

Haytor View Community Primary School & Nursery

Statement on the Teaching of Maths

'Number & Calculation'

Latest Revision – February 2019



Learning together - enjoying success - aiming high - celebrating difference – enriching community

Principles underpinning our consideration of maths learning and related assessment/moderation

Maths inside the black box – Hodgen & Wiliam (2006):-

- 'Mathematics is a connected body of knowledge'
- 'Mathematical literacy requires understanding of the meaning, use and justifications of mathematical ideas'
- 'To be successful pupils need to build up what Skemp(1976) calls a *relational* understanding of how ideas interrelate'

Commission on Assessment without Levels (2015); The benefits of assessment without levels:-

- 'support more informative and productive conversations with pupils'
- 'enable pupils to take more responsibility for their achievements'

Maths Provision – Foundations of Provision

Maths provision at Haytor View, whilst firmly guided by statutory guidelines and expectations at from the Early Years and Foundation Stage Framework (EYFS) and National Curriculum is committed to developing maths understanding over process. In doing so we must acknowledge that current testing practices at the end of Key Stage 2 currently maintain a significant focus upon process and as a result all this fact must be bridged in a way that allows children to demonstrate their learning and skills effectively at this point.

The recognised and shared challenge across the school is to acknowledge the complexities of statements presented in EYFS and National Curriculum, and to get underneath these in a manner that supports us in recognising what children *really* understand and what we as practitioners might be missing as we consider our own provision and children's next steps.

It is our aim to ensure that all children have a sound understanding of the number system, the role of maths in real life and an awareness of themselves as maths learners which ultimately enables them to develop elegance and efficiency in their approach to mathematical problem solving.

Moderation and ARE

ARE definitions sit at the heart of moderation processes – they allow a coherent approach and ensure that our understanding of progression throughout the school is consistent

ARE definitions impact upon our provision as they guide us as to the experiences we need to be offering our children to support their progress but are not the limit to expectations as this is set by the curriculum.

ARE definitions are not published for each year group in the National Curriculum – whilst there are commercial 'models' that have been produced following the introduction of the National Curriculum they do not reflect our own thinking and awareness of our context, our children or necessarily our understanding of maths.

Programme of Assessment & Moderation of Maths

Recorded and shared assessment of maths takes place half termly in Years 1-6, termly in the Foundation Stage.

Moderation takes place regularly at phase level and periodically in line at cross-phase (whole school) level in line with current moderation arrangements which seek both to inform assessment and develop the awareness and understanding of learning leaders.

External moderation links continue to develop and are being explored using a range of partners.

Tools to support half termly assessment and moderation

The documents listed below represent an agreed list of tools which can be used to inform half termly assessment and support moderation opportunities. They provide a range of levels of focus upon outcomes

and their potential links to understanding. The documents do not represent the sole sources of support for planning provision or assessment on a within-sequence basis.

The following documents may be used :-

Haytor View Calculation Policy

incorporating Addition; Subtraction; Multiplication; Division; Number and Place Value – this is detailed in an Appendix to this document, updated February 2018

National Curriculum Statements & Interim Framework Statements at Year 2

Programmes of Study & Statements published by the DfE – providing scope and detail as to what children should understand

Babcock LDP Key Understandings

Narrative of joined up understanding making links between different parts of the curriculum – extracted, fundamental ‘bigger statements’

Rising Stars Guidance

Support for consideration of key skills and concepts

NAHT Key Performance Indicators

Manageable stepping stones of key understandings sitting between the depth of national curriculum and narrative of Babcock Key Understandings

Early Years and Foundation Stage Document

DfE published non-statutory curriculum for Early Years education

NCETM Mastery documents

Gives examples of activities that enable children to demonstrate an understanding beyond simply completing a calculation correctly.

Aspects of In-School Provision that Support Children's Understanding of Maths, 'Number and Calculation – February 2018'

Teachers will:

- Assess carefully to identify exact next steps for children
- Provide opportunities based upon assessments that will support the development of children's understanding
- Think 'What am I missing?' 'What opportunities can I provide to reveal true understanding?'
- Use verbal questions to analyse children's use of language and terminology in relation to number and calculation
- Use the 'Connective Model' as a fundamental guide/prompt – considering links between the language; concrete; pictorial; abstract aspects of number and calculation
- Have a particular focus upon exploring depth of understanding through providing opportunities for children to demonstrate their understanding
- Consider the growth mindset when supporting children's mathematical development
- Recognise and value, through their provision, the importance of the fundamentals of number
- Recognise and value, through their provision, the role and value of mathematical fluency
- Bring practical opportunities to children to support connections being made between concrete and abstract understanding
- Allow children the time and space required to explore number and calculation and support the development towards concepts becoming embedded and accessible tools to use in the future
- Have meta-learning based discussions that model the development of awareness
- Not be satisfied if children can 'do' the maths but to probe to ensure that the understanding of how they do it is embedded

Support of children's development in number and calculation will see learning leaders:

- Talking to parents who 'can't do maths' in a positive, encouraging and supportive manner about how they could.....still...learn
- Being available to parents with doubts around maths
- Using Time to Think as an opportunity to model approaches to maths in a relaxed environment
- Encouraging parents to get on board where they can support their children
- Displaying information to support parents and children around the importance of links between concrete, abstract, pictorial, linguistic aspects of maths
- Using concrete resources and opportunities eg. teen boards to support development

- Sharing stories to create vivid pictorial and abstract links
- Singing number rhymes and using props, including themselves, to link physical and abstract understanding
- Encouraging the questioning of 'what's the point of this maths that we're learning?'
- Creating learning walls as a tool and a point of reference for demonstrating links and providing reminders
- Maintaining accessible images of all learning opportunities in the past that remains relevant in the present
- Using photos of learning walls in children's books as points of reference
- Talking to children about Maths (Primary Maths Paper 4)
- Having high expectations that all can achieve
- Celebrating children's ideas through use of display to demonstrate value, be a source of pride and to bring interest in ideas
- Use pre-teaching opportunities based upon review and celebration
- Provide open-ended school-based and home learning opportunities
- Encouraging children to share their successes with other adults around the school
- Developing awareness through use of NCETM Subject Knowledge Tools
- Accessing NCETM and NRICH websites to support thinking around opportunities for assessment and provision
- Planning together to support provision development
- Extending concrete opportunities to engage with number
- Supporting children in being positive about assessment processes through an understanding of their role in learning

Moving forward learning leaders will be seeking to develop their approaches through their commitment to developing provision in the following areas:

- Linking different maths models together
- Creating a 'Why are we doing this?' display
- Looking for physical, oral and written experiences to show understanding
- Displaying concrete maths tools
- Engaging parents during Time to Think in pre-teach experiences
- Developing display – a counting zone – that children use to practice and enjoy number
- Supporting parents' understanding and interpretation of maths being used in school
- Ensuring basics are embedded appropriately before building upon these
- Using Time to Think to revisit fundamentals or pre-teach
- Developing video clips to explain maths thinking to be uploaded to the website to support wider understanding
- Developing maths display demonstrating Abstract – Pictorial – Concrete and the planning of tiny next steps that link these aspects together.

What is working well within phases? February 2019

Foundation Stage

- All members of the team can speak about age-related expectations in number and explain where children sit within the framework in particular areas
- There is a strong recognition that not until children's well-being levels are strong can they demonstrate what they know/understand – in the absence of sufficient well-being levels, children do not access skills that they have demonstrated earlier as this is not embedded in long term memory, and as a result working memory cannot support this process - working memory is affected by well-being levels and restricts children showing what they know/understand
- Creative ways to support confidence and well-being are being explored, discussed and implemented – recognising blockers and providing experiences to keep neural pathways 'lit' in the face of these

Key Stage 1

- Meeting and talking about next steps in children's maths learning
- Physical environment has developed to support maths
- There is a developing ownership of the curriculum

- There is a developing confidence in going deeper into maths learning as opposed to further – exploring understanding underneath responses is strengthening
- Elicitation and assessment activities provide insight into where discomfort or a lack of comfort/confidence lies
- There is a recognition that children's relationship with maths in 'real life' can be absent for many – experiences that children need as a result is informed by this awareness
- Children's awareness of meta-learning is developing through exploring questioning
- The team's recognition of the value and role of confidence is heightened, and as such approaches to supporting confidence is informing provision, along with the identification of what children need in terms of maths and related experience

Key Stage 2

- Meeting and talking about next steps in children's maths learning
- Discussion is learning to a clearer idea of learning journeys within phase
- Discussions are focussed upon 'what do we need children to learn to enable them to move on?'
- Children's meta-learning is a focus of classroom discussion
- There is a recognition and appreciation that essential understanding needs to be in place to secure next steps – mechanisms to make sure they are in place is not yet embedded
- Exploration around 'embeddedness' is informing discussion – Do we always check that it's in place? How 'in place' is this learning?
- The importance of revisiting key skills is recognised, discussed and acted upon.
- The responsiveness of maths fluency sessions are being explored – 'maths fluency is to maths, as spelling is to writing..... '
- The value of assigning competence is recognised and informs provision

<u>Characteristics of ARE and Approaches Used to Support Progress</u> <u>Phase Feedback & Guidance for Assessment</u> <u>February 2019 Revision</u>

Foundation Stage

Refer to meeting minutes – 15th February 2019 – Key discussion points/prompts/strands:-

- What is ARE?
- Who is ARE?
- How do you know? Evidence presented and discussed
- Who is below ARE?
- Why are they below ARE? Where are their gaps in understanding
- What are their next steps?
- What else do we need to consider?
- Relevance/Importance of working memory
- What are indicators of working memory failure? Include – incomplete recall; failing to follow instructions; place-keeping errors; task abandonment; emotional issues
- Exploring understanding of written graphics
- Developing confidence in describing the development of mathematical written graphics
- Development of provision to support the use of mathematical marks with guided and child-initiated play:
 - Clip boards set up with paper
 - Clip boards set up with 10 frames
 - Other shapes grids eg. circles and segment
- Increased numbers of smaller triangular white boards across the provision
 - White boards available outside

- Laminated numbers – train tickets, timetables
 - Number lines and pegs
- Increased number of signs displaying quantities around the room
 - Small coloured pieces of paper
- Bingo tickets, raffle tickets, national lottery tickets
 - Giant tape measure
- Numerals with corresponding values
 - Scales
- Tally boards for group times – one per group/keyworker

Key Stage 1

Characteristics of an ARE mathematician at year 1	Opportunities	Year 2 Characteristics (from Current Interim framework statements -To be updated)
<p>ADDITION</p> <p>To explain describe and model what + means</p> <p>Select and use concrete models to support or demonstrate addition.</p> <p>Understand, model and describe the commutative nature of +</p> <p>use + to create number sentences which describe situations, models, images and stories.</p> <p>Count on and back from any number 0-100</p> <p>To successfully, independently add one and two digit numbers up to 20.</p> <p>To have practised, established and ascertained number bonds to 20 and then have practice to recall them..</p> <p>To identify the whole and the parts in any number sentence.</p> <p>To recognise that they can use known number facts to work out unknown and describe when they do this.</p> <p>SUBTRACTION</p> <p>To explain, describe and model what – means.</p> <p>Subtraction as the inverse of addition</p> <p>Use the language of part part whole to describe subtraction</p> <p>Understand, describe and model the term 'difference'.</p>	<p>Experience of a Range of models and contexts Money, measure, concrete object</p> <p>Language of Part + part = whole, the whole is bigger)</p> <p>Investigation rather than practising process and answers.</p> <p>Practice and revisiting</p> <p>Will not simply have correct answers accepted but will be challenged to explain the reasoning behind the answer.</p> <p>Will have knowledge and understanding deepened and broadened not extended</p> <p>Mental maths meetings</p>	<p>add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17)</p> <p>add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17)</p> <p>recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships</p>

<p>MULTIPLICATION</p> <p>Understand, describe and record what \times means - lots of, times, multiplication</p> <p>Use model to demonstrate \times number sentences.</p> <p>Use number sentences to represent models showing multiplication situations for $\times 2$, $\times 10$, $\times 5$</p> <p>Recall of number patterns, describe, explain and present understanding of how those number patterns arise.</p> <p>Through investigation, develop understanding doubles to 20 leading to Recall of</p> <p>Understand, describe and record what 'doubling' is Link to $\times 2$, $2x$</p>	<p>Experience of a Range of models and contexts Money, measure, concrete object</p> <p>Use models to explore, develop not just memorise procedures or patterns.</p> <p>Lots of opportunities to revisit and present the same concept in lots of different ways.</p>	<p>read scales* in divisions of ones, twos, fives and tens</p> <p>recall multiplication and division facts for 2, 5 and 10 and use them to solve simple problems, demonstrating an understanding of commutativity as necessary</p> <p>identify $1/4$, $1/3$, $1/2$, $2/4$, $3/4$, of a number or shape, and know that all parts must be equal parts of the whole</p> <p>use different coins to make the same amount</p>
<p>DIVISION</p>		
<p>Understand describe record what division means. Division as sharing</p> <p>Understand, describe and record what a and 'halving' - Recall halves to 20</p> <p>Use halving to find quarters of objects, shapes, numbers or quantities.</p> <p>Investigating division by sharing</p> <p>Grouping</p> <p>Then link that there are lots of</p> <p>Link to known multiplication facts.</p>	<p>Experience of various models in a range of contexts.</p> <p>Lots of opportunities to revisit and present the same concept in lots of different ways.</p>	<p>partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus</p> <p>read scales* in divisions of ones, twos, fives and tens</p>

Refer to meeting minutes – 15th February 2019 – Key discussion points/prompts/strands:-

- Review document from last year and secure ARE understanding
- Which children are below but close to ARE?
- What are the challenges in this respect?
- What can we do to support these children in working closer to ARE
- Shared planning to practise implementing the changes identified
- Comments from individual teachers in relation to the process

Thoughts and Next Steps
<p>Develop confidence of children to secure ARE- its not just the maths, it's the wellbeing and personal confidence.</p> <p>Secure the real life contexts for mathematical contexts to develop the personal relationships between the learner and the maths.</p>

Key Stage 2

Key considerations in relation to identified key gaps and securing next steps in relation to these:-

Year	Gap in understanding	Next steps – how can we go back and undo the misconception?
3	<p>Crossing boundary when counting eg 708 808 908 108 76 86 96 106 206</p> <p>5710 or 5707 which is bigger? Ordering 3 digits incorrectly 2810 is smaller than 2807</p> <p>Number formation – recognition of what they have recorded gets in the way of children being able to describe what they have done.</p> <p>Presentation in maths books. Underlined with ruler etc to take more pride in learning – it's important</p> <p>Misunderstanding of vocabulary</p> <p>Children shouting answers out</p>	<p>Place value problems. Aware that there is a change there and a barrier. Need to use Dienes' and record movement alongside recording of the numbers themselves. Connective model and how we need to tie together symbols, language, images and context. Give children this rich landscape and any new learning should 'hang' more securely on it.</p> <p>Use Dienes' and Number Talk to genuinely help develop children's understanding of number sense</p> <p>Phase policy about number formation and children to be reminded.</p> <p>Tighter focus on being able to copy from the board (thereby practising letter formation & modelling presentation)</p> <p>Connective model presented at the beginning of every unit, including vocabulary which will be clearly displayed and accessible to children. All adults and children using same tier 3 language.</p> <p>Ask children to use fingers to represent numbers of ways they have found to solve a problem or even an efficient way and an inefficient way. First thumb, second index etc</p>
4	2323 partitioned into 2000 + 3 + 3 Next time partitioned into 1000 + 1000 + etc	Partitioning of numbers. Number talk to go back and reorder understanding. Ensure children can read a number – using words correctly. Reading the number and seeing it. Connective model to

	<p>Number lines recorded incorrectly especially with jumps not corresponding to position on number line.</p> <p>Presentation in maths books. Underlined with ruler etc to take more pride in learning – it's important</p>	<p>ensure image and language and digits remain interconnected in children's minds</p> <p>Talk with children about their understanding to diagnose real gaps. What is it that they can't do? Find time to explore their understanding genuinely. Use Number Talk time to explore children's understanding. Why do we use number lines and imagery to support our understanding? Review connective model, display and refer to in teaching.</p> <p>Tighter focus on being able to copy from the board (thereby practising letter formation & modelling presentation)</p> <p>Requirement to practise skills until children understand a skill in an embedded way</p>
5	<p>Presentation in maths books. Underlined with ruler etc to take more pride in learning – it's important</p>	<p>Tighter focus on being able to copy from the board (thereby practising letter formation & modelling presentation)</p>
6	<p>Presentation in maths books. Underlined with ruler etc to take more pride in learning – it's important</p> <p>Selecting appropriate method for calculation</p>	<p>Tighter focus on being able to copy from the board (thereby practising letter formation & modelling presentation)</p> <p>Time spent being able to practice. Opportunities presented so children can make decisions. Choose one efficient way and one inefficient way of solving a calculation. Share this process through Number talks.</p>

Thoughts and Next Steps

Phase target – to develop the use of number talk to support children's understanding in maths. Teacher's role is to facilitate the discussion so the children negotiate a way through the topic. Make sure you record children's thinking and don't intervene! Don't misrepresent their thinking if they share their thinking verbally – don't assume, ask!

Phase target – to repeatedly practice skills. Need to review thinking and rehearse skills in order to embed them in children's understanding. Time needs to be spent practising skills outside of the maths session.