Policy

Maths at Strike Lane

Contents

- Aims and Objectives
- Adaptive Teaching
- Maths Planning
  - Schemes of Learning
  - Year Group Overviews
  - Small Steps
  - Calculation Policy
  - Termly Assessments
- Times Table Daily Initiative

Aims and Objectives

Maths at Strike Lane

Aims and Objectives of the Maths Curriculum at Strike Lane

- All children will become fluent in the fundamentals of mathematics, including through varied and frequent practise with complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems.
- All children will have the ability to reason mathematically following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- All children will have opportunities to solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.
- Our children will demonstrate an improved mathematical mindset.
- All children have access to a well planned and sequenced Maths curriculum.
- All children who may have special educational needs and/or additional needs are identified and provided for as early as possible.
- There is a focus on developing rich vocabulary, including the appropriate use of subject specific, technical and mathematical language.
- We establish high expectations for teachers and pupils.
- We promote continuity and coherence across the school.

Teaching and Learning

- We aim to develop the content of The Primary National Curriculum, enabling all children to achieve the highest standards possible in mathematics and benefit from a broad, rich and personalised curriculum.
- The acquisition of basic mathematical skills is vital to the life opportunities and achievement of our children.
- In all classes, children have a wide range of mathematical abilities. We recognise this fact and provide suitable learning opportunities for all children by matching teaching and learning to the ability of the child.
- We build on what the children know and adapt teaching and learning accordingly. We introduce new learning in small steps, build on prior knowledge and space practice to avoid cognitive overload and support the transfer of learning to long-term memory.
- We ensure that concepts are taught with the aid of practical, concrete resources. Multiple representations are used in order to develop conceptual understanding.
- We recognise the impact classroom assistants have and understand how they can support children to develop their mathematical understanding (TA_Recommendations_Summary.pdf (d2tic4wvo1iusb.cloudfront.net)).
- Learning environments develop a mathematical and a growth mindset which foster resilience, perseverance, independence, confidence and resourcefulness.

Maths at Strike Lane

Coherence

Connecting new ideas to concepts that have already been understood, and ensuring that, once understood and mastered, new ideas are used again in next steps of learning,

What might this look like in practice?

- Teacher explicitly links new learning to prior learning – often at the beginning and the end of the lesson
- The learning is broken into small, carefully sequenced steps
- Each lesson focuses on one point, in depth so that learning is sustainable.

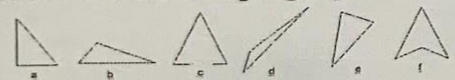
Variation

The central idea of teaching with variation is to highlight the essential features of a concept or idea through varying the non-essential features.

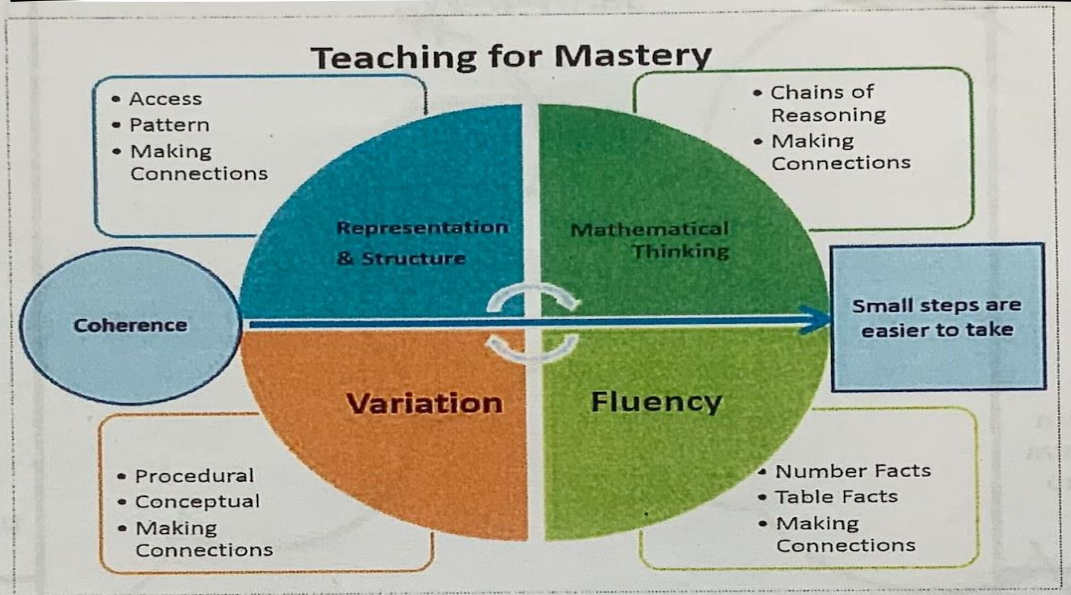
When giving examples of a concept, it is useful to add variation to emphasise:

- What it is (as varied as possible);
- What it is not.

When constructing a set of activities / questions it is important to consider what connects the examples; what mathematical structures are being highlighted?



To get a sense of what a triangle is learners need to see examples of triangles which show all aspects being varied (length of sides, angles, orientation). If most triangles are shown with one side as a horizontal base and the vertex pointing upwards (as in a, b and c), this feature might be over-generalised and pupils might think that d or e are not triangles. It is also important to give non-examples, as in f and to discuss why this is not a triangle.



Fluency

Fluency demands more of learners than memorisation of a single procedure or collection of facts. It encompasses a mixture of efficiency, accuracy and flexibility.

Quick and efficient recall of facts and procedures is important in order for learners' to keep track of problems, think strategically and solve problems.

Fluency also demands the flexibility to move between different contexts and representations of mathematics, to recognise relationships and make connections and to make appropriate choices from a whole toolkit of methods, strategies and approaches.

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

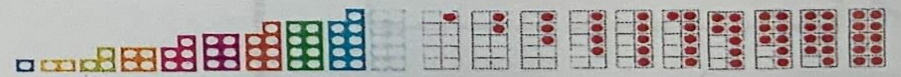
What might this look like in practice?

- Adults ask questions that require children to reason, 'What is the same? What is different?'
- Adults ask pupils to explain, convince, draw diagrams or use manipulatives to illustrate an idea or strategy, reason and conjecture as a natural part of all activity in the mathematics classroom. This further supports deep and sustainable learning.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

Here are two representations for numbers within 10; the tens frame and Numicon:



Both are very helpful concrete and pictorial representations of number but they are representing different structures. The tens frame is drawing attention to the '5 and a bit' structure of numbers, whereas Numicon draws attention to the odd/even structure. Both images support seeing the complement to 10. The two images of 6, for example give different (equally important) ways of thinking about the structure of 6 which in turn influence that ways the children might transform, compare and combine numbers when calculating.

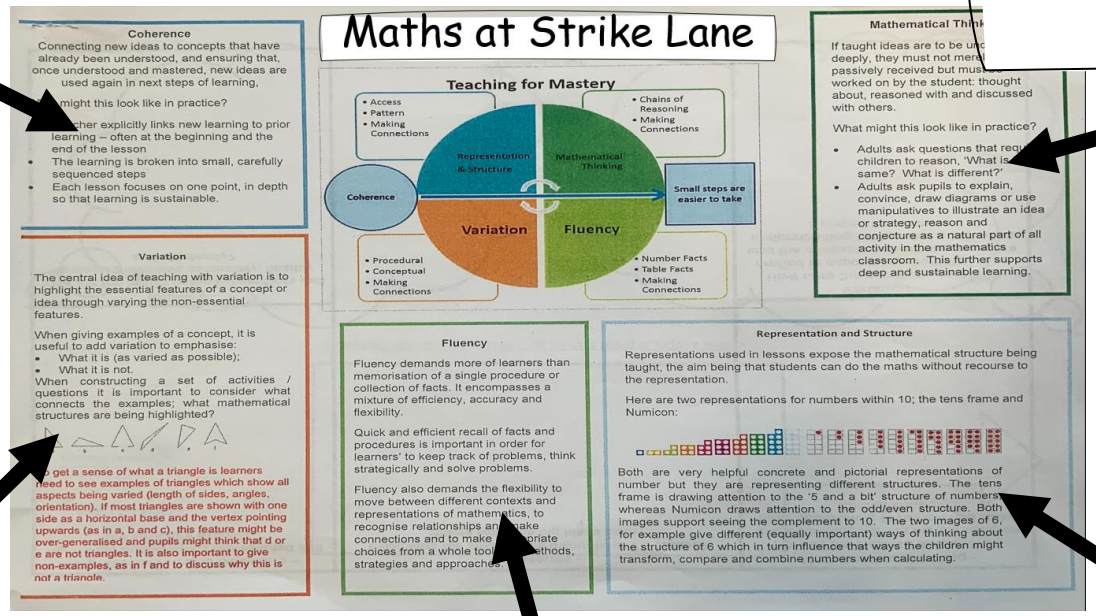
Coherence

Building on prior learning and making the connections between what the children know and what they are learning now.

Mathematical Thinking

Ideas must be thought about and reasoned with and discussed with others.

Explain, prove, what is the same, what is different, reason, etc…



Variation

Changing and adapting the non-essential features in order to highlight the essential features in a concept.

You are keeping children on the edge of their seat by not allowing them to become comfortable.

A subtle change or tweak that encourages depth of understanding.

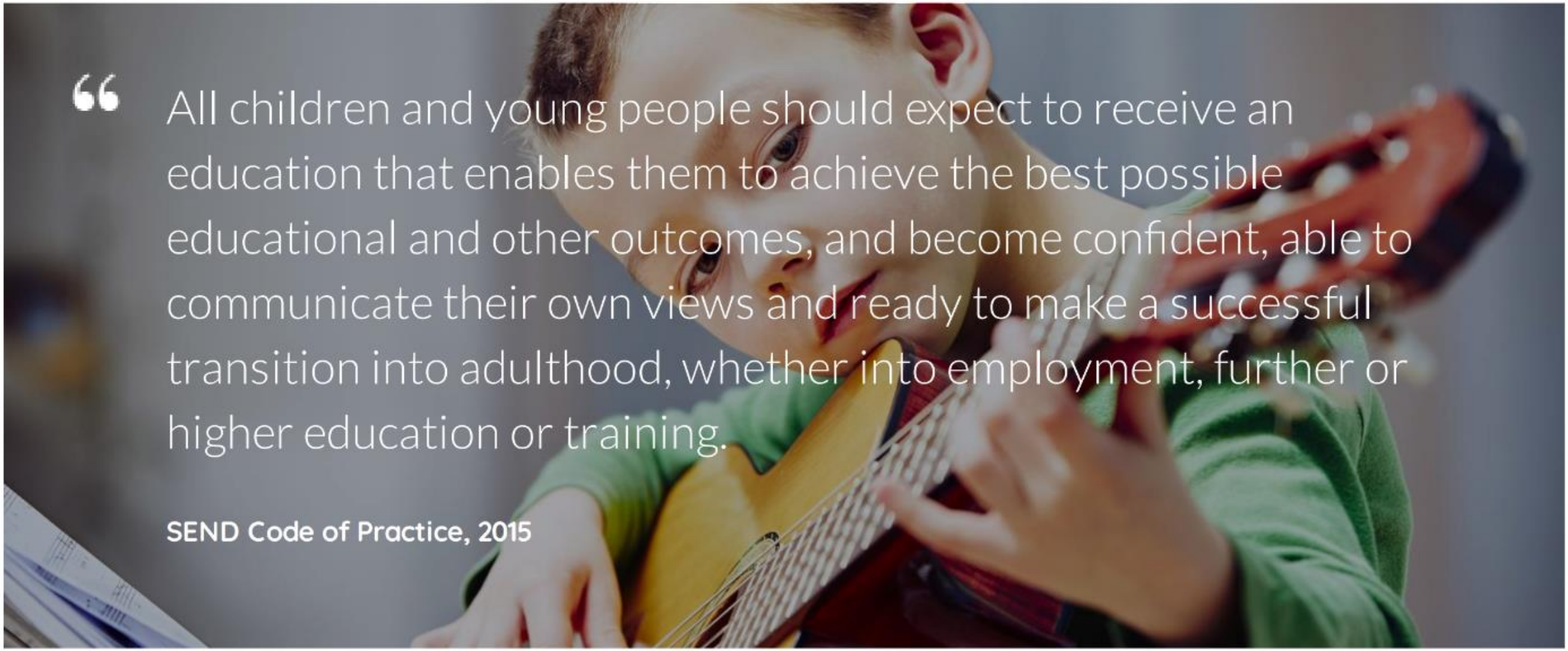
Fluency

Efficiency, accuracy and flexibility.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught.

Adaptive Teaching



SEND_Code_of_Practice_January_2015.pdf (publishing.service.gov.uk)

What is Adaptive Teaching?

At Strike Lane we adapt our teaching to support all children in accessing our school curriculum in order for them to become confident mathematicians.

Adaptive teaching is a term used in the Early Career Framework to describe a teaching approach that is responsive to information about learning, and adjusts teaching to better match pupil need.

According to the Early Careers Framework standard 5, adaptive teaching is an essential part of teaching, and seeks to understand pupils' differences, including their different levels of prior knowledge and potential barriers to learning.

Adaptive teaching is also described by Education Southwest as 'being responsive to information about learning, then adjusting teaching to better match pupil need', breaking it down into a 4-step process:

1. Anticipate barriers

2. Plan to address them

3. Use assessment to elicit evidence of learning

4. Make in-the-moment adaptations

EEF_Special_Educational_Needs_in_Mainstream_Schools_Guidance_Report.pdf (d2tic4wvo1iusb.cloudfront.net)

Early Career Framework (publishing.service.gov.uk)

Understanding Adaptive Teaching v11 (d2tic4wvo1iusb.cloudfront.net)

Understanding Adaptive Teaching

The Early Career Framework provides a helpful explanation of why Adaptive Teaching matters:

- *Pupils are likely to learn at different rates and to require different levels and types of support from teachers to succeed.*
- *Seeking to understand pupils' differences, including their different levels of prior knowledge and potential barriers to learning, is an essential part of teaching.*
- *Adapting teaching in a responsive way, including by providing targeted support to pupils who are struggling, is likely to increase pupil success.*

As far as possible, make curriculum do the work of determining learning objectives, assessment methods and likely barriers. A well-planned curriculum will reduce the teacher's need to make in-the-moment adaptations. When additional adaptations are necessary, note that the strategies below are illustrative, not exhaustive, and that adaptations will need considering from a subject-specific point of view.

For an overview of strategies which research evidence suggests can have a positive impact across phases and for all pupil groups, including those with SEND, see the EEF's '5-a-day' approach:

https://bit.ly/EEF5aday

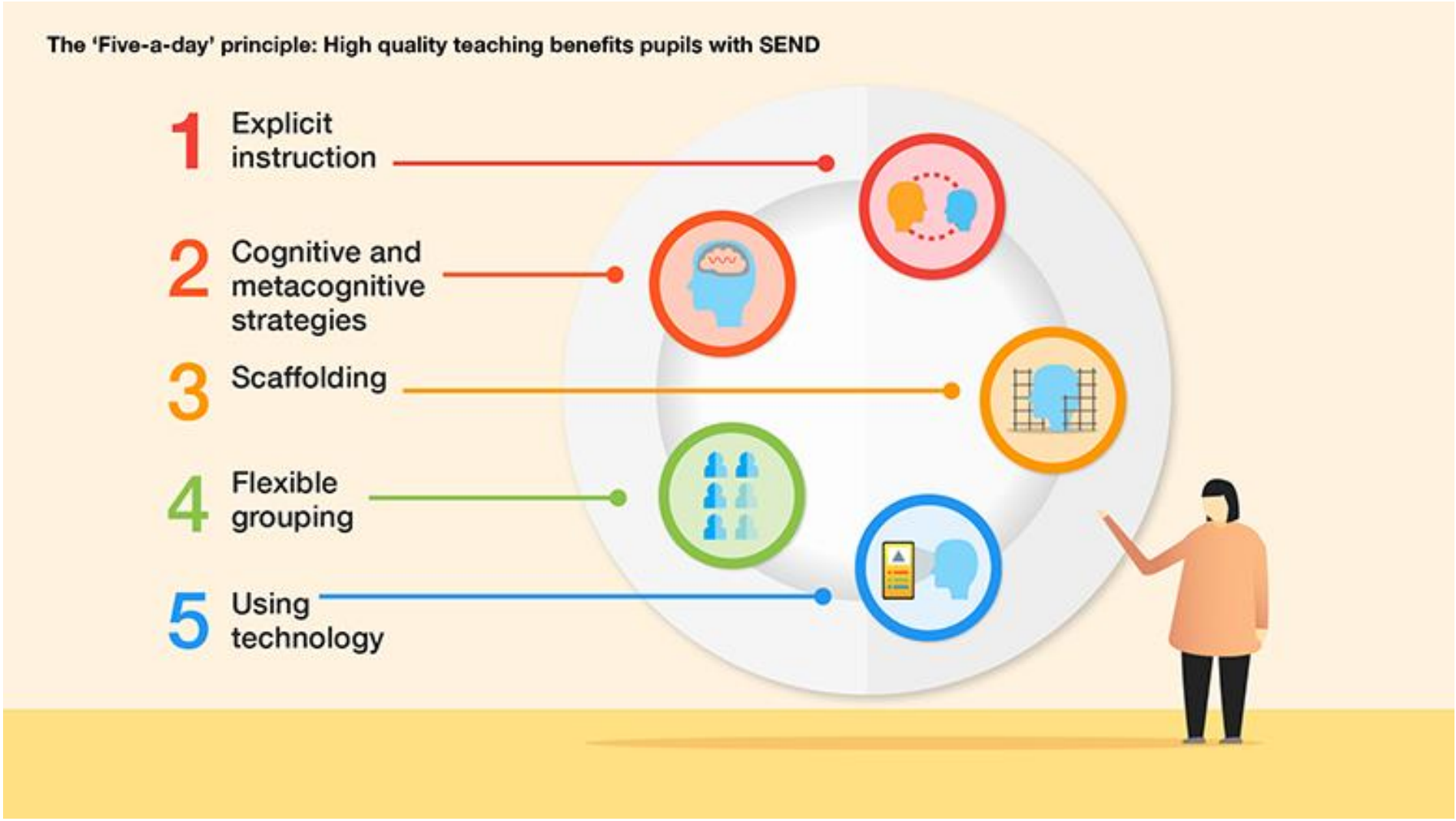
Understanding Adaptive Teaching v11 (d2tic4wvo1iusb.cloudfront.net)

[Understanding Adaptive Teaching v11 (d2tic4wvo1iusb.cloudfront.net)]

"Good teaching for pupils with SEND is good teaching for all."

EEF_Special_Educational_Needs_in_Mainstream_Schools_Guidance_Report.pdf (d2tic4wvo1iusb.cloudfront.net)

The EEF's 'Five-a-day approach' describes the five approaches that the evidence base underpinning the SEN in Mainstream guidance report suggests teachers should be considering for all learners, including those with SEND:



https://eef.li/SEND

High quality teaching benefits pupils with SEND

The ‘Five-a-day’ principle

The research underpinning the EEF’s guidance report ‘Special Educational Needs in Mainstream Schools’ indicates that supporting high quality teaching improves outcomes for pupils with SEND. Five specific approaches—the ‘Five-a-day’ indicated below—are particularly well-evidenced as having a positive impact. Teachers should develop a repertoire of these strategies, which they can use daily and flexibly in response to individual needs, using them as the starting point for classroom teaching for all pupils, including those with SEND.

https://eef.li/SEND

1 Explicit instruction

Teacher-led approaches with a focus on clear explanations, modelling and frequent checks for understanding. This is then followed by guided practice, before independent practice.

2 Cognitive and metacognitive strategies

Managing cognitive load is crucial if new content is to be transferred into students' long-term memory. Provide opportunities for students to plan, monitor and evaluate their own learning.

3 Scaffolding

When students are working on a written task, provide a supportive tool or resource such as a writing frame or a partially completed example. Aim to provide less support of this nature throughout the course of the lesson, week or term.

4 Flexible grouping

Allocate groups temporarily, based on current level of mastery. This could, for example, be a group that comes together to get some additional spelling instruction based on current need, before re-joining the main class.

5 Using technology

Technology can be used by a teacher to model worked examples; it can be used by a student to help them to learn, to practice and to record their learning. For instance, you might use a class visualiser to share students' work or to jointly rework an incorrect model.

https://eef.li/SEND

Promoting High Quality Talk in Mathematics

TOLD_Poster_1.0.pdf (d2tic4wvo1iusb.cloudfront.net)

Evidence indicates that high-quality talk can play an important role in supporting learning.

This is reflected in multiple recommendations across the EEF's 'Improving Mathematics in the Early Years and Key Stage 1' and 'Improving Mathematics in Key Stages 2 and 3' guidance reports.

The 'TOLD' acronym summarises four key principles for encouraging productive talk in mathematics lessons.

TAKE PART

To ensure that all pupils participate in high quality talk, we need to encourage engagement and support the development of listening skills where needed.

This can be achieved by directly inviting contributions from particular pupils. It may also be helpful to establish clear expectations around participation, and to prompt pupils' reflection on the participation of the group, and the quality of discussions.

OPPORTUNITIES

Encouraging children to work on shared problems and tasks can elicit collaboration and discussions around concepts, strategies and ideas. Using storybooks and games can also provide opportunities for rich mathematical discussions.

To maximise opportunities for learning, it is important to plan key questions and discussion points in advance. Open-ended questions such as '*How did you...?* or '*Why does this...?*' are particularly helpful in gathering a range of possible responses from pupils.

LINKS

Support pupils to elaborate upon their own responses, and those of their peers.

Helpful questions to encourage pupils to make links between responses include:

- *'Can you tell me a bit more about…?'*
- *'Can you give me an example to illustrate your point here?'*
- *'Who can build on what has been said here?'*

DEBATE:

Allow pupils to share and explain contrasting opinions and viewpoints.

Teachers can promote debate by:

- Prompting pupils to debate whether key statements are true, false, or sometimes true.
- Providing worked examples to encourage pupils to compare and contrast multiple approaches and strategies.

Further information and guidance can be found in the EEF's 'Improving Mathematics in the Early Years and Key Stage 1' and the 'Improving Mathematics in Key Stages 2 and 3' guidance reports.

Improving Mathematics in the Early Years and Key Stage 1 | EEF (educationendowmentfoundation.org.uk)

Improving Mathematics in Key Stages 2 and 3 | EEF (educationendowmentfoundation.org.uk)

Maths Planning

The White Rose Maths 'schemes of learning'

A scheme of learning is a clear, time-linked plan for learning.

Our schemes are written for year groups and cover the whole school year of learning.

Blocks of learning

For each year group, the scheme of learning includes an overview of the maths that our children should be learning at any point in the year.

Each year is split into three terms (autumn, spring and summer), and each term comprises individual blocks of learning about a particular topic.

You'll notice that we spend lots of time building strong number skills in Key Stage 1, Key Stage 2 and early secondary years. These essential core skills lay a solid foundation for more complicated learning later on.

Sometimes we might be a little behind or ahead of the scheme schedule. That's fine; we deliberately build flexibility into our schemes to allow for these variations.

EYFS


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Getting to know you
Match, sort and compare
FREE TRIAL
VIEW
Talk about measure and patterns
VIEW
It's me 1, 2, 3
VIEW
Circles and triangles
VIEW
1, 2, 3, 4, 5
VIEW
Shapes with 4 sides
VIEW
Spring term
Alive in 5
VIEW
Mass and capacity
VIEW
Growing 6, 7, 8
VIEW
Length, height and time
VIEW
Building 9 and 10
VIEW
Explore 3-D shapes
VIEW
Summer term
To 20 and beyond
VIEW
How many now?
VIEW
Manipulate, compose and decompose
VIEW
Sharing and grouping
VIEW
Visualise, build and map
VIEW
Make connections
VIEW
Consolidation

Year 1

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** (within 10) FREE TRIAL VIEW					Number **Addition and subtraction** (within 10) VIEW					Geometry **Shape** VIEW	Consolidation
Spring term	Number **Place value** (within 20) VIEW					Number **Addition and subtraction** (within 20) VIEW			Number **Place value** (within 50) VIEW		Measurement **Length and height** VIEW	Measurement **Mass and volume** VIEW
Summer term	Number **Multiplication and division** VIEW					Number **Fractions** VIEW		Geometry **Position and direction** VIEW	Number **Place value** (within 100) VIEW		Measurement **Money** VIEW	Measurement **Time** VIEW	Consolidation

Year 2

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** FREE TRIAL VIEW				Number **Addition and subtraction** VIEW					Geometry **Shape** VIEW		
Spring term	Measurement **Money** VIEW				Number **Multiplication and division** VIEW			Measurement **Length and height** VIEW		Measurement **Mass, capacity and temperature** VIEW		
Summer term	Number **Fractions** VIEW				Measurement **Time** VIEW			**Statistics** VIEW		Geometry **Position and direction** VIEW		Consolidation

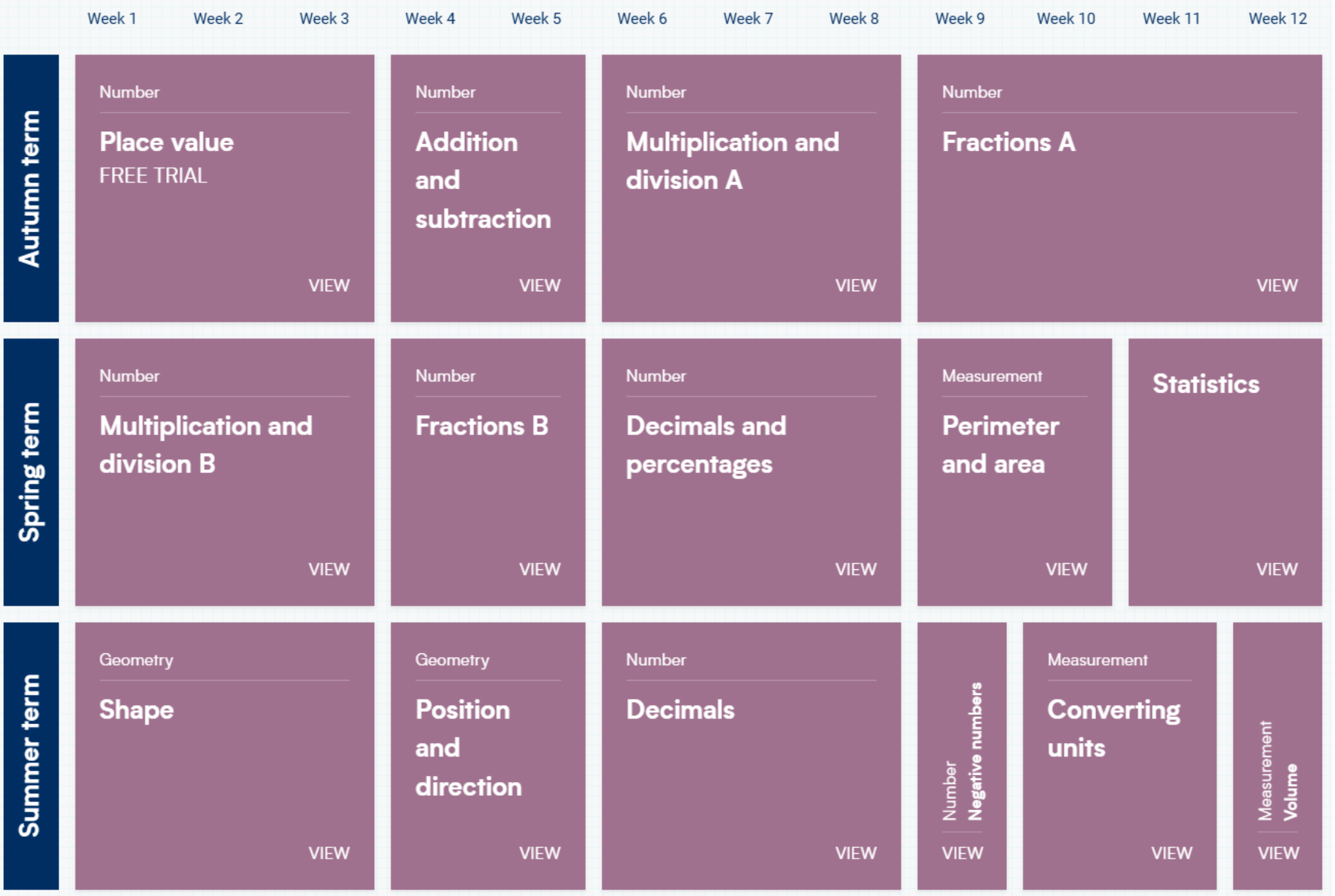
Year 3

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** FREE TRIAL VIEW			Number **Addition and subtraction** VIEW					Number **Multiplication and division A** VIEW			
Spring term	Number **Multiplication and division B** VIEW			Measurement **Length and perimeter** VIEW			Number **Fractions A** VIEW		Measurement **Mass and capacity** VIEW			
Summer term	Number **Fractions B** VIEW			Measurement **Money** VIEW			Measurement **Time** VIEW		Geometry **Shape** VIEW		Statistics VIEW	Consolidation

Year 4

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** FREE TRIAL VIEW				Number **Addition and subtraction** VIEW			Measurement **Area** VIEW	Number **Multiplication and division A** VIEW			Consolidation
Spring term	Number **Multiplication and division B** VIEW			Measurement **Length and perimeter** VIEW	Number **Fractions** VIEW				Number **Decimals A** VIEW			
Summer term	Number **Decimals B** VIEW		Measurement **Money** VIEW		Measurement **Time** VIEW	Consolidation		Geometry **Shape** VIEW	**Statistics** VIEW		Geometry **Position and direction** VIEW	

Year 5


Week 1
Week 2
Week 3
Week 4
Week 5
Week 6
Week 7
Week 8
Week 9
Week 10
Week 11
Week 12
Autumn term
Number
Place value
FREE TRIAL
VIEW
Number
Addition and subtraction
VIEW
Number
Multiplication and division A
VIEW
Number
Fractions A
VIEW
Spring term
Number
Multiplication and division B
VIEW
Number
Fractions B
VIEW
Number
Decimals and percentages
VIEW
Measurement
Perimeter and area
VIEW
Statistics
VIEW
Summer term
Geometry
Shape
VIEW
Geometry
Position and direction
VIEW
Number
Decimals
VIEW
Number
Negative numbers
VIEW
Measurement
Converting units
VIEW
Measurement
Volume
VIEW

Year 6

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number **Place value** FREE TRIAL VIEW		Number **Addition, subtraction, multiplication and division** VIEW					Number **Fractions A** VIEW		Number **Fractions B** VIEW		Measurement **Converting units** VIEW
Spring term	Number **Ratio** VIEW		Number **Algebra** VIEW		Number **Decimals** VIEW		Number **Fractions, decimals and percentages** VIEW		Measurement **Area, perimeter and volume** VIEW		**Statistics** VIEW	
Summer term	Geometry **Shape** VIEW		Geometry **Position and direction** VIEW		**Themed projects, consolidation and problem solving** VIEW							

Small Steps

The small steps

Each block of knowledge has been divided into a series of small learning steps.

Together, these small steps cover all the curriculum content that our children need to know.

Brain science tells us that children remember more by learning maths in small, related chunks.

White Rose Maths have used the best available research to map out the crucial learning steps that will help our children to understand what they are learning clearly.

-Year Group Overviews

-Supporting Materials

-Small Step Lists

Calculation Policy

Year 1 - 6

Calculation Policy
Addition and Subtraction

#MathsEveryoneCan

PowerPoint Presentation (whiteroseeducation.com)

White Rose Maths

Year 1 - 6

Calculation Policy
Multiplication and Division

#MathsEveryoneCan

PowerPoint Presentation
(whiteroseeducation.com)

White Rose Maths

Times Table Daily Initiative

Our aim at Strike Lane is that all of our children, by the end of year 4, develop fluency and accuracy in all their times tables as part the National Curriculum.

Knowledge, fluency and accuracy of the times tables will mean that our children are confident and efficient at grasping new learning throughout their time at our school.

Times Tables Initiative (Multiplication Project)

Maths Challenge – What is it?

- Systematic, whole class approach to learning the times tables.
- Aims to break down the learning of the times tables into manageable chunks learning a times table at a time (see overview document).
- Importance of the commutative law and the relationship with division facts.
- Rote learning in which children learn the number facts AND a sound pattern (this is important).
- Little and often - A two minute times table test, twice a day.
- 40 questions in each test. The children have two minutes to complete the test. An average of 3 seconds per question.

The Key Principles

1) Learn each number sentence as a memorised phrase by repeating the sound pattern out loud.
2) Learn each fact one way round only.

4 x 6 = becomes six fours are twenty four.

We always state the larger number first. The children very quickly become attuned to this and it just helps in the learning process.

3) Learn one new fact at a time. We will look at 6 x 6 = 36 one day.

Then 7 x 6 = the following day.

4) Don't think. We want them to become known facts.

Leave the answers on display.

5) 6 times table booklet will contain x2 – x3 – x4 – x5 – x6 facts but will be weighted with additional six times table facts.

Reading out the answers

- The children mark their own booklets so that they can fill in any gaps if necessary.
- The full times table fact is read out. We always say the larger number first so that they are only learning one sound pattern for each fact. For example, if the number fact is 6 x 7 = 42, we say seven sixes are forty two.
- The children then repeat that fact back to you. It's important that every child does this.
- For division facts say the following. For 18 divided 3 say MMM threes are eighteen. The children then say the learnt times table fact. Six threes are eighteen.
- Once marked the children then share their results with the class and identify a number fact they need to learn.

Whole School Times Tables Overview

Times Tables Overview

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	10 Visual Representation		5 Visual Representation		2 Visual Representation	
Year 2	10		5		2	
Year 3	4	8		3	6	
Year 4	9	7		11	12	
Year 5 & Year 6	<u>Assessment Review</u> Assessment to highlight any areas of whole class need to embed quick recall of times table. Identify times table, e.g. 6x and use the booklet focusing on tests. Work through the booklet within a quicker timeframe before moving onto the next. Identify specific times tables which children need support with, e.g. 7 x 6. Tests 9 – 12: All the new times table Tests 13 – 22: The new times table combined with previously learnt times tables.					

Example of a Times Table Booklet

Times Table Practice Booklet A

10 Times Table

Name: _____

Class: _____

Facts in this booklet:

2 x 10 = 20

3 x 10 = 30

4 x 10 = 40

5 x 10 = 50

6 x 10 = 60

7 x 10 = 70

8 x 10 = 80

9 x 10 = 90

10 x 10 = 100

11 x 10 = 110

12 x 10 = 120

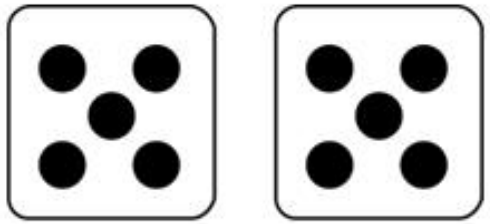
MATHSHUBS

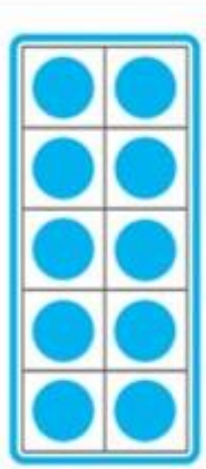
1		2	
3 x 10 = _____	6 x 10 = _____	5 x 10 = _____	10 x 10 = _____
30 ÷ 10 = _____	50 ÷ 10 = _____	3 x 10 = _____	10 x 2 = _____
12 x 10 = _____	9 x 10 = _____	10 x 12 = _____	60 ÷ 10 = _____
10 x 3 = _____	10 x 10 = _____	100 ÷ 10 = ____	4 x 10 = _____
10 x 4 = _____	40 ÷ 10 = _____	7 x 10 = _____	10 x 5 = _____
10 x 11 = _____	10 x 12 = _____	9 x 10 = _____	12 x 10 = _____
11 x 10 = _____	10 x 2 = _____	10 x 9 = _____	50 ÷ 10 = _____
3 x 10 = _____	2 x 10 = _____	10 x 11 = _____	10 x 10 = _____
80 ÷ 10 = _____	100 ÷ 10 = ____	10 x 2 = _____	10 x 4 = _____
10 x 2 = _____	10 x 9 = _____	30 ÷ 10 = _____	110 ÷ 10 = ____
10 x 4 = _____	5 x 10 = _____	10 x 10 = _____	10 x 7 = _____
10 x 5 = _____	70 ÷ 10 = _____	80 ÷ 10 = _____	10 x 8 = _____
60 ÷ 10 = _____	8 x 10 = _____	2 x 10 = _____	9 x 10 = _____
10 x 7 = _____	10 x 12 = _____	3 x 10 = _____	10 x 6 = _____
6 x 10 = _____	10 x 10 = _____	7 x 10 = _____	80 ÷ 10 = _____
10 x 7 = _____	110 ÷ 10 = ____	6 x 10 = _____	11 x 10 = _____
9 x 10 = _____	7 x 10 = _____	40 ÷ 10 = _____	90 ÷ 10 = _____
80 ÷ 10 = _____	12 x 10 = _____	10 x 3 = _____	2 x 10 = _____
10 x 10 = _____	20 ÷ 10 = _____	8 x 10 = _____	10 x 11 = _____
4 x 10 = _____	10 x 5 = _____	10 x 4 = _____	10 x 5 = _____

All 10 times table facts

Example of Year 1 Visual Representations

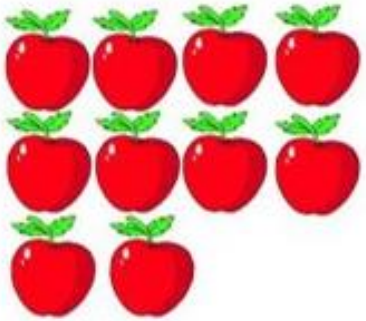
Year 1 – Visual Representations





ten

Visual Representations of 10



Year 1 – Visual Representations