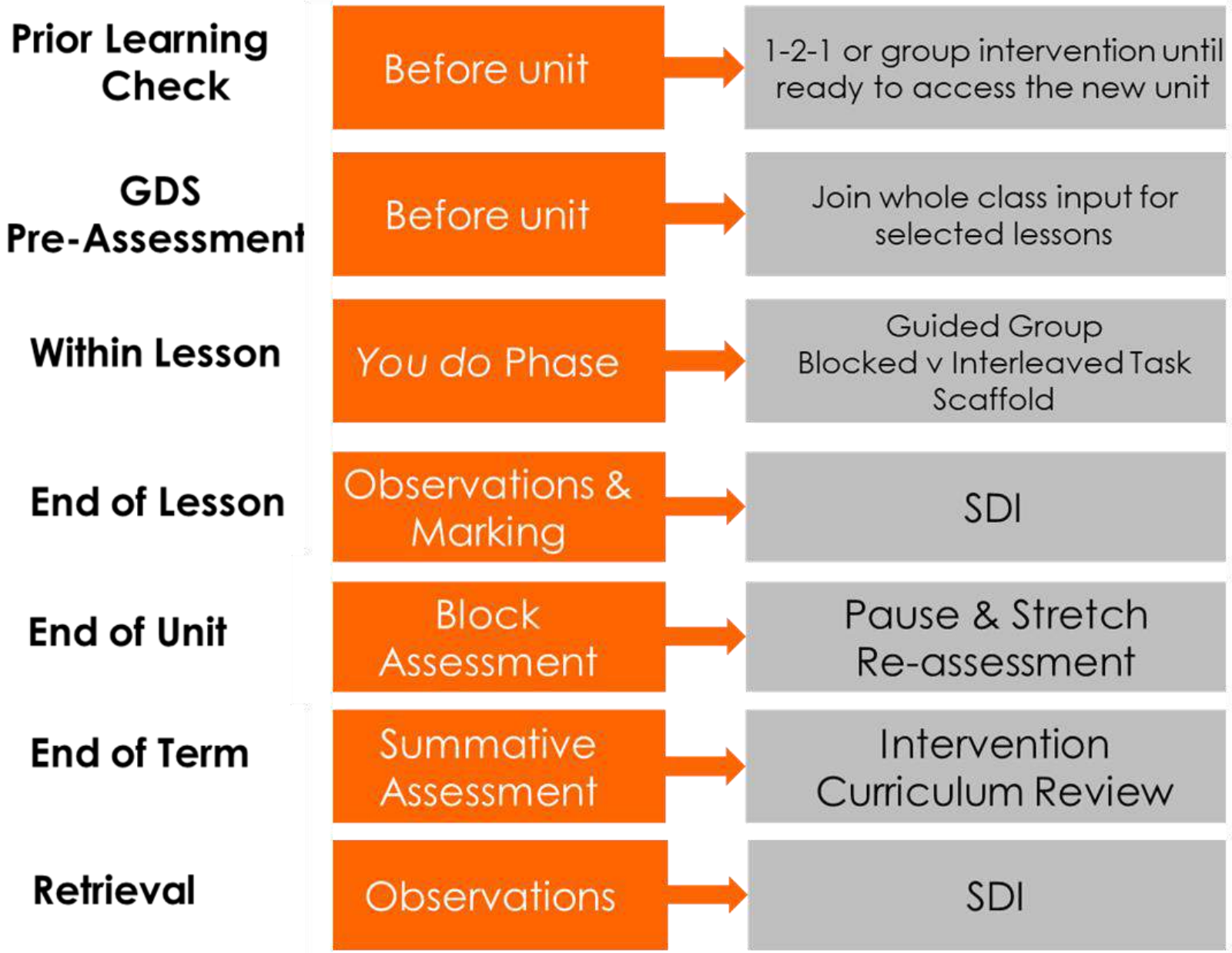
Assessment

All of our children can be mathematicians!

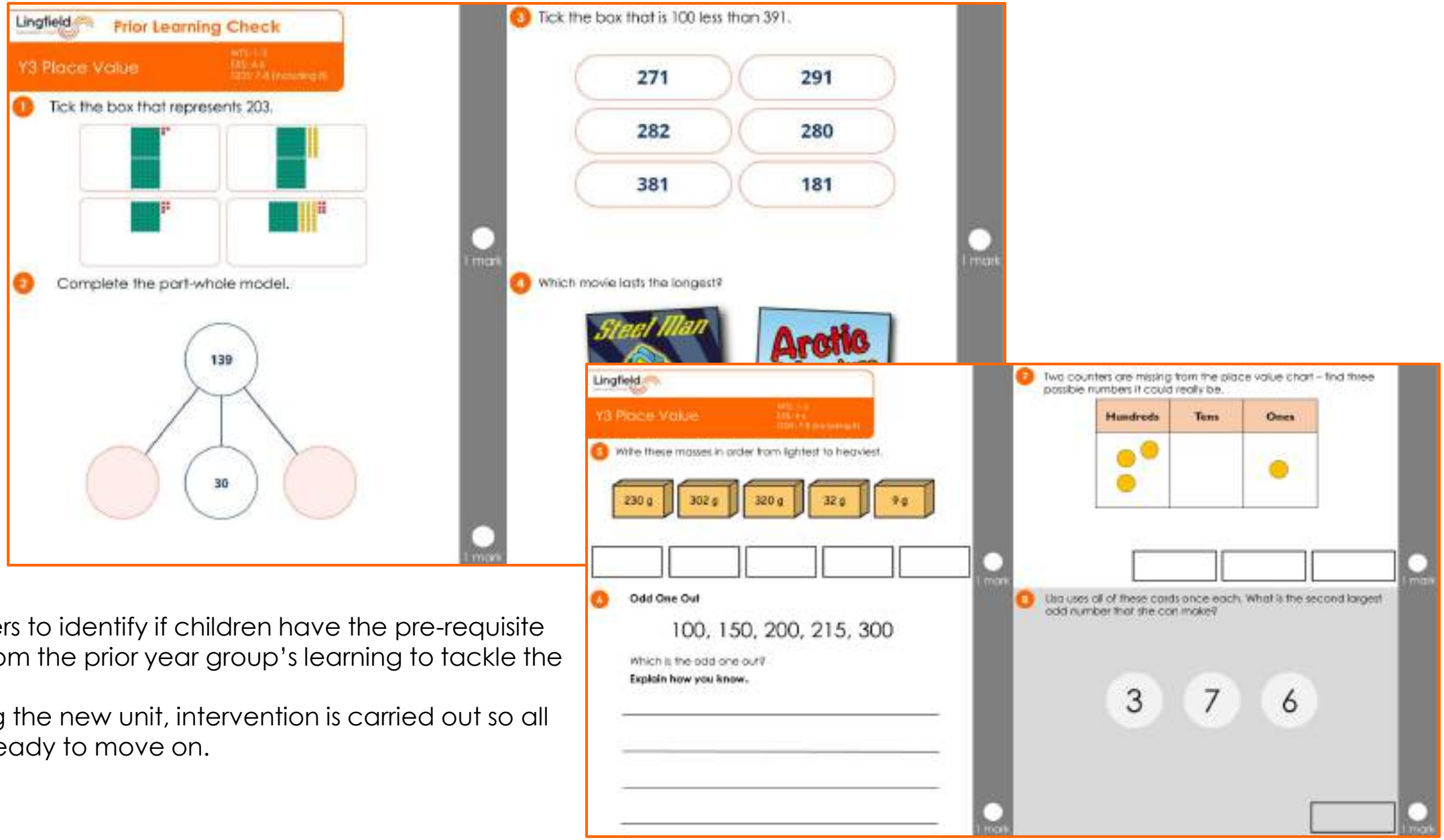
Assessment Model



Layers of Assessment



Prior Learning Checks

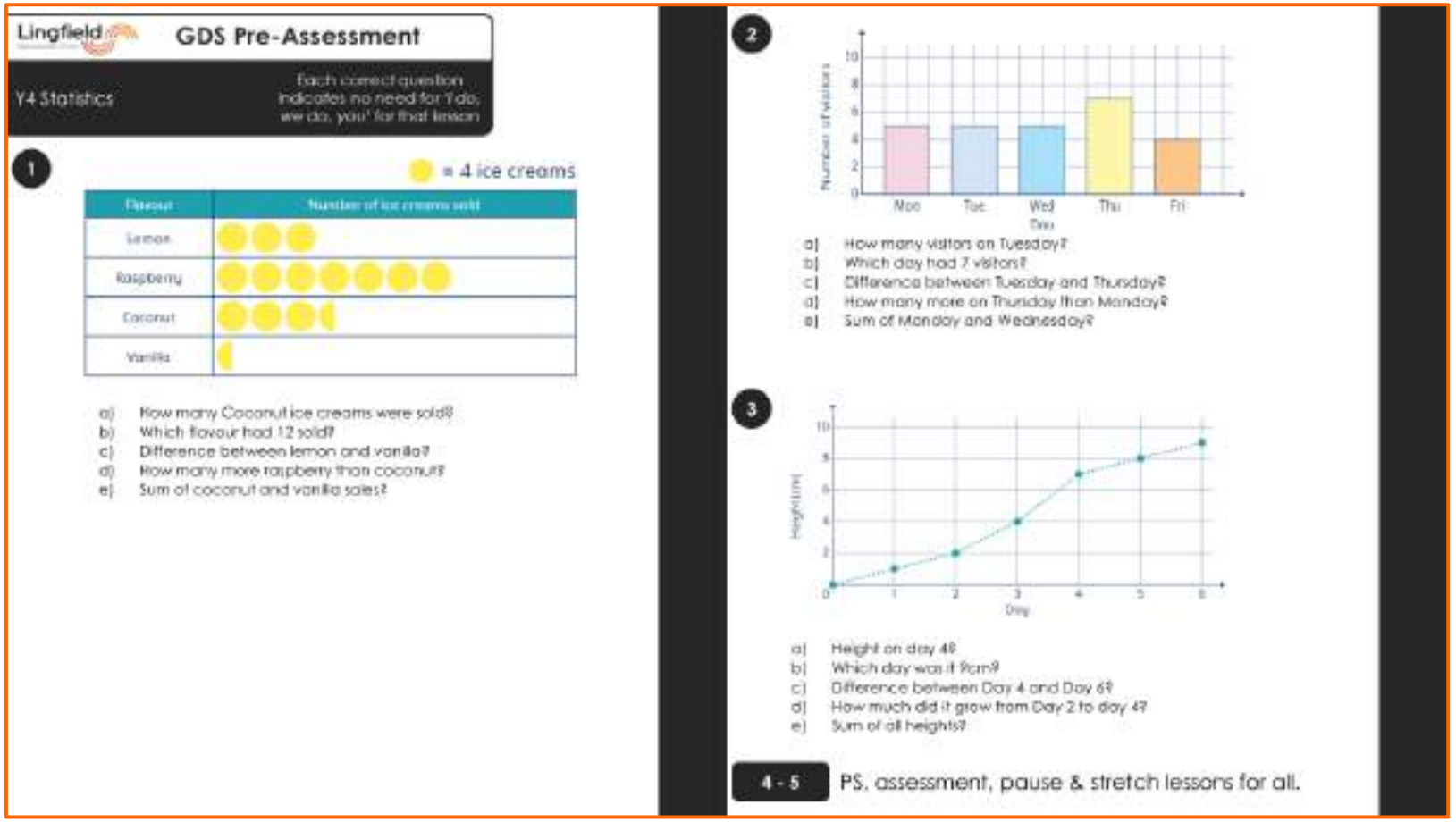


- Allows teachers to identify if children have the pre-requisite knowledge from the prior year group's learning to tackle the new content.
- Before starting the new unit, intervention is carried out so all children are ready to move on.

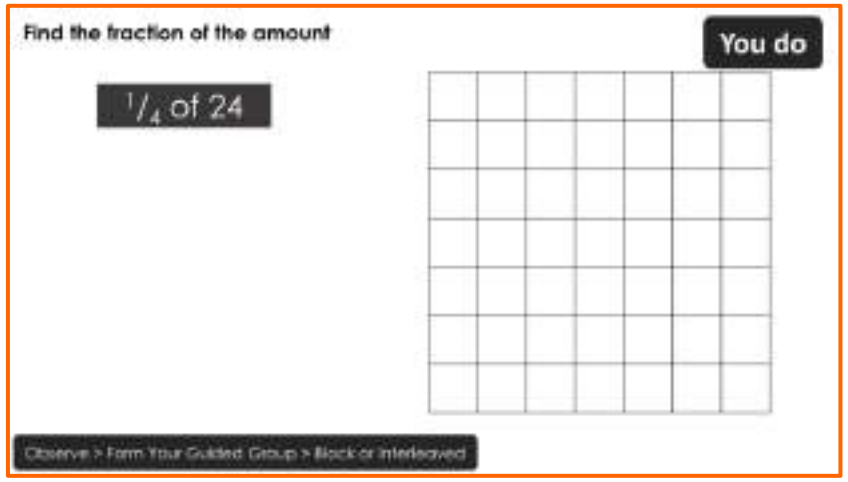
GDS Pre-Assessments

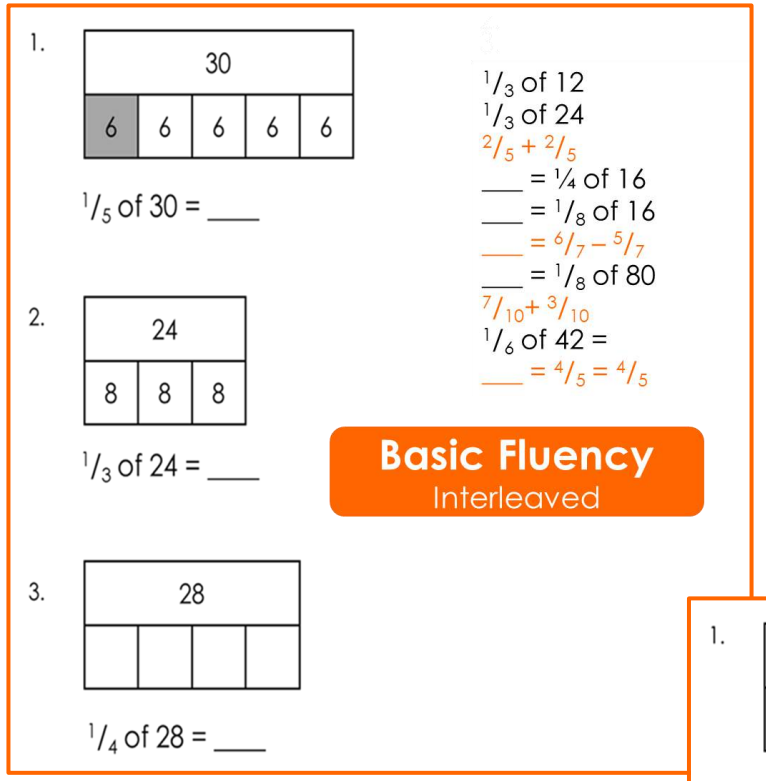
- Allow teachers to identify children who have enough maths understanding to tackle new learning without direct instruction using metacognitive strategies:
  - Discussions with their teacher about which upcoming content they found easy and therefore can tackle alone – this puts children in charge of their own learning.
  - Discussions with their teacher about which upcoming content they found challenging and therefore need to join the main teaching – this puts children in charge of their own learning.
  - For secure lessons children bypass the direct instruction phase and work independently monitoring their own success and areas to improve.
  - Children are trained to monitor whether they actually did actually need input and then rejoin the group mid-lesson if need be.

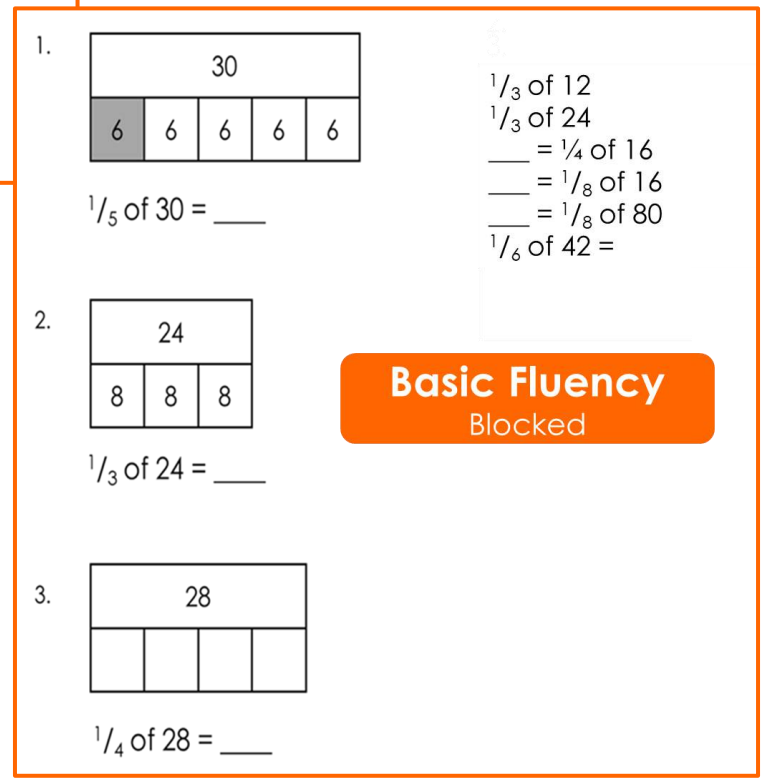
- This then leaves time within each learning step for these children to be exposed to deepening tasks from across the curriculum.



Within Lesson Assessment







- After the teaching and modelling process, a '*you do*' question - completed independently and matching the full difficulty of the first task – is used to signpost which children will work on the interleaved task and which will work on the blocked task (with support where required).
- This ensures all of the more confident mathematicians are stretched even in their basic fluency.
- This is all based on assessment in the lesson based on 'checks for understanding.'

End of Lesson Assessment

- Marking that identifies precise misconceptions to create a positive feeling for maths – *lots of what I did was correct*!
- Marking informs **same day intervention (SDI)** so all new learning is built on a secure understanding of previous learning.

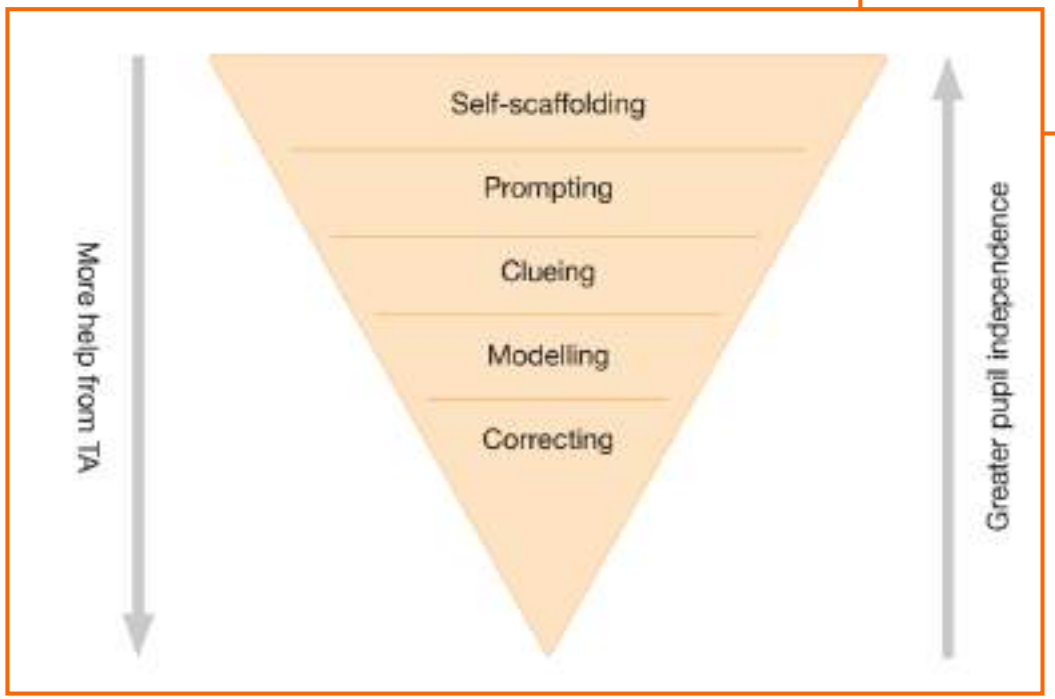
Misconceptions matter but don't signpost everything as a misconception!

$$\begin{array}{r} 4\ 2\ 5\ 7 \\ -\ 3\ 1\ 5\ 4 \\ \hline 7\ 1\ 0\ 3 \end{array}$$ ✗

You get maths all wrong!

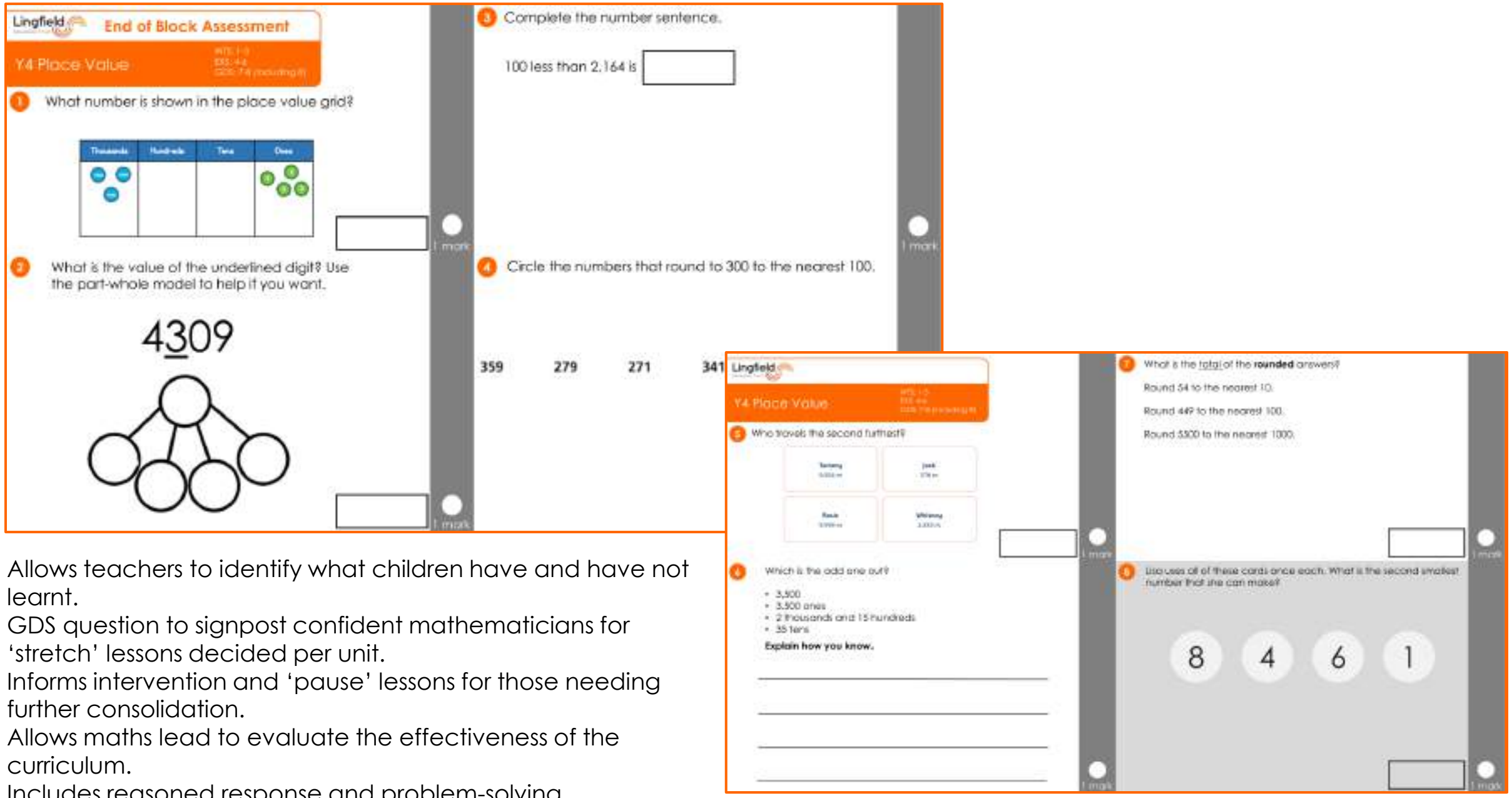
Draw children's attention to ¾ correct and only ¼ not.

$$\begin{array}{r} 4\ 2\ 5\ 7 \\ -\ 3\ 1\ 5\ 4 \\ \hline (7)\ 1\ 0\ 3 \end{array}$$



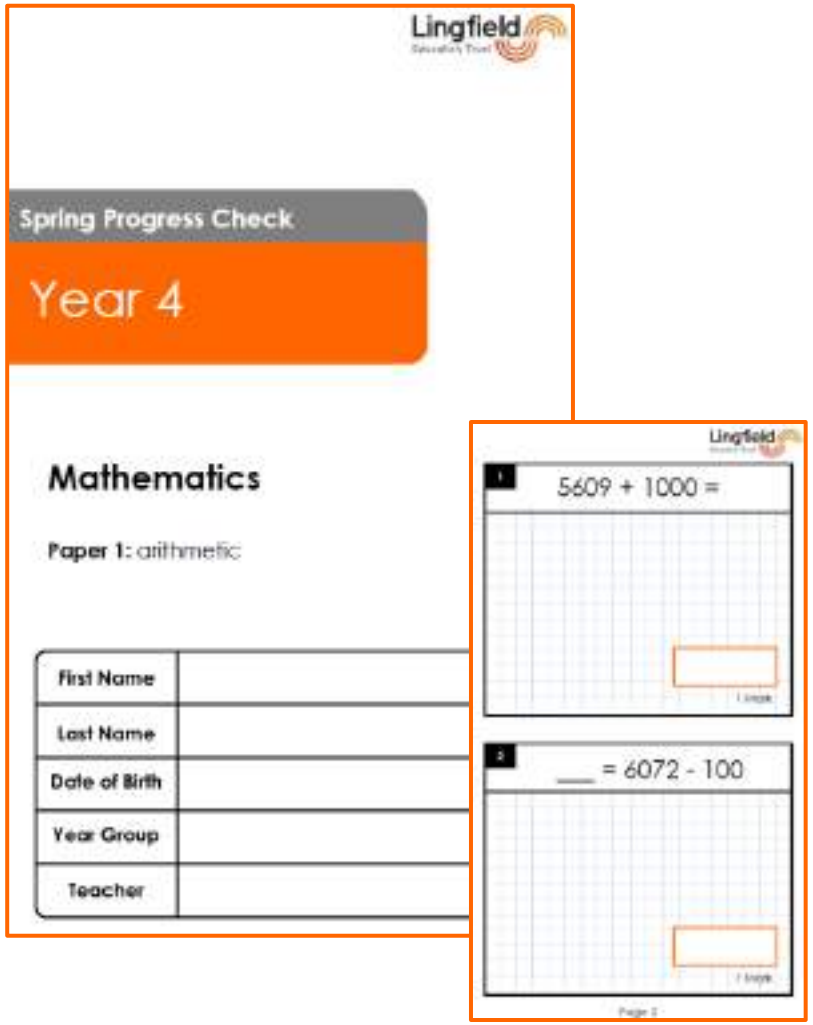
- SDI that fosters independence.
- Not just correcting but intervention to secure understanding before the next new learning.

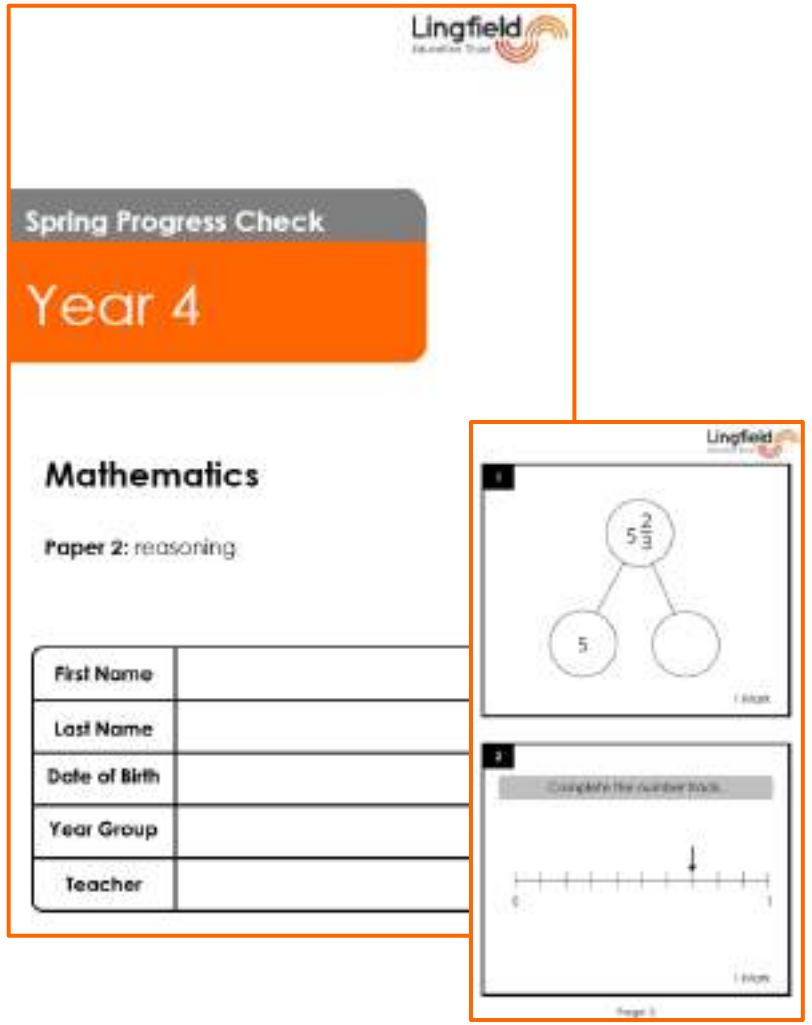
End of Unit Assessments



- Allows teachers to identify what children have and have not learnt.
- GDS question to signpost confident mathematicians for 'stretch' lessons decided per unit.
- Informs intervention and 'pause' lessons for those needing further consolidation.
- Allows maths lead to evaluate the effectiveness of the curriculum.
- Includes reasoned response and problem-solving.

Summative Assessments





- Allow teachers to find out if children: can work on different maths concepts at the same time; can link their maths learning together and solve multi-step and multi-domain problems.
- Allows maths leads to evaluate the effectiveness of the curriculum.
- **Taken when children are ready; when the content has been taught.**

Mathematical Endpoints

To help bring all our assessment information together our maths curriculum has its own 'endpoints'.

Factual Knowledge	Automatically recall all addition and subtraction facts within 10
	Automatically recall all addition and subtraction facts to 10
	Automatically recall all double facts to 10
	Automatically recall all halving facts from 10
	Automatically recall all 'ten and a bit' addition and subtraction facts
Place Value	Read numbers to 20 in numeral form
	Read numbers to 20 in word form
	Write numbers to 20 as numerals
	Write numbers to 20 as words
	Partition numbers to 20 into tens and ones
	Compare numbers to 20 practically (without inequality symbols)
	Order three numbers to 20
	Know one more to 20
	Know one less to 20
	Identify odd and even numbers to 20
Counting	Count forwards in ones to 100 from any given number
	Count backwards in ones from 100 from any given number
	Count a given amount from a larger group within 20
	Count in 2s from zero
	Count in 10s from zero
	Count in 5s from zero
Addition & Subtraction Strategies	Understand the symbols for addition and equals within equations (QA:AQ)
	Use doubles as an addition strategy to 10
	Use near doubles as an addition strategy to 10
	Use 1 more as an addition strategy to 20
	Use '10 and a bit' as an addition strategy to 20
	Can select the most efficient strategy for a given addition question
	Understand the symbols for subtraction and equals within equations (QA:AQ)
	Understands subtraction structure of 'taking away'
	Use halves as a subtraction strategy from 10
	Use 1 less as a subtraction strategy from 20
	Use '10 and a bit' as a subtraction strategy from 20
	Can select the most efficient strategy for a given subtraction question
Spatial Reasoning	Recognise, name and describe the properties of common 2-D shapes
	Recognise, name and describe the properties of common 3-D shapes
	Compose shapes and talk about shape properties
	Decompose shapes and talk about shape properties
	Use every day mathematical vocabulary to describe position
	Use every day mathematical vocabulary to describe direction
	Use every day mathematical vocabulary to describe movement

Pattern	Identify the unit of repeat in repeating patterns (e.g. AB, ABC, ABBC)	
	Identify errors in repeating patterns	
	Recognise growing patterns	
	Identify errors in growing patterns	
Measures	Know the days of the week	
	Sequence events in chronological order using precise mathematical language	
	Understand the concept of length/height	
	Understand the concept of mass/weight	
	Understand the concept of capacity/volume	
	Tell the time to o'clock	
Mathematical Models	Use ten frames effectively	Use part-whole models effectively
	Use bar models effectively	
	Use number lines for counting and place value accurately	
	Uses Y1 precise mathematical vocabulary (see appendix)	
Reasoning	Respond mathematically to…	*What do you notice*
	what's the same, what's different?	*explain which is the odd one out!*
	explain why this correct/incorrect!	*what went wrong?*
	prove that x is true!	*how would you improve x?*
Problem Solving	Solve problems involving rules and patterns	
	Solve problems involving more than one possible answer	
	Solve logic problems	
	Solve real-life word problems	

Greater Depth	**Children are described as being greater depth for areas of maths rather than maths as whole.**	
	Solve more complex tasks with multiple steps	Generalise from findings and create rules/patterns to solve questions of a similar type
	Solve problems that involve multiple mathematical concepts	Complete metacognitive tasks, for example describing their approach, the easy parts and the difficulties
	Use and compare a range of strategies and evaluate efficiencies	Create their own problems
	Guide other pupils by teaching and modeling a concept	Use more precise mathematical vocabulary in their reasoning

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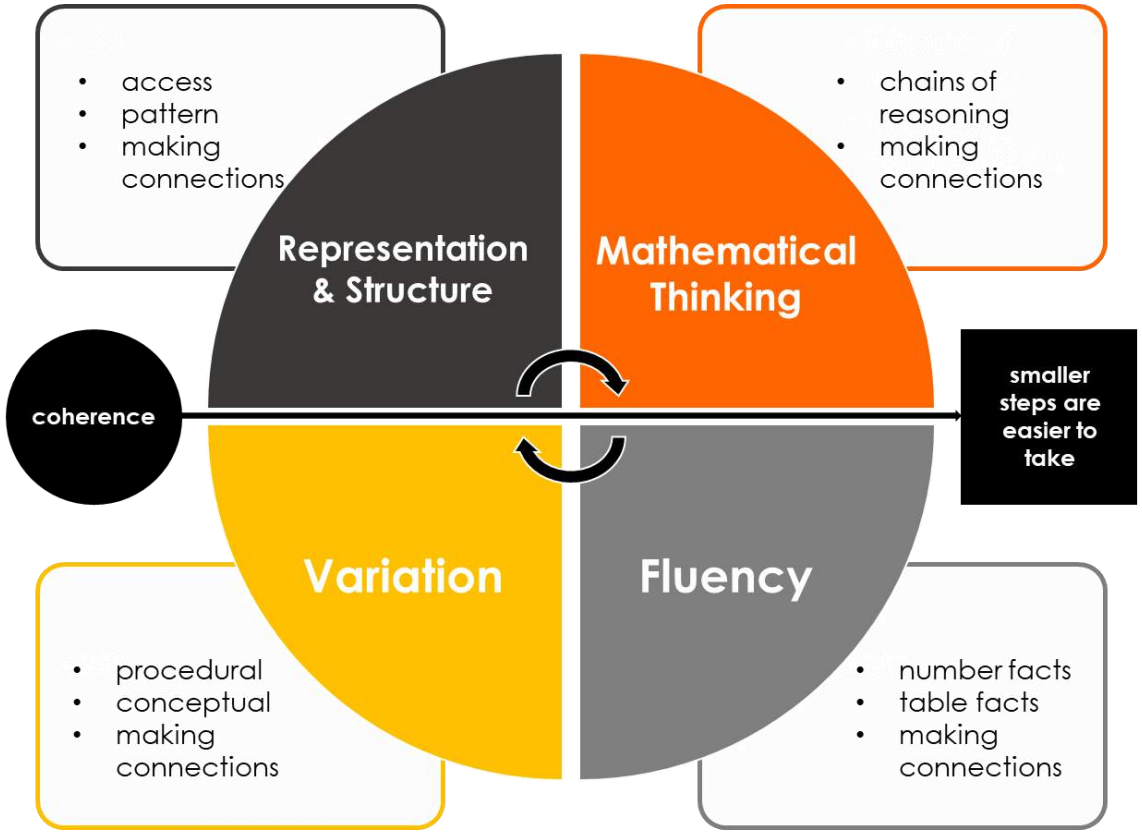
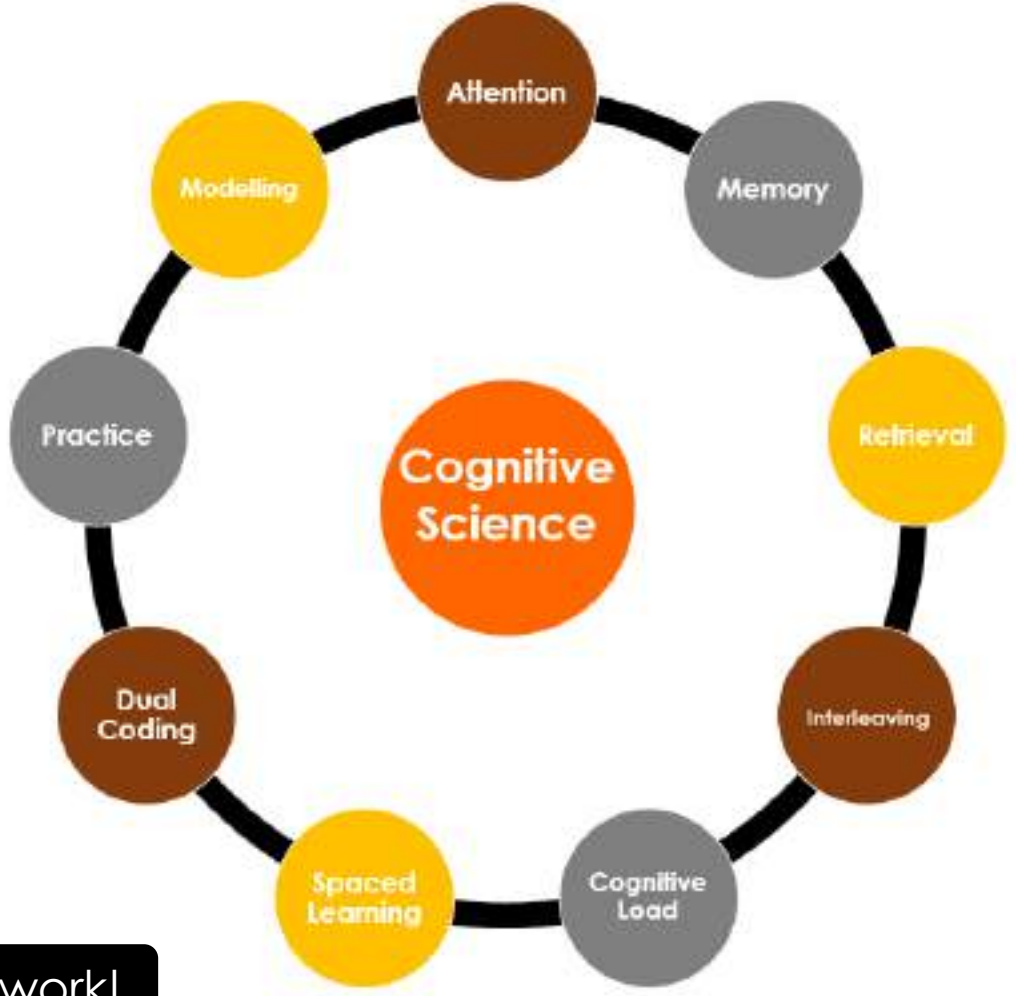
Pedagogy

All of our children can be mathematicians!

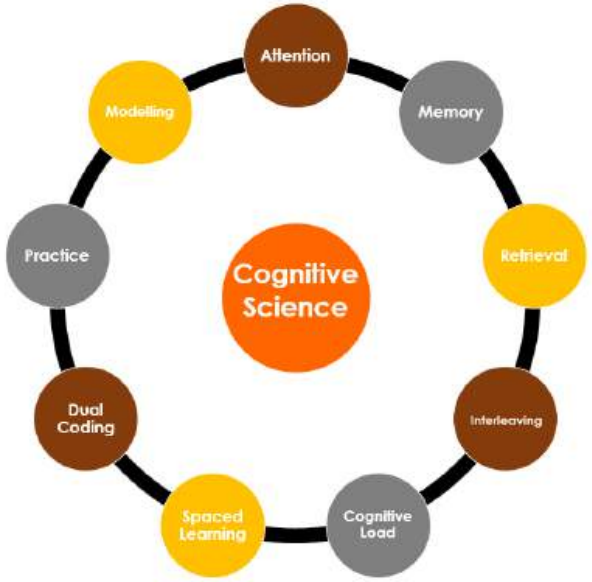
A fusion of the best of the mastery & cognitive science approaches





One without the other will not work!

Cognitive Load Theory



Cognitive Load Theory is central to our curriculum and lesson design: we know that for our cultural belief - ***all of our children can be mathematicians*** - to be a lived reality requires that their working memory is not overloaded. Our approach to maths addresses this in several ways:

- Extraneous visual and auditory stimuli are removed where at all possible, for example lesson slides and tasks have only what is required on them and teachers say just what is needed.
- The curriculum is built around small steps.
- Our lesson delivery model (LDM) ensures children are taught key vocabulary and fact fluency before it becomes a barrier in the lesson.
- The LDM is built around a robust *I do, We do, You do* model so children are instructed in small steps.
- Varied fluency and variations are built in once the core concept has been secured using our chosen accessible representations and procedures.
- We never want fact fluency to be a barrier to wider maths competence and therefore we have daily, dedicated fluency sessions for all year groups.
- Likewise, we never want a lack of time to rush fluency or prevent problem-solving, therefore we have dedicated problem-solving lessons to ensure all children can be taught problem-solving, practise problem-solving and independently solve problems – once fluency in an area has been secured.

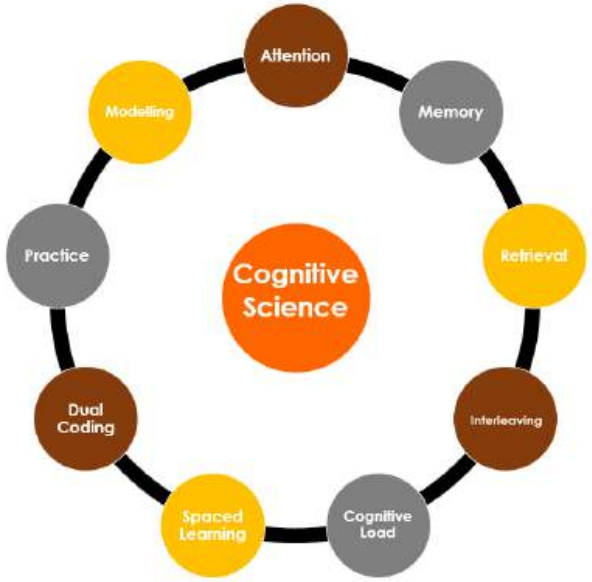
Interleaving & Method Selection

To ensure our children are presented with the optimal amount of desirable difficulties our basic fluency tasks are designed with the principles of interleaving and method selection in mind.

As children regularly have to come off the lesson content question and attend to some interleaved content, they are constantly having to 'reload memories' of the lesson input – they can't just drop into routine.

For children, who may need further scaffold with the lesson content, we use our *You Do* lesson component to decide which children work on the 'interleaved' task and which work on the 'blocked' task until secure.

Based on research, interleaving is only used in KS2.



Basic Fluency: long multiplication

a) 1111 x 11 =
b) ___ = 2222 x 22

c) 3233 x 23 =
d) __ = 2233 x 32

e) ___ = 3234 x 34
f) ___ = 6806 x 42

g) ___ = 8786 x 67
h) 9039 x 42 =
i) 5678 x 49 =

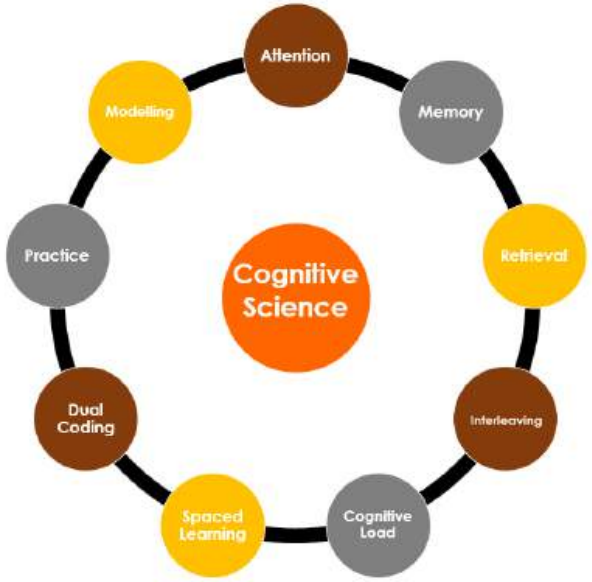
Basic Fluency: long multiplication

a) 1111 x 11 =
b) ___ = 2222 x 22
c) 9 x 4 =
d) 3233 x 23 =
e) __ = 2233 x 32
f) 43 x 8 =
g) 4315 x 6 =
h) 40 x 80 =
i) ___ = 3234 x 34
j) ___ = 6806 x 42
k) 3451 x 10 =
l) ___ = 8786 x 67
m) 9039 x 42 =
n) 45.2 x 20 =
o) $^{2}/_{5}$ x 4 =
p) 5678 x49

Basic Fluency: long multiplication

a) 1111 x 11 =
b) ___ = 2222 x 22
c) A rhombus has ___ right angles
d) 3233 x 23 =
e) __ = 2233 x 32
f) 4307m = ____km
g) 4315 x 6 =
h) 3.52pm in 24hr time = ____
i) ___ = 3234 x 34
j) ___ = 6806 x 42
k) A rectangle measure 24m by 6m what is its perimeter?
l) ___ = 8786 x 67
m) 9039 x 42 =
n) ___ = 456.2 + 3.986
o) $^{2}/_{5}$ x 4 =
p) 5678 x49

Spaced Retrieval Practice



The simple view of memory tell us that in order for learning stored in the long-term memory to be retained and not decay, it needs to be regularly retrieved from this storage.

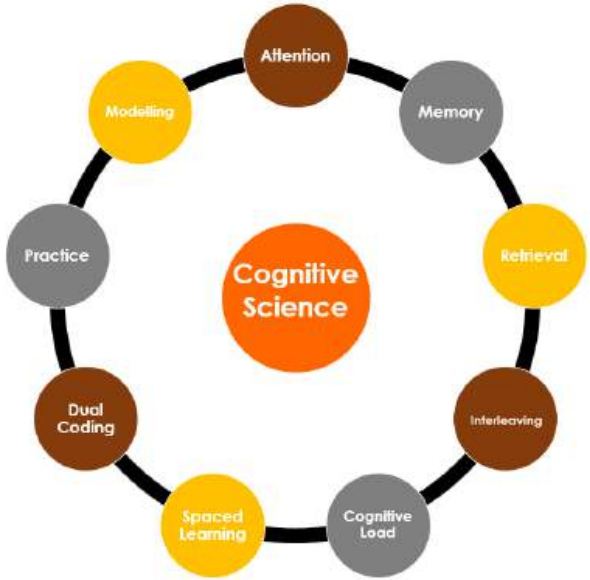
To ensure that all of the key learning from our curriculum is retained, we have a systematic plan for spaced retrieval. This means that key knowledge/skills are retrieved on a planned cycle.

We have also allowed research to guide us in terms of who does retrieval, when and how:

- In order for us to know what every child knows, children complete retrieval tasks individually.
- It is the act of thinking that causes retrieval and so children complete retrieval independently – retrieval is more effective than a reminder.
- Our retrieval sessions are separate to our main maths lessons to ensure the narrative flow of lessons is not disturbed as this can increase cognitive load. This also allows us to unpick any misconceptions as the main maths lesson time is not affected.
- Each time a piece of knowledge/skill is retrieved on the cycle, it is brought back using a slightly different prompt thus further strengthening the memory.

To help manage cognitive load with younger children, KS1 are presented with one retrieval question at a time, that they do individually and independently.

Spaced Retrieval Practice

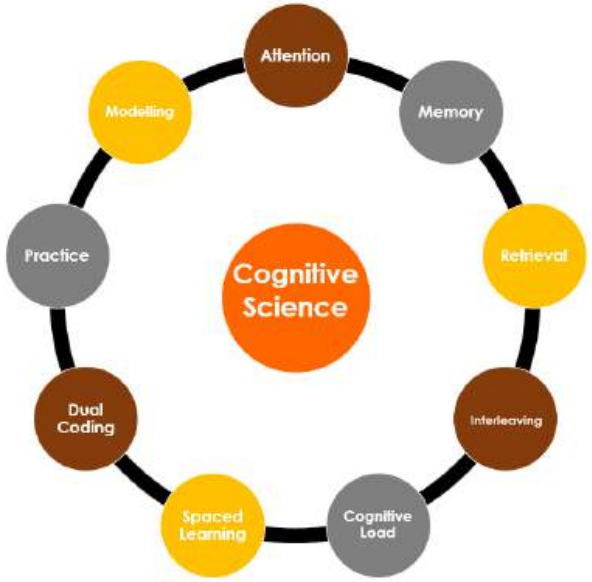


Spaced Retrieval

Year 4: Autumn

Week	Addition / PV	Subtraction / PV	Multiplication	Division	Fractions	GMS
1	PV: value of digits, partition, compare, order		Multiplying with 1 and zero	Dividing by 1 and itself	1/2 of shape and amount	Patterns
2	Mental Methods	Mental Methods	Equal Groups & Repeated +	Division by group & share	¼ of shape and amount	2D Shape
3	Written Methods	Written Methods	Table Facts	Table Facts	¾ of shape and amount	3D Shape
4	Inverse Checks	Approximation Checks	Scaled Table Facts	Scaled Table Facts	Unit fractions	Position & Direction
5	Missing Number	Balance Number Equations	Mental Methods	Mental Methods	Non-unit fractions	Length
6	PV: value of digits, partition, compare, order	PV: rounding	Written Methods	Written Methods	equivalence	Mass & Capacity
7	Mental Methods	Mental Methods	Missing Number	Missing Number	Add/take fractions	Money
8	Written Methods	Written Methods	Balance Equations	Balance Equations	Fractions of amounts	Time
9	Inverse Checks	Approximation Checks	Multiplying with 1 and zero	Dividing by 1 and itself	1/2 of shape and amount	Statistics
10	Missing Number	Balance Number Equations	Equal Groups & Repeated +	Division by group & share	¼ of shape and amount	Pattern & 2D/3D Shape
11	PV: value of digits, partition, compare, order	PV: rounding	Table Facts	Table Facts	¾ of shape and amount	Position & Direction
12	Mental Methods	Mental Methods	Scaled Table Facts	Scaled Table Facts	Unit fractions	Length
13	Written Methods	Written Methods	Mental Methods	Mental Methods	Non-unit fractions	Mass & Capacity
14	Inverse Checks	Approximation Checks	Written Methods	Written Methods	equivalence	Time
15	Missing Number	Balance Number Equations	Missing Number (inc balance equations)	Missing Number (inc balance equations)	Add/take fractions	Money

Spaced Learning

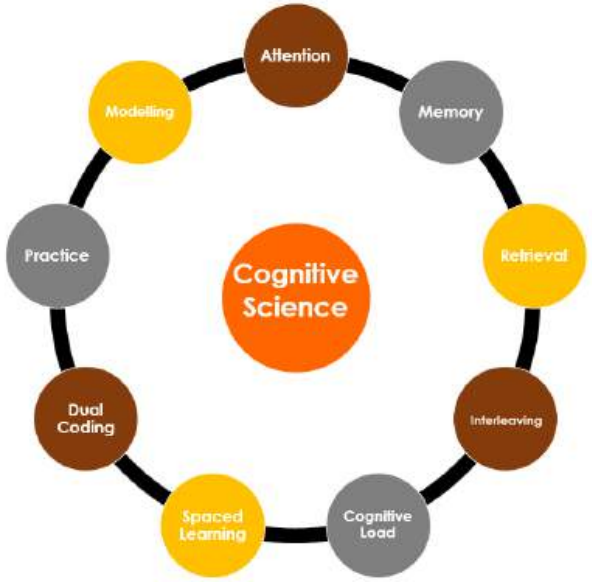


Addition/subtraction and multiplication/division table facts are crucial to children enjoying maths and being successful at it. We recognize that typical approaches, which are based around a one-off two-week block of work, are not effective in ensuring all children learn all of these facts to automaticity. The cognitive load is too high.

We have applied the concept of spaced learning to our fact fluency with children developing a deep conceptual understanding that leads to automaticity over a greater amount of time.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Addition Facts to 5	Addition Facts to 5	Addition Facts to 10 and from 10 to 20	Addition Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20
Year 2	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition Facts to 20 Bridging 10	Addition Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10
Year 3	Addition & Subtraction Facts to 20	Addition & Subtraction Facts to 20	x2, x10, x5 Multiplication Facts	x2, x10, x5 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts
Year 4	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12
Year 5	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts
Year 6	Application	Application	Application	Application	Application	Application

Direct Instruction & Enquiry



Direct instruction using an ***I do, We do, You do*** model lies at the heart of our system of the transfe of expertise.

New content is delivered through direct modelling in the ***I do*** phase.

Further expertise is then transferred through the ***We do*** phase, where teachers and children work together in a **faded scaffolding** way on a concept or skills. Rich reasoning questions lie at the hec of this teacher-child phase.

Following this children work collaboratively on the learning with guidelines and roles so that both participants are active learners.

To ensure that staff know whether their teaching has been received by all, or which children may need further support in a guided-group, the ***You do*** phase is completed before children work independently. We want them to practice and encode success not misconceptions. This is our check.

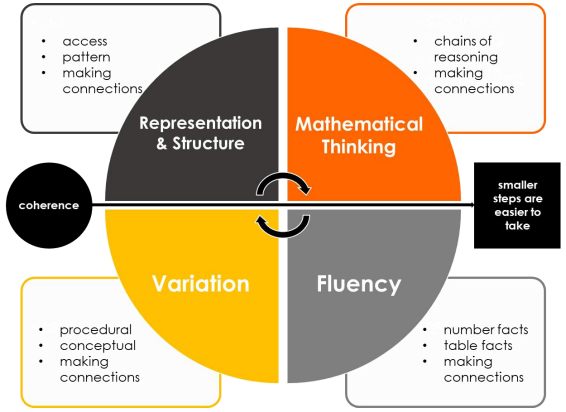
Based on research we have a discussion component early on in our lesson deliver model (LDM) that allows children to **enquire** and discover – through a clever prompt - what the new learning for the day is and why it is important – we find that children alighting on this themselves is really effective at engaging all learners as they have found their own purpose – something they do not yet know.

I do

We do

You do

Our Mastery Approach To Maths



Coherence

- The precise ordering of content in our curriculum, acts as scaffolding for our children in itself.

Fluency

- Fact fluency is developed within maths lessons but also within additional, daily fluency sessions. In these sessions, a deep conceptual understanding is developed using a range of manipulatives and visual representations. To ensure this leads to automaticity, daily automaticity practice is built into maths lessons and automatic recall is assessed every half-term.
- To ensure our children are truly fluent, our maths lessons are structured in a way that children have to apply their fluency to a range of variations and varied fluency prompts.

Variation

- In order to ensure too much variation early on does not lead to cognitive overload, our lessons are structured in a way that children work on what we decide is the most accessible representation/procedure to initially learn a concept/skill. Immediately after this, children work on a range of variations to strengthen their understanding. This initial 'basic fluency' phase tightly matches the direct instruction and working wall scaffold. The 'varied fluency' phase also allows us to pair this new learning with other areas of maths to build connections, for example comparison questions presented on a bar chart.

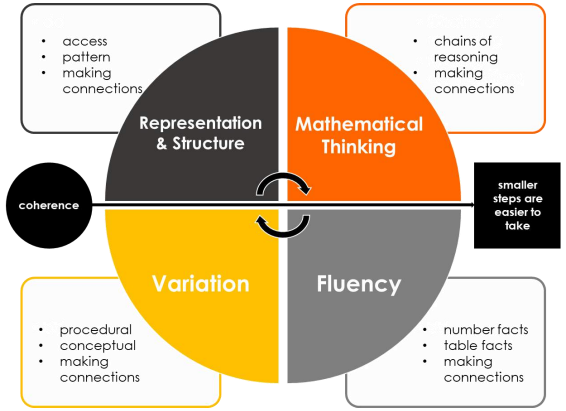
Representation & Structure

- Concrete resources are used to introduce new concepts in each year group of school, as they help children expose the structure of maths, for example our children use a tens frame to see how 7 + 4 can be represented as 7 + 3 to make a new ten leaving the 1 as a bit for ten and a bit as 11. When manipulatives are first introduced, specific lessons are planned to teach how to actually use the, before they are paired with mathematical content. We also know that for each piece of learning 'concreteness fading' needs to be applied so children can ultimately work without scaffold.

Mathematical Thinking

- We view reasoning as 'reasoning throughout' not as an end of lesson task. Children are asked to reason throughout maths lessons, including how new learning links to old, reasoning with the precise mathematical vocabulary taught and about how to tackle problems. To ensure all children are taught how to be problem-solvers, practice being problem-solvers and acts as independent problem-solvers, we have dedicated problem-solving lessons when a concept/skill has been secured.

Fact Fluency – Never A Barrier!

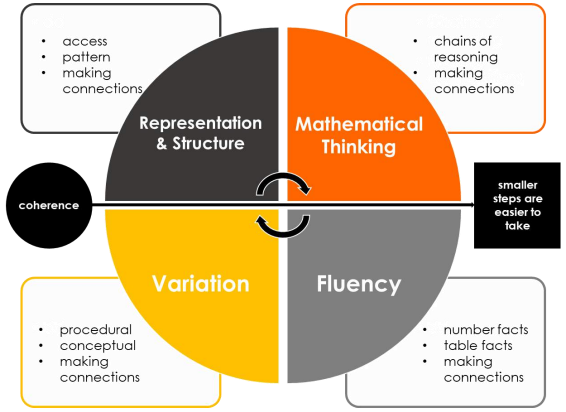


As a school we run a dedicated fact fluency program to support our main maths curriculum to ensure that fact fluency is never a barrier to our children's wider maths development.

These sessions run for 15 minutes daily and embed a deep conceptual understanding of these facts though the use of manipulatives. This is then turned into automaticity using our mental maths/fact fluency starters and half-termly fluency checks. The data from these fluency checks is then used to inform precise, targeted intervention.

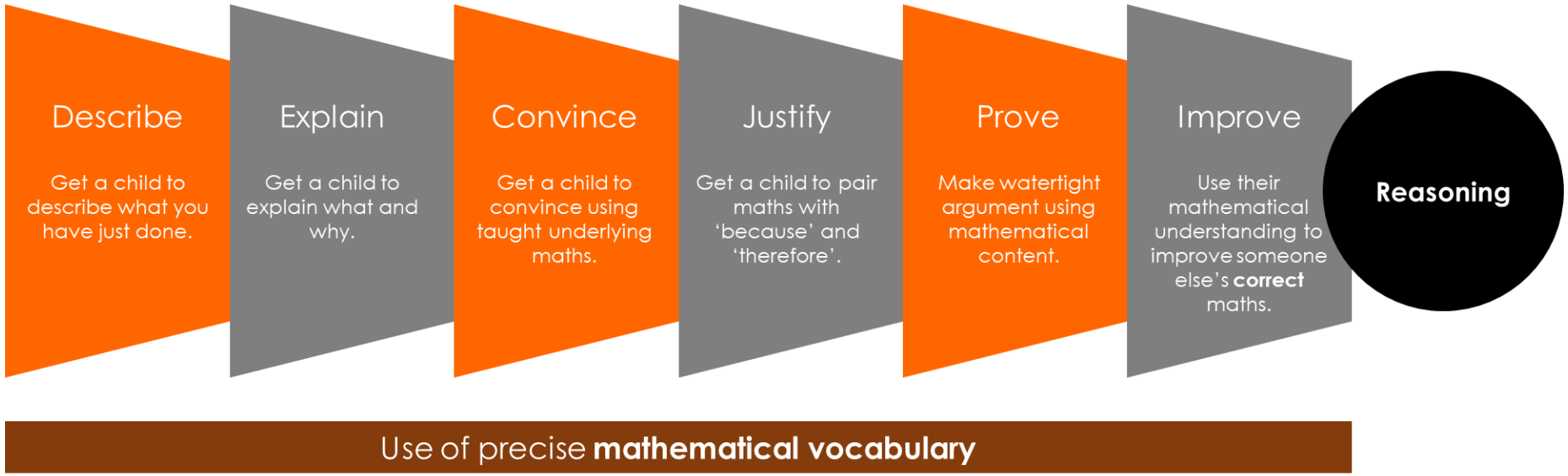
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	Addition Facts to 5	Addition Facts to 5	Addition Facts to 10 and from 10 to 20	Addition Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20
Year 2	Addition & Subtraction Facts to 10 and from 10 to 20	Addition & Subtraction Facts to 10 and from 10 to 20	Addition Facts to 20 Bridging 10	Addition Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10	Addition & Subtraction Facts to 20 Bridging 10
Year 3	Addition & Subtraction Facts to 20	Addition & Subtraction Facts to 20	x2, x10, x5 Multiplication Facts	x2, x10, x5 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts	x4, x8, x3, x6 Multiplication Facts
Year 4	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12
Year 5	Multiplication Facts to 12 x 12	Multiplication Facts to 12 x 12	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts	Addition, Subtraction, Multiplication, Division Facts
Year 6	Application	Application	Application	Application	Application	Application

Systematic Teaching of Reasoning



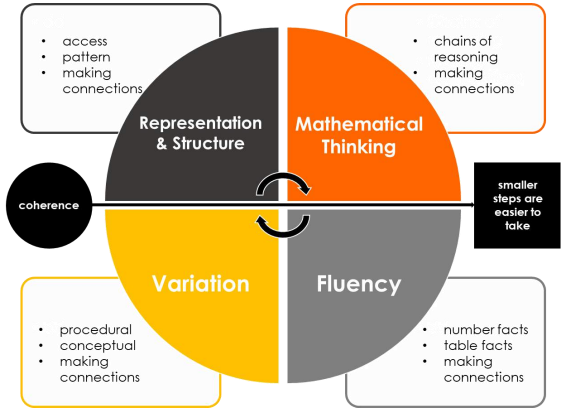
To ensure that our children are proficient in reasoning about mathematics, we have a rigorous, systematic approach:

- Precise mathematical vocabulary is directly taught, practised and applied
- Reasoning prompts are introduced one-at-a-time so children master each before learning new structures. When each is secure, variation in prompts is added.
- Over the course of a week during this learning phase, initial days are build around verbal responses to ensure children can speak it before writing it and then later in the week written responses are worked on.
- The aim is that this systematic approach allows all children to be able to reason effectively in verbal and written form using a range of reasoning structures.



Our key reasoning prompts are used to frame discussions in other subjects too. The rationale is that as our children develop comfort and competency with the reasoning sentence frames in other contexts, when they are asked them apply them to novel maths ideas, they only have to use working memory on the maths.

Systematic Teaching of Reasoning



Monday	Tuesday	Wednesday	Thursday	Friday	Discussion Opener
What's the same? What's different?	What's the same? What's different?	What's the same? What's different?	What's the same? What's different?	What's the same? What's different?	Previously taught and practised reasoning structures are kept fresh and revisited through use in *discussion starters*. For example, in week 2 what's the same/different can be used.
Odd one out?	Odd one out?	Odd one out?	Odd one out?	Odd one out?	
Always, sometimes, never?	Always, sometimes, never?	Always, sometimes, never?	Always, sometimes, never?	Always, sometimes, never?	
What went wrong?	What went wrong?	What went wrong?	What went wrong?	What went wrong?	
Convince me… is correct/not	Convince me… is correct/not	Convince me… is correct/not	Convince me… is correct/not	Convince me… is correct/not	
Prove that…	Prove that…	Prove that…	Prove that…	Prove that…	
Improve…	Improve…	Improve…	Improve…	Improve…	

Structured **verbal** practice

Structured **written** practice

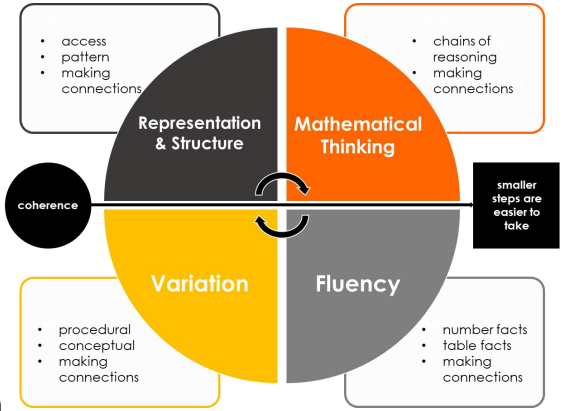
In the first Autumn Term, we remove variation so we can add it add the right time. Each week a new reasoning structure is taught and practised moving from structured verbal work to structured written work. The next week a new structure is introduced.

Structures learnt in previous weeks are kept refresh and revisited in the discussion opener of each lesson.

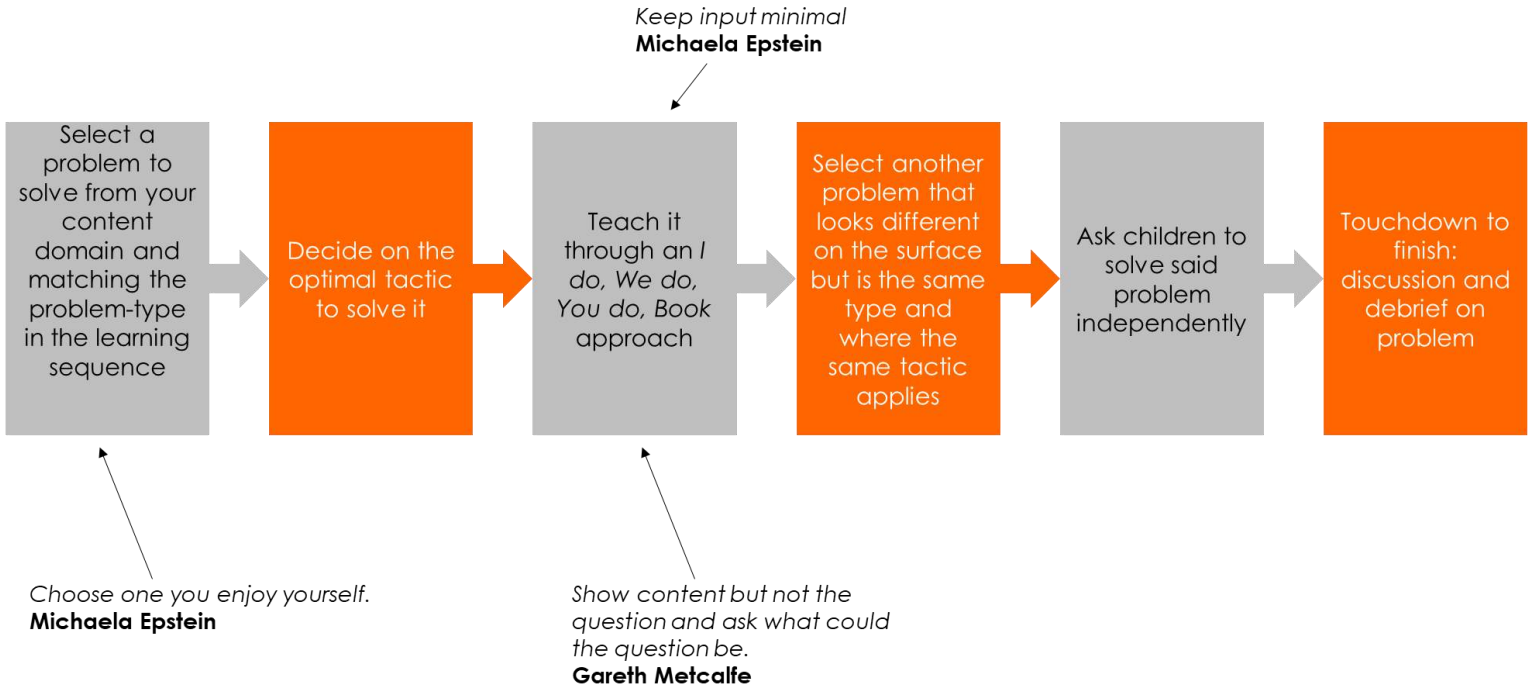
After Autumn Term 1, variation in structures and can be introduced at the right time so **all** can do it.

We know a mixed bag from day one will exclude some children who can actually do it!

Direct Teaching of Problem-Solving

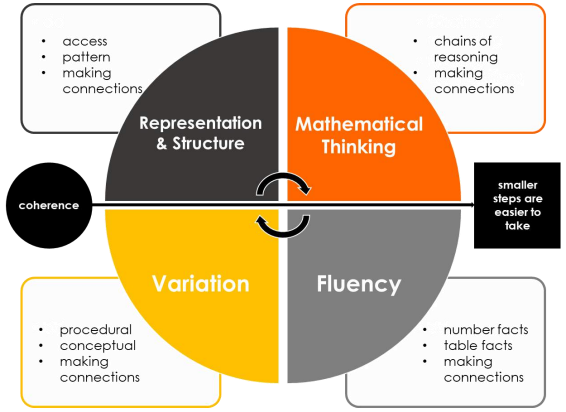


- All children are taught a full range of problem-solving skills; all are exposed to a range of problem-types; all practice a range of skills; and all independently apply learnt skills.
- Problem-solving is taught when underlying content is secure.
- We have a specific LDM for our dedicated problem-solving lessons that ensures it is a problem-solving approach for all.
- Problem types are built into learning sequences to ensure children are systematically taught each skill, each year.
- Based on National Curriculum guidance, KS1 children do less problem-solving. Year 1 are introduced to it in Spring and then just one lesson per block is planned for in KS1 to ensure fluency takes precedent.
- As children progress through school they are exposed to a wider range of problem types linked to units of work.
- Alongside this, each year group has one half-termly generic problem-solving skills lessons with the aim being that these skills can then be further applied in content-based problem-solving lessons.



Direct Teaching of Problem-Solving

Open-ended problems	Real-life word problems	Working backwards	More than one possibility
Problems with multiple steps	All possibilities	Problems with multiple domain content	Investigations
Spotting patterns and rules	Visual Problems	Logic	As a general rule of thumb, a numerical value or values will be the desired outcome.



Problem-Solving Skills

The underlying problem-solving skills to teach are:

- **Term 1:** Trial and Improvement… Resilience
- **Term 2:** Systematic approach
- **Term 3:** Working collaboratively
- **Term 4:** Finding starting points
- **Term 5:** Visualising
- **Term 6:** Conjecturing & Generalising

Y1	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word					
Y2	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word	Working Backwards				
Y3	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word	Working Backwards	Open Ended			
Y4	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word	Working Backwards	Open Ended	Multi-Step		
Y5	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word	Working Backwards	Open Ended	Multi-Step	All Possibilities	Multi-Domain	Investigation
Y6	Rules & Patterns	More than 1 Possibility	Visual problems	Logic	Real-life Word	Working Backwards	Open Ended	Multi-Step	All Possibilities	Multi-Domain	Investigation

GDS & SEND

To ensure **all** of our children are supported and challenged to the highest possible standard, our maths curriculum and pedagogy meet all of the standards of **LET *curriculum for all***.

Mathematics *for ALL*

In order to support children with SEND in meeting the ambitious curricular goals, we apply a range of specific support, adaptation and modification methods, specific to the child and their needs. These could include:

Ambition for ALL | Special Educational Needs

Cognition & Learning Needs

- Use of maths manipulatives – both physical and electronic – to progress learning from concrete to pictorial to abstract – most maths is quite abstract and this presents a challenge for SEND pupils.
- Use a consistent range of manipulatives at first so pupils have a go to resource that they know well before using a wider range.
- Reduce the cognitive load required for tasks (minimising the amount of steps, simplifying the recording, not overloading with non-essential information)
- Reduce the amount the amount of reading required and ensure decoding levels match the task.
- Ensure reading aspects of maths have improved accessibility, including larger font, bolds, the use of different colours and avoiding italics (Simpler versions of text so that reading materials match the child's reading ability)
- Pre-teaching of pertinent vocabulary will support learning, as well as having clear displays and/or points of reference for the children to remember and use vocabulary correctly.
- Use of additional adult when possible
- Splitting teaching and tasks up into smaller steps: teach a step of learning and do tasks linked to it and then do the next steps – avoiding all teaching and all tasks at once.
- Pay extra attention to the grading of difficulty of the work – only add one extra element of challenge at a time, for example carefully moving from no exchanging, to some, to lots, to exchanging from zeros in column subtraction.
- Slowed down pace of learning and use of consolidation, for example lots of work on basic skills and varied fluency before reasoning and problem solving
- When even the basic fluency mentioned above is too challenging then, where necessary, differentiated outcomes and tasks.
- When SEND pupils do access reasoning and problem solving use sentence stems/starters to scaffold answers.
- Use modified scientific resources (e.g. thermometer, measuring containers, scales)
- Mixed ability groupings/paired work/peer support
- Task targets/clear success criteria
- Visual stimuli/hooks- turn abstract in to concrete
- Constructive working atmosphere – research suggests quieter atmospheres aide maths learning

Communication & Interaction Needs

- Pre-teaching of pertinent vocabulary will support learning, as well as having clear displays and/or points of reference for the children to remember and use vocabulary correctly.
- Pre-teaching vocabulary, vocabulary maps/word banks
- Use of visuals to support understanding of key concepts
- Use of own communication methods / aids – such as PECS, Makaton, writing, drawing
- Use of sentence stems to frame answers
- Allow verbal responses where necessary

Ambition for ALL | Special Educational Needs

Sensory / Physical Needs

- Use of maths manipulatives – both physical and electronic – to progress learning from concrete to pictorial to abstract – most maths is quite abstract and this presents a challenge for SEND pupils.
- Use a consistent range of manipulatives at first so pupils have a go to resource that they know well before using a wider range.
- Awareness of sensory needs, modification of learning environment (light, sound, seating)
- Modifying visual sources, e.g. pictures, text
- Written sources may be converted to auditory form
- Provide activities that require movement for pupils who learn best through doing and for pupils who find it difficult to sit still for long periods – e.g. role-play, using the interactive whiteboard with pupil involvement.

SEMH

- Pre-teach of concepts so pupils feel confident about the lesson to help avoid maths anxiety.
- Agree with pupils before lesson about answering group questions to avoid pupils feeling being put on the spot.
- Pre-emptive pre-teach sessions for when the teaching of the curriculum and personal beliefs may conflict.

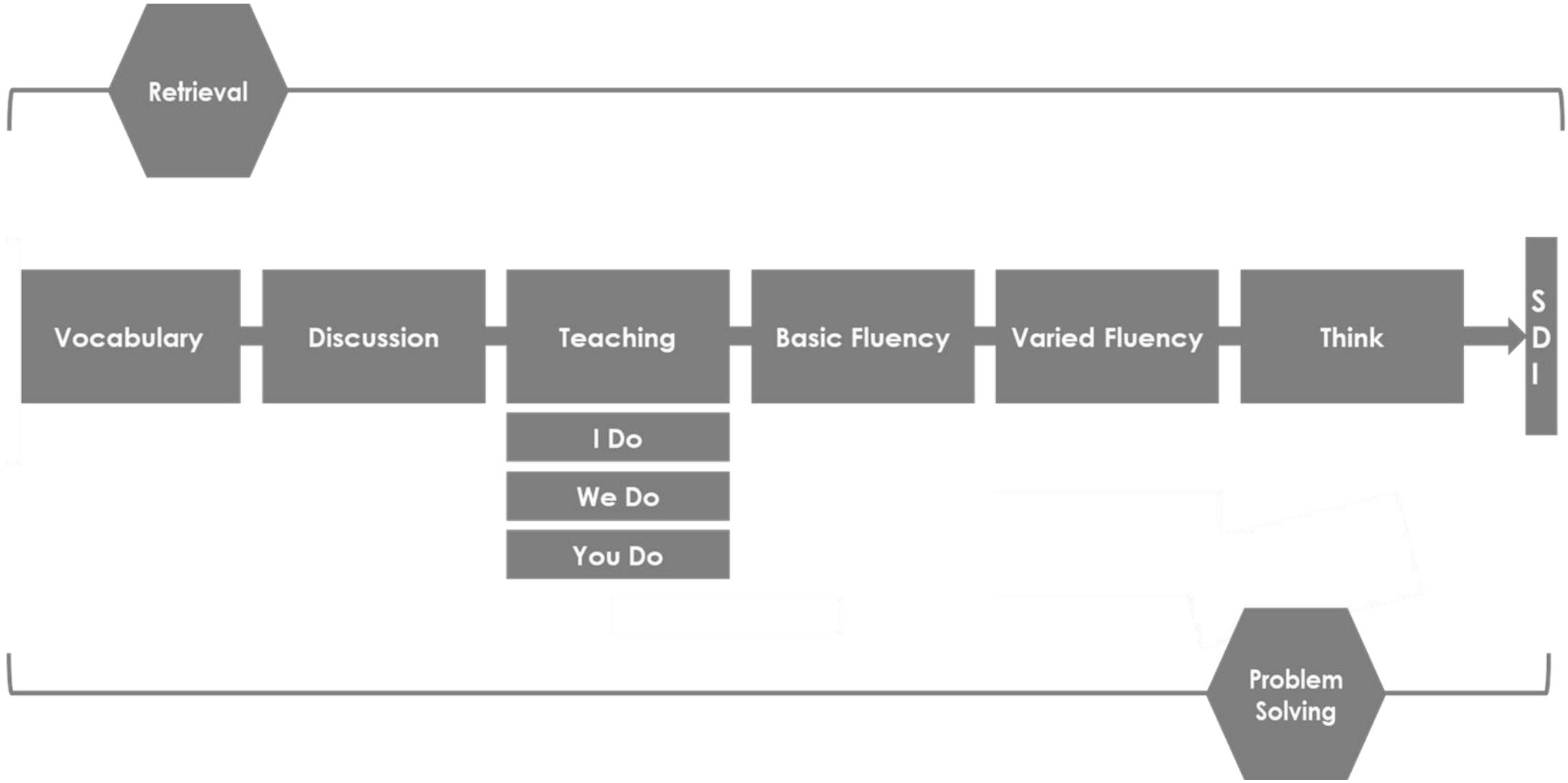
Ambition for ALL | The Most Able

Some children show skill, knowledge or aptitude above that which is typically expected for their subject, for their age. It is important that these children are afforded the opportunity to shine.

Indicators that children may be working above their age related expectations

- **Greater Depth Maths expectations are clearly stated at individual objective level through the Trust exemplification materials and mini assessments tasks.**
- Pupils can demonstrate all elements of Y6 expected outcomes in a range of contexts and types of problems solving (measurement, time, word problems, logic puzzles, finding all possibilities, true/false, finding and describing patterns and sequences)
- Pupils can solve more complex tasks with multiple steps.
- Pupils can solve problems that involve multiple mathematical concepts, for example having to convert between units before being able to solve a problem and then back afterwards.
- Pupils can solve open-ended problems, where there are multiple possibilities.
- Pupils can generalise from findings and create rules/patterns to solve further questions of a similar type, for example pupils may notice that the corners of triangles total 180°, those of quadrilaterals total to 360° and so those with five sides would total a further 180° to make 540°.
- Pupils can solve a problem / answer a question using a range of strategies – not just one.
- Pupils can guide other pupils to age-related expectations by teaching and modelling a concept.
- **It is important to note that while pupils working at a greater depth of understanding should be able to apply their existing knowledge to solve new ones, there is also a place for teaching such pupils the strategies needed to solve more complex problems.**

Our Lesson Delivery Model That Brings It Together



Lingfield Education Trust

EYFS

All of our children can be mathematicians!

Maths in EYFS

Culture… *to make lovers of maths*

Curriculum (as detailed as primary)

Reasoned Introduction… wonderings (valued wonderings)

Direct Instruction (ideally in a circle)

Focused, adult-led Maths play

Purposeful, adult-initiated maths play built around Shrec

Child initiated, free play using the maths

Lots of chances for **fine motor skills** – this is a real barrier for some of our Y1 chn in terms of pencils and manipulating manipulatives!

Dedicated maths area that had chances to revisit the key areas of early maths (matching, sorting, ordering, comparing, patterning, spatial reasoning.

Also lots of maths picture, story books available in said area

Simple shared whiteboard system to note who still needed to experience an area or had a gap to address

We know our target group and WE FIND THEM!

Maths in EYFS

- Direct mathematical teaching
- Play-based consolidation, intervention and stretch in areas

Mathematical Routines

- Register on five frames
- Snacks from 5 frames
- Paying for snacks
- Tidying up through shadowing
- Count in lines

Mathematical Input

- Subitising starter
- Sat in circle
- Direct teaching
- Discussion
- Reasoning
- Choral recital
- No opt out
- Relatively short
- **Teach how to use areas**

- *Master the Curriculum*
- *White Rose / NCETM Mastering Number*

Maths Through Provision (in and out)

Content Linked

- Defined areas
- Engaging, lovely, enticing areas
- Activities directly linked to the input some via adult some independent as you have taught the play
- Vocabulary on boards for adults

- Maths area used for further focus group teaching **while others play <u>maths</u>**

- Tracking of areas

Always Out Maths

- Spatial awareness

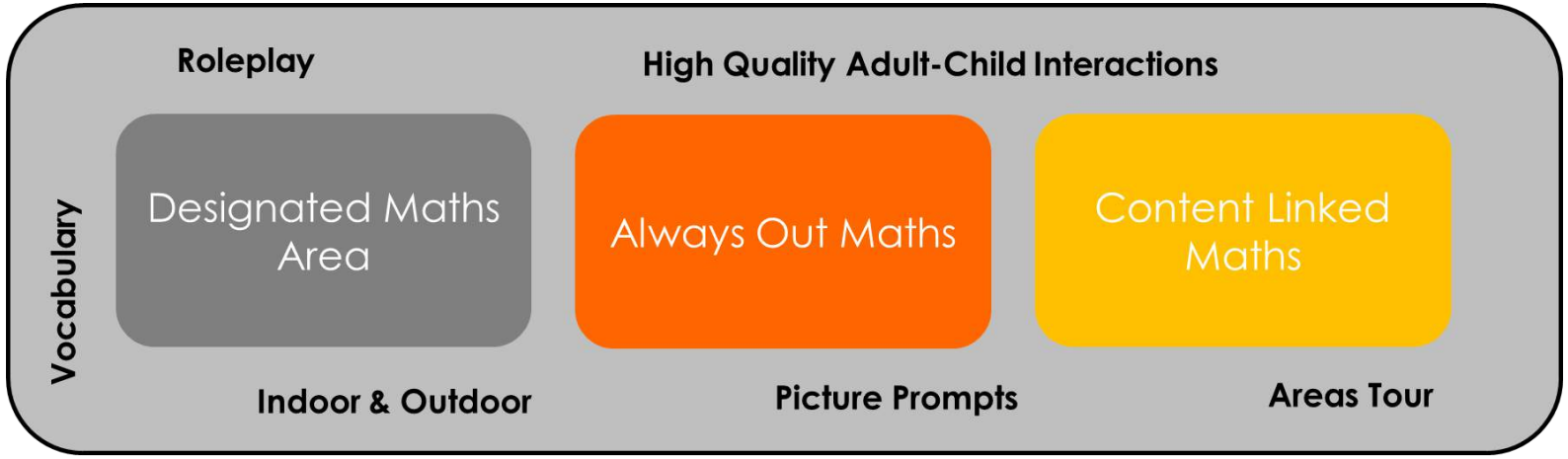
- Sorting
- Matching
- Ordering
- Comparing
- Patterning

- Subitising
- Counting
- Number composition

- Picture prompts

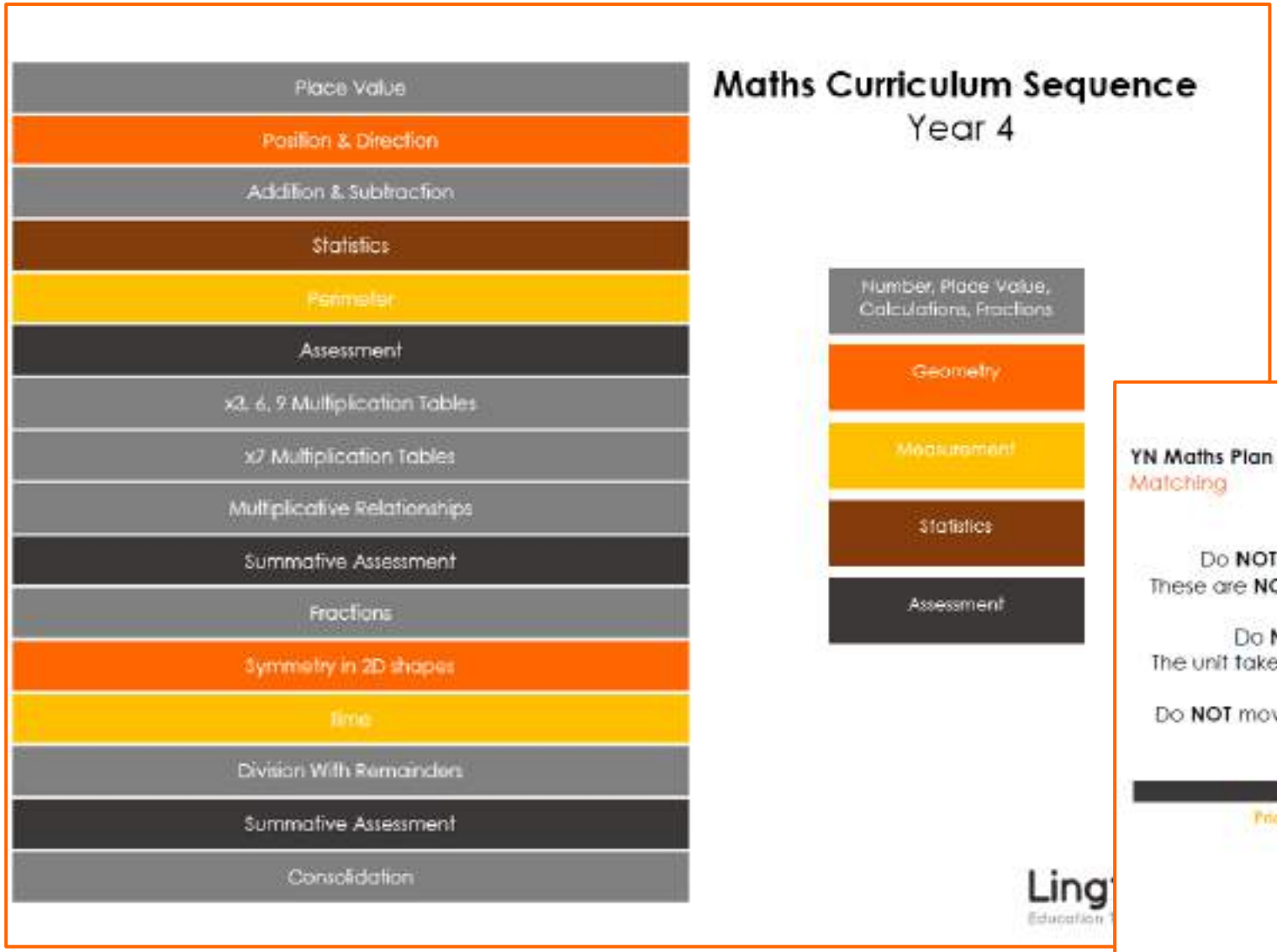
Assessment

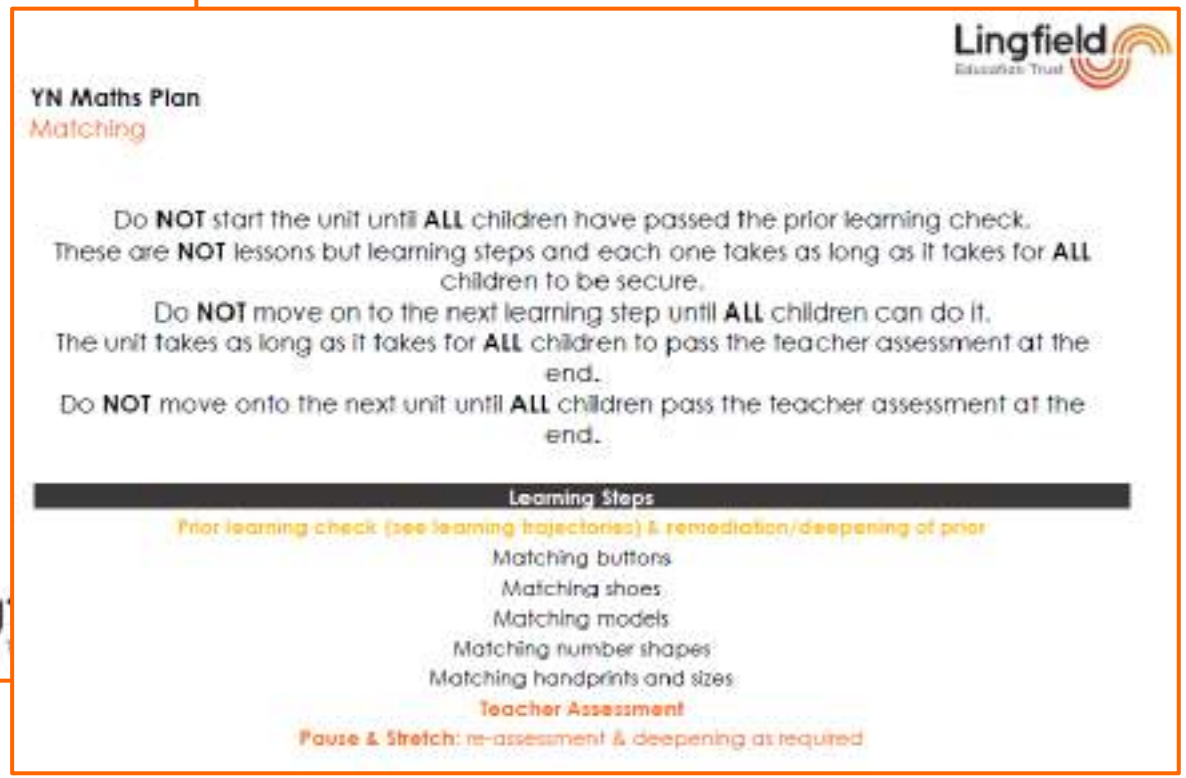
- Shared SDI board
- Areas Tracking
- LET Trust Ready Documents



- Mathematical play based on unit of work
- Patterning and spatial awareness play always provided

Curriculum Detail & Support… *the same as the rets of school!*





Assessment

Mathematics

Early Years Expectations: *Trust Ready - Nursery*

To ensure **all** of our youngest children in EYFS have the best possible start to their maths education, our maths EYFS curriculum meets all of the standards of **LET *trust-ready documentation***.

Educational Programme:

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

"The learning process is something you can incite, literally incite, like a riot."

Audre Lorde

Early Years Expectations: Nursery *Trust Ready*

Mathematics

Lingfield Education Trust

Area of Learning : Mathematics

Summer Term N2 (N2+)

By the end of the Summer term N2 children should be able to…

- Subitise up to three objects (fast recognition without counting)
- Recite numbers past 5 by rote and with visual aid e.g number track with picture to match each numeral
- Count back from 5 to 0 by rote
- Hold fingers up correctly for each number to 5 when counting orally.
- Count on in 1s from any number up to 5 – visual aid and fingers
- Chant rhymes and songs involving numbers to 5 and beyond, e.g., *1,2,3,4,5 once I caught a fish alive*
- Recognise numerals 0-3
- Counting one-to-one correspondence to 3 – how many? (1:1 principle)
- Counting one-to-one correspondence to 3 – give me? (1:1 principle)
- Know that the order in which objects are counted doesn't affect the total e.g left to right or right to left … (order irrelevance principle)
- When counting objects, Say one number for each item in order e.g 1,2,3 … (stable order principle)
- Know that the last number reached when counting a small set tells you how many there are (cardinal principle)
- Know that anything can be counted to 3, for example drum beats, claps, pictures in a book, large objects and tiny… (Abstraction principle)
- Link numerals and amounts to up to 3 by matching objects to the number
- Experience the language of zero meaning nothing through play and every day practical activities, e.g., *there are no oranges left in the bowl*
- Display an understanding of the composition of numbers to 3, practical part whole model
- Practical exposure to quantities, more/fewer, eg, snack time.
- Be able to recognise and name numicon pieces for 1, 2, 3,4 and 5
- Say some common shape names, e.g., circle, square, rectangle, triangle
- Talk about and explore 2D and 3D shapes using informal language – sides, corners, straight, flat, round
- Sort by a given criteria.
- Understands and uses the language of position, e.g., on, inside, next to, under, over, in front, behind through play, for example a doll's house or garage
- Create their own spatial patterns showing some organisation or regularity.
- Make models in the block area and respond to practitioners using the vocabulary can you make it taller? Shorter? Longer?
- In meaningful contexts, find the longer or shorter, heavier or lighter and more/less full of two items
- Recognise and discuss patterns on clothes, in nature and in the environment, e.g., stripes, spots, checks, etc
- Notice and correct an error in a repeating pattern – show AB patterns correct and incorrect
- Recall a sequence of events in everyday life and stories
- Begin to use time words such as now, then.
- Begin to sing days of the week – introduce yesterday and tomorrow

Spring Term N2 (N2=)

By the end of the Spring term N2 children should be able to…

- Recite numbers up to 5 and beyond with support - Adult to model counting at all times in the school day, for example lining up, giving out fruit…
- Begins to point, touch or move each item, saying one number name for each item - 1, 2, 3 (stable order principle) whilst playing
- Begin to recognise numbers which are familiar to themselves.

- Continue work on conceptual subitising, what do you notice? What do you see?
- Chant rhymes and songs involving numbers, e.g., *five speckled frogs*
- Show fingers for numbers to 5 with support whilst counting or singing number songs
- Becoming familiar and aware of (through play) the key mathematical resources, including: numicon, counters, tens frames and cubes
- Compare two small groups of objects, saying when there are the same/different number of objects in each group, e.g., 'You've got two, I've got two. Same!'
- Play with and begin to name some common shapes, e.g., name circle, square
- Respond to both informal and common shape names, e.g., find something pointy, twisty, wiggly, bumpy, heart, star, flower, straight, wavy, bent
- Classify and sort shapes by a given criteria, for example *big circles and small circles*
- Begin to understand and respond to the language of position, e.g., on, inside, next to, under, over, in front, behind - playing with practitioner and following instructions
- Show an awareness of what's happening now and what is happening next through every day activities, getting dressed – first socks then shoes
- Create and extend AB patterns, e.g., stick, leaf, stick… red, blue, red … movement patterns clap, stamp …

Autumn Term N2 (N2-)

By the end of the Autumn Term N2 children should be able to…

- Shows an interest in numbers through games and playful activities
- Begin to say the number names, some of which are in the right order (rote counting)
- Begin to count on their fingers to 3
- Compare amounts saying which has more or the same
- Listen and enjoy number songs and rhymes – join in with some parts e.g finish the line of song, fill in missing parts
- Explore how things look from different viewpoints including things that are near or far away
- Explore differences in size, length, weight and capacity – which one is longest? Heaviest? Full? Empty?
- Predict, move and rotate objects to fit the space or create the shape they would like (inset puzzles and pattern blocks)
- Begin to understand some talk about immediate past and future – before, now and next
- Join in with simple patters in sounds, objects, games, stories, dance and movements, predicting what comes next

N1 (N1+)

By the end of the Summer Term N1 children should be able to…

- Listen to, enjoy and begin to sing counting songs - such as '10 Green Bottles', '1, 2, Buckle My Shoe' and '1, 2, 3, 4, 5, Once I Caught a Fish Alive' – as a means to develop early counting
- Join in with listening to books and stories involving numbers, for example *My Three Book*, and join in with naming numbers in the book
- Talk about numbers around them, for example from door numbers, and begin to know that numbers are part of everyday life
- Say some counting words, engaging in counting-like behaviour, making sounds and pointing or saying some numbers – possibly in sequence
- Begin to learn about shapes by having fun exploring a range of resources including: 2d shapes, 3d shapes and blocks to create their own simple structures and arrangements
- Begin to explore capacity by selecting, filling and emptying containers
- Begin to compare and recognise changes in number of things, using words like more, lots of, same
- Show interest in what happens next using the pattern of everyday routines, including times of the day such as, meal times or home time

Mathematics

Early Years Expectations: ***Trust Ready - Reception***

Educational Programme:

Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

"The learning process is something you can incite, literally incite, like a riot."

Audre Lorde

Early Learning Goal: Mathematics | Number

Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Progression towards the Early Learning Goal	Other areas to consider…
R+ **By the end of the Summer term children should be able to…**	
• Recognise and read numbers to 10 – including when not in order and show that they understand the relationship between them • Display a deep understanding of the composition of numbers up to 10, (e.g. make 10 in different ways and combinations using manipulatives/objects) • Display accurate 1:1 correspondence to 10, using concrete apparatus - then visually • Confidently count to 10 • Match numeral to quantity up to 10 – inc. out of sequence • Subitise to 5 (conceptually and perceptually) • Understand 1 more and 1 less for numbers to 10 • Mentally recall number bonds up to 5 without apparatus and up to 10 (with apparatus if needed) • Calculate addition bonds and subtraction facts to/within 10 using apparatus and/or number track if needed (i.e. by using 2 sets of objects) – link to 1:1 correspondence • Know that addition and subtraction are related (practically through the language of part whole) • Mentally, quickly recall all doubles to 5 (i.e. double 1, 2, 3, 4, 5)	--- • Make sensible estimates within 10 and beyond using subitising if possible or counting to check • Use the vocabulary (link to C&L) of addition and subtraction in practical contexts and in discussion – part, whole, altogether, take away, more than, less than to 10 inc. comparison of quantities • Recognise numerals of personal significance (ie. age, number in family, numerals on clocks, door numbers, etc), • Know which month/day comes before/ after a given month/day • Understand largest, most, smallest, least, fewest and numbers beyond 10–'Order and compare 3 objects according to length, height, mass link to SSM • Form the digits 0-9 accurately • Introduce writing the digits 0 – 9 in squares (Year 1 ready) • Recognise the verbal abbreviation for ordinal numbers and relate this to date of own birthday (e.g. 9th of May), months of year 1st, 2nd- and finishing positions in a race. Link to SSM) • Link ordinal numbers to months/days of week - 1st 2nd (K) …link to SSM • Subitise beyond 5 (conceptually and perceptually) – dots on a dice, numicon piece, ten-frame, pebbles, etc,
R= **By the end of the Spring term children should be able to…**	
• Recognise and read numbers to **8** including when not in order with the aid of a number track, picture clues • Accurately use 1:1 correspondence with concrete and visual resources to 8 • Know that anything can be counted e.g. claps, drum beats… to 8 • Count an irregular arrangement to 8 • Match numeral to quantity to 8	• Make sensible estimates using subitising within estimating number of pebbles, conkers, (link to UtW), etc.) • Begin to use the vocabulary (link to C&L) of addition and subtraction in practical contexts and in discussion – part, whole, altogether, take away, more than, less than to 8 inc. comparison of quantities

- Display a deep understanding of the composition of numbers up to 8 e.g. make 8 in different ways (with concrete aids) (use manipulatives e.g. 10 frames and double sided counters, numicon (including over lapping), unifix, part whole model
- Become more confident with the part whole model for numbers to 8
- Find 1 more and 1 less using numbers to 8 – compare using manipulatives and number tracks (links to 'Number Patterns – compare quantities up to 10)
- Mentally recall addition bonds up to 5 through the language of part whole
- Mentally recall subtraction facts up to 5 through the language of part whole
- Find number bonds up and including 6, 7and 8 (using concrete aids to help)
- Explore that addition and subtraction are related (practically through the language of part whole)
- Subitise (perceptual) to 5- dots on a die, numicon piece, ten-frame, real objects
- Recognise doubles up to 4 (double 1, 2, 3, 4) concrete aid or fingers (within composition)

- Begin to use ordinal numbers first, second … tenth in real life situations (e.g. race results/ days of the month)(K) (SSM)
- Understand largest, smallest & number in-between up to 8 no. track
- Form the digits 0-8 accurately
- Say number sequences within 10 - forwards and backwards eg 4,5,6,?? 7,6,5 ??
- Explore the language of halves e.g. cut the fruit,

R- By the end of the Autumn Term children should be able to…

- Recognise and name numbers 0 to 5 – when not in order
- Counting: 1:1 correspondence to 5 - how many?
- Counting: 1:1 correspondence to 5 – give me?
- Know that anything can be counted (to 5) claps, drum beats…
- Count an irregular arrangement to 5
- Understand that zero means nothing
- Match numeral to quantity to 5 – concrete and visual
- Display a deep understanding of the composition of numbers up to 5 (use manipulatives e.g. 5 frames and double-sided counters, numicon (including over lapping), unifix, part whole model
- Explore the concept of wholes and parts using objects, quantities and numbers within numbers
- Find 1 more and 1 less numbers to 5 – using concrete and number track (not no. line at this point)
- Find number bonds to 2, 3 and 4 (using concrete aids to help)
- Subitise (perceptual) to 4 - dots on a die, numicon piece, ten-frame, real objects
- Recognise doubles 1 and 2 concrete aid or fingers (within composition)

- Begin to understand and use ordinal numbers first, second -- in real life situations (e.g. race results/position in queue)
- Know that a pair means two
- Understand and find pairs of socks, gloves, legs … (practically using the vocabulary same/ different) UtW
- Order and compare sets of numbers and quantities/objects up to 5 (UtW)
- Understand largest and smallest numbers within 5 using practical/visual aids e.g. no. track
- Form the digits 0 to 5 accurately
- Understand and use directional language - forwards, backwards, turn around, on top, underneath, next to. Drip Feed

Early Learning Goal: Mathematics | Numerical Patterns

Children at the expected level of development will:

- Be able to verbally count beyond 20, recognising the patterns of the counting system
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than, or the same as the other quantity
- Explore and represent patterns within numbers up to 10, including odd and even numbers, double facts and how quantities can be distributed equally

Progression towards the Early Learning Goal	Other areas to consider…
R+ By the end of the Summer term children should be able to…	
• Count by rote from 0 forwards to 20 and beyond • Count by rote forwards in 1s from any number to 20 and beyond • Compare and order a variety of quantities up to 10, recognising greater than, less than and the same as in practical context (inc. quantities) • Understand and use the vocabulary more, most, fewer, less than and equals, the same as with quantities up to 10 • Instant recognition of odd and even numbers to 10 represented by structures e.g. dots, even numbers always have a partner/pairs (made visible) • Automatic recall of doubles to 5 (double 1,2,3,4 & 5)	• Count to/back in 1s from 20 – count people onto/off a queue/add/take away single objects • Pronounce teen numbers correctly – sixteen not sixty **SSM** • Chant the months of the year by heart • Begin to link ordinal numbers to each month • Know which day and month comes before/ after a given day and month • Name the four seasons • Becoming aware of the analogue clock counting around the clock to 12 and recognise and read o'clock times • Becoming aware of the language associated with time (long hand, short hand, hour, minutes, clock, watch) • Compose and decompose shapes. children recognise a shape can have other shapes within it, just as numbers can • Classify and sort objects according to a criteria and begin to sort objects using own criteria • Continue given repeating patterns (sound, colour, shape, objects) • Create own repeating patterns. • Order and compare 3 objects according to length, mass, capacity • Understand and use the vocabulary longer, taller, wider, shorter, narrower, heavier, lighter, deep, shallow. • Recognise and calculate using coins – 1p, 2p, 5p, 10p, 20p
R= By the end of the Spring term children should be able to…	
• Count in 1s forwards to 20 – visual aid • Count forwards in 1s from any number (to 20) – visual aid • Count back in 1s from 20– visual aid • Say the number before and after to 10 - visual aid • Compare a variety of quantities up to 5 recognising more/greater than, fewer/less than and the same as • Understand and use the vocabulary more, most, greater than, fewer, less than and equals, the same as with quantities up to 5 • Explore odd and even numbers to 8 (represented by structures) recognising and discussing the patterns e.g. odd numbers	• Instant recall +1 -1 numbers to 20 – visual aid • Pronounce numbers correctly with support – copy me **SSM** • Chant the days of the week • Know there are 7 days in a week • Know which day comes before/ after a given day • Know which days are the weekend • Know what day it is today, yesterday, tomorrow • Chant the months of the year with support • Know which month your birthday is in

there's always one left out and even numbers always have a partner
- Explore that addition and subtraction are related (practically through the language of part whole)
- Doubles to 5 concrete aid or fingers.

- Understand general time of day and chronology of day in school and at home (develop vocab: *morning, lunch, tea, home time, bed etc*)
- Understand position through words – e.g. "The bag is under the table," – with no pointing (under, on top, next to, behind, in front)
- Name and describe common solid shapes cube, cuboid, Use the language solid, face, edges
- Sort objects using two criteria e.g. Sort solid shapes straight edges, curved edges
- Find something bigger than, smaller than, taller than, shorter than, heavier, lighter, deeper.
- Find something the same size, equal to (length, weight, capacity)
- Continue a simple repeating pattern e.g. red, blue, red … apple, banana, apple …
- Notice and correct an error in a repeating pattern
- Talk about money using the terms, pennies, pence, change, amount
- Read price tags in role play shop up 1p, 2p, 5p,10p

R- By the end of the Autumn Term children should be able to…

- Count by rote forwards and backwards to 10 – visual aid
- Hold fingers up correctly for each number to 10
- Count on and back in 1s from *any number* to 10 – visual aid and fingers
- Know by heart the number before and after numbers to 5
- Chant rhymes involving numbers e.g. 1,2 buckle my shoe…

SSM

- Chant the days of the week with support.
- Begin to know what day it is today.
- Begin to know what day it is tomorrow.
- Sort objects using a given criteria e.g. big, small, heavy, light.
- Name and describe common flat shapes circle, square, rectangle, triangle.
- Use the language flat, sides and corners.
- Classify and sort objects into sets according to given criteria, areas in classroom with labels, block area, pencils into colours, buttons e.g. colour, shape, holes in centre,
- Copy a given pattern (sound, colour, shape, objects -)e.g. clap, clap, click… red, blue, red … apple, grape, orange… square, triangle, square …
- Use templates/ stencils as patterns to produce an identical image e.g. draw around stencils and templates.
- Copy given pictures/patterns from resources (both natural and manmade e.g. conkers, twigs, leaves, inset shape patterns, block area make a model from given picture.
- Understand position through words and real scenarios, pictures – for example, "The bag is under the table," (under, on top, next to, behind, in front)
- Discuss simple routes – forwards, backwards, turn, corner.
- Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then.
- Pay for items in role play shop using pennies.
- Know that coins are collectively called money and we spend them.

Lingfield Education Trust

CPD

All of our children can be mathematicians!

We apply the mastery approach to our staff CPD to model ensure all teachers are as skilled as possible to teach maths. All staff means SLT, teachers and support staff!

Maths Lead CPD	Teacher CPD	Teaching Assistant CPD
LET Maths Network	Monitoring & Assessment Evidence Drives CPD	LET TA Network
NCETM Maths Hub	Whole-School	NCETM Maths Hub
TfC Sunderland	Individual	
National CPD Lead Visits	LET Maths Network	
	NCETM Maths Hub	

Lingfield Education Trust

NC Coverage

All of our children can be mathematicians!

National Curriculum Coverage: Year 1

	National Curriculum Objective	Year	Unit
PV	count to and across 100, forwards and backwards	1	6
PV	count, read and write numbers to 100 in numerals;	1	1/5/8
PV	count in multiples of 2s, 5s and 10s	1	9
PV	given a number, identify 1 more and 1 less	1	1/5
PV	identify and represent numbers using objects and pictorial representations	1	1/5
PV	read and write numbers from 1 to 20 in numerals and words	1	1/5
AS	read, write and interpret mathematical statements	1	2/6
AS	represent and use number bonds and related subtraction facts within 20	1	2/6
AS	add and subtract one-digit and two-digit numbers to 20, including 0	1	2/6
AS	solve one-step problems that involve addition and subtraction	1	2/6
MD	solve one-step problems involving multiplication and division	1	9
FDP	recognise, find and name a half as 1 of 2 equal parts	2	10
FDP	recognise, find and name a quarter as 1 of 4 equal	2	10
MEA	compare & describe measures	1	5
MEA	measure and record	1	5
MEA	recognise and use language relating to dates	1	10
MEA	tell the time to the hour and half past the hour	1/2	10/11
GEO	recognise and name common 2-D and 3-D shapes	1	4
GEO	describe position, direction and movement, including whole, half, quarter and three-quarter turns	2	8

National Curriculum Coverage: Year 2

	National Curriculum Objective	Year	Unit
PV	count in steps of 2, 3, and 5 from 0, and in 10s from any number, forward & back	2	1
PV	recognise the place value of each digit in a two-digit number (10s, 1s)	2	1
PV	identify, represent and estimate numbers	2	1
PV	compare and order numbers from 0 up to 100; use <, > and = signs	2	1
PV	read and write numbers to at least 100 in numerals and in words	2	1
PV	use place value and number facts to solve problems	2	1
AS	solve problems with addition and subtraction	2	2
AS	recall and use addition and subtraction facts to 20 fluently	2	2
AS	add and subtract numbers using concrete objects, pictorial reps &mentally	2	2
AS	show that addition of 2 numbers can be done in any order and subtraction of 1	2	2
AS	recognise and use the inverse relationship between addition and subtraction	2	2
MD	recall and use multiplication and division facts for the 2, 5 and 10 multiplications	2	6
MD	calculate mathematical statements for multiplication and division	2	6
MD	show that multiplication of 2 numbers can be done in any order	2	6
MD	solve problems involving multiplication and division	2	6
FDP	recognise, find, name and write fractions 1/3, 1/4 , 2/4 and 3/4 of a length, shape,	2	10
FDP	write simple fractions, for example 1/2 of 6 = 3 and rec the equiv of 2/4 and 1/2	2	10
MEA	choose and use appropriate standard units to estimate and measure	2	12
MEA	compare &order lengths, mass, volume/cap and record the results using >, < and =	2	12
MEA	recognise & use symbols for pounds (£) and pence (p); combine amounts	2	12
MEA	find different combinations of coins that equal the same amounts of money	2	12
MEA	solve simple problems in a practical context involving addition and subtraction	2	12
MEA	compare and sequence intervals of time	2	12
MEA	tell and write the time to five minutes, including quarter past/to the hour	2	12
MEA	know the number of minutes in an hour and the number of hours in a day	2	12
GEO	identify and describe the properties of 2-D shapes	2	8
GEO	identify and describe the properties of 3-D shapes	2	8
GEO	identify 2-D shapes on the surface of 3-D shapes	2	8
GEO	compare and sort common 2-D and 3-D shapes and everyday objects	2	8
GEO	order & arrange combinations of mathematical objects in patterns and sequences	2	8
GEO	use mathematical vocabulary to describe position, direction and movement	2	8
STA	interpret and construct simple pictograms, tally charts, block diagrams and table	2	4
STA	ask and answer simple questions by counting the number of objects	2	4
STA	ask-and-answer questions about totaling and comparing categorical data	2	4

National Curriculum Coverage: Year 3

	National Curriculum Objective	Year	Unit
PV	count from 0 in multiples of 4, 8, 50 and 100; find 10/100 more or less than a number	3	1
PV	recognise the place value of each digit in a 3-digit number (100s, 10s, 1s)	3	1
PV	compare and order numbers up to 1,000	3	1
PV	identify, represent and estimate numbers using different representations	3	1
PV	read and write numbers up to 1,000 in numerals and in words	3	1
PV	solve number problems and practical problems involving these ideas	3	1
AS	add and subtract numbers mentally	3	2
AS	add and subtract numbers with up to 3 digits	3	2
AS	estimate the answer to a calculation and use inverse operations to check answers	3	2
AS	solve problems, including missing number problems	3	2
MD	recall and use multiplication and division facts for the 3, 4 and 8 tables	3	7
MD	write and calculate mathematical statements for multiplication and division	3	7
MD	solve problems, including missing number involving multiplication & division	3	7
FDP	count up/down in tenths; recognise that tenths arise from dividing an object by 10	5	8
FDP	recognise, find and write fractions of a discrete set of objects	3	9
FDP	recognise & use fractions as numbers: unit fractions & non-unit fract with small den	3	9
FDP	recognise and show, using diagrams, equivalent fractions with small denominators	5	11
FDP	add and subtract fractions with the same denominator within one whole	3	9
FDP	compare and order unit fractions, and fractions with the same denominators	3	9
FDP	solve problems that involve all of the above	3/5	Both
MEA	measure, compare, add/subtract: lengths (m/cm/mm); mass (kg/g); vol/capacity	3	1
MEA	measure the perimeter of simple 2-D shapes	4	5
MEA	add and subtract amounts of money to give change	3	2
MEA	tell and write the time from an analogue clock,	3	11
MEA	estimate and read time with increasing accuracy	3	11
MEA	know the number of seconds in a minute and the number of days in each month	3	11
MEA	compare durations of events	3	11
GEO	draw 2-D shapes and make 3-D shapes using modelling materials	3	10
GEO	recognise angles as a property of shape or a description of a turn	3	6
GEO	identify right angles, recognise that 2 right angles etc	3	6
GEO	identify horizontal and vertical lines and pairs of perpendicular and parallel lines	3	10
GEO	identify lines of symmetry in 2-D shapes presented in different orientations	4	11
GEO	compare and classify geometric shapes	3	10
STA	interpret and present data using bar charts, pictograms and tables	3	3
STA	solve one-step and two-step questions	3	3

National Curriculum Coverage: Year 4

	National Curriculum Objective	Year	Unit
PV	count in multiples of 6, 7, 9, 25 and 1,000	4	1
PV	find 1,000 more or less than a given number	4	1
PV	count backwards through 0 to include negative numbers	5	2
PV	recognise the place value of each digit in a four-digit number	4	1
PV	order and compare numbers beyond 1,000	4	1
PV	identify, represent and estimate numbers using different representations	4	1
PV	round any number to the nearest 10, 100 or 1,000	4	1
PV	solve number and practical problems that involve all of the above	4/5	All
PV	read Roman numerals to 100 (I to C)	6	11
AS	add and subtract numbers with up to 4 digits using the formal written	4	3
AS	estimate and use inverse operations to check answers to a calculation	4	3
AS	solve addition and subtraction two-step problems in contexts	4	3
MD	recall multiplication and division facts for multiplication tables up to 12 × 12	4	7
MD	use place value, known and derived facts to multiply and divide mentally	4	7
MD	recognise and use factor pairs and commutativity in mental calculations	4	7
MD	multiply two-digit and three-digit numbers by a one-digit number	5	5
MD	solve problems involving multiplying and adding	4	7
FDP	recognise and show, using diagrams, families of common equivalent fractions	5	8
FDP	count up and down in hundredths	5	8
FDP	solve problems involving increasingly harder fractions	5	11
FDP	add and subtract fractions with the same denominator	4	10
FDP	recognise and write decimal equivalents of any number of tenths or hundreds	5	8
FDP	recognise and write decimal equivalents to 1/4, 1/2 , 3/4	5	8
FDP	find the effect of dividing a one- or two-digit number by 10 and 100	4	8
FDP	round decimals with 1 decimal place to the nearest whole number	5	8
FDP	compare numbers with the same number of decimal places up to 2 DP	5	8
FDP	solve simple measure & money problems involving fractions & decimals to 2 DP	5	8
FDP	solve problems that involve all of the above	4/5	All
MEA	convert between different units of measure	5	8
MEA	measure and calculate the perimeter of a rectilinear figure	4	5
MEA	find the area of rectilinear shapes by counting squares	5	7
MEA	estimate, compare and calculate different measures	5	8
MEA	read, write and convert time between analogue and digital 12- and 24-hour clocks	4	12
MEA	solve problems involving converting units of time	4	12
GEO	describe positions on a 2-D grid as coordinates in the first quadrant	4	2
GEO	describe movements between positions as translations	4	2
GEO	plot specified points and draw sides to complete a given polygon	4	2
GEO	complete a simple symmetric figure with respect to a specific line of symmetry	4	11
GEO	identify acute and obtuse angles and compare and order angles	5	12
GEO	identify lines of symmetry in 2-D shapes presented in different orientations	4	11
GEO	compare and classify geometric shapes	4	11
STA	interpret and present discrete and continuous data	4	4
STA	solve comparison, sum and difference problems	4	4

National Curriculum Coverage: Year 5

	National Curriculum Objective	Year	Unit
PV	read, write, order, compare numbers to 1,000,000	5	1
PV	count forwards or backwards in steps of powers of 10 to 1,000,000	5	1
PV	interpret negative numbers in context	5	2
PV	round any number up to 1,000,000 to the nearest 10, 100, 1,000, 10,000 and 100,000	5	1
PV	read Roman numerals to 1,000 (M) and recognise years written in Roman numerals	6	11
AS	add and subtract whole numbers with more than 4 digits	5	4
AS	add and subtract numbers mentally with increasingly large numbers	5	4
AS	use rounding to check answers to calculations and determine	5	4
AS	solve addition and subtraction multi-step problems in contexts	5	4
MD	identify multiples and factors, including common factors of 2 numbers	5	10
MD	know and use the vocabulary of prime numbers	5	10
MD	recognise and use factor pairs and commutativity in mental calculations	5	10
MD	establish whether a number up to 100 is prime and recall prime numbers up to 19	5	10
MD	multiply numbers up to 4 digits by a one- or two-digit number	5	5
MD	multiply and divide numbers mentally, drawing upon known facts	5	5
MD	divide numbers up to 4 digits by a one-digit number	5	5
MD	multiply &divide whole numbers and those involving decimals by 10, 100 and 1,000	5	8
MD	recognise and use square numbers and cube numbers	5	10
MD	solve problems involving multiplication and division	5	5
MD	solve problems involving addition, subtraction, multiplication and division	5	5
MD	solve problems involving multiplication and division	5	5
FDP	compare & order fractions whose denominators are multiples of the same number	5	11
FDP	identify, name and write equivalent fractions of a given fraction	5	11
FDP	recognise mixed numbers and improper fractions and convert from one form	5	11
FDP	add & subtract fractions with the same denominator, & multiples of same number	5	11
FDP	multiply proper fractions and mixed numbers by whole numbers	5	11
FDP	read and write decimal numbers as fractions	5	8
FDP	recog & use thousandths & relate them to tenths, hundredths and dec equivalents	5	8
FDP	round decimals with 2 DP to the nearest whole number and to 1 decimal place	5	8
FDP	read, write, order and compare numbers with up to 3 decimal places	5	8
FDP	solve problems involving number up to 3 decimal places	5	8
FDP	solve problems which require knowing percentage and decimal equivalents	6	7
FDP	recognise the per cent symbol (%)	6	7
MEA	convert between different units of metric measure	5	7
MEA	understand equivalences between metric units and common imperial units	6	8
MEA	measure and calculate the perimeter of composite rectilinear shapes	4	5
MEA	calculate and compare the area of rectangles	5	7
MEA	estimate volume	5	10
MEA	solve problems involving converting between units of time	4	12
GEO	identify, describe & represent the position of a shape following a reflection /transla	5	3
GEO	identify 3-D shapes, including cubes and other cuboids, from 2-D representations	6	10
GEO	know angles are measured in degrees: estimate & compare acute, obtuse & reflex	5	12
GEO	draw given angles, and measure them in degrees	5	12
GEO	identify acute & obtuse angles & compare & order up to 2 right angles by size	5	12
GEO	Calculate missing angles	5	12
STA	solve comparison, sum & difference problems using info presented in a line graph	6	4
STA	complete, read and interpret information in tables, including timetables	6	4

National Curriculum Coverage: Year 6

	National Curriculum Objective	Year	Unit
PV	read, write, order and compare numbers up to 10,000,000	6	1
PV	round any whole number to a required degree of accuracy	6	1
PV	use negative numbers in context, and calculate intervals across 0	6	1
PV	solve number and practical problems that involve all of the above	6	1
AS	add and subtract whole numbers with more than 4 digits	6	3
AS	add and subtract numbers mentally with increasingly large numbers	6	3
AS	use rounding to check answers to calculations	6	3
AS	solve addition and subtraction multi-step problems in contexts	6	3
MD	identify multiples and factors, including finding all factor pairs and common factors	6	7
MD	Know/use the vocabulary of prime numbers, prime factors and composite numbers	5	10
MD	recognise and use factor pairs and commutativity in mental calculations	5	10
MD	establish whether a number up to 100 is prime and recall prime numbers up to 19	5	10
MD	multiply numbers up to 4 digits by a one- or two-digit number formal written method	6	5/6
MD	multiply and divide numbers mentally, drawing upon known facts	5	10
MD	divide numbers up to 4 digits by a one-digit number using short division	5	10
MD	multiply and divide whole numbers and decimals by 10, 100 and 1,000	5	10
MD	recognise and use square numbers and cube numbers	5	10
MD	solve problems involving mul/div, including factors, multiples, squares and cubes	5	10
MD	solve problems involving addition, subtraction, multiplication and division	6	5/6
MD	solve problems involving multiplication and division	6	5/6
FDP	simplify fractions; fractions in the same denomination	6	7
FDP	compare and order fractions, including fractions >1	6	7
FDP	add and subtract fractions with different denominators and mixed numbers	6	7
FDP	multiply simple pairs of proper fractions, writing the answer in its simplest form	5	11
FDP	divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 1/6	5	11
FDP	associate a fraction with division and calculate decimal fraction equivalents	6	7
FDP	identify the value of each digit in numbers given to 3 decimal places	5	8
FDP	multiply one-digit numbers with up to 2 decimal places by whole numbers	5	8
FDP	use written division methods in cases where the answer has up to 2 decimal places	5	8
FDP	solve problems which require answers to be rounded	6	7
FDP	recall and use equivalences between simple fractions, decimals and percentages,	6	7
ALG	use simple formulae	6	9
ALG	generate and describe linear number sequences	6	9
ALG	express missing number problems algebraically	6	9
ALG	find pairs of numbers that satisfy an equation with 2 unknowns	6	9
ALG	enumerate possibilities of combinations of 2 variables	6	9
RAT	solve problems involving the relative sizes of 2 quantities	6	8
RAT	solve problems involving the calculation of percentages	6	8
RAT	solve problems involving scale factors	6	8
RAT	solve problems involving unequal sharing and grouping	6	8
MEA	solve problems involving the calculation and conversion of units of measure	6	5/6
MEA	use, read, write and convert between standard units, converting measurements	6	5/6
MEA	convert between miles and kilometres	6	8
MEA	recognise that shapes with the same areas can have different perimeters	6	10
MEA	recognise when it is possible to use formulae for area and volume of shapes	6	10
MEA	calculate the area of parallelograms and triangles	6	10
MEA	calculate, estimate and compare volume of cubes and cuboids	6	10
GEO	describe positions on the full coordinate grid (all 4 quadrants)	6	2
GEO	draw and translate simple shapes on the coordinate plane, and reflect	6	2
GEO	draw 2-D shapes using given dimensions and angles	6	2
GEO	recognise, describe and build simple 3-D shapes, including making nets	6	2
GEO	compare and classify geometric shapes	6	2
GEO	recognise angles at a point, straight line, vertically opposite, and find missing angles	5	12
GEO	illustrate and name parts of circles, including radius, diameter and circumference	5	4
STA	interpret and construct pie charts and line graphs and use these to solve problems	6	4
STA	calculate and interpret the mean as an average	6	4