Singleton Church of England Primary School

Mathematics Overview

"Passion for Learning .....Passion for life"

Governors and school leaders facilitate a reflective and ambitious culture. Constructive challenge and creative ideas are encouraged,
valued and used to inform whole school planning. The views of learners, parents, staff, governors, therapists, social workers and other
stakeholders inform the evaluation of the quality of our work and provision, which in turn is used to identify areas for improvement.

Curriculum Overview

Intent

The aim of our curriculum is linked to our vision

School Vision

To provide the children with a wide variety of engaging and challenging opportunities enabling them to live life to the full. Developing a growth mind-set, believing that with God everything is possible. To show, love, trust, wisdom and respect, becoming exemplary role models in our community and the wider world.

MATHEMATICS IS THE MOST BEAUTIFUL AND MOST POWERFUL CREATION OF THE HUMAN SPIRIT.
— Stefan Banach, Polish mathematician

The rationale behind this is…

At Singleton Church of England School, we believe that every child must be provided with opportunities to develop socially, emotionally, academically and physically to achieve the highest possible standards. The sky is the limit for our children. We seek to inspire each other and learn to value greatness, ambition and achievement of all kinds. To belong to Singleton School is an honour. Each of us aspires to reach a potential, which is not limited, but is given wings through the creative curriculum and our Christian Values, which will truly enable us to embrace living our lives without limits.
As such, there is high academic/ vocational / technical ambition for all pupils, and as a school, we do not offer disadvantaged pupils or pupils with SEND a reduced curriculum.

Singleton C of E Primary School is an exciting and innovative Church of England School committed to providing the highest standard of education for every pupil. We share, with parents, the responsibility for teaching our children and preparing them for the future. It is a place where children really matter and every individual's ability is recognised, developed and rewarded. We embrace every child's learning journey and encourage them to be the best they can be.

At Singleton, our intent for mathematics is to teach a rich, balanced and progressive curriculum using maths to reason, problem solve and develop fluent conceptual understanding in each area. Our curriculum allows children to better make sense of the world around them by making connections between mathematics and everyday life. Our policies, resources and schemes support our vision and clearly outline where maths can be incorporated across different curriculum areas. The structure of the mathematics curriculum across school shows clear progression in line with age related expectations. Teaching curriculum content in blocks allows children to explore skills and knowledge in depth and gain a secure understanding of particular subject matter. Key knowledge and skills are also revisited regularly allowing repetition to embed learning. A concrete, pictorial, abstract approach provides children with a clear structure in which they can develop their depth of understanding of mathematical concepts. We aim to ensure that mathematics is a high-profile subject which child view positively and with a 'Can do' attitude.

EYFS

Our children will leave the Foundation Stage at Singleton CE Primary School having had many opportunities to develop their understanding of number (including the composition of numbers, number bonds and subitising), numerical patterns (including odds and evens and doubling), measurement, shape and space in a broad range of contexts in which they can explore, enjoy, learn, practise and talk about numbers and shapes. We encourage pupils to understand and respond to the symbols that represent numbers and what this means in real contexts. We support children in understanding what an important role shapes and numbers play in our everyday lives and how they develop our own understanding and help us to solve problems. We approach this area by fostering a love of number and the enjoyment of solving problems.

We have developed our own bespoke planning for the EYFS stage

New EYFS maths yearly Overview.doc

Y1 - 6

To support with teacher workload / work life balance we have devised our own scheme of work which uses Unit Plans from the National strategies and White Rose Maths as a basis.

- We have developed a curriculum that is ambitious and designed for all pupils. It is coherently planned and sequenced towards cumulatively providing the necessary knowledge and skills for the pupils' future to empower them to take their role as informed and active citizens in the 21st century. Its emphasis is not just on mathematical knowledge but also skills and concepts. It has the same challenging academic ambitions for all pupils. They all work from a shared starting point to answer the same key questions.
- Singletons numeracy scheme of work is a complete curriculum programme for primary mathematics which provides 6 blocks of work to interest pupils and encourage curiosity about the mathematics curriculum, but also provides opportunities for investigation, challenge, using and applying and problem solving. It offers complete coverage of the Programme of Study for Mathematics (2014).
- From starting points suitable for all, pupils develop to tackle appropriate challenges for KS1 and KS2 pupils of varying abilities. The units have key questions to encourage the use of mathematical enquiry, as well as a focus on the acquisition and application of key subject knowledge, concepts and vocabulary throughout.
- There is a consistent approach to mental and written calculations used across school and the planning supports the 'modelling' / direct teach aspect for all staff – to help scaffold teaching and learning experiences.
- Skills, knowledge and understanding in mathematics progress through Year 1 to Year 6, being taught, developed and applied throughout the schemes of work. A range of opportunities are provided to enable all pupils to communicate their knowledge and understanding of the subject. Links are made within and across units to support pupils in making connections.
- In our school we have mixed aged classes and the scheme of work has been developed to support with the teaching and learning of Age-Related Expectations for each year group. The front cover of each unit provides the teaching staff with information for the year group below and above.

MATHEMATICS KNOWS NO RACES OR GEOGRAPHIC BOUNDARIES; FOR MATHEMATICS, THE CULTURAL WORLD IS ONE COUNTRY.

— David Hilbert, German mathematician

Implementation

Our curriculum is frequently reviewed to ensure that is it current and effective and teachers are supported and aided in their teaching of mathematics through appropriate high quality CPD ensuring confidence in the skills and knowledge that they are required to teach. We continually strive to build upon the excellent understanding of the expectations of the curriculum that our staff have. We achieve this through regular quality CPD which is provided through the subject leader, external courses, collaborative lesson study and an annual support package from North North West Maths Hub. All staff are encouraged to raise questions, seek support and request further training if needed in order to ensure everyone is confident in what they teach. Good practice is always shared between staff and all CPD is used to inform teaching and learning across school. Resources and equipment are audited regularly so that children have materials of high quality and accuracy to support their learning. Our resources allow us to better use models and images to support learning in each area and enable the progression from concrete to pictorial to abstract.

EYFS

Implementation:

In Foundation our teaching of Maths is based upon the NCETM materials. Numberblocks episodes are used as a launch pad for the children, they bring the numbers and ideas to life in the world around them. We have devised our own bespoke math curriculum, this is used as a planning tool, but we adapt according to the needs of our children. Pupils explore maths, using mathematical vocabulary to reason and explain their findings. Our children use their maths skills to make better sense of the world around them, relating pattern between mathematics and everyday life. Teachers teach the skills needed to

succeed in mathematics providing examples of good practice and having high expectations. In Foundation, each day children take part in a quick fifteen-minute whole class number activity in the morning, and experience related activities in the continuous provision. Throughout EYFS we create a rich environment, where talk for maths is a key learning tool for all pupils. There are opportunities for our children to explore and develop their mathematics throughout our learning environment, inside and outside. Adults are skilled at encouraging mathematical opportunities through children's play and will challenge where this is a focus for the child's next step.

Progression - cardinality and counting
Progression - comparison
Progression - composition
Progression - pattern
Progression - shape and space

Y1 – 6

Our scheme of work is designed to be delivered by non-specialists, with core mathematical knowledge identified and explained throughout. The unit plans are very detailed in terms of the 'how to teach' a strategy / concept. They provide clear models for demonstration that are consistently built upon and developed as the children progress through school. The plans provide flexibility for the staff to plan tasks and activities for their classes taking into account the learning needs of the children.

- Appropriate discussion is recommended as a means of checking pupils' mathematical learning systematically, identifying misconceptions and providing immediate feedback. With Key questions and discussion points identified within the Unit Plans
- Questions and tasks to deepen learning for the most able pupils are incorporated where appropriate.
- On the Block overviews – NRICH tasks and their links have been identified for the staff
- The plans are progressive - Revisiting ideas and concepts in different, more challenging, contexts in later units, using varied assessments and the inclusion of quizzes / games, Key questions, warm up games and plenaries all designed to help pupils remember content and integrate new knowledge into their evolving conceptual framework.
- Quality resources and materials are provided to support the mathematics curriculum and are sequenced towards the accumulation of skills, knowledge and understanding for pupils' futures. Each year group has their own planning folder on the server which has a wealth of resources saved for the staff to reduce their workload but to also ensure that consistently high quality resources are used. These include
    - NRICH links
    - Gordon's ITP's models and images
    - Links to White Rose - Maths Hub – mastery support materials
    - Overcoming Barriers – Teaching support guides
    - Intervention programmes - Over coming barriers, Wave etc
    - PowerPoints
    - Games
    - Pitch and expectations
    - Maths Knowledge organisers
    - Maths Challenges
- We also have a high level of quality practical resources.


2. a Progression in Knowledge and skill


2. Maths - progression of skills

Progression in Knowledge and Skills - mathematics FS – Y6

Evidence of impact

The impact of our mathematics curriculum is that children understand the relevance and importance of what they are learning in relation to real world concepts. Children know that maths is a vital life skill that they will rely on in many areas of their daily life. Children have a positive view of maths due to learning

in an environment where maths is promoted as being an exciting and enjoyable subject in which they can investigate and ask questions; they know that it is reasonable to make mistakes because this can strengthen their learning through the journey to finding an answer. Children are confident to 'have a go' and choose the equipment they need to help them to learn along with the strategies they think are best suited to each problem. Our children have a good understanding of their strengths and targets for development in maths and what they need to do to improve. Our maths books evidence work of a high standard of which children clearly take pride; the components of the teaching sequences demonstrate good coverage of fluency, reasoning and problem solving. Our feedback and interventions support children to strive to be the best mathematicians they can be, ensuring a high proportion of children are on track or above. Our school standards are high, we moderate our books both internally and externally and children are achieving well.

EYFS

All children are expected to success and make outstanding progress from their starting points. They are competent with the skills of subitising and have developed number sense skills. Pupils can talk about number and explain what it is and isn't. They solve problems and make predictions about what might happen while using appropriate vocabulary. Our pupils apply their mathematical skills in a variety of contexts. They have a positive mind set about maths and making 'mistakes.'

Y1 – 6

- The impact of the Mathematical approach is evidenced through the pupils' use and understanding of the identified mathematical vocabulary and their association of it with relevant learning contexts
- It is evidenced by the use and outcomes of the varied activities, key questions, key assessment opportunities and quizzes threaded through the learning experiences provided.
- It is also demonstrated by the pupils' ability to show progress along the 'observe, use mathematical vocabulary to describe, compare, give reasons and explain what they are learning about' sequence, and in their acquisition, application and transferability of mathematical skills.
- In particular, it is evidenced by the pupils' ability, willingness and confidence in addressing and discussing each unit's key questions, giving an ability-indicative response focusing on mathematical vocabulary, skills and concepts.
- Our Numeracy curriculum is taught and implemented successfully, with the following strengths:
    - Subject knowledge (including content and pedagogy) of teachers is strong – this is supported by an effective scheme of work which includes additional supportive materials for teachers to read around prior to teaching

MATHEMATICS HAS BEAUTY AND ROMANCE. IT IS NOT A BORING PLACE TO BE, THE MATHEMATICAL WORLD. IT IS AN EXTRAORDINARY PLACE; IT IS WORTH SPENDING TIME THERE.

— Marcus du Sautoy, British mathematician

Intent

Why develop our own schemes of work?

Y1 – 6

We are a small school with mixed aged classes. When the new National Curriculum was introduced in 2014 we found ourselves in a different position to a one form entry school, with the introduction of 'Age Related Expectations,' - milestones to be reached at a specific year group.

With a mixed aged class scenario, we could not support our mathematical teaching and learning with an 'off the shelve style scheme of work' as so many primary schools were doing at this time. This became very apparent in the early days, so as such we began in 2014 developing our own approach to the

development of a scheme of work for mathematics in our school that also encompassed a strategy for teaching a mixed age class using a teaching carousel.

We devised a complete curriculum programme for primary Mathematics drawing on readily available quality resources such as White Rose, The National Strategies, NRICH which ensures pupils gain a coherent knowledge and understanding of mathematics. It offers complete coverage of the National Curriculum Programme of Study for Mathematics (2014)
From starting points suitable for all, the units develop to provide appropriate challenges for KS1 and KS2 pupils of varying abilities. The units have key questions to develop the use of mathematical enquiry, as well as a focus on the acquisition and application of key subject knowledge, concepts and vocabulary throughout. Revisitation is embedded within the scheme to support retention of knowledge. Learning is interleaved so that children return to key aspects of mathematics throughout the year to develop and deepen their learning.

How the scheme is organised?

Blocked Plans

- **Blocked Plan** (Medium term plan)**– 6-week overview**
  - These identify the National Curriculum coverage for the six-week block.
  - These plans where possible provide for the staff a clear concise overview of the NC for **both age ranges** that they teach and they have been organised to the best of our ability to ensure that we can teach via topic and concept. Although this is not always possible, so for example in Y5/6 the year 6 children are supposed to cover algebra and ratio and proportion where as Y5 do not – but we cannot teach them separately so the Y5 children have to cover these concepts at a differentiated level.
  - The challenge lower down the school in Y1/2 is ensuring that the children in Y1 don't miss out on Key essential learning and that number, the number system and place value are embedded. In light of this we give the staff in this class options of Y1 and Y2 planning – so that within the carousel where staff feel they have to be taught separately as year groups the Teaching assistant will support with delivery and the class teacher will ensure within her target group sessions she teaches specifics to a group.
  - These plans also identify the support plans from the Unit plans that help with planning.
  - The plans also outline the NRICH links to reduce staff workload
  - **Statutory and non-statutory guidance** is also outlined on these Block plans for both year groups taught – **it is vital that staff look at this part** of the plan so that they can make sure that they cover all aspects for both age ranges so that there are no gaps

Example of a Block Plan

KS1 KS2

block 4 Year 1 2.docx

block 5 - y5 6.docx

THE STUDY OF MATHEMATICS, LIKE THE NILE, BEGINS IN MINUTENESS BUT ENDS IN MAGNIFICENCE.
— Charles Caleb Colton, English cleric, writer and collector

Progression in Mathematics –

Overview of annual coverage

- This document was developed alongside the Block Plans – focusing on how we implement the new curriculum. Looking at what we need to teach in terms of statutory requirements – but also the frequency and the whole school approach.
- Research from Ofsted suggests that there is a growing body of evidence that interleaving (teaching a curriculum that revisits strand each term) improves retention. This is something that as a school we have advocated for many years
- This document is used by staff to see the progression throughout the school.
- These also supports the notion that the work given over time across the school match the aims of the NC – is coherently planned and sequenced – building on prior knowledge and skills – providing a pathway for future learning.
- Staff need to be aware that this is a live document and that it should be reviewed annually – so for example if in Y5/6 Teacher feels that there are too many lessons on shape and not enough on fractions – we would look to modifying this and the Block Plans over views to facilitate his professional judgements

Progression in Knowledge and skills

Alongside the Curriculum Coverage, assessment and progression grids we also produced for the staff
Curriculum Progression of skills and knowledge grids.

- This is bespoke for our school, to support with planning, teaching and learning.
- This is particularly important with the mixed age classes – as it provides a quick reference point
- It breaks the numeracy curriculum down into the statutory areas e.g. Number and place value and Addition and Subtraction. It then enables staff at a glass to see what was taught prior and what comes next.
- The progression in skills charts uses the Lancashire KLIPs – which we use within teaching and learning and assessment. The KLIPs break learning down in to manageable steps
- This supports with SEN and inclusion as it supports with differentiation for children that are working below Age related expectations. We also use LAPS – which breaks down the learning outlined in KLIPs into even smaller steps
- These also supports the notion that the work given over time across the school match the aims of the NC – is coherently planned and sequenced – building on prior knowledge and skills – providing a pathway for future learning
- Additional charts are available on Twinkl etc – but these although linked to the National curriculum – don't necessarily cross reference with the Klips as easily and the noticeable difference is the fact that the objectives are more generic – e.g. an overall objective without the steps that build upon to achieve the objective. But they are available and do have uses.

2. Maths - progression of skills

Unit Plans – These are our Short-term plans

- They support delivery of effective lessons with the focus on mathematical representations, language structures, and the relevant connections to other areas and the expectations set out in the example assessment questions.

- These support assessment of children's learning and inform decisions about when to move on (formative assessment) as well as summative assessment to check whether the learning has been sustained
    - These are a starting point for staff in terms of planning – they ensure that all the NC is taught and they also provide a structure for how it is taught – e.g. how often children are taught place value within a year etc.
    - Not every unit has teaching suggestions – there are a small amount of lessons that teachers need to plan some from scratch – but the vast majority of lessons within the units do have an excellent base for teachers as a starting point.
    - The front sheet of a unit plan identifies the KLIPs (Key Learning Indicators of Performance) coverage for that unit which is how we break down the critical knowledge and skills and deliver the National Curriculum. It also identifies the coverage for the year group below and above. This is necessary for mixed aged planning and teaching. This supports with SEN and inclusion as it supports with differentiation for children that are working Below Age related expectations
    - We developed the plans into topic units as we have to teach the class as a whole we cannot teach the year groups separately.
    - The unit plans provide guidance on the 'Direct / Model how teach' aspect of the lesson – ensuring that strategies are consistently taught across school and built upon as children progress. This also ensures that support staff have a clear structure as to how to teach concepts when working with a group. Within this Key question are identified and also Key Vocab It also has suggestions for Plenary and mental warm ups for the staff to use as well if they feel appropriate
    - Within these plans staff have the flexibility to use their professional judgements to adapt and modify to meet the learning needs of the children.
    - We recommend to the staff that they use WHITE ROSE Maths materials, NRICH, Test base, Mastery Materials and Twinkl to support their teaching / planning These plans do **not contain tasks** – the staff have to add tasks suitable for the children that they are teaching to the plans – they have to look at the front cover and see the expectations for the two-year groups that they teach and plan tasks accordingly to ensure that NC for both year groups are covered.
    - The staff cross reference the KLIPs (which are the assessment steps we use within maths) with the NC coverage on the front of the plan
    - We buy in to and have bought a range of supportive materials to help staff **plan the tasks** - White ROSE Maths Hub Resources, Mastery / Mastery with greater depth, Abacus, Test Base, NRICH, Pitch and Expectations, My Maths etc. Reference to task / resources should be added to the plans
    - Expectations in terms of tasks are as follows – over the week the tasks must include
        - Mastery / Mastery with Greater depth
        - NRICH style task
        - Reasoning and problem solving
        - Varied Fluency tasks
        - Staff must have an in depth understanding of the calculations policy and consider the transitions between Concrete – Pictorial – Abstract – this must be evident within the execution of the task and the type of task

Example of a unit plan

Year 2 Unit 1 Spring Term.doc

KILPS /LAPS

- We use LCC KLIPs /LAPs to support with Assessment without levels – they are key learning indicators that break down the NC into progressive stages which are designed to scaffold the learning.
- The LAPS key learning is broken down into smaller steps to support teachers in planning appropriate learning opportunities
- The Staff use these at the planning stage and cross-reference the NC expectations on the front of the unit plans with the relative KLIPs for tracking of progress.
- These key pieces of learning will support pupils in becoming fluent in the knowledge and skills of the curriculum and ensure that the learning is effective and sustained.

Example of KLIPs and Laps

LAPS - Year 6.pdf

LAPS - Year 3.pdf

Teaching

- Quality first teach model implemented across school. The Wave 1 element is about what should be on offer for all children: the effective inclusion of all pupils in high-quality everyday personalised teaching. Such teaching will, for example, be based on clear objectives that are shared with the children and returned to at the end of the lesson; carefully explain new vocabulary; use lively, interactive teaching styles and make maximum use of visual and kinaesthetic as well as auditory/verbal learning. Approaches like these are the best way to reduce, from the start, the number of children who need extra help with their learning or behaviour. Inclusive Quality first teach should include the following: -
  - Highly focused lesson design with sharp objectives
  - High demands of pupil involvement and engagement with their learning
  - High levels of interaction for all pupils
  - Appropriate use of teacher questioning, modelling and explaining
  - An emphasis on learning through dialogue, with regular opportunities for pupils to talk both individually and in groups
  - An expectation that pupils will accept responsibility for their own learning and work independently
  - Regular use of encouragement and authentic praise to engage and motivate pupils.
  - Understand that Students take individual and multiple pathways in their learning
  - Engage students in challenging learning experiences
  - High expectations for their students and encourage risk taking

Quality First Teaching Maths
Ensure links to prior learning are implicitly made
Give access to a wide range of practical resources

Ensure key learning points are reviewed regularly throughout the lesson
Ensure understanding of mathematical vocabulary. Are learners using the correct Language?
Provide a talking partner for pupils to share/explain their mathematical thinking
Give lots of thinking time
Present tasks in a meaningful context
Make close observations of pupils to fully understand the mathematical strategies being used to solve problems – get them to 'talk through' what they're doing
Ensure multi-step tasks are supported by jottings and model this
Give a wide range of contexts for pupils to apply their learning – exploring and investigating, reflecting on and talking through a process, demonstrating, directing and telling, reflecting and evaluating, using and applying, problem solving
Give opportunities for pupils to make up problems using skills learned for their talking partner to solve
Give opportunities for pupils to check their solutions using a range of methods
Don't rush into abstract and formal written work before understanding is secure
Be prepared to explore, repeat and rehearse steps again to ensure understanding of abstract concepts
Use squared paper – one digit per square
Different coloured pens for hundreds, tens, units
Mini plenaries – re modelling consolidating and embedding / summarising and reminding
Modelling of Strategies underpins all teaching
Guided learning structures in place
Set high expectations for students and encourage risk taking

- Staff use Unit plans that are specific to our school, they supplement and personalise these plans with WHITE ROSE MATHS materials, twinkl, NRICH, and the calculations policy etc.
- Teaching assistants should have access to a white board throughout a maths session and should stop learning to consolidate or move learning on further by 'modelling' throughout the maths lesson.
- **All staff** should use the calculations policy and be very aware of the process of concrete, pictorial and abstract. Support staff should use this to reference resources that they may need for a lesson.
- All support staff have a copy of the plan prior to the lesson so that they know what they are teaching – especially with their target groups in the follow up lesson to the teacher. Support staff use the calculations policy as a guide to practical equipment that they may need on hand to support with learning
- It is Vital that all staff ensure that the direct teaching aspect of their plan for addition, subtraction, multiplication and division is directly linked to the calculations policy – so that there are no gaps in learning. Images from the calculations policy can also be copied and pasted on to the plans to support staff.
- The calculation policy also has guidance for 'In greater depth' and this should be referenced by staff when planning.

- Mental maths – should play a part in the maths lesson / curriculum from oral quick-fire games to keep skills sharp – to mental maths tests and times table tests as the children move up the school

Example of Quality First Teach approach

Inclusive Quality First teach approach

- **Calculations policy (EYFS – Y6)**
  - All staff have a copy of this and should use this constantly – staff are responsible for ensuring that they have a good understanding of the process of learning- 'Concrete – pictorial – Abstract'
  - Staff have had training on this and should go to Teacher if they are unsure about anything.
  - It is vital that there is consistency in approach and that the staff 'model' strategies correctly and know what the next step is to challenge and what the previous step is.
  - Staff need to get the balance and ensure that they don't jump to abstract too soon – but also that they don't spend too long at the pictorial stage.

Maths calculations Policy 2022.docx

- **Carousel for teaching / marking within a mixed age class – see below for example**
  - The carousel is a guide / support for teachers – teachers can use their autonomy to adapt and deliver the carousel in a way that meets the needs of their cohort. The overview just provides guidance and a structure to support with mixed aged teaching and learning.
  - The class teacher always delivers a 5 – 10 min directed teach to the whole class bar one group that is in targeted support with the TA.
  - We have introduced a carousel for teaching and marking that runs across the school
  - The challenge with teaching mixed age classes is the fact that the year groups have different Age-related expectations and as a teacher, it is physically impossible to teach different concepts at the same time.
  - Within our planning, we have developed a carousel that focus on target teaching as well as whole class. This enables us to address specific learning for each age range within the mixed age class.
  - The planned tasks for the targeted groups – 2 sessions a week are vitally important as they are the opportunity to make sure that they are meeting Age Related Expectations based on the KLIPS relevant to their age range. These sessions should also ensure that there are no gaps within learning
  - Each class has five groups and during the week, each group will be taught a targeted session by the class teacher. During this session, the teacher sets tasks that are ambitious and challenge learning. This group are then supported by the teacher for up to 80% of the lesson to ensure that learning potential is maximised. This session is quality marked.
  - The following lesson the same group are in a target follow up session with the Teaching Assistant – this enables further challenge of consolidation based on prior learning.

- In the week, all 5 groups have 2 targeted sessions.
- The teacher and the TA – also monitor two other groups for approx. 20 – 25% of the lesson – this is identified on the carousel grid.
- The carousel has been developed in such a way that the highest attaining groups receive their targeted support on the Monday and Tuesday – the expectation is that they can then be independent learners throughout the rest of the week – so they have 3 independent lessons in which Lead Learners are allocated.
- All other groups receive adult monitoring support for 2 additional lessons – so they have 2 targeted support lessons and 2 monitored lessons a week. They then only have one independent session. This ensures that learning potential is maximised and that the mixed aged related expectations are addressed to the best of our ability.
- All teachers should ensure that the carousel is in place in their classroom and that it is understood by all other adults in the room. When there are additional adults such as student teachers – they should be added to the carousel to support with moving learning on the 'blue independent' session - this will mean that a more challenging activity can be planned and this group can receive additional adult 'modelling' of learning and coaching throughout the session.

Example of Scaffold and Challenge Structure Year 5/6 for Numeracy

Group	Monday	Tuesday	Wednesday	Thursday	Friday
1 **Year 6** **GD** **Group 1**	Quality Mark - Teacher Teacher does 10 min intro with rest of class – then goes to work with this group **This group is the Target group today – so they get 80% support / challenge** But teacher to work 2 groups throughout the lesson – Group 1 and Group 2	**Marking = ✓• Teaching Assistant** takes the children off straight away ensure this group respond to quality mark – Then TA – direct teaches this group for 10 mins – **This group is the Target group today – so they get 75% support / challenge -** TA work throughout lesson moving between Group 1 and Group 4	**Marking Self-mark ✓•** - Children to be given answers **Independent** – straight off with a task at beginning of lesson (if you have additional adults they can support this group)	**Independent** – straight off with a task at beginning of lesson **Marking** TA to ✓• within the last 5 mins of the lesson the lesson but to also include an open-ended marking prompt – to assess understanding – see Appendix 4	Independent – straight off with a task at beginning of lesson **Marking** Peer / self-assessment
2 **Year 6** **ARE** **Group 2**	Teacher to support this group as well **Marking** Peer / self-assessment	Quality Mark - Teacher Teacher does 10 min intro with rest of class – then goes to work with this group **This group is the Target group today – so they get 80% support / challenge** But teacher to work 2 groups throughout the lesson – Group 2 and Group 3	**Marking = ✓• Teaching Assistant** takes the children off straight away ensure this group respond to quality mark – Then TA – direct teaches this group for 10 mins – **This group is the Target group today – so they get 75% support / challenge -** TA work throughout lesson moving between Group 2 and Group 5	Working independently – if you have additional adults in the room they can support this group **Marking** Self-mark ✓• - Children to be given answers **Andrea** – to trouble shoot and oversee	**Marking ✓• Teaching Assistant** throughout the lesson but to also include an open ended marking prompt – to assess understanding – see Appendix 4 **TA** work throughout lesson moving between Group 4 and Group 2
3 **Year 5/6** **SEN / LA** **Group 3**	**Marking ✓• Teaching Assistant** throughout the lesson but to also include an open ended marking prompt – to assess understanding – see Appendix 4 **TA** work throughout lesson moving between Group 5 and Group 3	Teacher to support this group as well **Marking** Peer / self-assessment	Quality Mark - Teacher Teacher does 10 min intro with rest of class – then goes to work with this group **This group is the Target group today – so they get 80% support / challenge** But teacher to work 2 groups throughout the lesson – Group 3 and Group 4	**Marking = ✓• Teaching Assistant** takes the children off straight away ensure this group respond to quality mark – Then TA – direct teaches this group for 10 mins – **This group is the Target group today – so they get 75% support / challenge -** TA work throughout lesson moving between Group 3 and Group 2	Working independently – if you have additional adults in the room they can support this group **Marking** Self-mark ✓• - Children to be given answers Teacher- to trouble shoot and oversee
4 **Year 5** **GD** **Group 4**	Working independently – if you have additional adults in the room they can support this group **Marking** Self-mark ✓• - Children to be given answers	**Marking ✓• Teaching Assistant** throughout the lesson but to also include an open ended marking prompt – to assess understanding – see Appendix 4 **TA** work throughout lesson moving between Group 1 and Group 4	Teacher to support this group as well **Marking** Peer / self-assessment	Quality Mark - Teacher Teacher does 10 min intro with rest of class – then goes to work with this group **This group is the Target group today – so they get 80% support / challenge** But teacher to work 2 groups throughout the lesson – Group 4 and Group 5	**Marking = ✓• Teaching Assistant** takes the children off straight away ensure this group respond to quality mark – Then TA – direct teaches this group for 10 mins – **This group is the Target group today – so they get 75% support / challenge -** TA work throughout lesson moving between Group 4 and Group 2
5 **Year 5** **ARE**	**Marking = ✓•** Teaching **Assistant** takes the children off straight away ensure this group respond to quality mark – Then TA – direct teaches this group for 10 mins – **This group is the Target group today – so they get 75% support / challenge -** TA work throughout lesson moving between Group 5 and Group 3	Working independently – if you have additional adults in the room they can support this group **Marking** Self-mark ✓• - Children to be given answers	**Marking ✓• Teaching Assistant** throughout the lesson but to also include an open-ended marking prompt – to assess understanding – see Appendix 4 **TA** work throughout lesson moving between Group 2 and Group 5	Teacher to support this group as well **Marking** Peer / self-assessment	Quality Mark - Teacher Teacher does 10 min intro with rest of class – then goes to work with this group **This group is the Target group today – so they get 80% support / challenge** But teacher to work 2 groups throughout the lesson – Group 5 and Group 3

Assessment / Provision Map

Summative Assessment:

We use assessment grids (APP system with use of Lancashire KLIPS statements to highlight which children (against the Maths assessment focus's and NC coverage) are below/meeting/exceeding age-related expectation. This feeds into our own 'Assessment without Levels system which tracks progress against Age related expectations and incorporates a # system to indicate depth of learning. The process is as follows:-

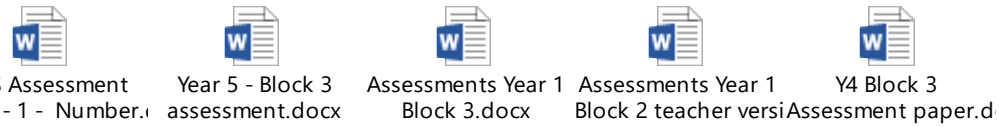
- Teachers monitor and track using the KLIPs (Key Learning Indicators of Progression) these are a set of skills / knowledge that have been devised through breaking down the national curriculum into progressive steps
  - Each lesson has been crossed referenced with the KLIPs as well as the National Curriculum. Teachers highlighted the KLIPS coverage and understanding as they teach. The KLIP grids form a continuous record of progress.
- Alongside the KLIPs tracking we use assessment tasks / questions / games / quizzes/ plenaries etc. within the scheme.

Key Assessment Opportunities

EYFS – Y6

- Linking to our Block planning we have developed **Key Assessment Opportunities** in the form of tasks / questions. These are linked directly to the National Curriculum and cross referenced with the KLIPS
- They have been developed using the **DfE Mathematics guidance Key Stages 1 and 2 June 2020 document** supplemented by Test base. https://assets.publishing.service.gov.uk/media/6140b7008fa8f503ba3dc8d1/Maths_guidance_KS_1_and_2.pdf
- The DfE document gives clear guidance and support with the criteria for knowing when a child is 'ready to progress.
- In order to reduce teacher workload, the **Key Assessments** have been put together for the staff- they consist of a range of questions or tasks that are matched to the National Curriculum and the KLIPs covered in that Block of teaching. There are a wealth or questions that can be selected from or at the teacher's discretion used in their entirety. As we use a spiral approach to learning Key Assessment questions may reoccur within different Blocks throughout the year.
- Staff can use these **Key Assessments** in any way they wish – formally or informally (e.g. a quiz), at the end of the BLOCK or throughout the block threaded into lessons.
- Within the children's books there will be evidence of **Key Assessment Opportunities**
- The pitch of the questions set in these booklets indicate whether the child is meeting Age Related Expectations and a line with the age-related assessment guidance from the DfE.
- The DfE guidance then also gives information for staff in terms of what the conceptual prerequisite is that needs to be revisited if the child has not met the expectation – or what the future application will be if the child easily meets the expectation.
  - The questions are written in ways that allow for both varied fluency and reasoning.
  - As we have a spiral approach to numeracy – staff use the outcomes of these tests to inform future teaching and learning – the outcomes also feed into future planning

Examples of Key Assessments questions and tasks – linked to Blocks of learning



Other approaches

- For SEN children – where appropriate we use LAPs and PIVATs to support teaching and learning – work is differentiated and any additional WAVE 3 provision is very specific
- Quality First teach – implemented across school
- We use our own Assessment without levels system – to track and monitor pupil progress. The children are formally tested on 3 occasions throughout the year. (once a term)
- The data is then analysed and discussed with the classroom teacher. From this, we develop a WAVE 2 provision map. Which is a short term usually 10- 12 weeks of provision (over a term)
- A range of interventions are used to provide consolidation, address gaps in skills and knowledge or provide catch up. We currently use the following; -
    - Overcoming barriers
    - Securing levels
    - Wave
    - Springboard
    - CGP
    - Bonds
    - Whilst we recognise that some of these interventions are not recent interventions – our evaluations indicate that, they are effective. The teaching assistants find them useful and like the structure – it supports them with their understanding as to how to break down learning and move learning on. The models and images within the interventions are a very useful tool that give specifics and also the review, application and confirming learning questions match very closely with the DfE assessment examples in terms of pitch and expectations. We also feel that it is very important to reduce workload and use resources that have been devised by accomplished mathematicians that we know work.
    - Interventions in our school are used as a resource to meet a particular need. We don't necessarily use the intervention as a whole programme in its entirety. For example, when a 'need' is identified we then go to the interventions and look and see which intervention programme addresses the need and pick out that element / lesson plan. Within a Wave 2 intervention additional provision, one or more intervention programmes may be used to address a need. The staff ensure that elements of the intervention programmes used address the need in line with the new national curriculum and our calculations policy.
    - Overcoming Barriers materials are also used by staff within their planning for specific topic as the teaching tips, models and images and review, application and confirming learning questions are excellent.

DfE Mathematics guidance Key Stages 1 and 2 June 2020 document

Ready to Progress criteria: year 1 to year 6

The table below is a summary of the ready to progress criteria for all year groups

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number Place Value	1NPV–1 Count within 100, forwards and backwards, starting with any number.		3NPV–1 Know that 10 tens are equivalent to 1 hundred, and that 100 is 10 times the size of 10; apply this to identify and work out how many 10s there are in other three digit multiples of 10. →	4NPV–1 Know that 10 hundreds are equivalent to 1 thousand, and that 1,000 is 10 times the size of 100; apply this to identify and work out how many 100s there are in other four-digit multiples of 100. →	5NPV–1 Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. →	6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).
		2NPV–1 Recognise the place value of each digit in two-digit numbers, and compose and decompose two-digit numbers using standard and nonstandard partitioning. →	3NPV–2 Recognise the place value of each digit in *three*-digit numbers, and compose and decompose *three*-digit numbers using standard and non-standard partitioning. →	4NPV–2 Recognise the place value of each digit in *four*-digit numbers, and compose and decompose *four*-digit numbers using standard and nonstandard partitioning. →	5NPV–2 Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and nonstandard partitioning. →	6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and nonstandard partitioning.
	1NPV–2 Reason about the location of numbers to 20 within the linear number system, including comparing using < > and = →	2NPV–2 Reason about the location of any twodigit number in the linear number system, including identifying the previous and next multiple of 10. →	3NPV–3 Reason about the location of any *three*digit number in the linear number system, including identifying the previous and next multiple of 100 and 10. →	4NPV–3 Reason about the location of any *four*digit number in the linear number system, including identifying the previous and next multiple of 1,000 and 100, and rounding to the nearest of each. →	5NPV–3 Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. →	6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Number Place Value			3NPV–4 Divide 100 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 100 with 2, 4, 5 and 10 equal parts. →	4NPV–4 Divide 1,000 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in multiples of 1,000 with 2, 4, 5 and 10 equal parts. →	5NPV–4 Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts. →	6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.
					5NPV–5 Convert between units of measure, including using common decimals and fractions.	
NF	1NF–1 Develop fluency in addition and subtraction facts within 10. →	2NF–1 Secure fluency in addition and subtraction facts within 10, through continued practice. →	3NF–1 Secure fluency in addition and subtraction facts that bridge 10, through continued practice.			
	1NF–2 Count forwards and backwards in multiples of 2, 5 and 10, up to 10 multiples, beginning with any multiple, and count forwards and backwards through the odd numbers. →		3NF–2 Recall multiplication facts, and corresponding division facts, in the 10, 5, 2, 4 and 8 multiplication tables, and recognise products in these multiplication tables as multiples of the corresponding number. →	4NF–1 Recall multiplication and division facts up to 12×12, and recognise products in multiplication tables as multiples of the corresponding number. →	5NF–1 Secure fluency in multiplication table facts, and corresponding division facts, through continued practice.	
				4NF–2 Solve division problems, with two-digit dividends and one-digit divisors, that involve remainders, and interpret remainders appropriately according to the context.		
			3NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10). →	4NF-3 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 100) →	5NF-2 Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 1 tenth or 1 hundredth).	

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
AS + -	1AS-1 Compose numbers to 10 from 2 parts, and partition numbers to 10 into parts, including recognising odd and even numbers.	2AS-1 Add and subtract across 10.	3AS-1 Calculate complements to 100.			6AS/MD-1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).
	1AS-2 Read, write and interpret equations containing addition (+), subtraction (−) and equals (=) symbols, and relate additive expressions and equations to real-life contexts.	2AS-2 Recognise the subtraction structure of 'difference' and answer questions of the form, "How many more…?".	3AS-2 Add and subtract up to three-digit numbers using columnar methods.			6AS/MD-2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
		2AS-3 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract only ones or only tens to/from a two digit number.	3AS-3 Manipulate the additive relationship: Understand the inverse relationship between addition and subtraction, and how both relate to the part-part-whole structure. Understand and use the commutative property of addition, and understand the related property for subtraction.			6AS/MD-3 Solve problems involving ratio relationships.
		2AS-4 Add and subtract within 100 by applying related one-digit addition and subtraction facts: add and subtract any 2 two digit numbers.				6AS/MD-4 Solve problems with 2 unknowns.

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
MD		2MD-1 Recognise repeated addition contexts, representing them with multiplication equations and calculating the product, within the 2, 5 and 10 multiplication tables.	3MD-1 Apply known multiplication and division facts to solve contextual problems with different structures, including quotitive and partitive division.	4MD-1 Multiply and divide whole numbers by 10 and 100 (keeping to whole number quotients); understand this as equivalent to making a number 10 or 100 times the size. →	5MD-1 Multiply and divide numbers by 10 and 100; understand this as equivalent to making a number 10 or 100 times the size, or 1 tenth or 1 hundredth times the size.	For year 6, MD ready-to progress criteria are combined with AS ready to-progress criteria (please see above).
		2MD-2 Relate grouping problems where the number of groups is unknown to multiplication equations with a missing factor, and to division equations (quotitive division).		4MD-2 Manipulate multiplication and division equations, and understand and apply the commutative property of multiplication.	5MD-2 Find factors and multiples of positive whole numbers, including common factors and common multiples, and express a given number as a product of 2 or 3 factors.	
				4MD-3 Understand and apply the distributive property of multiplication. →	5MD-3 Multiply any whole number with up to 4 digits by any one-digit number using a formal written method.	
					5MD-4 Divide a number with up to 4 digits by a one-digit number using a formal written method, and interpret remainders appropriately for the context.	

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
F			3F-1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.			6F-1 Recognise when fractions can be simplified, and use common factors to simplify fractions.
			3F-2 Find unit fractions of quantities using known division facts (multiplication tables fluency). →		5F-1 Find non-unit fractions of quantities.	6F-2 Express fractions in a common denomination and use this to compare fractions that are similar in value.
			3F-3 Reason about the location of any fraction within 1 in the linear number system. →	4F-1 Reason about the location of mixed numbers in the linear number system.		6F-3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.
				4F-2 Convert mixed numbers to improper fractions and vice versa.	5F-2 Find equivalent fractions and understand that they have the same value and the same position in the linear number system.	
			3F-4 Add and subtract fractions with the same denominator, within 1. →	4F-3 Add and subtract improper and mixed fractions with the same denominator, including bridging whole numbers.	5F-3 Recall decimal fraction equivalents for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$ and $\frac{1}{10}$, and for multiples of these proper fractions.	

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
G	1G-1 Recognise common 2D and 3D shapes presented in different orientations, and know that rectangles, triangles, cuboids and pyramids are not always similar to one another. →	2G-1 Use precise language to describe the properties of 2D and 3D shapes, and compare shapes by reasoning about similarities and differences in properties. →	3G-1 Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.		5G-1 Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size.	
G					5G-2 Compare areas and calculate the area of rectangles (including squares) using standard units.	
	1G-2 Compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations. →		3G-2 Draw polygons by joining marked points, and identify parallel and perpendicular sides. →	4G-1 Draw polygons, specified by coordinates in the first quadrant, and translate within the first quadrant. →		6G-1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.
				4G-2 Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons.		
				4G-3 Identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry.		

Maths Formal Assessments

We use formal assessment tests 3 time a year at the end of each term. In our school we use Lancashire Mathematics Assessment tests across school but in the Summer term for Year 2 we use the optional SATs materials.

The Lancashire Mathematics Assessment Tests are designed to support teachers in confirming their teacher assessments at the end of each term.

We use particular tests these because they complement the Lancashire KLIPs Assessment system which we use within our 'Assessment Without Levels' tracking process.

The staff use the supplementary analysis tools to identify the impact of teaching and learning and to identify key areas for action. The information from the analysis feeds into future planning, teaching and learning (generic area for future focus) and provision maps. (personalised targeted learning needs)

The end of Autumn term tests questions are pitched against a realistic expectation of what children should have achieved up to that point in time. The assessments for the end of Autumn and Spring terms are not against end of year expectations.

The tests will only measure whether a child is on track to achieve the end of year expectations or whether they are not on track. The results will not give a precise attainment score for children working outside of the year group expectations, however, if a child in Year 4 is suspected of achieving in line with a child beginning to learn the Year 3 curriculum, then they could sit the Year 3 tests to confirm a teacher assessment of 'Entering' Year 3.

The end of Spring term tests will assess whether a child is on track to achieve the end of year expectations at that point in time.

The end of Summer term tests will assess whether a child has achieved the end of year expectations for that year.

The tests are designed to resemble the national SATs, that children in 6 take, in appearance, structure and question design. Therefore, they support children in becoming familiar with the national end of Key Stage tests.

LCC do not produce a threshold of a certain number of marks for children to achieve as the tests are to be used to support the teacher's professional judgement of the children's abilities, linked to our Assessment without levels system.

IMPACT

- The impact of our Mathematics curriculum is evidenced through the pupils' use and understanding of the knowledge, skills, concepts and specialist vocabulary.
- It is evidenced by the use and outcomes of the varied activities, assessments and quizzes provided.
- The broad range of approaches for pupils to communicate their knowledge ensures that everyone can demonstrate progression and impact. In particular, it is evidenced by the pupils' ability, willingness and confidence in addressing and discussing each unit's key question, giving a response focusing on mathematical vocabulary, skills and concepts.
- Pupils understand and can clarify to others what mathematics is and the importance and value of studying the subject. They can explain to others how they are progressing and what they can do to get better in the subject.

MILLIONS SAW THE APPLE FALL, BUT NEWTON ASKED WHY.

— Bernard Baruch, American financier, philanthropist and statesman

Subject knowledge for teachers

The Singleton Mathematics Scheme focuses on the subject as an individual discipline and it sets high expectations for the quality of teaching within the subject. However, the structure and levels of support within the scheme especially with the direct teaching consider that most primary teachers and many Mathematic subject leads are not subject specialists.

The core mathematical knowledge needed by each teacher is provided in multiple areas:- Key Knowledge Overview, Block Plan overviews and in greater depth in the Unit plans. Sample responses / diagrams and visual aids are provided to questions posed to guide non-specialist teachers on expectations. A resource list / links with useful quality websites are available on the Block Plans and a wealth resources are included in the individual class planning folders to support further teacher research.

We believe that this vital to support with workload and also quality teaching and learning experiences.

Pupil Voice:

We believe strongly in giving our pupils a real voice in decision-making and our Junior Leadership Team (JLT) include two representatives for Maths and STEM. Pupils work with the Maths Subject Lead, our governors and HT to look at ways in which to improve Maths across school in terms of resources ideas/ideas for trips and lesson delivery! Pupils monitor floor books and evidence and take pride in seeing their ideas implemented across school!

Educational Visits and Cultural Capital

In order to develop a broad, rich and deep mathematical education we believe children learn through experience. It is therefore considered essential to provide the children with hands on experiences, through educational visits. We aim to address this with suggestions on the two-year cycle with Educational visits, trips and real experience.

As a school, we also see the non-statutory requirements of the National Curriculum as an opportunity to further enrich our children's learning and life experiences and developed these as Cultural Capital enhancements that very much make up the foundation of our schools' vision. In school we have STEM clubs, annual X factor completion, Science, Maths & STEM week & maths-based visits both in and out of school. We have excellent links with our local high schools and colleges who offer a variety of sessions for our pupils throughout the year including maths competitions.

EYFS

Teachers in the EYFS ensure the children learn through a mixture of adult led activities and child-initiated activities both inside and outside of the classroom. Mathematics is taught through an integrated approach. This is supported by the Development Matters non-statutory guidance as well as Number blocks for EYFS Maths and the NCETM Mastering Number resources as well as NRICH.

Please read this section in conjunction with the calculations policy

In the context of mathematics, children are given opportunities to develop their skills in the following areas:

- Counting
- Understanding and using numbers

- Calculating simple addition and subtraction problems
- Describing shapes, spaces and measure

Mathematics within the revised framework (Sep 2021) incorporates many elements of the mastery approach. Specifically, it says:

- 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 varies 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 special reasoning skills across all areas of maths including shapes, space and measures.
- It is important that children develop positive attitudes and interest in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

The EYFS Framework in relation to mathematics aims for our pupils to achieve the following Early Learning Goals:

ELG: Number

- develop a deep understanding of number to 10, including the composition of each number.
- Subitise up to 5.
- Automatically recall number bonds up to 5 and some number bonds up to 10, including double facts.

ELG: 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.

In addition, the curriculum we offer includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures.

Learning in the early years at Singleton

We focus on Six key areas of mathematical learning

1. Cardinality and counting
2. Comparison
3. Composition
4. Pattern
5. Shape and Space
6. Measures

Looking briefly at each in turn:

Cardinality and counting

- When children understand the cardinality of numbers, they know what the numbers mean in terms of knowing how many things they refer to.

We recognise that Learning to count in the early years is a fundamental skill and key to mastering mathematical concepts in the future. We implement the following Steps needed to successfully count:

1. The one-to-one principle: children must name each object they count and understand there are two groups: the one that has been counted and the one that hasn't yet been counted
2. The stable order principle: children must know how to count in the right order
3. The cardinal principle: children need to understand the last number in the set is the total amount
4. Counting anything: children need to realise that anything can be counted, not just objects that can be touched, but also things like claps and jumps
5. Order of counting doesn't matter: children need to understand that the order of counting in the set is irrelevant and will still lead to the same amount

Comparison

- Comparing numbers involves knowing which numbers are worth more or less than each other.

Composition

- Learning to 'see' a whole number and its parts at the same time is a key development in children's number understanding.

Pattern

- Developing an awareness of pattern helps young children to notice and understand mathematical relationships.

Shape and space

- Mathematically, the areas of shape and space are about developing visualising skills and understanding relationships, such as the effects of movement and combining shapes

Measures

- Measuring in mathematics is based on the idea of using numbers of units in order to compare attributes, such as length or capacity.

Assessment

Assessing children to find out which step they are struggling with is key to helping them overcome difficulties and become confident counters.

We have developed A set of Key Assessment tasks to support with this

Assessment Tasks - 1 - Number.docx
Assessment Tasks - Early Learning Goals
Assessment Tasks -2 - Addition and su
Assessment Tasks -3 - Multiplication c
Assessment Tasks -4 - Measurement.d
Assessment Tasks -5 - Shape and Spac
Assessment Tasks -6 - Position and Di

Our Approach to teaching and learning within the EYFS stage

Types of Activities used to boost number sense in Reception Year

We recognise that children need lots of opportunities to develop number sense and deepen their conceptual understanding. Here are some examples of activities we use to support our Reception Year learners with counting:

Crowd control

- Display the number of children allowed in each area using pictorial representations of cubes on a 10 frame. Once the children begin to realise how many are allowed in the area, they start to

discuss the meaning of more and less. For example, "no more children are allowed in," or "you can come in because one more than three is four."

Bunny ears

- Encourage children to show numbers using their fingers above their head. "Bunny ears six" means they place their fingers above their head to show six. They may decide to use three fingers on each hand. As they become more confident, you could introduce swapping, where they show the same number but with a different configuration of fingers, in this case two and four, or five and one.

Grouping straws

- Each morning, drop different amounts of art straws all over the carpet. Say something like, "oh no class, I can't believe it. I've dropped all my straws again. They were all in 10s. Can you help me?" This activity helps children consolidate counting objects and gets them to think about stopping after they have made 10. Providing elastic bands helps them to keep track of their groups of 10.

Fastest 10 frames

- This game can help distinguish between those who have developed a good understanding of number sense and those who need further support. Give each child their own frame and cubes. Tell them a number and observe how they place the cubes on the frame. If the children are working with the number eight, do they say each number name as they place the cube on the frame, or do they realise eight is two less than 10? If so, they should be able to place the cubes down faster than other children.
- What do they do when you say the next number? For example, for the number five, do they automatically remove three cubes, or do they remove all of the cubes and start over counting from one to five?

Everyday questions to develop number sense

Questioning within EYFS is key to learning – it underpins all that we do. The following questions are examples of how we help develop their number sense and let them practice using mathematical terms.

When prepping lunch or a snack, count out the different types of food with your child, and as you lay the table, count out the different items. Ask your child questions like:

- How many grapes are there?
- How many tomatoes are there?
- How many plates are there?

Practice using the terms more than, fewer than and as many as by asking:

- Are there more grapes than tomatoes?
- Are there fewer tomatoes than grapes?
- Are there as many plates as people eating?

Remember to practice each sentence:

- There are more grapes than tomatoes
- There are fewer tomatoes than grapes
- There are as many plates as family members eating

When counting, we make sure that we count one number for one item to strengthen the child's sense of one-to-one correspondence.

Number Rhymes

We carefully select number rhymes to include those that children are familiar with from home. We make sure the rhymes include:

- Counting back and counting forward
- "No" or "none" (Five little ducks went swimming one day)
- Counting in pairs (two, four, six, eight, Mary at the cottage gate)

- Counting to five, 10 and beyond

Problem solving, reasoning and numeracy

The EYFS requires children to be supported in developing their understanding of problem solving, reasoning and numeracy in a broad range of contexts in which they can explore, enjoy, learn, practise and talk about their developing understanding. They must be provided with opportunities to practise these skills and gain confidence.

Young children learn best through play. For their learning to be effective, they need sensitive and informed support from adults.
All children can be successful with mathematics, provided they have opportunities to explore ideas in ways that make personal sense to them and opportunities to develop concepts and understanding. We believe that children need to know that practitioners are interested in their thinking and respect their ideas.

Mark making
Young children use their own marks and representations to explore and communicate their mathematical thinking. These graphics include:

- Scribble-marks
- Drawings
- Writing
- Tally-type marks
- Invented and standard symbols including numerals

Young children's graphical exploration builds on what they already know about marks and symbols and lays the foundations for understanding mathematical symbols and later use of standard forms of written mathematics.

Developing understanding with careful questioning
When children play and interact with other children, there are always opportunities for maths talk to help them develop a deep understanding.
For instance:

- I have made a pattern. What's your pattern?
- How many blocks taller is my model compared to yours?
- How do we know this area is full?
- I have three cars, how many do you have?
- Do you have more?
- How do you know?

We recognise that it is important to give learners long enough to think about their answer and give their response, but not so long that it disrupts the flow of play.

Adding maths talk activities to your daily routine
We believe developing maths talk within daily routines gives learners a chance to understand concepts while using real-life concepts. It also means that children can consolidate what they have learned.

The following activities are example of what this might look like in our school:

How many children are at school?
Get the class to work out how many children are at school by placing a picture of themselves or a counter representation on large 10 frames. Ask them questions like:

- How do we know this 10 frame is full?
- How many children are absent?
- How do you know?
- What can you tell me about number seven?

Sorting and grouping objects as a class
Sorting and grouping objects as a class helps children learn to reason and look for patterns. Give them a variety of buttons each day and ask open-ended questions like, "how can we sort the buttons?" They can use critical-thinking skills to come up with a range of ideas like sorting by size, colour, pattern, and shape.

Vote for a story
First, ask a child to pick two books. Everyone in the class gets to vote (using a piece of lego, for instance) on which of the books should be read. Tally the votes at the end of the day to determine the winner. This can lead to questions such as:

- Why?
- How do you know?
- How many more votes did one book have than the other?

The key to introducing mastery in the early years is to keep activities fun and part of your daily routine. The more learners explore maths through play, the more engaged they become.

Pattern Awareness
We recognise that a child's ability to spot mathematical patterns can predict later mathematical achievement, more so than other abilities such as counting. It also shows pattern awareness can vary a great deal between individuals.
Explicitly teaching pattern awareness links to encouraging "pattern sniffing" with children in order to develop mathematical understanding and thinking. It is important that staff understand what mathematical pattern awareness is. We provide the following information to the EYFS team: -

What is mathematical pattern awareness?
Patterns are basically relationships with some kind of regularity between the elements. In the early years, Papic et al suggest there are three main kinds:

- Shapes with regular features, such as a square or triangles with equal sides and angles, and shapes made with some equally spaced dots
- A repeated sequence: the most common examples are AB sequences, like a red, blue, red blue pattern with cubes. More challenging are ABC or ABB patterns with repeating units like red, green, blue or red, blue, blue
- a growing pattern, such as a staircase with equal steps

Children who are highly pattern aware can spot this kind of regularity: they can reproduce patterns and predict how they will continue.

Why is pattern awareness important?
Spotting underlying patterns is important for identifying many different kinds of mathematical relationships. It underpins memorization of the counting sequence and understanding number operations, for instance recognizing that if you add numbers in a different order their total stays the same.
Pattern awareness has been described as early algebraic thinking, which involves:

- Noticing mathematical features
- Identifying the relationship between elements
- Observing regularities

The activity Pattern Making focuses on repeating patterns and suggests some engaging ways of developing pattern awareness, with prompts for considering children's responses. Children can make trains with assorted toys, make patterns with twigs and leaves outside or create printing and sticking patterns in design activities.

Repeating Patterns
It is important to introduce children to a variety of repeating patterns, progressing from ABC and ABB to ABBC.

Focusing on alternating AB patterns can result in some young children thinking that ‘blue, red, red’ can’t make a pattern. They say things like, “That’s not a pattern, because you can’t have two of the same colours next to each other.”