

Eleanor Palmer Primary School Maths Policy

This policy sets out the approach to teaching and learning maths at our school. Our separate Calculation Policy, explains in detail how we teach addition, subtraction, multiplication and division.

Our Aims

- To give the children a rich and balanced mathematics curriculum that develops their fluency, reasoning and problem solving – the key aims of our National Curriculum for mathematics;
- To present maths as an engaging, exciting, creative and relevant subject and in so doing, promote a confident attitude in tackling mathematical challenges; and
- To ensure that all children achieve a high standard in mathematics and develop a positive attitude towards maths.

Teachers at Eleanor Palmer are passionate and rigorous in their expectation of the children's progression in mathematics, and inventive in how they teach maths. Basing their pedagogy on evidence from bodies such as the NCETM, as well as what we have found to have an impact on children's mathematical development at EP, they gather, develop and share great lesson ideas which make maths relevant as well as those which promote problem solving with pure number. Games, reasoning and problem solving are cornerstones of our teaching and learning of mathematics. The school has worked in partnership with NRICH for a number of years and is committed to its problem solving approach. In addition, the publications 'Talk Maths', 'Talk Times Tables' and 'Raising the Game', created by Eleanor Palmer staff, capture much of our approach to the teaching of mathematics.

Organisation of classes

Children are taught in mixed attainment classes. There is an expectation that teachers' knowledge of levels of attainment are established quickly at the start of a new school year, using a combination of test data, teacher assessment by the previous teacher and initial assessments within lessons (see Assessment below). With end of year expectations in mind, teachers will plan lessons in which all the children are working on the same mathematical concept – for example place value or division.

Teachers use a teaching for mastery approach. At our school this means that the whole class will work together in some lessons, particularly those that introduce and explore a new concept. Teachers will use a 'ping pong' dialogic style, working with the whole class, focusing on small steps, key representations, questions and misconceptions, aiming for all children to become secure in the concept. In other lessons, it might be effective for the class to spend more time working in smaller groups or on independent practice; this will be based on the teacher's assessment, from the previous lesson. Teachers will, informed by their assessments, adjust lessons and activities so that they are pitched at appropriate levels of challenge and provide the right 'next step'.

Best practice at our school is keeping the whole class working on the same concept, taking small steps to master this but also assessing progress and using 'flexible grouping': grouping that is informed by day to day marking and assessment of misconceptions. When appropriate, throughout the lesson, the children will be drawn together to learn from each other, share misconceptions and 'penny drop' moments, so they can progress as a class.

Children with special educational needs may well be working to an individual plan and teachers will differentiate their work, ensuring they are included in the theme of the lesson. Whatever their level of attainment, children should not experience repeated failure or effortless success; success should be encoded.

Inclusion

Eleanor Palmer is an inclusive school. Special care must be taken by all staff to ensure that all children have equal opportunity to succeed in maths and that insecurities and stereotypes are not compounded by how the lessons are organised and presented.

Staff should ensure that images represented in resource material motivate all children equally. Classroom presentation and organisation should represent the achievement of all the children. Staff should make careful decisions about groupings and pairings. We have high expectations of all children.

Time

All classes should have a daily mathematics lesson equivalent of at least 1 hour a day or 45 minutes at Key Stage 1. However, lessons should not be cut short if the class is on the verge of an exciting discovery, and counting and rehearsing factual fluency can and should be done throughout the lesson and in any spare 5 minute moments. Children do some of this essential memorisation at a different point during the day; we call it Keepy Uppy! Lessons are taught by the class teacher and sometimes senior leaders or our other class teachers will team-teach lessons alongside them. As one of their daily maths lessons for example, Kate Frood, headteacher, teaches a weekly problem-solving lesson to Years 5 and 6 with the class teacher.

Planning

The core of our planning is taken from the National Curriculum for Mathematics and teachers use the Camden Journey Planners, NCETM Teaching for Mastery materials, the Hamilton Trust website and White Rose Maths to design their medium-term and weekly lesson sequences. These documents set out key curriculum targets, teaching notes and suggested approaches for each year; they are kept in year group folders in our shared drive. Time and great care is put into our termly plans to ensure that we build upon what has been taught before in a consistent and effective manner (see Appendix 1). Our teachers use NRICH to find and adapt great problem-solving lessons and our school is a treasure trove of books full of great resources. We encourage teachers to magpie ideas and make them their own. Colleague's brains are always available to be picked, senior leaders make regular time to support maths planning, and Kate Frood's office and Natalie Stevenson's maths book cupboard are great places to find inspiration.

None of these resources describe differentiation in any detail and it is expected that for each unit of work, the class teacher adapts, dials back or deepens the objectives and tasks for the specific needs of their class.

Termly plans follow a whole school format (see Appendix 1) which bring together key objectives and noted activities, games and websites. These plans were initially written collaboratively with Natalie Stevenson in 2019 and will be adapted and added to in subsequent terms.

There is no requirement to use or hand in a prescribed whole school weekly planning sheet. However, it is expected that teachers plan an overview of the week's objectives for their own records, based on their termly plan. This should then be shared with other members of staff working with the class. Teachers are expected to annotate changed plans and keep note of formative assessments etc.. These are critical!

Each lesson has a clearly stated 'Learning Objective' referred to as an 'L.O'. Children, (and in younger classes, adults) write these at the start of their work, alongside the 'short date' e.g. 01/01/18.

Plans are monitored by the Head at the start of each term, and books are monitored by the SLT on a half-termly basis. Key questions considered as part of monitoring are:

- Is there evidence of teaching and activities being adapted for the class based on formative assessment?
- Is it clear what the aims are for each week/lesson/unit of work ('by the end of this lesson (s) the children will be able to....')?
- Are these plans live working documents?

Coding, part of the Computing Curriculum, shares lots of links with mathematics so when coding is the Computing focus of a term, these lessons can be recorded in maths books and planned as a weekly maths lesson. We believe that the reasoning, debugging and problem solving involved in Coding is brilliant for mathematical development.

When planning lessons, we believe that there is always room for activities such as an idea from a staff meeting or course! If the teacher is inspired and enthusiastic, this will influence the children to be passionate about the subject. When this is the case, teachers are expected to adjust their long term plans and think about how they can re-balance the mathematics covered in the coming months, taking care that they don't miss out any topics.

Foundation Stage

In the Foundation Stage there must be a daily whole class session supported by linked independent and guided activities. By the summer term of Reception, a full maths lesson should take place daily, in line with the National Curriculum. Planning is based on the stages outlined in "The Curriculum Guidance for the Foundation Stage" alongside the National Curriculum and Statutory Framework For Early Years Foundation Stage. Teachers take care to plan opportunities that cover all areas of maths (patterning, subitizing and counting, for example) and use the NCETM's early years materials, White Rose Maths and Learning Trajectories to do so.

Evidence based best practice

We have a strong commitment to the following mathematical pedagogy and it is expected that all teachers share this philosophy and demonstrate it in their teaching.

1) A great emphasis on the **building blocks of number** in the early years so that children develop a secure grasp of 'the big picture'. We see the building blocks as:

- An understanding of **place value** and **partitioning** of numbers, starting from 'the story of' numbers 1-10... how 6 can be partitioned in different ways, for example;
- Confident and fluent recall of basic **number facts** and an understanding of what this unlocks (if we know this, what else do we know?);
- An understanding of the **relative size and position** of number.

2) Teachers plan with the five big ideas from the Teaching for Mastery approach at the heart of their teaching:

- Representations
- Variation
- Fluency
- Mathematical Thinking
- Coherence

- 3) Whole class interactive teaching with clear teacher exposition and modelling, both to introduce new concepts at the start of the lesson and to assess and consolidate what the children have learnt in **plenary** sessions.
- 4) A strong emphasis on **questioning**, by the teacher of the pupils, which prompts **reasoning**.
- 5) New topics and concepts should always be introduced by clearly **linking** them to existing knowledge and understanding.
- 6) An emphasis on using and **applying** mathematics through **problem solving**.
- 7) Shared thinking as an approach to solving such problems and investigations.
- 8) A commitment to using **consistent, developmental representations** to aid the children's understanding and their progress towards calculating fluently and accurately by the end of KS2.
- 9) The use of '**good mistakes**' to put the exploration of misconceptions at the heart of a lesson and to foster a growth mind-set.
- 10) **Mathematical talk** between the teacher and the children and among children themselves (talk partners). There must always be an emphasis on the use of correct mathematical language and extremely high expectations of the children **explaining** their thinking in full sentences.
- 11) A high priority is set on the learning of **addition and subtraction facts**, and **times tables**, with an aim that children know them all by heart in Year 4; and certainly by age eleven. We all use maths games particularly as Keepy Uppy activities, to rehearse key facts and to engender a love of maths!

Feedback

Wherever possible, the child should be present whilst their work is marked. The most important 'marking' is informal diagnostic assessment during the lesson. Teachers should be teaching with a 'pen in hand' and should be 'working the room' rather than sitting with just one group for too long. This means teachers will be as close as possible to teachable moments in the lesson, and that marking after school focuses on assessing next steps to design the next lessons, rather than wading through pages of maths for which they were not present.

At the end of the lesson, children from Year 2 upwards write a short message to their teacher, reflecting on their learning during the lesson. The teacher can then reply to this directly.

The expectation is for maths books to be assessed daily whenever possible, so that the next lesson can be planned in response to the learning. A child's next steps may be to move on within the theme, to dial back a step, to do more examples to secure understanding, or simply the next day, to work closely with the teacher to deal with misconceptions. In line with our assessment and feedback policy, we do not use red pen, and crosses for incorrect answers are to be avoided. Drawings and exclamations are, however, encouraged!

There is no set formula for what teachers write in books as they mark, but acknowledgement of the child's work and encouragement should be evident, often with a direct response to their message. Crucially, the next lesson will show that the teacher has designed examples based on their marking/assessment from the previous day. Adult comments written when marking should be addressed to the child. Where another adult has intervened with a child's learning, for example a support teacher during a lesson, comments should be in the 3rd person, alongside the adult's name e.g. 'Shahed was confused about subtracting when there was a zero so we used place value counters and he seemed to get it. Well done! – Janet'. These comments are addressed to both the child and the class teacher.

Assessment

Each child's progress should be continually assessed and should inform day to day planning. We assess by:

- Observation whilst children are engaged in a task or are specifically asked to work through a question so as to identify the 'bug in their thinking';
- Using our subject knowledge and experience to anticipate and teach away from misconceptions;
- Intuitive on the spot comments made by the teacher to the child/group which extend/limit or change the direction of the given task;
- Discussions with the class or group, particularly during the plenary;
- Using 'What do I know about...' sheets (see Appendix 2) at the end of some units of work – for example Fractions – to give the children the opportunity to show what they already know about a maths topic, what they learnt in previous years, and whether they can answer some questions at an age appropriate level. This should then be annotated in green pen at the end of the unit of work by the children, to add new learning and correct initial mistakes. It will give the children a sense of their progress!
- Formal assessment tasks as follows:
 - At the end of each unit of work, teachers have end of unit 'quizzes' which they can use at their discretion to inform their teacher assessment
 - At the end of Year 4 and each term throughout 5, Kate Frood gives the class a Big Headteacher Times Table Test (100 questions) to ensure that all pupils have learnt these facts and continue to be fluent with them. This helps the class teacher and Kate to identify and support children who have not learnt their tables or cannot use them to solve questions such as 30×5 or 0.3×5 .
 - At the end of each term, teachers use Hodder's PUMA tests – covering a range of mathematical topics - which indicate a child's standardised score, relative to their age. Class teachers mark the papers themselves in order analyse gaps in knowledge and to inform future planning. These scores are returned to Kate and used to inform teacher assessment
 - At the end of Year 2 and 6 the children sit standard assessment tasks (SATs). These are marked internally in Year 2 and externally in Year 6.

At the end of each term, teachers use their assessments to record whether children are meeting age expected levels, are below these levels or have achieved mastery in that year group. Teachers email Kate an excel data capture sheet for inputting into the school's Primary Progress Toolkit tracking system. This data enables us to track progress and aids teachers and senior leaders to identify gaps, trends and children who need support

Record Keeping

Teachers keep informal records on individual pupils to inform their end of year report writing.

Records are kept by the Head tracking individual pupil progress. These are key to target setting for Year 6.

In Foundation Stage, Profile Books are used to keep a record of Mathematics, with assessment comments, next steps and updates on progress recorded by the Foundation Stage team. In Key Stage 1, A4 2cm squared maths books are used. In Key Stage 2, A4 1cm squared books are used. Work must be dated and where possible and practical, any photos, pictures or activities done on paper must be stuck in books. Completed books must be stored to monitor progress and may be taken home at the end of the academic year, but the most current book moves up to the next class for assessment purposes.

Maths work which the children are particularly proud of should be displayed and/or kept in the children's Best Bits Books, with a note of the date and context noted.

Presentation

Work should always be dated and given a title – the 'L.O.'. Books are to be seen as 'work' books and the recording of working and thinking is encouraged – thinking can be messy but never careless! Teachers should discuss with children the difference between recording for keeping track (jotting down cumulative totals informally), recording for accuracy (when calculating in columns and it's important to line up digits) and recording for sharing (perhaps to present findings to the class). We encourage clear layout of calculations to minimise errors and children should take pride in their work.

Role of support staff

There is usually a member of support staff present in a maths lesson. It is our policy that they do not always work with the same children, and particularly not always with the lowest attainers. They will be active and enthusiastic participants in whole class discussions, perhaps giving whispered support, asking the teacher questions, modelling misconceptions or recording shared thinking on a flip chart. These ways of being involved with lessons were researched and developed in a support staff lesson study in 2017. As the children work through their mathematics, support staff might repeat key concepts from whole class discussions, use representations that will clarify a child's thinking (e.g. a number line or base 10 equipment) or support reasoning by 'thinking aloud' and questioning. Support staff should sit beside children on a chair or on the carpet as appropriate and annotate children's work during a lesson.

Display of children's work

In line with our display policy, there should be a maths display in every class. This should include children's work as well as key visuals such as 100 squares, times table squares and fraction walls.

Resources

Each class should have a well maintained stock of core resources (ten frames, number lines, dice, playing cards, fraction cards, Numicon, place value counters, 100 squares etc...) kept in a defined area to use regularly. There must be no stigma to using equipment and children should be encouraged to get equipment independently, based on what they think will help them. Because of this, it may be appropriate to have out key resources on all tables for a sequence of lessons, for example, having place value counters out during Year 3 lessons on columnar addition.

Each classroom should have key visuals displayed and referred to in lessons:

- FS and KS1 should have number lines, washing lines, number tracks, Numicon number lines and 100 squares. In Year 2, a multiplication square is a good idea as well as a fraction wall that includes $\frac{1}{4}$ family too!
- KS2 classrooms should have 100 squares, multiplication squares and fraction walls clearly visible. In Years 4, 5 and 6, you should have place value charts showing tenths, hundredths and thousandths. Number lines showing negative numbers are a good idea too!

Larger resources, such as measuring equipment, are kept in the maths room – down the corridor next to Year 1.

There are excellent resources on the internet for use on our interactive whiteboards. We all use Interactive Resources (www.interactive-resources.co.uk) lots and every teacher and child has login details. We recommend exploring and adding to the year group folders we have set up on this website, and referring to great games you find in your maths homework. Just ask for advice and the login details!

The Headteacher also has a range of personal resources available for use in her room. Please leave a 'post it' detailing what you have borrowed!

Calculators

Calculators should be used as a tool for exploring number from the Nursery upwards and as a calculating tool from Year 5. They are not used where core paper and pencil methods such as multiplication are being taught, but rather for applied problem solving where calculation is not the aim, but finding patterns is. Specific lessons about calculator skills should be taught in Years 5 and 6. Their use in Key Stage 2, as part of a problem-solving lesson, is positively encouraged.

Involving Parents

When a child joins our school in Foundation Stage, a maths pack is sent home, containing what we believe are core resources to help parents foster maths learning at home. This includes Numicon, for example, to help children to instantly recognise numbers. These maths packs will be explained and presented to parents by either the Foundation Stage Leader or Maths Subject Leader. Each year, a document showing age related expectations for maths will be sent home to support parents to know which facts should be memorised and practiced, and what mathematical achievements should be accomplished by the end of that year group.

In line with our revised homework policy, only the learning and practice of core facts is sent home in maths. Parents are advised which games work, and our monthly Stay and Play sessions give parents a stock of tried and tested EP games. In addition, in Year 6, since 2016, we have been part of an exciting new trial with Colin Hegarty of Hegarty Maths whereby Year 6 pupils access online video materials to support their curriculum and a successful transition into Key Stage 3.

Appendix 1 –Termly planning

Year 2 Termly Planning Example

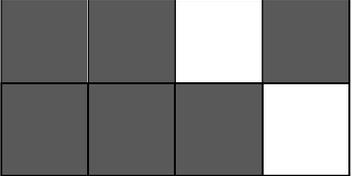
	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	
Autumn	<p>NB. Ensure WR Summer block 1 done through computing including describing turns</p> <p>Number: Place Value</p> <p>WR Autumn Block 1 (leave out counting in 2s, 5s, 10s and 3s)</p> <p>Spine repeat 1.8 – 1.10</p> <p>Links could be made to WR Autumn Block 3 money</p> <p>Fluency: assess additive grid and gap analyse; use this for keepx uppx</p> <p>Games & Problems: caterpillar chance; predict the poo; What's in the bag (10s and 1s yxcs); est-mysteries and estimation station; place value representation bingo; give a dog a bone; one big triangle problem</p>			<p>Number: Addition and Subtraction</p> <p>WR Autumn Block 2 up to step 12, Add two 2-digit numbers – crossing ten – adding ones and add tens (bum sums)</p> <p>Spine 1.11 – 1.15, leaving out 1.12, difference (to be done in money block)</p> <p>Fluency: assess additive grid and gap analyse; use this for keepx uppx</p> <p>Games & Problems: elevenses; race past 50 (owmison tile game); slidy totals; race to 100 and race to 0; Totality problem</p>				<p>Measures: Money</p> <p>WR Autumn Block 3</p> <p>Link spine 1.12 with difference in this block</p> <p>Fluency: assess additive grid and gap analyse; use this for keepx uppx</p> <p>Games & Problems: I have 5 coins problem</p>			<p>Number: Multiplication and Division</p> <p>Pick up on Autumn Block 1, counting in 2s, 5s, 10s and 3s</p> <p>WR Autumn Block 4</p> <p>Spine 2.2-2.4</p> <p>Fluency: doubling and halving, linking thinking; counting collections of large objects.</p> <p>Games & Problems: magic vs rich</p>		Consolidation
Spring	<p>Number: Addition and Subtraction</p> <p>WR Autumn Block 2 step 13 – 16</p> <p>Spine 1.16</p> <p>Fluency: assess additive grid and gap analyse; use this for keepx uppx</p> <p>Games & Problems: Four rolls to 100; sum difference; do sequence of limited digit problems and circle connections problem</p>		<p>Number: Multiplication and Division</p> <p>WR Spring Block 1 (consider moving odd and even numbers in keepx uppx)</p> <p>Spine 2.5-2.6 (2.5 is about commutativity and doesn't come into WR block) Fluency: chanting x5 and x10 or x2 and x4</p> <p>Games & Problems: swarpx strips; make multiples; wheelie counting problem</p>		<p>Number: Fractions</p> <p>WR Spring Block 4</p> <p>Spine still to come</p> <p>Fluency: Count in fractions up to 10, starting from any number</p> <p>Games & Problems:</p>			<p>Statistics</p> <p>WR Spring Block 2</p> <p>Fluency: assess additive grid and gap analyse; use this for keepx uppx</p> <p>Games & Problems:</p>		<p>Geometry</p> <p>WR Spring Block 3</p> <p>Fluency:</p> <p>Games & Problems:</p>		Consolidation	

Summer	<p>Measurement: key concepts</p> <p>WR Spring Block 5 (length and height) and Summer Block 4 (capacity and temperature)</p> <p>Fluency:</p> <p>Games & Problems: can you make? problem</p>	Revision	<p>Measurement: Time</p> <p>WR Summer 3</p> <p>NCETM time progression advice</p> <p>Fluency:</p>	<p>Measurement:</p> <p>WR Spring Block 5 (length and height) and Summer Block 4 (capacity and temperature)</p>	<p>Problem Solving & Investigations</p> <p>WR Summer Block 2 and 4</p> <p>Games & Problems: Making your own games</p>	Consolidation
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Year 6 Termly Planning Example (Autumn)

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Autumn	<p>Number: place value WR Autumn block 1 Spine 1.30 Numbers to 10,000,000 Comparing and ordering, negative numbers, rounding</p> <p>Recap briefly Writing numbers</p> <p>Understanding the value of a digit within a number</p> <p>Adding numbers (to the power of 10)</p> <p>Fluency: Counting in 10s 5s 20s 25s Finding missing numbers on scales and working out the intervals; counting in powers of ten up and down Games & Problems: Make 5 numbers (see below); what's it worth problem Nrich Dicey Operations Tarsia – place value problem solving</p>	<p>Number: addition, subtraction, multiplication and Division (nb Wick Court week) WR Autumn block 2 Be careful with using factors to divide in this block – its challenging. Spine 1.31 and 2.23-2.26 (including mean averages); 2.28-2.29 Use Journey planner for key pointers Do not spend long on columnar addition – more time in that week on subtraction and exchanging Mix in mental questions that they should not be using the method for Eg: $1,234,567 - 1001 =$ Use dienes image (Nrich) for subtraction Multiply multi-digit numbers up to 4 digits by a two digit whole number using the formal written method of long multiplication Show compact next to expanded columnar multiplication next to grid method, examining the links. Use Journey planner for unit break down Divide numbers up to 4 digits by a two digit number Chunking as an informal method. Make links with mental methods to teach the formal method of short and long division. Refer back to images of using place value counters. Fluency: rounding numbers and counting up and down; chanting times tables... gap analysis and probes; finding common factors and multiples; finding mean average Use estimation (inverse and rounding) Word problems Games & Problems: factor chains, 99, countdown (target number), digit decisions; (see below) sum cross problem</p>	<p>Number: fractions WR Autumn block 3 – nb. Equivalence seems to not be covered in this block and needs to be! Spine 3.9 (you will almost certainly need to revise Y5 3.7-3.8)</p> <p>Unit break down: Simplify, compare and order, add and subtract, multiply and divide, fractions of amounts, equivalence</p> <p>. if we know $\frac{1}{2} \times 6 = 3$ then is $3 \div 6 = \frac{1}{2}$? This challenges misconceptions about x always making a bigger product</p> <p>Number: ratio Percentages [e.g. of measures, and such as 15% of 360] and the use of percentages for comparison. Write percentages as a fraction with a denominator of 100 and as a decimal fraction. WR Spring block 6 – first half Spine 2.27 Use the Power maths and Maths no problem for visual Fluency: counting up and down in fractional steps; common factors and multiples; step counting in nearly number decimals e.g. 1.9s Games & Problems: Interactive Resources – games Fraction flags Matching Fractions https://nrich.maths.org/8283/note https://www.ncetm.org.uk/resources/43609 https://nrich.maths.org/5870</p>	<p>Number: decimals WR Spring block 1 Spine 3.10</p> <p><i>Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1,000 giving answers to 3 d.p. (the significance of each digit's position), then move on to x or \div by integers.</i></p> <p>Decimals as fractions Fractions to decimals - link to previous unit</p> <p>Fluency: Find rules and missing numbers in multiplicative sequences. Divide multiples of 100 by 20 and 25 by chunking in 20s or 25s.</p> <p>Estimating where numbers should be placed on different number lines</p> <p>Games & Problems: Nrich – spirals Mathsframe – interactive games</p>	Consolidation & Revision							

Appendix 2:

When I hear 'fraction', I imagine...	What I learnt about fractions in other years....	
If I am asked to find $\frac{1}{3}$ of 24....	What I understand about fractions at the moment... Date:	
If I am asked to find $\frac{1}{2}$ of 42....	What fraction of the whole shape is shaded? 	When I hear decimal fraction, I imagine...
If I am asked to find $\frac{3}{4}$ of 28...	Here's what I know about finding 'equivalent' fractions...	
If I am asked to simplify $\frac{6}{8}$...	If I am asked to add $\frac{3}{10}$ and $\frac{8}{10}$...	