Maths Policy

January 2025

National Curriculum

The National Curriculum for maths aims to ensure pupils can:

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

Our Vision

At Forest Fields we have high expectations for all of our pupils and believe that all pupils can achieve highly and become confident and skilled mathematicians. We strive for all pupils to be curious about mathematics and understand the importance of mathematics in their everyday lives.

The National Curriculum is based on the mastery approach. Maths mastery at Forest Fields is an approach to teaching which supports all learners to access age related curriculum requirements. Staff teach children to explore concepts deeply to develop a secure understanding before progressing on to new concepts.

Our mastery approach is an engaging and accessible style of mathematics teaching. This is inspired by the educational approach from Singapore and Shanghai, which is underpinned in White Rose Maths and Maths No Problem. We use both White Rose Maths and Maths No Problem to extend fluency, reasoning and problem solving. Our approach is designed to enhance understanding and enjoyment, as well as raise attainment for every pupil.

When pupils can make connections in their learning, sustain their understanding and build on prior learning, they are building a rich canvas of learnt experiences that makes them not only better Mathematicians but better learners altogether.

Intent

At Forest Fields we want **all** our children to:

- Succeed and make progress from their starting points, with a majority of children meeting age related expectations, year on year.

To make good progress and meet age related expectations, children at Forest Fields need:

- **To learn key facts.** Key facts such as times tables and number bonds are learned to automaticity to avoid cognitive overload in the working memory, enabling pupils to focus on new concepts. This supports our aim to ensure our children are fluent with number.

- **To have a deep understanding of mathematical concepts and procedures**. All pupils are given time to fully understand, explore and apply their ideas. Concrete, pictorial and abstract representations of concepts are used to help pupils to explore and develop their understanding.

- **To have a sound understanding of mathematical vocabulary**. Developing the way pupils speak and write about mathematics is key to developing strong understanding and reasoning skills. We expect pupils to explain their thinking and to explain why or how they know something to be true or false.

- **To have a positive attitude towards Mathematics.** Rejecting the notion that some pupils 'just can't do mathematics' and encouraging pupils with the belief that through hard work, they can succeed. We instil and nurture traits of self-confidence, independence, initiative, resilience and cooperation when working on and solving mathematical problems.

Planning

At Forest Fields our curriculum planning for maths is broken down into long term, medium term and short term.

The Foundation Stage

The Long Term plan is formed from the curriculum objectives outlined in The Early Learning Goals (ELG)/ Development matters document (*Appendix 1.*)
The key aims are then shared out throughout the year and discussed as a team to create a long term plan for Forest Fields. (*Appendix 2)*

The Medium Term plans are adopted from the EYFS Mastery Programme NCETM resources (*Appendix 3)*

Daily planning identifies taught sessions, focussed activities and provision in the environment (weekly) for the goals identified (*Appendix 4)*

Key Stage 1 and 2

The curriculum for Mathematics gives a detailed outline of the objectives that we teach in the long term plans *Appendix 5*

We follow the Long term plans set out by the White Rose Hub. *Appendix 6*

Our medium-term mathematics plans, give details of the teaching objectives for each term, and define what we teach. *Appendix 7*

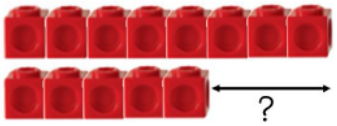
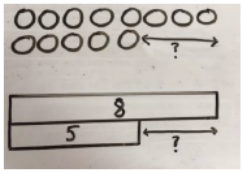
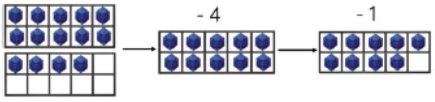
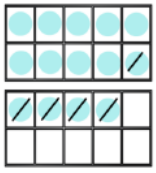
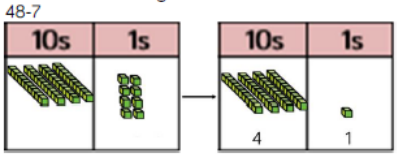
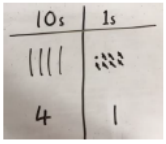
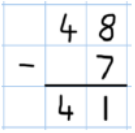
Daily Planning is completed each week. This must include: clear objectives / teaching sequence / adapted activities / key Questions and fluency skills activities. The planning format at Forest Fields must be followed by all staff and includes the steps; Flashback 4, Vocabulary, In Focus, Guided Practice, Independent Practice, and Structured Reflection. *Appendix 8*

Planning across the key stages is developed to offer opportunities for pupils to learn and revisit. Teachers are required to plan lessons which respond to previous learning, build on prior learning, challenge and engage all ability levels and develop reasoning and problem-solving skills. Using the White Rose scheme of work, staff at FFPS are able to plan well-sequenced units of work using a curriculum that spirals back each year to cover strands of maths at increasing complexity. Our teaching sequence is also carefully considered, beginning with recall through flashback 4 then moving to new learning with key vocabulary and an anchor task. The children then have the chance to apply learning in a guided way before moving to independent practice. The lesson finishes with a structured reflection to help the children develop metacognition skills which can help with their learning. Challenge is built in to our teaching sequence through questioning and greater depth challenges. Planning is always amended to meet the needs of each individual cohort and individual children, and so staff are not bound by the objectives within a unit of work. In EYFS we follow the NCETM mastering number curriculum. Covering subitising, cardinality, ordinality, counting and comparison throughout the year.

Implementation

The school harnesses a **variety of teaching and learning styles** in mathematics lessons. Children are encouraged to explore ideas and present findings in a variety of ways and will have the opportunity to explore different **representations**. To aid this, Forest Fields has adopted a "**CPA approach**": concrete, pictorial, abstract.

Concrete, Pictorial, Abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils. Often referred to as the concrete, representational, abstract framework, CPA was developed by American psychologist Jerome Bruner. It is an essential technique within the Singapore method of teaching maths for mastery.

Concrete	Pictorial	Abstract
Finding the difference (using cubes, Numicon or Cuisenaire rods, other objects can also be used). Calculate the difference between 8 and 5. 	Children to draw the cubes/other concrete objects which they have used or use the bar model to illustrate what they need to calculate. 	Find the difference between 8 and 5. 8 – 5, the difference is ☐ Children to explore why 9 - 6 = 8 – 5 = 7 – 4 have the same difference.
Making 10 using ten frames. 14 – 5 	Children to present the ten frame pictorially and discuss what they did to make 10. 	Children to show how they can make 10 by partitioning the subtrahend. 14 - 5 = 9 4 1 14 – 4 = 10 10 – 1 = 9
Column method using base 10. 48-7 	Children to represent the base 10 pictorially. 	Column method or children could count back 7. 

There are **manipulatives in every classroom** to help facilitate this. Our principal aim is to develop children's knowledge, skills and understanding of key concepts in mathematics, whilst fostering enthusiasm and confidence. Tasks are set to **embed knowledge, challenge understanding** and **provide a safe and encouraging environment** to take risks.

During lessons we value and encourage children to ask **mathematical questions and discuss** with peers and the wider class their findings and explanations. They have the opportunity to use a **wide range of resources** such as number lines, number squares, digit cards and small apparatus to support their work. In KS1 each child has access to a 'number tray' to support their development of fluency skills ***(appendix 9).*** Time is given for children to explore, generalise and prove their learning. We also provide opportunities across the year for pupils to **revisit key skills** to support the embedding and retention of the areas taught.

Staff are kept up to date on current thinking, new teaching methodologies and ideas by the subject leaders through staff meetings, INSET and individual support. CPD opportunities are shared with staff, inline with our SIP, and these may be further opportunties directed if a need is identified, or requested

EYFS Curriculum

Mathematics within the EYFS is developed through purposeful, play based experiences and is represented throughout the indoor and outdoor provision. The learning is based on pupils' interests and schemas, and current themes. Planning focuses on meeting the Early Lerning Goals from Development Matters. Teacher directed, whole class sessions happen daily and there is one main activity completed in focus groups each week. Chidlren are encouraged to practice and apply their learning in continuous provision where there are linked challenges set up. Additionally, Maths is integrated into the daily routines including songs, rhymes and stories.

Year 1 to Year 6

Teachers in each Year group use the White Rose Maths Hub curriculum maps to ensure coverage of all areas of the National Curriculum. These documents, provide a long and medium term plan which gives full coverage and consistency across Year groups and provides continuity across Key Stage 1 and 2. To accompany the medium and long term planning, teachers use the supporting exemplification materials, in our Maths Mastery folders, which provide examples of fluency, reasoning and problem solving questions to be used in short term planning.

The curriculum map is flexible and teachers are expected to adapt these to meet the needs of their class. Therefore if a concept has not been grasped thoroughly by most pupils, there is flexibility to adapt the curriculum map and revisit concepts. Pupils are given longer on key mathematical concepts in number and calculation, in order to build their fluency, as number sense will affect their progress in every other area.

Each teacher has accesss to the Singapore Maths No Problem textbooks. These are used to support the delivery of the White Rose Hub planning documents. The text books contain ideas for teaching and lesson sequencing and provides pupil materials, where appropriate to the activities that have been planned. They mirror the CPA approach of the WRH documents and therefore are a invaluable resource for teachers at the planning stage.

Adaptations

We believe in developing a depth of understanding for pupils of all abilities, which requires teaching fewer topics but in greater detail. This allows teachers to adapt tasks with greater ease and success. Rather than accelerating high attaining pupils through subsequent Year group topics, they are challenged to delve deeper through reasoning and problem-solving activities. To support lower attaining pupils, tasks can be scaffolded in a variety of different ways. This enables all pupils to access the same curriculum, working on the same concepts and skills at the same time.

To ensure adaptation is successful, teachers plan carefully considered tasks and lessons. A good task will enable all pupils to access the content and to engage with it, whilst at the same time be easily modified to challenge various levels.

Strategies of adaptation which will be evident include:

- Skillful questioning within lessons to promote conceptual understanding.
- Identifying and responding rapidly to misconceptions that arise.
- Challenging, through rich sophisticated problems, those that grasp concepts rapidly
- Concrete, pictorial and abstract representations according to levels of conceptual understanding.

It may be evident that very low ability or SEND pupils will be accessing maths curriculum content more suitable for their needs. This is dependent on the individual needs of the pupil so that they are challenged at the appropriate level.

Vocabulary

We encourage and build children's mathematical vocabulary throughout FFPS. New vocabulary is introduced and taught discretely and teachers model using key vocabulary throughout lessons. This can be seen during modelling in discussion and with the use of stem sentences during let's learn. Upon each working wall, staff will display key vocabulary relating to the current unit of work being taught.

Assessment

Teachers use National Test-style Standardised Assessments or **NTS tests** at the end of each term in years 1 – 5 and in year 6 , children will complete **National Standardised Test papers** each half term to check children's progress. The results of the NTS and SATs tests will be recorded in SIMs giving a raw and scaled score for each child.

Following these assessments, teachers will complete **question level analysis** to inform planning and interventions. This will be done using MARK which is a cloud based system that is part of the NTS assessments package. For Year 6, this will be done using pre-pepared spread sheets.

Children will also complete 'end of block' White Rose Hub assessments so that teachers can assess the success of smaller 2-4 week units of teaching. These assessments will be used to identify areas which may need revisiting or for identifying intervention groups.

Feedback and Marking

Our policy is underpinned by evidence of best practice from the Education Endowment Foundation and other expert organisations. The Education Endowment Foundation research shows that effective feedback should:

- Be specific, accurate and clear
- Redirect or refocus the learner's actions to achieve a goal
- Encourage and support further effort
- Be given sparingly so it is meaningful
- Provide specific guidance on how to improve and not just when a student is wrong

Our policy on feedback has at its core a number of principles:

- The sole focus of feedback and marking should be to further pupils's learning;
- Evidence of feedback and marking is incidental to the process; we do not provide additional evidence for external verification;
- Written comments should only be used where they are accessible to pupils according to age and ability;
- Feedback delivered closest to the point of action is most effective, and as such feedback delivered in lessons is more effective than comments provided at a later date;
- Feedback is provided both to teachers and pupils as part of assessment processes in the classroom, and takes many forms other than written comments;
- Feedback is a part of the school's wider assessment processes, which aim to provide an appropriate level of challenge to pupils in lessons, allowing them to make good progress;
- All pupils' work should be reviewed by teachers at the earliest available opportunity so that it might impact on future learning. When work is reviewed, it should be acknowledged in books.

Building on the work of the Assessment Commission, we have set out how feedback is given in three ways:

1. Immediate feedback – at the point of teaching
2. Summary feedback – at the end of a lesson/task
3. Review feedback – away from the point of teaching (including written comments)

Type	**What it looks like**	**Evidence (for observers)**

Immediate	• Takes place in lessons • Includes teachers gathering feedback from teaching • Often given verbally to pupils for immediate action • May involve use of a teaching assistant to provide support or further challenge • May re-direct the focus of teaching or the task • Children may self-mark their work at any point during the lesson to inform them of their progress. • Teacher may use the visualiser to 'Show Call' a child's work and display particular strengths a common misconception.	• Lesson observations/learning walks • Some evidence of annotations or use of marking code
Summary	• Takes place at the end of a lesson or activity • Often involves whole groups or classes • Provides an opportunity for evaluation of learning in the lesson • May take form of self- or peer- assessment against an agreed set of criteria • In some cases, may guide a teacher's further use of review feedback, focusing on areas of need	• Lesson observations/learning walks • Timetabled pre- and post-teaching based on assessment • Some evidence of self- and peer-assessment
Review	• Takes place away from the point of teaching • Leads to adaptation of future lessons through planning, grouping or adaptation of tasks • May involve written comments/annotations for pupils to read / respond to • May involve numbered AfL Tasks for groups of children who need to work on the same objective • Provides teachers with opportunities for assessment of understanding	• Acknowledgement of work completed through use of the marking code • Use of annotations to indicate future groupings in Maths or targets in English • Completed learning summary sheets for Maths and English for some lessons

<u>Agreed Marking Strategies</u>

1. Pupils always use one square per digit for laying out calculations.
2. We always mark in green pen and the pupils peer assess in red pen.
3. Titles used – not always learning objectives.
4. Whenever possible, marking and feedback will take place while the pupils are with the teacher.
5. Pupils do their own corrections during the lesson or as soon as possible afterwards.
6. Pupils will review their own work, contribute to and receive peer assessment regularly.
7. When writing comments, questions or tasks, teachers should be efficient and model neat handwriting.
8. We use the agreed marking symbols across the school.
9. When work is marked by anyone other than the class teacher, this is initialled.
10. All work is looked at, assessed and marked frequently and efficiently by the teacher.

<u>Revisiting and retrieval</u>

Classes begin lessons with 'flashback 4' (WRH) to ensure concepts taught in previous lessons, weeks and terms are continually recalled and practised to ensure they become embedded within the long-term memory. The WRH curriculum is designed in a spiral, with each year group revisiting previous year group maths but at greater depth.

Fluency, reasoning and problem solving

Each maths lesson sequence begins with an element of number fluency. A chance for children to develop their fluency with number before moving on to a problem during the in-focus stage of the lesson. Children are encouraged to discuss solutions to the problem using reasoning before the teacher guides the children to the most efficient method to find a solution. We aim to ensure all children will have the opportunity to reason and solve problems through the course of a lesson. At the end of each teaching sequence, children are encouraged to answer a metacognition question, which helps the children to think about how effective their problem-solving strategies have been and what they might do differently next time. At FFPS we are involved in a 4 large maths projects, 2 of which are aimed at improving children's fluency with number. Counting collections (EEF) in EYFS and Dance Equation (EEF) in Year 1.

Resources

Each teacher has a bank of essential resources that are kept in each classroom. These resources are there so that teachers are able to teach using concrete, pictorial and abstract examples to secure understanding.

ICT

Each classroom has an interactive whiteboard and visualiser installed and teachers use it within their mathematics teaching whenever they feel it is appropriate. This will be particularly evident during guided practice.

In KS1 and KS2, MyMaths software is used to complement our teaching in school. Teachers set questions and monitor achievement as the children complete the tasks at home. Times Table Rockstars is used daily. In KS1, Numbots software is used to focus on number fluency. Teachers have access to the White Rose Premium resources.

Homework

Please see Homework policy.

Subject leadership

There is one teacher designated as Mathematics Co-ordinator for EYFS, KS1 and KS2.

Moderation

Moderation activities occur each term in maths through staff meetings, PPA times and subject leader time. Forest Fields with other schools will look at assessments and moderate judgments in EYFS, KS1 and KS2 throughout the year as well as working with LA advisors through formal and informal moderation activities.

Reporting

We report to parents in writing at the end of each year. Teachers comment on the attainment of pupils in the core subjects and outline achievement in foundation subjects. Scores in National assessments are included in these reports. We also hold parents evenings once a term. Parents are always able to discuss the progress of their pupils through arrangement with their class teachers. In addition to parents' evenings, there are termly SEN reviews with SENDCo, teaching staff and parents for pupils who are receiving additional support with their behaviour and learning.

The Head Teacher presents a progress report to the full governing body once a term.

Interventions

Our interventions are informed by summative and formative assessment and pupil progress meetings. Assessment data will be used to decide on what is the focus of the intervention and which children will be part of the intervention. Regular assessment will happen to ensure children are removed from the intervention once the aim of the intervention has been achieved.

Impact

Planning, teaching and assessments have impact on progress and learning through:

- Developing and embedding pupil's knowledge and skills in maths that can be applied in different contexts and time periods. As a result, the majority of pupils will meet age related expectations in each year group and develop progress from their given starting points.
- A curriculum which is carefully planned to sequence the acquisition of knowledge and skills systematically over time and ensures coverage which meets the ambition of the National Curriculum.
- A curriculum that divides new material into manageable steps lesson by lesson, whilch allows objectives to be covered in greater detail and pupils to achieve a more in depth understanding.
- Deeply embedding learnt concepts into pupils memory through consistent revisiting of previously learned knowledge.
- Quality teaching, which includes:
    - Providing lessons that generate enthusiasm and enjoyment so that children develop confidence and a positive attitude towards maths
    - Quickly identifying and acting upon misconceptions with swift and appropriate action being taken by teachers to meet needs
    - Setting challenges which stretch and deepen understanding
    - Providing environments that celebrate and encourage investigation, and perseverance
    - Consistent review of planning, assessments and progress
    - SEND, disadvantaged and vulnerable children closely monitored and appropriate interventions being put in place so that they catch up.
    - Assessment data and question analysis is used to inform teaching an intervention.

Safeguarding

Filtering and Monitoring (related to KCSIE Sept 23, paragraph 142)

We use Smoothwall to monitor computing in school. We use SchoolsIT Netsweeper as our filtering service. We use Apple Classroom and Senso to support the management of computing which enables staff to support filtering and monitoring.
The School Business Manager, Headteacher and LDSLs receive weekly notifications for Level 3+ incidents. We have a LDSL that checks the monitoring system we use in school for incidents below Level 3+.

Appendix 1; EYFS Long term Plan. ELG/Development matters 2021

Mathematics

EYFS Statutory 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.

Birth to three – babies, toddlers and young children will be learning to:	Examples of how to support this:
Combine objects like stacking blocks and cups. Put objects inside others and take them out again.	Encourage babies and young toddlers to play freely with a wide range of objects - toddlers engage spontaneously in mathematics during nearly half of every minute of free play. Suggestions: when appropriate, sensitively join in and comment on: • interestingly shaped objects like vegetables, wooden pegs, spoons, pans, corks, cones, balls • pots and pans, boxes and objects to put in them, shape sorters • stacking cups: hiding one, building them into a tower, nesting them and lining them up.
Take part in finger rhymes with numbers. React to changes of amount in a group of up to three items.	Use available opportunities, including feeding and changing times for finger-play, outdoors and inside, such as 'Round and round the garden'. Sing finger rhymes which involve hiding and returning, like 'Two little dicky birds'.
Compare amounts, saying 'lots', 'more' or 'same'. Develop counting-like behaviour, such as making sounds, pointing or saying some numbers in sequence.	Draw attention to changes in amounts, for example, by adding more bricks to a tower, or eating things up. Offer repeated experiences with the counting sequence in meaningful and varied contexts, outside and indoors. Suggestions: count fingers and toes, stairs, toys, food items, sounds and actions.
Count in everyday contexts, sometimes skipping numbers – '1-2-3-5'.	Help children to match their counting words with objects. Suggestions: move a piece of apple to one side once they have counted it. If children are saying one number word for each object, it is not always necessary to correct them if they skip a number. Learning to count accurately takes a long time and repeated experience. Confidence is important.

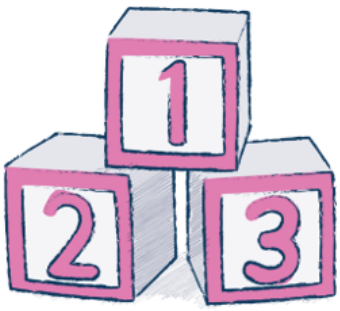
Birth to three – babies, toddlers and young children will be learning to:	Examples of how to support this:
Climb and squeeze themselves into different types of spaces. Build with a range of resources. Complete inset puzzles.	Describe children's climbing, tunnelling and hiding using spatial words like 'on top of', 'up', 'down' and 'through'. Provide blocks and boxes to play freely with and build with, indoors and outside. Provide inset puzzles and jigsaws at different levels of difficulty.
Compare sizes, weights etc. using gesture and language - 'bigger/little/smaller', 'high/low', 'tall', 'heavy'.	Use the language of size and weight in everyday contexts. Provide objects with marked differences in size to play freely with. Suggestions: dolls' and adult chairs, tiny and big bears, shoes, cups and bowls, blocks and containers.
Notice patterns and arrange things in patterns.	Provide patterned material – gingham, polka dots, stripes etc. – and small objects to arrange in patterns. Use words like 'repeated' and 'the same' over and over.

3 and 4-year-olds will be learning to:	Examples of how to support this:
Develop fast recognition of up to 3 objects, without having to count them individually ('subitising'). Recite numbers past 5. Say one number for each item in order: 1,2,3,4,5. Know that the last number reached when counting a small set of objects tells you how many there are in total ('cardinal principle'). Show 'finger numbers' up to 5. Link numerals and amounts: for example, showing the right number of objects to match the numeral, up to 5.	Point to small groups of two or three objects: "Look, there are two!" Occasionally ask children how many there are in a small set of two or three. Regularly say the counting sequence, in a variety of playful contexts, inside and outdoors, forwards and backwards, sometimes going to high numbers. For example: hide and seek, rocket-launch countdowns. Count things and then repeat the last number. For example: "1, 2, 3 – **3 cars**". Point out the number of things whenever possible; so, rather than just 'chairs', 'apples' or 'children', say 'two chairs', 'three apples', 'four children'. Ask children to get you several things and emphasise the total number in your conversation with the child. Use small numbers to manage the learning environment. Suggestions: have a pot labelled '5 pencils' or a crate for '3 trucks'. Draw children's attention to these throughout the session and especially at tidy-up time: "How many pencils should be in this pot?" or "How many have we got?" etc.

3 and 4-year-olds will be learning to:	Examples of how to support this:
Experiment with their own symbols and marks as well as numerals. Solve real world mathematical problems with numbers up to 5. Compare quantities using language: 'more than', 'fewer than'.	Encourage children in their own ways of recording (for example) how many balls they managed to throw through the hoop. Provide numerals nearby for reference. Suggestions: wooden numerals in a basket or a number track on the fence. Discuss mathematical ideas throughout the day, inside and outdoors. Suggestions: • "I think Jasmin has got more crackers…" • support children to solve problems using fingers, objects and marks: "There are four of you, but there aren't enough chairs…." • draw children's attention to differences and changes in amounts, such as those in stories like 'The Enormous Turnip'.
Talk about and explore 2D and 3D shapes (for example, circles, rectangles, triangles and cuboids) using informal and mathematical language: 'sides', 'corners'; 'straight', 'flat', 'round'.	Encourage children to play freely with blocks, shapes, shape puzzles and shape-sorters. Sensitively support and discuss questions like: "What is the same and what is different?" Encourage children to talk informally about shape properties using words like 'sharp corner', 'pointy' or 'curvy'. Talk about shapes as you play with them: "We need a piece with a straight edge."

3 and 4-year-olds will be learning to:	Examples of how to support this:
Understand position through words alone – for example, "The bag is under the table," – with no pointing. Describe a familiar route. Discuss routes and locations, using words like 'in front of' and 'behind'.	Discuss position in real contexts. Suggestions: how to shift the leaves **off** a path or sweep water away **down** the drain. Use spatial words in play, including 'in', 'on', 'under', 'up', 'down', 'besides' and 'between'. Suggestion: "Let's put the troll under the bridge and the billy goat beside the stream." Take children out to shops or the park: recall the route and the order of things seen on the way. Set up obstacle courses, interesting pathways and hiding places for children to play with freely. When appropriate, ask children to describe their route and give directions to each other. Provide complex train tracks, with loops and bridges, or water-flowing challenges with guttering that direct the flow to a water tray, for children to play freely with. Read stories about journeys, such as 'Rosie's Walk'.
Make comparisons between objects relating to size, length, weight and capacity.	Provide experiences of size changes. Suggestions: "Can you make a puddle larger?", "When you squeeze a sponge, does it stay small?", "What happens when you stretch dough, or elastic?" Talk with children about their everyday ways of comparing size, length, weight and capacity. Model more specific techniques, such as lining up ends of lengths and straightening ribbons, discussing accuracy: "Is it **exactly**…?"

3 and 4-year-olds will be learning to:	Examples of how to support this:
Select shapes appropriately: flat surfaces for building, a triangular prism for a roof, etc. Combine shapes to make new ones – an arch, a bigger triangle, etc.	Provide a variety of construction materials like blocks and interlocking bricks. Provide den-making materials. Allow children to play freely with these materials, outdoors and inside. When appropriate, talk about the shapes and how their properties suit the purpose. Provide shapes that combine to make other shapes, such as pattern blocks and interlocking shapes, for children to play freely with. When appropriate, discuss the different designs that children make. Occasionally suggest challenges, so that children build increasingly more complex constructions. Use tidy-up time to match blocks to silhouettes or fit things in containers, describing and naming shapes. Suggestion: "Where does this triangular one /cylinder /cuboid go?"



3 and 4-year-olds will be learning to:	Examples of how to support this:
Talk about and identify the patterns around them. For example: stripes on clothes, designs on rugs and wallpaper. Use informal language like 'pointy', 'spotty', 'blobs', etc. Extend and create ABAB patterns – stick, leaf, stick, leaf. Notice and correct an error in a repeating pattern. Begin to describe a sequence of events, real or fictional, using words such as 'first', 'then...'	Provide patterns from different cultures, such as fabrics. Provide a range of natural and everyday objects and materials, as well as blocks and shapes, for children to play with freely and to make patterns with. When appropriate, encourage children to continue patterns and spot mistakes. Engage children in following and inventing movement and music patterns, such as clap, clap, stamp. Talk about patterns of events, in cooking, gardening, sewing or getting dressed. Suggestions: • 'First', 'then', 'after', 'before' • "Every day we..." • "Every evening we..." Talk about the sequence of events in stories. Use vocabulary like 'morning', 'afternoon', 'evening' and 'night-time', 'earlier', 'later', 'too late', 'too soon', 'in a minute'. Count down to forthcoming events on the calendar in terms of number of days or sleeps. Refer to the days of the week, and the day before or day after, 'yesterday' and 'tomorrow'.

Children in reception will be learning to:	Examples of how to support this:
Count objects, actions and sounds.	Develop the key skills of counting objects including saying the numbers in order and matching one number name to each item. Say how many there are after counting – for example, "…6, 7, 8. There are **8 balls**" – to help children appreciate that the last number of the count indicates the total number of the group. This is the cardinal counting principle. Say how many there might be before you count to give a purpose to counting: "I think there are about 8. Shall we count to see?" Count out a smaller number from a larger group: "Give me seven…" Knowing when to stop shows that children understand the cardinal principle. Build counting into everyday routines such as register time, tidying up, lining up or counting out pieces of fruit at snack time. Sing counting songs and number rhymes and read stories that involve counting. Play games which involve counting. Identify children who have had less prior experience of counting and provide additional opportunities for counting practice.

Children in reception will be learning to:	Examples of how to support this:
Subitise.	Show small quantities in familiar patterns (for example, dice) and random arrangements. Play games which involve quickly revealing and hiding numbers of objects. Put objects into five frames and then ten frames to begin to familiarise children with the tens structure of the number system. Prompt children to subitise first when enumerating groups of up to 4 or 5 objects: "I don't think we need to count those. They are in a square shape so there must be 4." Count to check. Encourage children to show a number of fingers 'all at once', without counting.
Link the number symbol (numeral) with its cardinal number value.	Display numerals in order alongside dot quantities or tens frame arrangements. Play card games such as snap or matching pairs with cards where some have numerals, and some have dot arrangements. Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards.

Children in reception will be learning to:	Examples of how to support this:
Count beyond ten.	Count verbally beyond 20, pausing at each multiple of 10 to draw out the structure, for instance when playing hide and seek, or to time children getting ready. Provide images such as number tracks, calendars and hundred squares indoors and out, including painted on the ground, so children become familiar with two-digit numbers and can start to spot patterns within them.
Compare numbers.	Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same. Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well. Distribute items evenly, for example: "Put 3 in each bag," or give the same number of pieces of fruit to each child. Make deliberate mistakes to provoke discussion. Tell a story about a character distributing snacks unfairly and invite children to make sure everyone has the same.
Understand the 'one more than/one less than' relationship between consecutive numbers.	Make predictions about what the outcome will be in stories, rhymes and songs if one is added, or if one is taken away. Provide 'staircase' patterns which show that the next counting number includes the previous number plus one.

Children in reception will be learning to:	Examples of how to support this:
Explore the composition of numbers to 10.	Focus on composition of 2, 3, 4 and 5 before moving onto larger numbers Provide a range of visual models of numbers: for example, six as double three on dice, or the fingers on one hand and one more, or as four and two with ten frame images. Model conceptual subitising: "Well, there are three here and three here, so there must be six." Emphasise the parts within the whole: "There were 8 eggs in the incubator. Two have hatched and 6 have not yet hatched." Plan games which involve partitioning and recombining sets. For example, throw 5 beanbags, aiming for a hoop. How many go in and how many don't?

Children in reception will be learning to:	Examples of how to support this:
Automatically recall number bonds for numbers 0–5 and some to 10.	Have a sustained focus on each number to and within 5. Make visual and practical displays in the classroom showing the different ways of making numbers to 5 so that children can refer to these. Help children to learn number bonds through lots of hands-on experiences of partitioning and combining numbers in different contexts, and seeing subitising patterns. Play hiding games with a number of objects in a box, under a cloth, in a tent, in a cave, etc.: "6 went in the tent and 3 came out. I wonder how many are still in there?" Intentionally give children the wrong number of things. For example: ask each child to plant 4 seeds then give them 1, 2 or 3. "I've only got 1 seed, I need 3 more." Spot and use opportunities for children to apply number bonds: "There are 5 of us but only 2 clipboards. How many more do we need?" Place objects into a five frame and talk about how many spaces are filled and unfilled.

Children in reception will be learning to:	Examples of how to support this:
Select, rotate and manipulate shapes to develop spatial reasoning skills.	Provide high-quality pattern and building sets, including pattern blocks, tangrams, building blocks and magnetic construction tiles, as well as found materials. Challenge children to copy increasingly complex 2D pictures and patterns with these 3D resources, guided by knowledge of learning trajectories: "I bet you can't add an arch to that," or "Maybe tomorrow someone will build a staircase." Teach children to solve a range of jigsaws of increasing challenge.
Compose and decompose shapes so that children recognise a shape can have other shapes *within* it, just as numbers can.	Investigate how shapes can be combined to make new shapes: for example, two triangles can be put together to make a square. Encourage children to predict what shapes they will make when paper is folded. Wonder aloud how many ways there are to make a hexagon with pattern blocks. Find 2D shapes within 3D shapes, including through printing or shadow play.
Continue, copy and create repeating patterns.	Make patterns with varying rules (including AB, ABB and ABBC) and objects and invite children to continue the pattern. Make a deliberate mistake and discuss how to fix it.
Compare length, weight and capacity.	Model comparative language using 'than' and encourage children to use this vocabulary. For example: "This is heavier than that." Ask children to make and test predictions. "What if we pour the jugful into the teapot? Which holds more?"

Appendix 2; EYFS Long Term Plan

Integrated Curriculum Map for Foundation Stage 2 2023-2024

Mathematics SPECIFIC AREA timetabled lessons	**Strand/ Half-term**	**Subitising**	**Cardinality, ordinality and counting**	**Composition**	**Comparison**
	1 **Children will:**	Perceptually subitise within 3 Identify sub-groups in larger arrangements Create their own patterns for numbers within 4 Practise using their fingers to represent quantities which they can subitise Experience subitising in a range of contexts, including temporal patterns made by sounds.	Relate the counting sequence to cardinality, seeing that the last number spoken gives the number in the entire set Have a wide range of opportunities to develop their knowledge of the counting sequence, including through rhyme and song Have a wide range of opportunities to develop 1:1 correspondence, including by coordinating movement and counting have opportunities to Develop an understanding that anything can be counted, including actions and sounds Explore a range of strategies which support accurate counting.	See that all numbers can be made of 1s compose their own collections within 4.	Understand that sets can be compared according to a range of attributes, including by their numerosity Use the language of comparison, including 'more than' and 'fewer than' Compare sets 'just by looking'.
	2 **Children will:**	Continue from first half- term subitise within 5, Perceptually and conceptually, depending on the arrangements.	Continue to develop their counting skills explore the cardinality of 5, linking this to dice patterns and 5 fingers on 1 hand Begin to count beyond 5 Begin to recognise	Explore the concept of 'wholes' and 'parts' by looking at a range of objects that are composed of parts, some of which can be taken apart and some of which cannot	Compare sets using a variety of strategies, including 'just by looking', by subitising and by matching Compare sets by matching, seeing that when every object in a

			numerals, relating these to quantities they can Subitise and count.	explore the composition of numbers within 5.	set can be matched to one in the other set, they contain the same number and are equal amounts.

	3 **Children will:**	Increase confidence in subitising by continuing to explore patterns within 5, including structured and random arrangements Explore a range of patterns made by some numbers greater than 5, including structured patterns in which 5 is a clear part Experience patterns which show a small group and '1 more' continue to match arrangements to finger patterns.	Continue to develop verbal counting to 20 and beyond Continue to develop object counting skills, using a range of strategies to develop accuracy Continue to link counting to cardinality, including using their fingers to represent quantities between 5 and 10 Order numbers, linking cardinal and ordinal representations of number.	Continue to explore the composition of 5 and practise recalling 'missing' or 'hidden' parts for 5 Explore the composition of 6, linking this to familiar patterns, including symmetrical patterns Begin to see that numbers within 10 can be composed of '5 and a bit'.	Continue to compare sets using the language of comparison, and play games which involve comparing sets Continue to compare sets by matching, identifying when sets are equal explore ways of making unequal sets equal.
	4 **Children will:**	Explore symmetrical patterns, in which each side is a familiar pattern, linking this to 'doubles'.	Continue to consolidate their understanding of cardinality, working with larger numbers within 10 become more familiar with the counting pattern beyond 20.	Explore the composition of odd and even numbers, looking at the 'shape' of these numbers begin to link even numbers to doubles begin to explore the composition of numbers within 10.	Compare numbers, reasoning about which is more, using both an understanding of the 'how many' of a number, and its position in the number system.
	5 **Children will:**	Continue to practise increasingly familiar subitising arrangements, including those which expose '1 more' or 'doubles' patterns use subitising skills to	Continue to develop verbal counting to 20 and beyond, including counting from different starting numbers Continue to develop confidence and accuracy in both verbal	Explore the composition of 10.	Order sets of objects, linking this to their understanding of the ordinal number system.

		enable them to identify when patterns show the same number but in a different arrangement, or when patterns are similar but have a different number Subitise structured and unstructured patterns, including those which show numbers within 10, in relation to 5 and 10 Be encouraged to identify when it is appropriate to count and when groups can be subitised.	and object counting.		

Appendix 3; Example of EYFS MTP

Family: Is everything what it appears to be?

	Week 1 (2 days)	Week 2	Week 3	Week 4	Week 5	Week 6	
Pen Patrol	Holiday News	Happy New Year	Chinese New Year	Burns Night	Winter Wonderland	Valentines Day	
Sign of the week							
Language words of the week Urdu		Help مدد (madad)	Good sitting اچھی نشست (achi nashast)	Good listening اچھی سننے کا موقع (achi sunnay ka moqaa)	Good looking جاذب نظر (jazeb nazar)	Finished تکمیل (takmeel)	
Books	Hair love			Handa's surprise			
Songs	This is the way we brush our hair This Is the Way We Brush Our Hair | Songs | The Baby Club (youtube.com)			Oranges and Lemon Oranges and lemons | Early Years - Nursery Rhymes (youtube.com)			
Writing session	**Immersion-** Read the story. Introduce characters and key vocabulary and tier 2 vocabulary.	**Practise** Sequence the story. Act out the story. Make a story map. Children to make their own story map.	**Innovation** Teacher to model the change of the story. Revisit innovated class story. Re-tell and act out the story. Children to write out the story/ make their own innovated story map.	**Immersion-** Read the story. Introduce characters and key vocabulary and tier 2 vocabulary.		**Practise** Sequence the story. Act out the story. Make a story map. Children to make their own story map.	**Innovation** Teacher to model the change of the story. Revisit innovated class story. Re-tell and act out the story. Children to write out the story/ make their own innovated story map.
RMC 8: 40 – 9am	Name Pop sentences LA- Fine motor skills						
9-9:30 Little Wandle 1:20-1:35 Group phonics	Little Wandle Little Wandle reading groups						
10:45-11:45 Dough Disco, Funky fingers handwriting	Letter family						
PSHE	PANTOSAURUS						
Role Play	Hair Salon			Extend the home corner to a market selling fruits			
PD	Gymnastic focus: Unit 1 travelling using mats, benches and large apparatus for balancing and climbing						
Numeracy	Subitising	cardinality	Making 5	composition			
UoW	I know that I will change as I get older. **Key vocab** Baby Elderly Child Teenager Adult	I can say how buildings in the past were similar and different. **Key vocab** Past materials Present Change Features Modern old	I can talk about my experiences of being in a house in a different country and how it was the same / different to my home here. **Vocab** – as last week	I can say if the country I am visiting has a hot or cold climate. **Vocab** Hot Cold Warm Climate country			
EAD	Talking about myself and my interests.	Listening to and re-telling traditional stories.					

Appendix 4; Example of EYFS daily planning

Early Learning Goal	Weekly/daily objectives	Lesson breakdown				
		Mon	Tues	Wed	Thurs	Fri
Maths	See weekly NCETM planning	show numbers to 5 using their fingers. see that 5 can be partitioned into 4 and 1.	show ways of making 5 on their fingers. see that 5 can be partitioned into 3 and 2.	find ways to partition a set of 5.	understand that 5 can be partitioned (split) into different parts. be able to explain what the parts are. use what they know about 5 to work out a hidden number.	

Appendix 5: Year group objectives based on the National Curriculum

EYFS Objectives (linked to ELGs)

- **Number**
- 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.

- **Numerical Patterns**
  Verbally count beyond 20, recognising the pattern 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 evens and odds, double facts and how quantities can be distributed equally.

Year 1 Objectives

Place Value

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- read and write numbers from 1 to 20 in numerals and words

Addition and Subtraction

- read, write and interpret mathematical statements involving addition (+), subtraction (–) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ☐ – 9.

Multiplication and Division

- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Fractions

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.

Geometry – Properties

- recognise and name common 2-D and 3-D shapes, including:
  - 2-D shapes [for example, rectangles (including squares), circles and triangles]
  - 3-D shapes [for example, cuboids (including cubes), pyramids and spheres].

Geometry – Position and direction

- describe position, direction and movement, including whole, half, quarter and three-quarter turns.

Measure

- compare, describe and solve practical problems for:
  - lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
  - mass/weight [for example, heavy/light, heavier than, lighter than]
  - capacity and volume [for example, full/empty, more than, less than, half, half full, quarter]
  - time [for example, quicker, slower, earlier, later]
- measure and begin to record the following:
  - lengths and heights
  - mass/weight
  - capacity and volume
  - time (hours, minutes, seconds)
- recognise and know the value of different denominations of coins and notes
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years
- tell the time to the hour and half past the hour

Year 2 Objectives

Place Value

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100; use <, > and = signs
- read and write numbers to at least 100 in numerals and in words
- use place value and number facts to solve problems.

Addition and Subtraction

- solve problems with addition and subtraction:
  - using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  - applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  - a two-digit number and ones
  - a two-digit number and tens
  - two two-digit numbers
  - adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.

Multiplication and Division

- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (×), division (÷) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Fractions

- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.

Geometry – Properties

- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects.

Geometry – Position and direction

- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).

Measure

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels
- compare and order lengths, mass, volume/capacity and record the results using >, < and =
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins that equal the same amounts of money
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- compare and sequence intervals of time
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times
- know the number of minutes in an hour and the number of hours in a day.

Statistics

- interpret and construct simple pictograms, tally charts, block diagrams and simple tables
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity
- ask and answer questions about totalling and comparing categorical data.

Year 3 Objectives

Place Value

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
- recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers up to 1000 in numerals and in words
- solve number problems and practical problems involving these ideas.

Addition and Subtraction

- add and subtract numbers mentally, including:
  - a three-digit number and ones
  - a three-digit number and tens
  - a three-digit number and hundreds
- add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.

Multiplication and Division

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

Fractions

- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- recognise and show, using diagrams, equivalent fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
- compare and order unit fractions, and fractions with the same denominators
- solve problems that involve all of the above.

Geometry – Properties

Pupils should be taught to:

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise angles as a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle
- identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

Geometry – Position and direction

-

Measure

- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- measure the perimeter of simple 2-D shapes
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example to calculate the time taken by particular events or tasks].

Statistics

- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables.

Year 4 Objectives

Place Value

- count in multiples of 6, 7, 9, 25 and 1000
- find 1000 more or less than a given number
- count backwards through zero to include negative numbers
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers
- read Roman numerals to 100 (I to C) and know that over time, the numeral system changed to include the concept of zero and place value.

Addition and Subtraction

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Multiplication and Division

- recall multiplication and division facts for multiplication tables up to 12 × 12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

Fractions

- recognise and show, using diagrams, families of common equivalent fractions
- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.
- solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- solve simple measure and money problems involving fractions and decimals to two decimal places.

Geometry – Properties

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations
- complete a simple symmetric figure with respect to a specific line of symmetry.

Geometry – Position and direction

- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon.

Measure

- Convert between different units of measure [for example, kilometre to metre; hour to minute]
- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- estimate, compare and calculate different measures, including money in pounds and pence
- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days.

Statistics

- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.

Year 5 Objectives

Place Value

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals

Addition and Subtraction

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Multiplication and Division

- identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context

Fractions

- compare and order fractions whose denominators are all multiples of the same number
- identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$]
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- read and write decimal numbers as fractions [for example, $0.71 = \frac{71}{100}$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25.

Geometry – Properties

- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees (°)
- identify:
  - angles at a point and one whole turn (total 360°)
  - angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°)
  - other multiples of 90°
- use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles.

Geometry – Position and direction

- identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.
- Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.

Measure

- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water]
- solve problems involving converting between units of time
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling.

Statistics

- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables.

Year 6 Objectives

Place Value

- read, write, order and compare numbers up to 10 000 000 and determine the value of each digit
- round any whole number to a required degree of accuracy
- use negative numbers in context, and calculate intervals across zero
- solve number and practical problems that involve all of the above.

Addition and Subtraction

- perform mental calculations, including with mixed operations and large numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Multiplication and Division

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
- divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations

Fractions

- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, $\frac{3}{8}$]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems which require answers to be rounded to specified degrees of accuracy
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

Geometry – Properties

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets

Geometry – Position and direction

- describe positions on the full coordinate grid (all four quadrants)

- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles

- draw and translate simple shapes on the coordinate plane, and reflect them in the axes.

Measure

- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- convert between miles and kilometres
- recognise that shapes with the same areas can have different perimeters and vice versa
- recognise when it is possible to use formulae for area and volume of shapes
- calculate the area of parallelograms and triangles
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units [for example, mm^3 and km^3].

Statistics

- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average..

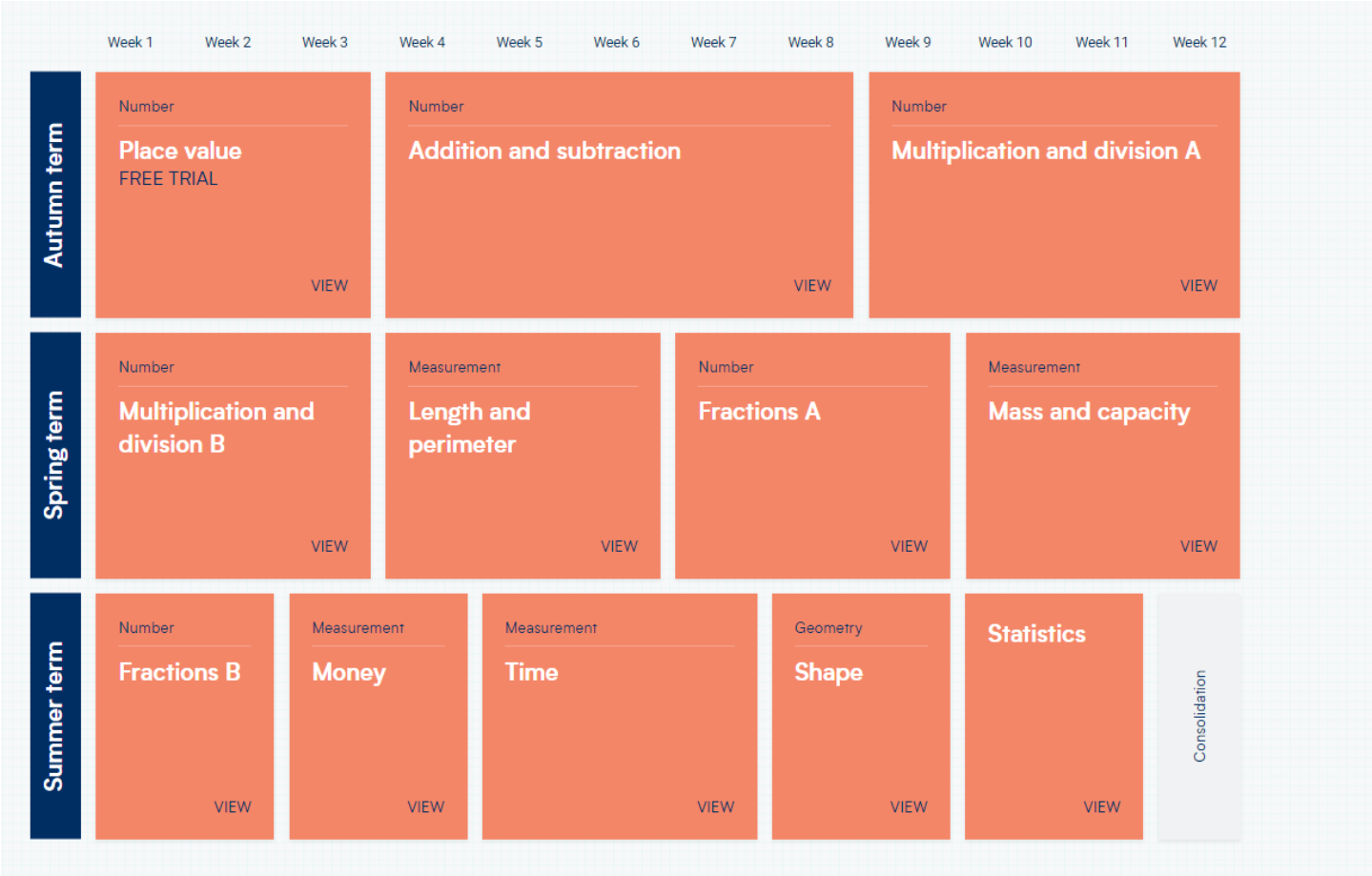
Algebra

- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables.

Ratio and proportion

- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- solve problems involving similar shapes where the scale factor is known or can be found
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

Appendix 6 – Example of a long term overview (White Rose)



Appendix 7 – Example of medium term planning (White Rose)

Step 1 Apply number bonds within 10

Step 2 Add and subtract 1s

Step 3 Add and subtract 10s

Step 4 Add and subtract 100s

Step 5 Spot the pattern

Step 6 Add 1s across a 10

Step 7 Add 10s across a 100

Step 8 Subtract 1s across a 10

Step 9 Subtract 10s across a 100

Step 10 Make connections

Step 11 Add two numbers (no exchange)

Step 12 Subtract two numbers (no exchange)

Step 13 Add two numbers (across a 10)

Step 14 Add two numbers (across a 100)

Step 15 Subtract two numbers (across a 10)

Step 16 Subtract two numbers (across a 100)

Step 17 Add 2-digit and 3-digit numbers

Appendix 8 – Example of planning teaching sequence

L.O To find equal groups.

Vocabulary

Group

A number of things that are gathered together.

A group of 5 people

Flashback 4

Year 3 | Week 7 | Day 5

1) Amir jumps 118 cm.
Mo jumps 91 cm.
How far do they jump in total?

5×10

2) Complete the bar model.

638	193

3) Compare using <, > or =

635 – 30 ◯ 635 – 300

4) How many faces does the shape have?

White Rose Maths

Can you complete the sentences below?

In Focus

There are _____ plates.

There are _____ strawberries on each plate.

There are ____ equal groups of ____

Can you write a number sentence for the groups of strawberries?

Let's learn

There are 3 plates.

There are 5 strawberries on each plate.

There are 3 equal groups of 5

There are 3 equal groups with 5 in each group.

There are 15 altogether.

1. Complete the sentences to describe the groups.

a)

There are ☐ plates.

Each plate has ☐ cakes.

There are ☐ equal groups of ☐

b)

There are ☐ bags.

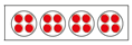
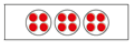
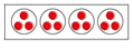
Each bag has ☐ apples.

There are ☐ equal groups of ☐

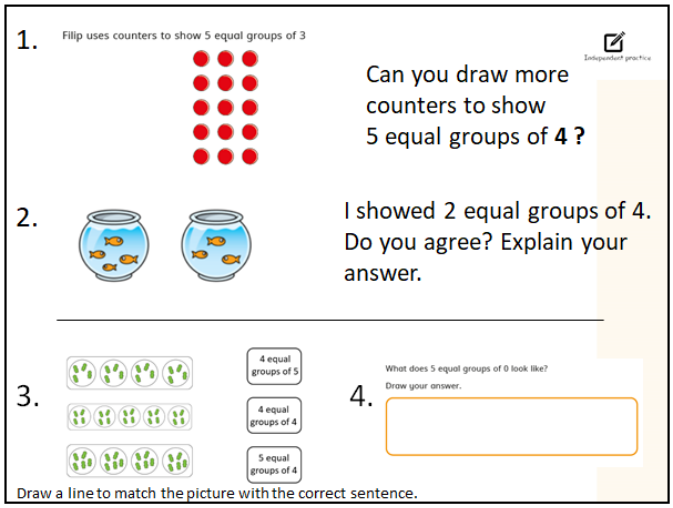
Guided practice

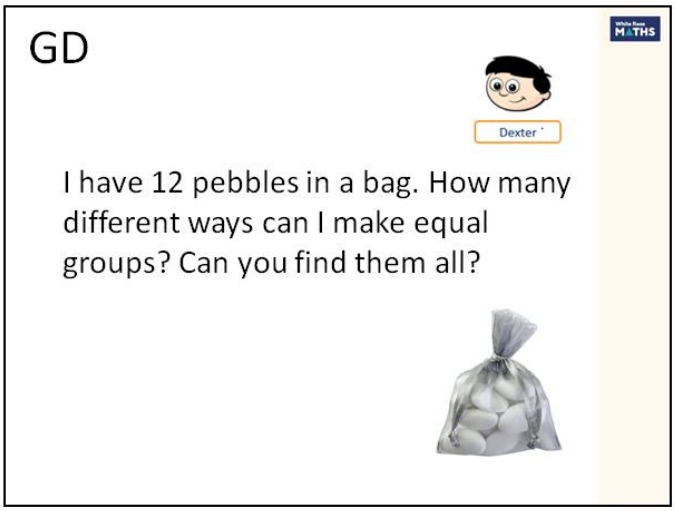
2.

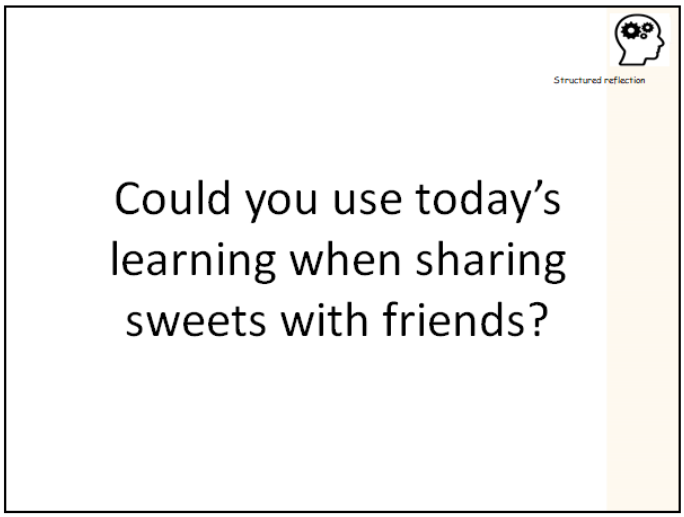
Match the statements to the pictures.

3 equal groups of 4	
3 equal groups of 3	
4 equal groups of 3	
4 equal groups of 4	

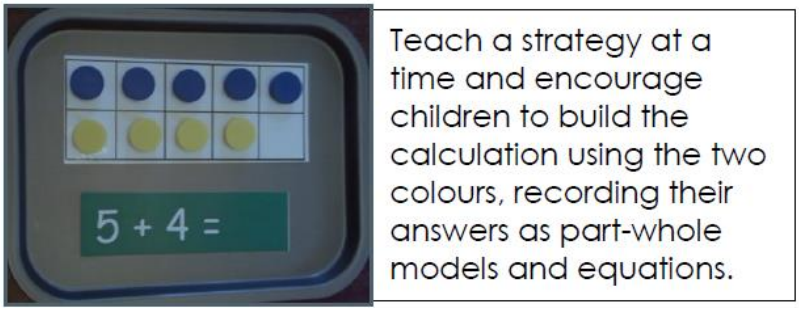
3. Can you show 4 equal groups of 3 in your book?



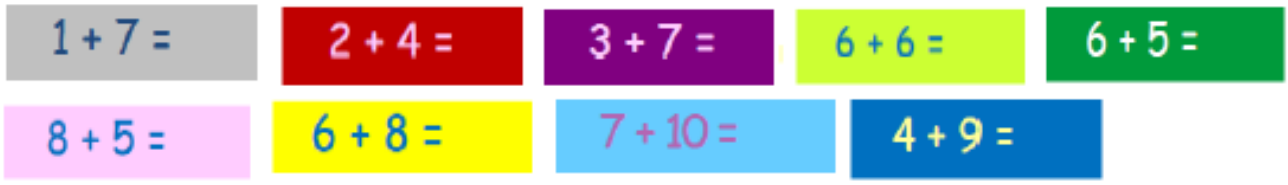




Appendix 9 –fluency trays



The **colour-coded addition cards** can be used for rehearsal of the different strategies.



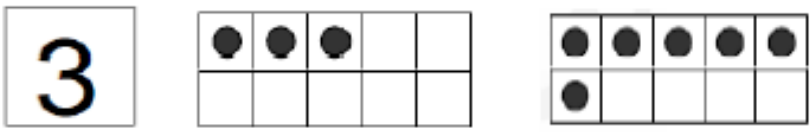
Using the ten-frame trays to help children visualise the additive root facts:

Step 1.

Although in other maths sessions children may look at random arrangements of numbers on a ten-frame in order to practise subitising and using their part-part-whole skills, ensure children are able to create and recognise **without counting** the numbers 1-10 on the ten-frame using this '**rule**' when they are learning strategies for the additive root facts:

Always fill the top row first starting from the left (the same way you read). When the top row is full start filling the bottom row from the left.

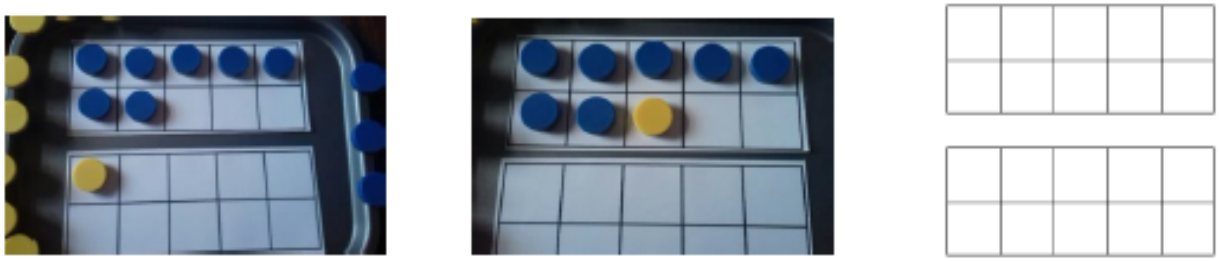
Allow children opportunities to practise building and recognising the numbers 1-10 by calling out the number and using numeral cards and ten-frame flash cards.



Step 2.

When the children can confidently recognise the numbers 1-10 **without counting** start teaching the strategies in the given order.

E.g. 'Adding one': For 1 + 7 or 7 + 1 children build both amounts (addends) and move the smallest amount of counters to create the total.



Step 3.

When children are gaining confidence with a particular strategy encourage them to visualise moving the counters (of the smallest addend) rather than actually moving them. Eventually the children should be able to picture the numbers on empty ten-frames, visualising the entire addition fact in order to picture the total.

Number Fact Fluency Programme step by step			**Totals to ten and adding ten**
Step	Strategy	Using the ten-frame trays	Additional Activities/Notes
1	Representing and recognising 0-10 on a ten-frame	Ensure children always fill the top row first starting from the left and then start filling the bottom row from the left when the top row is full. Encourage children to explain how they know the numbers 0-10 without having to count them. E.g. "Show me ..6" "Can you do it without counting?" "How do you know you have ..6?" "How many more counters do you need to make ..9?"	• Use ten-frame flash cards to support instant recognition of the numbers 0-9 • Children could record ten-frame number representations and match with the numeral • Children could complete partly filled ten-frames to represent given numbers
2	Adding 1 (grey cards)	**1.** Children build both amounts (putting the larger number on the top ten-frame even when given, for e.g. 1 + 7 instead of 7 + 1) and move the single counter to create the total. They should say the answer **without counting** the counters. **2.** They build the amounts but imagine moving the single counter and say/record the number sentence. **3.** When they are ready (maybe later in the week) they imagine the counters on the ten-frames, imagine moving the single counter and say/record the number sentence.	• Children represent the facts as part-part-whole models and record the addition facts in different ways • Ask, "What else do you know because you know...7+1=8?" This will encourage children to think of related facts: (1 + 7 = 8 8 – 1 = 7 17 + 1 = 18 27 + 1 = 28) • Use the 'adding one' flash cards (grey) to review progress • Use real-life contexts and encourage children to create their own 'number stories'
3	Adding 2 to even numbers (red cards)	**1.** Children build both amounts (putting the larger number on the top ten-frame) and move the smaller amount of counters to create the total. They say the answer **without counting.** **2.** They build the amounts but imagine moving the smaller number of counters and say/record the number sentence. **3.** When they are ready (later in the week) they imagine the counters on the ten-frames, imagine moving the smaller number of counters and say/record the number sentence.	• Children rehearse 'skip counting' in twos first from zero and then from any even number. • Ask, "What else do you know because you know...4+2=6?" (6 – 2 = 4 6 – 4 = 2 14 + 2 = 16 24 +2 = 26) • Use the 'adding two to even numbers' cards (red) to review progress • Use real-life contexts and encourage children to create their own 'number stories'
4	Adding 2 to odd numbers (orange cards)	(Use the ten-frame trays as before.)	• Children rehearse 'skip counting' in twos first from one and then from any odd number. • Ask, "What else do you know because you know...5+2=7?" (7 – 2 = 5 7 – 5 = 2 15 + 2 = 17 25 +2 = 27) • Use the 'adding two to odd numbers' cards (orange) and real-life problems.

11	Doubles of numbers to ten: 6+6, 7+7, 8+8, 9+9 (lime green cards)	**1.** Children build both amounts (addends) and move the counters from the lower ten-frame to make a ten and create the total. They say the answer **without counting** the counters and record the addition fact in different ways. **2.** They build the amounts but imagine moving the counters to make a ten and say/record the number sentence. **3.** Finally (later in the week) they imagine the counters on the ten-frames, imagine moving the counters to make a ten and say/record the number sentence.	• Children represent the facts as part-part-whole models and equations • Ask, "What else do you know because you know... 6+6 = 12? (12-6 = 6 60+60 = 120 16+16 = 32 36+36 = 60 + 12 = 72) • Use real-life contexts and encourage children to create their own 'number stories'
12	Near doubles: 5+6, 6+7, 7+8, 8+9 (dark green cards)	**1.** Children build both amounts (addends) and move the counters from the smaller addend to make a ten and create the total. They say the answer **without counting** the counters and record the addition fact in different ways. **2.** They build the amounts but imagine moving the counters from the smaller addend to make a ten and say/record the number sentence. **3.** Finally (later in the week) they imagine the counters on the ten-frames, imagine moving the counters from the smaller addend to make a ten and say/record the number sentence.	• Children represent the facts as part-part-whole models and equations • Ask, "What else do you know because you know ... 6+7 = 13? (13-6 = 7 60+70 = 130 36+37 = 60 + 13 = 73) • Use real-life contexts and encourage children to create their own 'number stories'
13	Bridging ten: 7+4, 8+3, 8+4, 8+5 (pink cards)	Use the ten-frame trays as before for the remaining bridging ten facts.	Use part-part-whole models, equations, related facts and real-life contexts as before.
14	Number in the middle: 5+7, 6+8, 7+9 (yellow cards)	Use the ten-frame trays as before.	Use part-part-whole models, equations, related facts and real-life contexts as before.
15	Adding 9 by making a ten *(or compensating)* (dark blue cards)	Use the ten-frame trays as before.	Use part-part-whole models, equations, related facts and real-life contexts as before.