Learning Academy Partnership

Our Core Offer: Maths

Summer 2025

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Trust Mission, Vision, Core Values and Beliefs

Our Mission: *Flourishing Futures*
"I came that they may have life and live it to the full."
John 10:10

Our Vision: *We will be an exceptional School Trust. We are committed to social mobility and a culture of belonging. We do this by investing in people enabling every child to be taught by the very best teachers so that we can achieve social change and all children flourish.*

Our Core Values: Our core values guide the way in which we work together:

Excel: We champion opportunity and equality for all and in all that we do.
Empower: We invest in each other and our communities.
Together: We are one team and agree to work as one family.

Our Beliefs: We believe that:

We are Stronger Together: we deliver and achieve more than we could ever do individually.
In a Sense of Belonging: every member of our School Trust matters and knows that they belong.
In Removing Barriers: ensuring that where you begin does not limit your horizons.
In Realising the Possible: you cannot be what you cannot see.

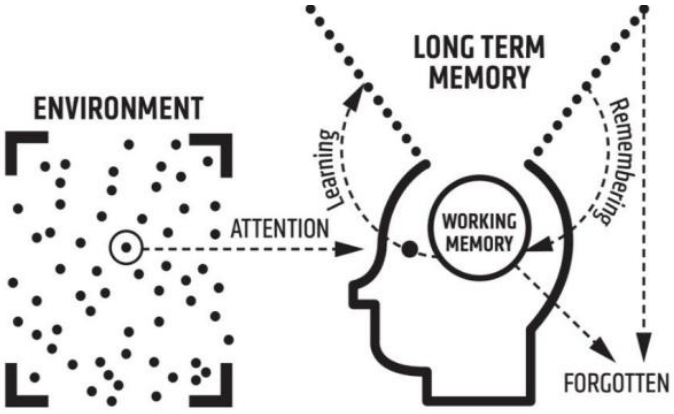
Rationale of the Maths Core Offer

Changes to our maths curriculum during the 2024-25 academic year have been driven by two main factors.

Optimal Learning Approach

Firstly, work in schools linked to our Optimal Learning Approach highlighted the need to adapt our teaching principles, mainly in terms of:

- Defining core objectives for every year group and developing structures to increase children's exposure to these objectives and therefore impacting on long term memory
- Increasing the opportunity for retrieval practice to develop the speed of recall, reducing the impact of the forgetting curve and strengthening schema
- Development of spaced practice linked to core objectives across the year
- Reduction of cognitive load throughout a maths lesson and across the curriculum
- Providing a range of opportunities for purposeful practice that is well-pitched to maximise progress
- Developing learners that have the motivation to use a modelled method systematically when working independently.
- Relentless exposure to worked examples so that children build confidence, work consistently and develop flow
- Dual coding through models, images, vocabulary and manipulatives
- Thinking out loud when modelling to exemplify mathematical decision making



Pedagogy on a Page

Secondly, during the 24-25 academic year, schools across the trust have embedded our Pedagogy on a Page document to maximise the impact of effective teaching and learning strategies. Effective maths teaching draws on all of these principles over time:

- Modelling – e.g. MT, OT, YT and when working with individuals during the independent part of the lesson.
- Questioning and Checking Understanding – maximising Assessment for Learning opportunities, especially during Flashback 4, your turn and the independent part of the maths lesson
- Routines – effective classroom routines coupled with effective maths pedagogy
- Explicit Instructions – My Turn
- Retrieval Practice – Flashback Four and the Retrieval slide of the White Rose session
- Reflection – e.g. the daily exit question
- Adaptive teaching – e.g. effective variation during the independent part of the lesson
- My Learning – e.g. children being resourceful when representing the problem using models, images or manipulatives
- Oracy – e.g. Through Flashback 4 to regularly retrieve or through verbal feedback during 'our turn' when children are using new vocabulary
- Feedback – addressing misconceptions in the moment through effective assessment for learning

White Rose Maths

Our approach is underpinned by White Rose Maths to ensure that teaching and learning of maths is progressive and is supported by a clear progression of models, images etc. The White Rose progression is based on clearly defined steps through units of learning and across units of learning. The White Rose curriculum is written with mastery principles at its core

- Numbers first – Developing a secure understanding of number is the first step to competency in the curriculum as a whole.
- Breadth before depth – knowledge is reinforced to develop a secure understanding
- Encourages collaboration – children progressing through their units of learning as a group and supporting each other as they learn with regular opportunities for children to be deepening their knowledge through articulating and representing their thinking collaboratively
- Focuses on fluency, reasoning and problem solving – giving children the skills and rapid recall of core knowledge to enable them to be competent mathematicians

Concrete/Pictorial and Abstract Approach

At the heart of our mastery approach is the Concrete Pictorial Abstract (CPA) approach. Research shows that when children are introduced to a new concept, working with concrete physical resources and pictorial representations leads to a better understanding of abstract concepts. We use CPA throughout our schemes of learning.

Maths Curriculum Intent Statement

As mathematicians, our children will develop a deep conceptual understanding through exploration, reasoning and problem solving of all areas.
We expect our children to explain and articulate their understanding and become fluent in number so they can use known number facts to make efficient choices with calculations. They will make connections and discover patterns to take creative approaches when faced with challenges and show appreciation of the beauty and power of Mathematics. We aim to develop resilient learners and our children take time to deepen their understanding of mathematical structures through the use of resources and representations.

Effective Teaching and Learning in Maths

Elicitation

In preparation for the teaching sequence, children complete an elicitation task to demonstrate their depth of understanding of this area of mathematics from the previous year's curriculum. This also serves to retrieve knowledge in this area from the long-term memory, in preparation for the teaching sequence.

Using this elicitation, teachers consider what preparation for the coming teaching sequence children will need. This may involve retrieval or practice sessions before the current year group content is taught. Lesson outcomes will be based on National Curriculum objectives and the Non-Statutory Guidance Ready-to-progress (RTP) criteria.

Use of Manipulatives

Children will be offered an appropriate range of manipulatives (as outlined in our calculation policy) to develop conceptual understanding for all learners. Teachers use these to expose the structure of the mathematics rather than to 'do' the mathematics. In this way, new concepts are introduced using Bruner's Concrete, Pictorial and Abstract approach.

Whilst there is a value, at times, for children to select their own manipulatives, teachers need to ensure that the use of manipulatives reduce misconception rather than increase them. Therefore, manipulatives that align with the teacher model would be the most appropriate.

Relationships and Connections

We deliberately expose the interconnectivity of mathematical ideas and provide learners with varied opportunities to move fluently between different representations of mathematical ideas. Children are often asked to show another way of solving a problem or to make sense of a different representation in the context of the same problem, to develop flexibility and what Richard Skemp terms, relational understanding, "a more meaningful learning in which the pupil is able to understand the links and relationships which give mathematics its structure."

Children are often asked to engage with other children's methods and critique these to develop a depth of understanding in the concept.

All Can Achieve

In line with Piaget's research, we believe that children need to find learning challenging to discover new things. We appreciate that new ideas will be accommodated with time, exploration, talk, concrete resources and conceptual understanding, as outlined above.

During a lesson, teachers are continually assessing attainment and progress through effective assessment for learning strategies and lesson structure and feeding back accordingly. A child who is quick to grasp a concept in one lesson, may not in the next. Therefore, we have no attainment based groupings in our classrooms.

Scaffolding and Deepening

We expect the vast majority of our children to move through the programme of study for their year group at broadly the same pace. Rapid graspers are challenged through rich and sophisticated problems and expected to demonstrate their reasoning, explain their thinking to others and be able to model the concept in more than one way.

Those taking longer to master have extra time to consolidate, pre-teaching and 'keep-up' interventions as appropriate, whilst receiving appropriate scaffolds through well-planned, quality first teaching in the classroom. Where possible, interventions take place in the maths lesson or on the same day, with children given time to apply independently before the next lesson, in order to keep up. All children are given opportunities to go deeper in their learning through journaling prompts (e.g. explain, prove another way) and scaffolds within their independent work.

Pupils will spend enough time to fully explore a concept before moving on to a different topic. Each teaching sequence is designed to provide minimal step progression through concepts so that all pupils can move forward together at broadly the same pace. An idea is well formed and reinforced by ample practice. New knowledge is then used in subsequent lessons so that all ideas build on top of each other and pupils have ample opportunity to develop relationships between the topics. Ideas are revisited as pupils progress through the years, each time at a higher level.

Typical Lesson Approach and Rationale

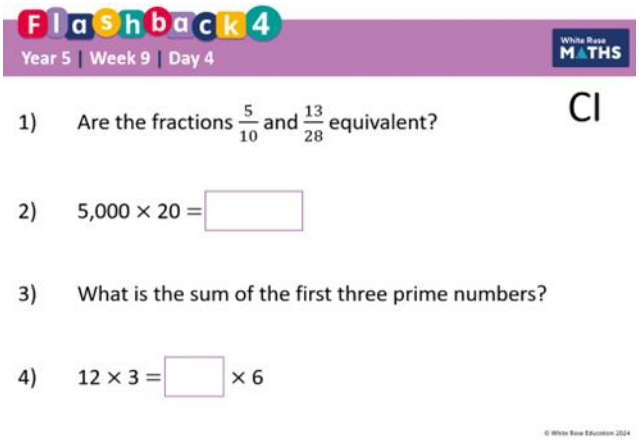
Part 1 - Flashback 4 – Approximately 10 minutes

At the start of the lesson, children work independently or with a partner to explore 4 questions. These questions have been developed by the White Rose team to ensure that all children have the opportunity to regularly retrieve key knowledge through effective spaced practice.

The structure of the 4 questions are:

- **What did we learn yesterday?**
- **What did we learn last week?**
- **What did we learn in the last unit?**
- **What did we learn last year?**

In addition, there is sometimes a 5th question on the slide (e.g. Roman numerals in Year 6) that varies overtime but consolidates the same objective.



Teachers need to use their knowledge of the class to enable a Flashback 4 session to be most effective. Strategies include:

- Refer to models, images and algorithms on a working wall to provide support to all learning of how they are expected to solve the problem (working wall will usually only support the children with the first 2 questions)
- Provide appropriate scaffolds and manipulatives to enable children to solve the problems using models and images that they have previously used in class
- Being ready to challenge children who are able to solve the questions quicky. For example, question 3 above gives teachers the opportunity to give some children an open-ended question to deepen their understanding.

- Briefly remodelling an example question linked to the day's 4 questions if needed (based on your assessment for learning from a previous session)
- Briefly modelling how to answer a question (in the moment or towards the end of the session) based on your assessment for learning.
- Removing a question if your class aren't ready to access the question (if you are planning to reteach a challenging objective later in the term)
- Adding an additional question if your assessment for learning or summative assessment analysis has identified a key gap

Over time, children should be able to demonstrate a high success rate independently or with a partner during Flashback 4. It is not essential for the vast majority of learners to have understood all four questions before moving on to the next part of the lesson.

If the majority of the children struggle with the 3rd question related to something taught in the last unit, if there is time, it would be appropriate for the teacher to remodel through a 'my turn' or 'our turn.'

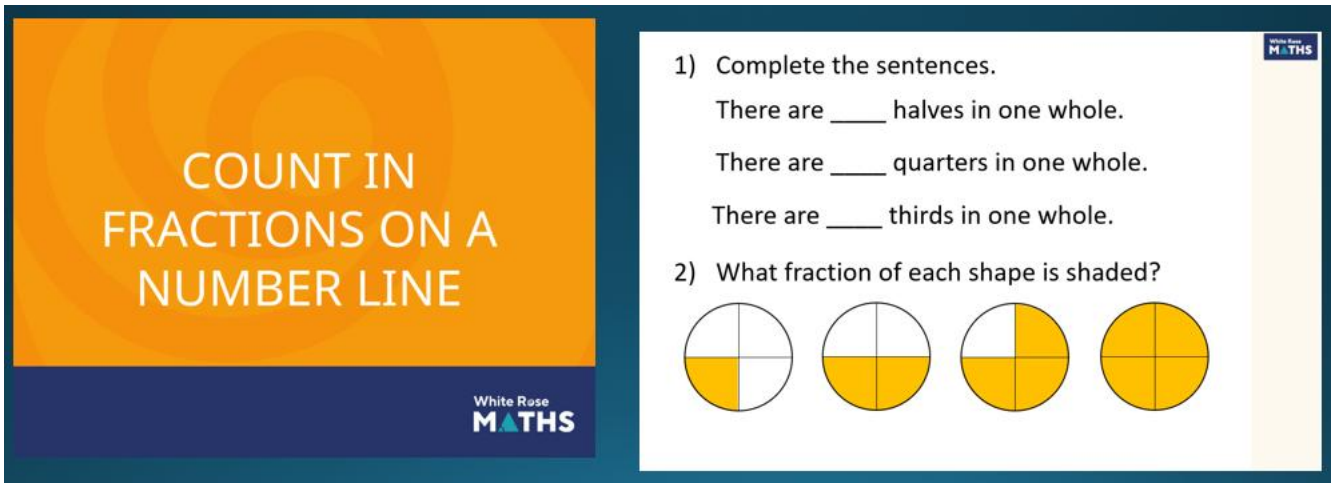
If the children struggle with more than one question, the teacher may have time to remodel one question but might need to state to the class 'I can see that some of us found question 4 tricky too so I'll find some time later in the week for us to practice this together.'

Flashback 4 is usually completed on a whiteboard with a partner and marked as a class.

Part 2 – Fluency – approximately 5-10 minutes

The second part of a maths lesson is a fluency session. The fluency slide is the first slide on the daily White Rose PowerPoint. Like Flashback 4, this gives the opportunity for children to recap prior knowledge through effective retrieval. However, unlike Flashback 4, the fluency slide is designed to recap a narrow band of knowledge that is relevant to the upcoming session.

High success rate needs to be achieved on the fluency slide to enable children to access the learning. In the example below, the children are retrieving key fractions knowledge in the retrieval slide before moving on to counting in fractions on a number line. If the vast majority of children are unable to understand question 2, the children aren't ready to complete the day's lesson as planned. In this case, teachers will either need to remodel the learning as part of the fluency session or adapt the main part of the planned session (e.g. remodelling the assessed gap)



Part 3 – Modelling New Learning – Approximately 15-20 minutes

The White Rose Maths daily PowerPoint supports teachers to model mathematical concepts through clear models and images. The PowerPoints are animated to support the children's understanding.

As part of our 'Pedagogy on a Page' approach to teaching across the curriculum, modelling using the White Rose slides in maths is usually taught in 3 parts – **My Turn, Our Turn, Your Turn**.

During the **My Turn** model, the children will be focused on the whiteboard and the teacher will model their thinking, effective vocabulary and will demonstrate the steps that they need to take to solve the question on the board. Teachers need to consider whether to model one question or more than one question and this will vary based on the teacher's assessment for learning and where the children are in terms of the unit of learning.

During **Our Turn,** the focus for the children continues to be the white board and the teacher, but this time the class work collaboratively to solve the problem. Learning during the 'our turn' part of the lesson might include the children working with a partner on a whiteboard.

The final part of the model, the teacher provides the children with the opportunity to work on a white board with a partner on a range of questions, this is the **Your Turn** phase. Children work collaboratively to solve the problem using the method or methods that has been modelled.

Chunking

In line with effective teaching and learning outlined in our Pedagogy on a Page document, effective teaching may involve the chunking of the modelling part of the lesson and independent activities.

For example, if children are learning to calculate the perimeter of rectilinear shapes, it may be more appropriate to model calculating the perimeter of an 'L' shape in a shorter input and then giving the children time to have a go at a couple of questions independently in books. The teacher would then have time to bring the children back together to model a different rectilinear shape (e.g. an 'E' shape) before repeating the teaching cycle.

Effective strategies to achieve high success rates when modelling new learning

- Adapting your planned session in the moment based on your assessment for learning from the fluency session
- Maximise Assessment for Learning opportunities – particularly during the 'Our Turn' part of the model so that lessons can be adapted when needed or targeted support can be provided (in the moment verbal feedback or identifying the children to go to first during the independent part of the session).
- Worked example visible to all children at the front of the classroom and an expectation that children are following the method
- Not introducing your children to too many models, images and methods
- Consider removing the animation from the White Rose slides if they aren't supporting the children's understanding or would affect the pace of your session
- Effective oracy strategies to develop new vocabulary and consolidate relevant vocabulary.
- Thinking out loud to children so that they know how good mathematicians think and how they establish what to do first.
- Modelling incorrectly (when appropriate) so that the class can spot the error, understand the misconception and solve successfully.
- Positive feedback linked to children being able to follow the modelled method

Part 4 – Independent Learning – Approximately 20 minutes

As part of our White Rose subscription, teachers have access to pupil worksheets that have a range of questions for every lesson.

To maximise learning, teachers need to carefully select appropriate questions from these pupil worksheets to create a learning strip. The questions are stuck in the book on the left-hand side of a page and the children solve the questions using the space on the right-hand side.

Key principles

- Independent learning strip contains models and images to support learning that mirror the images in the teacher's model
- Children work independently through the questions but can seek support from a partner or an adult when needed.
- Manipulatives are provided where appropriate
- Children can be challenged and extended by verbal feedback – APE – Another way, prove or explain

Variation Principles and Challenge

- Learning strip starts with a question or two that are below the attainment level of the session so that there is a high success rate at the start of the activity.
- Arithmetic and arithmetic style questions at Age Related Expectations are prioritised in the first half of the strip to enable children to develop fluency and flow with a method and develop their understanding of a concept
- Problem solving and reasoning questions are interspersed across the strip but are prioritised more in the second half of the strip so that children are exposed to these questions once they have developed confidence and accuracy with a method. Teachers need to ensure that, across the week, all children have the opportunity to problem solve and reason in maths.
- Questions that are considered greater depth will be prioritised in the second half of the strip
- Extension questions, where appropriate, will be made available

Part 5 – The Exit Question – Approximately 1-2 minutes

The independent part of the maths lesson involves the children tackling a range of questions that usually become more challenging and involve more problem solving and reasoning as they progress through the questions.

At the end of a maths lesson, many pivotal learners will be grappling with a challenging question and will rush to finish or leave the question unfinished whilst their peers are packing up and getting ready for the next part of the school day

At the end of the session, it is therefore important for all children to be able to reflect positively on their progress during the session.

The exit question should be a question that is broadly at age related expectation where the focus is on the method to solve the problem and the confidence to solve it, e.g.

If I gave you this question tomorrow morning…

- Do you think you would be able to remember the method that we have practiced today?
- What would you do first?
- Do you think that you could solve this problem successfully?

Long Term Planning

The Trust's long-term planning document is the National Curriculum 2014 Programme of Study. This should always be a teacher's first starting point for reference, particularly the first two pages which highlight the 3 aims underpinning all Trust CPD, teaching and learning activity in mathematics. This document:

• clearly states an expected pathway of progression across the Key Stage

• breaks down the Key Stage progression into a yearly plan

• reflects the school's vision and national priorities

The progression in knowledge and skills is mapped out by year group and the White Rose Maths teaching sequences. The White Rose Long term plans, coupled with the DfE ready-to-progress criteria map out the coverage of what to teach in a coherent order.

Mixed Age Planning

Teachers use the White Rose planning framework to support the alignment of similar concepts within mixed age classes but remaining focused on the key RTP criteria for their year group to ensure a cohesive journey through the mathematical learning that enables links and connections to be made with other mathematical concepts.

Where possible, teachers teach similar concepts to the whole class together, with appropriate differentiation to ensure that each year group accesses age-appropriate content. The non-statutory guidance supports this.

Demonstrating Depth

Based on the work of John Holt (1964) and more recently the NCETM (2015) we believe that a child really understands something (and has therefore mastered it) in maths if they can:

• Describe it in their own words

• Represent it in a variety of ways (e.g. using concrete materials, pictures and symbols)

• Explain it to someone else

• Make up their own examples (and non-examples) of it

• See connections between it and other facts or ideas

• Recognise it in new situations and contexts

• Make use of it in various ways, including in new situations

Children should therefore have opportunities to demonstrate the above in both lessons and independent application.

It is essential that, across the week, teachers have the opportunity to work closely with children who have the potential to achieve greater depth so that:

- Children have the opportunity to secure their understanding of the objective
- Children have the opportunity to develop their toolkit to demonstrate a depth of understanding
- Children have the opportunity to work with children who are working at greater depth and to be able to hear their thinking and see their mathematical process.

Fluency in number facts

All classes have a daily 15-minute fluency session, in addition to the main maths lesson. In KS1, the focus is on additive fact fluency and in KS2 the focus is on multiplicative fluency. In KS2, additive fluency is still taught to maintain the use of the 12 key strategies taught in KS1 and applying them to different numbers, appropriate to the year group.

We believe that children who can recall facts are able to secure the maths curriculum more easily due to the reduction in cognitive load when learning new methods when number facts are secure.

Additive facts

The trust has a systematic approach to the teaching of additive facts, outlined in the Number Sense Maths and Mastering Number materials. Children start with subitising numbers and quantities up to 5 and then look at the composition and decomposition of numbers to 10 before learning 12 key strategies to support them in deriving key number facts.

The aim of these sessions is for children to use these strategies to calculate to automaticity, rather than relying on counting. Sessions rely heavily on visual imagery and the use of concrete apparatus, supported by animations and key representations, with plenty of time to practice the strategies being taught. These are supplemented with activities parents can do at home to support the learning and involve them in their child's learning.

As a Trust we also use the Numbots app as a practice tool for home learning to consolidate many of the strategies taught. We know that this programme was based on the same research as the Number Sense Maths programme. More details can be found in our 'How to teach a Numbersensemaths session' doc.

Multiplicative facts

Unlike the learning of additive facts, our KS2 sessions focus on a key verbal sound pattern and learning and memorising the multiplicative facts using this same pattern, with one fact a day, through practice. The teaching of relationships and deriving facts is taught separately in the main maths lesson.

Children learn the tables systematically, one table at a time and one fact at a time, using the same sound pattern and without exposing the children to the commutative law (only showing the biggest number first).

When starting with a new times table, children are reminded of the facts they should know, based on the laws of commutativity. This reduces the number of facts children need to learn.

Children take a daily tables test (that takes 3 minutes for the children to complete). Children mark their daily test through chanting, using the memorised sound pattern and only reading the facts with the biggest number first. Children have the times table they are learning up on the board or in front of them so that they can refer to this if they want to. This scaffold is gradually reduced over time, as the facts become memorised.

We also use Times Tables Rockstars as a tool to help pupils practise the multiplication table they are currently learning and to practice all the tables together regularly. Time is given in school and at home to use this and progress is celebrated in class and as a whole school. More details can be found in our 'How to teach a Times Tables session' doc.

Assessment Points

As detailed in our formative assessment and feedback policy, an elicitation task is carried out at the start of each teaching sequence to reactivate and retrieve prior learning from the previous learning. This informs how the teaching for this sequence is tailored to meet the needs of all learners.

Ongoing feedback is given to children throughout lessons and 'live marking' is done in lessons so that children have the opportunity to action this feedback straight away and make greater progress in their learning. Teachers use this feedback to ensure learners have a depth of understanding within the concept, through 'explain, prove and show another way' prompts.

Teachers make use of assessment questions from the relevant age-appropriate, ready-to progress criteria (in the non-statutory guidance doc) throughout the teaching sequence to check children's understanding of the key concepts.

For additive facts fluency, baseline assessments are captured using Number Sense Maths materials and then at the end of each stage, as determined in the programme. This is alongside daily formative assessment on whiteboards and in children's responses.

For multiplicative fact fluency, baseline assessments are captured using the Soundcheck in TT rockstars for Y3, 4 and 5 and this is repeated termly for Y3 and 5 and half termly for Y4 to track progress towards the MTC check. Daily timed tests (out of 40) are captured in the tracking sheet for each school.

Summative PUMA tests are used at the end of the autumn and summer term, to track the progress of children both within and across school years, using a standardised score. PUMA assessments are optional in the spring term and not funded centrally. This additional data point should be considered for all pivotal learners. The summative assessments also provide diagnostic information about topics taught so far, which is integrated into the next term's teaching

Core Objectives

In July 2024, the conversion charts were released for the Year 6 SATs and, for the first time, the raw score required to achieve a standardised score of 100 dipped to 54. This meant that a child would be considered an Age Related mathematician if they got more questions wrong than right.

The same summer, children who took GCSE maths could pass their GCSE (achieve a grade 4) by being awarded just over a quarter of the marks available.

As a trust, we want all of our children to be confident and fluent mathematicians across the curriculum. To promote this, we have identified 10-15 core objectives for every year group. These objectives are centred around the key number concepts such a place value, multiplication, division, fraction, decimals and percentages.

Across the year, there will be a disproportionate focus on these objectives to achieve a high success rate, effective strategies include:

- Using the first half of the autumn term to revisit core objectives from the previous year
- To weave core objective questions into Flashback 4 (when you have space for an additional question)
- To provide opportunities for children to practice using White Rose Infinity Quizzes in school
- Using the core objectives overview to pinpoint key next steps for children working a year or more below ARE
- Monitor the progress and attainment of key learners using White Rose Infinity Plus
- Skew home learning towards practicing core objectives
- Sharing the core objective year group list with parents for them to use at home
- Using the summer term to revisit core objectives from current year