

Practice Guidance for Mathematics

Why is Mathematics important to the children in our school?

Our intention is for our children to:

- 1 Enjoy and be curious about Mathematics using it in their everyday life.
- 2 Become fluent in fundamentals of mathematics by recalling and applying knowledge rapidly.
- 3 To reason mathematically by finding patterns and using mathematical language.
- 4 To solve problems systematically by exploring and seeking solutions showing resilience.
- 5 Use concrete manipulatives, pictorial and abstract representations to make rich connections across mathematical ideas.
- 6 Master our 10 Learning Values.
- 7 Build knowledge as set out in our Mathematics Curriculum.
- 8 Build vocabulary as set out in our Mathematics Curriculum.
- 9 To have rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures.
- 10 Use our enabling environment to support our Mathematics Curriculum. This includes:
 - 'Real Maths' role play in every classroom.
 - 'Imagination den' with 3D wooden shapes in every classroom.
 - 'Technology zones' in classrooms using: Smart boards, computers, laptops and I-pads to support fluency.

What is Mathematics?

Math is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, architecture (ancient and modern), art, money, engineering, and even sports.

"The national curriculum 2014 for mathematics aims to ensure that all pupils:

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

Our approach to planning Mathematics:

All year groups plan for Maths using the 'Mastery' approach to teaching.

- EYFS- to work towards 'Revised EYFS Framework' expectations.
- KS1- to work towards KS1 National Curriculum expectations.

EYFS1 (Nursery) to follow guidance from White Rose. EYFS2 to Year 2 are to follow planning guidance from Pearsons 'Power Maths scheme.' The long term plan and individual lesson plans to meet each small step will be accessed from Power Maths and the National Curriculum expectation are on our school curriculum plan. (see Appendix 1). Year group unit plans will show the expected outcome for each unit using Earth, moon and stars level of assessment.

Unit planning should include: (see Appendix 2 for an example format)

- WALT- What do I want them to learn
- Previous learning they should have. (To be the focus of preteach/pre-requisite skills)
- Outcome: Earth, moon and stars levels of challenge.
- Notes on who has missed the lesson.

The Power Maths individual lesson plan gives examples of previous steps, next steps, misconceptions, strengthening activities and deepening activities which can be used by the teacher as needed to adapt the lesson for their individual classes and children. Each class has a master Teacher Guide book for each half term, can also be accessed on the Active Learn website.

Additional support for Mathematical activities to support Maths Challenge areas and support interventions the following websites can be used: 'White Rose', Master the curriculum, NRich and NCTEM.

Differentiation

Just as prescribed in the National Curriculum, the goal of Power Maths is never to accelerate through a topic but rather to gain a clear, deep and broad understanding.

"Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on."

National Curriculum: Mathematics programmes of study: KS1 & 2, 2013

Our Mastery approach to Maths demonstrates learning without limits. Every lesson is planned with an expectation that all children will achieve the basic requirement of the lesson. This is the Earth challenge. This may be achieved with support from peers or adults or scaffolding of the tasks.

The mastery approach allows children to explore the learning with concrete, pictorial and abstract approaches.

To deepen the learning the Power Maths using variation in its questioning. Every child has the opportunity to reach for the stars putting no cap on their learning. For every lesson there is a challenge question within the Power Learning Practise book.

The main purpose of differentiation is to challenge and raise standards of learning by ensuring that curriculum objectives are accessible to all our children despite their backgrounds or abilities. We see differentiation as a form of integration and not exclusion.

Daily Maths work out- 10-15mins every day to develop fluency can include:

- Number of the week/day (EYFS-1-20 /Y1- 1-100/ Y2- 0-100+)
- Lunchtime Maths displayed on part whole model, bar models and number sentences as appropriate
- Sun hat totals (seasonal)
- Date and weather, daily timetable
- Active counting and singing
- Other incidental opportunities which may occur e.g. topic related, or sharing resources.
- Power Maths- Power up
- **Mastering Number Programme** (introduced to EYFS2 to Year 2) 4 lessons per week to be taught using the scheme guidance from NCETM. (See appendix 3)

Essential resources for Mathematics:

Each year group uses manipulatives/ concrete resources.

EYFS- Numicon, novelty counters/ natural resources/five frames/part whole models.

YR 1- Numicon, tens frames/counters/ part whole models/Dienes (HTO).

YR 2- Numicon, cubes, Dienes (HTO) /place value counters.

In each classroom we are developing a Real Maths area where the resources and manipulatives are organised for the children to access independently during lessons and as free choice. Other resources are stored in classroom cupboards. Many other resources, including topic boxes are shared and stored centrally. In KS1 the Real Maths shops are an engaging area that are topic related to encourage children to use Maths for a real life person e.g. The Great Fire of London bakery in Year 2, Our clothes shop in Year 1.

Our approach to teaching and learning in Mathematics:

Daily Power Maths lessons of approximately 50minutes.

Lessons to follow the Power Maths lesson sequence (See appendix 4)

- 1) Power up/ Mastering Number
- 2) Discover
- 3) Share
- 4) Think together
- 5) Practice
- 6) Reflect

Lesson should be:

- Active, creative and fun
- Use resources-concrete apparatus
- Problem solving everyday (ideally to start the lesson-discover- bringing maths to life)
- Think, pair, share
- STEM sentences used to model how to use the vocabulary.
- Self-assessment used at the end of each unit.
- Jotters used instead of whiteboards to share working out/ rough work, children date their work, verbal feedback given rather than written marking.

- Power Maths Pupil workbooks used to record in weekly (minimum) - children to write short date next to the title, marking feedback policy to be used or children to self mark during whole class feedback using a coloured pencil to show corrections. (See appendix 5)
- Mastering Number (4days)/ Number of the week (1 day) to be used to develop fluency in every classroom. (appendix 3)

Homework

In EYFS2 at least once half termly homework related to Maths to support either children's targets or to consolidate the current maths learning, this can be games to play, an activity to complete or a Maths investigation.

In KS1 homework is sent home half termly for children to complete a Maths task to consolidate learning. All children in school have access to Maths games on Numbots and Education City which have been assigned to them to practise and consolidate their learning. Education City is updated termly.

Mathematics in the learning environment:

- Every Classroom has an accessible motivating and engaging Real Maths area with resources for the children to use in continuous provision. KS1 have a Real Maths shop.
- Displays must be relevant to embed vocabulary the children need for the taught topics.
- Mathematics vocabulary needed by the children/adults needs to be accessible in each classroom for each topic.
- A weekly certificate to be awarded, in each class, for 'Mathematician of the Week.'
- Classrooms all have a block area with match back labels to encourage children to use the correct shape names and measures.
- Classrooms have posters with the water bottles to show measures vocabulary suited to the year group- eg full, quarter full.
- (see appendix 6- Maths area essentials and desirables checklist, greater depth questions, posters etc.)

Our approach to assessment in Mathematics:

Assessment for learning is ongoing and central to effective classroom practice. Much of the time, during interactions with individual children, groups or the whole class, there is some assessment being made. What children do or discuss is observed and listened to and then analysed against expectations. This analysis informs future planning and identifies where children are in their learning and what they need to learn next. Misconceptions should be planned for and addressed as they occur (they are included in the Power Maths teacher guidance).

Early Years Foundation Stage (Ages 3-5years)

The EYFS profile is used in EYFS2 to assess in the summer term against the Early Learning Goals to state if each child is emerging or is working at the expected level the age related expectations. Prior to the Early Learning Goals children are assessed against age related goals as outlined in Developmental Matters 2021. It is used in EYFS to provide staff and parents with reliable and accurate information about each child's level of development. The EYFS profile enables staff to plan an effective, responsive and appropriate curriculum that will meet all children's needs. Within the Mathematics area of the EYFS profile, staff

record judgments against the OPAL Milestones at each child's Spotlight at their 6 months milestone (See appendix 7). Judgments are made from observation of consistent and independent behaviour, predominantly from children's self-initiated activities.

By the end of the EYFS, some children will be working at greater depth. Other children, depending on their individual needs, will be working towards some or all of the goals - particularly some younger children, some children with Special Educational Needs and Disabilities and some learning English as an additional language.

Assessments are recorded and analysed termly. Intervention programmes can then be planned and implemented effectively. Intervention groups can then be implemented.

Key Stage 1 (Ages 5-7 years)

2 Pre-planned assessment times are set across school. Work from the current term in books is analysed and specific observations are made in order to give children a best fit judgement towards their age related expectations (Appendix 7). The children's progress towards age related expectations are recorded and analysed at each assessment point. Intervention programmes can then be planned and implemented effectively. Children are then assessed to be working towards the expected level (WTS), or working at the expected level (EXS) or working at greater depth (GDS). Our assessment for KS1 is set out in steps: Children who are emerging will be assessed against steps to identify progress working towards KS1. Children working at the expected level for their year group and stage of the year will be at the required step as outlined on the assessment grid (eg Year 1, AP1-spring term is step 7 as expected). At the end of every unit teachers make judgements based on their observations, children's work and the end of unit check to say if the children have mastered the unit (moon) or just achieved the basic requirements (earth) or have been working on the challenges to be at greater depth (stars). These judgements will go towards the assessment points.

Throughout Year 2 children will experience question based assessments to assess their understandings of Mathematics. In the Summer term teacher assessments and National Curriculum assessments give their levels for Key Stage 1.

At the end of every lesson children are asked to reflect by answering a question to demonstrate their understanding. They can answer in words or with a picture or a calculation. At the end of every unit children are asked to self-assess against their understanding using a scale of faces to say how confident they feel. (appendix 7)

Teachers record and track data using O-Track.

Intervention in Mathematics:

Using ongoing assessment for learning teachers will identify through marking or through observations some children that will need time to consolidate their learning before the next lesson on a specific area, this will be carried out immediately, at the point of need where possible, within the same day or before the next lesson. As we identify misconceptions within the lesson they often make good learning for the whole class to deepen the learning so make it a valuable learning opportunity for all. The planning of Power Maths allows teachers time to slow down the pace of the lesson or to introduce consolidation lessons when a concept needs more time for children to embed their learning.

Teaching assistants have had intensive professional development in school to develop their confidence to support the teaching of Maths and promote positive attitudes to children as they access the challenges in the classroom. TAs use the Maths Challenge areas to support and develop children's learning. (Appendix 6) We have introduced The Mastering Number programme which is progressive from EYFS2 to Year 2 and allows children the opportunity to embed their fluency skills, small steps makes it accessible to all. Teachers encourage challenge through questioning. (Appendix 3)

Mathematics across the curriculum:

Real Maths is part of our continuous provision in every classroom e.g. a shop or a kitchen or office. EYFS have Mathematics embedded in the learning areas inside and outside. Every classroom has a block area with 3D shapes and measures for children to complete topic related challenges. (appendix 6)

On our Summer Maths Day we focus on the jobs of parents using Maths so children can see the purpose for learning that is achievable to them. (appendix 6)

Everyday maths in the class room date, lunch time numbers etc embed maths skills.

ICT opportunities using the Numbots and Education City games accessible to all.

Dice for games in all classes. Sand timers in classrooms to support children's independence to measure time.

Enrichment opportunities in Mathematics:

We have 3 Maths Days in school throughout the year. These are celebrated within school either with visitors or fun and engaging activities within the classroom or outside. One of the days supports the NSPCC charity and we ask the children to dress up- wear a number. We also hold an annual workshop for parents to work with their children on Mathematics activities.

Mathematical References:

- www.activelearnprimary.co.uk (Power Maths)
- <https://whiterosemaths.com>
- <https://www.nspcc.org.uk/what-you-can-do/charity-runs-cycles-and-challenges/social-and-special-events/number-day/>
- <https://www.ncetm.org.uk/>
- <https://www.gov.uk/government/publications/early-years-foundation-stage-profile-2018-handbook>
- <https://nrich.maths.org/>
- <https://masterthecurriculum.co.uk/>
- <https://mathsnoproblem.com/>

Mathematical Appendices:

- 1) Curriculum
- 2) Unit Plan
- 3) Mastering Number
- 4) Power Maths information and lesson sequence
- 5) Marking feedback

6) Environment

7) Assessment

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