




# ELEANOR PALMER MATHS POLICY





Reviewed by Curriculum Committee 12 09 22

This policy sets out the approach to teaching and learning maths at our school. Our separate [EP Calculation Progression Guidance](#) explains in detail how we teach addition, subtraction, multiplication and division. Our aim is 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.

### Principles for teaching mathematics at Eleanor Palmer

	<p>Children should enjoy maths and have fun in maths lessons so teachers plan accordingly and model their own enjoyment of the subject. Children will develop interests and preferences in areas of maths. <b>Games, reasoning and problem solving</b> are cornerstones of our teaching. The school has worked in partnership with NRIC for a number of years, and we are committed to our 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 for fostering <b>enjoyment and enthusiasm</b> for maths.</p>
	<p>Teachers at Eleanor Palmer believe that <b>everyone can progress</b> from their starting points and we focus on the children improving their personal bests, challenging themselves and achieving highly without feeling labelled or limited. It is part of our teachers' core job to ensure the <b>National Curriculum</b> is taught exceptionally well, so that children are ready for the next stages of their learning. We are passionate and rigorous in our expectation of progress. We have designed our maths curriculum so that it is sequenced and paced to ensure coverage but also to allow time for children to wonder, to ponder and to think deeply; some learning points will span several lessons. Teachers at Eleanor Palmer ensure the children are in the best possible position to <b>achieve highly</b> in lessons, in summative assessments and in the EYFS Baseline Assessment, the end of Key Stage SATs and the Year 4 Multiplication Check. Beyond these assessment points, we <b>enrich our mathematics</b> curriculum by giving all children the opportunities to enter problem solving maths challenges run by the UKMT across the Junior classes, and an inter-school Camden times table competition, Spring Slam.</p>
	<p>Every child should have the opportunity to be <b>included</b> and access a full, rich maths curriculum so our children work in mixed-attainment classes. All our children must feel like they belong in maths lessons and that when they are working on mathematical tasks, they are mathematicians. Our teachers therefore <b>group children and design tasks flexibly</b>, based on assessment in each lesson and across lessons. Children within the class will all be working on the <b>same mathematical concept</b> and teachers have high expectations that children tackle hard problems, following up 'I can't...' statements with '...yet!' and then breaking the learning into small clear steps so that the children can access them. Children are regularly given the opportunity to choose tasks based on self-assessment with the guidance of their teacher. Teachers choose physical resources, models and images to <b>reveal the structure of the mathematics</b> they're teaching, giving access to all the children in their class and opportunities for depth of understanding to grow.</p>

	<p><b>Creativity and playfulness</b> are crucial elements of maths at Eleanor Palmer. Children are encouraged to play with numbers and concepts, to make connections, using what they know to find efficient solutions or to assess different approaches. Problem solving lessons are taught each week and reasoning is embedded in every lesson. Teachers value children's conjectures, estimates, approaches and methods, and they place misconceptions or '<b>good mistakes</b>' at the heart of discussion. It is essential that <b>children talk maths</b> in lessons, that they are listened to, and that they make jottings, drawings and record their mathematical thoughts. These mathematical conversations and expressions give teachers a wealth of knowledge to plan the right next steps for their class.</p>
	<p>We use all sorts of <b>contexts</b> in maths lessons from money and measures to puzzles and patterns. We also plan to take advantage of <b>logical cross-curricular links</b> such as measuring in DT, coding in computing, statistics in science and personal best times in PE lessons. Children and class teaching teams explicitly refer to their learning journey through a unit, making links to prior learning and drawing children's attention to the progress they are making. Where it is appropriate, teachers draw attention to how different areas of mathematics are applicable to daily life, to future learning or to professions. Equally, we want teachers and children to <b>enjoy pure maths</b> for its own sake!</p>

### What does this look like for a child at Eleanor Palmer? Our mathematicians should...

1. *enjoy mathematics*
2. *make connections to prior learning and existing knowledge - linking their thinking*
3. *make jottings, drawings and record working out*
4. *use their own methods and approaches, learning new ones and assessing their efficiency*
5. *use manipulatives and resources to model their understanding and solve problems*
6. *reason, talk and be listened to*
7. *make 'good mistakes' and be comfortable to debug these*
8. *estimate, guess and share conjectures*
9. *ponder, take time and persevere*
10. *be playful and flexible with mathematics*

### What does this look like for teachers? Evidence-based pedagogy

We have a strong commitment to reading research and books about the teaching and learning of maths, and conducting our own research through lesson study and joint practice development groups. It is expected that all teachers share the following mathematical pedagogy and demonstrate it in their teaching:

- 1) An emphasis on **the building blocks of number and spatial reasoning** in the early years so that children develop a strong foundation from which to build. Number sense is prioritised and then systematically developed through the school: cardinality and counting, comparison, subitising, patterning and composition, including 'the story of' numbers 1-10.

2) The **5 big ideas from the Teaching for Mastery approach** are at the heart of our teaching:

- Representations
- Variation
- Fluency
- Mathematical Thinking
- Coherence

Whole class interactive teaching is expected, 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**, based upon excellent subject knowledge and assessment of the children, which prompts reasoning.

5) **Linking thinking** - 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 **additive facts**, and **multiplicative facts**, with an aim that children know them all by heart in Year 4; and certainly by age eleven.

12) We all use maths **games** to rehearse key facts and to engender a **love of maths**!

### **What children will learn**

At the start of each year, families are given a Mental Maths document, outlining which key facts children should know by the end of the year (appendix 1), a By the End of Year X document (appendix 2), showing exactly what will be covered during the year, and a curriculum letter detailing the key mathematical foci for that year group as well as other subjects. Mathematics is a spiral curriculum, which means that concepts such as addition or statistics are returned to each year, and sometimes each term, to build knowledge. Children learn about fractions, for example, from Year 1 onwards. There are, however, key points during a child's learning journey when we focus on an aspect of number for which the children are developmentally ready:

**EYFS** - number sense and the 'story of' numbers to 10 e.g.  $3 + 2 = 5$  is part of the 'story of 5'

**KS1** - additive reasoning and facts. Knowing additive facts for each number to 20, and linking thinking to related facts e.g. If we know  $3 + 6 = 9$ , we know  $9 = 3 + 6$ ,  $23 + 6 = 29$  and  $30 + 60 = 90$ .

**Years 3 and 4** - multiplicative reasoning and facts. Having rapid recall of times table facts and related division facts to  $12 \times 12$ .

**Years 5 and 6** - multiplicative reasoning and problem solving, fractions and decimals. Using knowledge of multiplication and division to find factors and to calculate with fractions and decimals.

### **Planning the sequence of learning**

The core of what we plan and teach is taken from the National Curriculum for Mathematics. We use White Rose Maths' scheme of work to underpin our termly Maths Curriculum Maps because it sequences the objectives from the National Curriculum, building concepts and skills in an order and at a pace which our experience has shown us to be effective. There is the right balance of revisiting prior learning, and introducing new contexts, there are consistent models and images, and reasoning and problem solving is embedded alongside fluency.

However, at Eleanor Palmer teachers teach the children, not a scheme! 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, and we add effective ideas. Colleagues' brains are always available to be picked, senior leaders make regular time to review and support maths planning, and we are enthusiastic in finding and sharing ideas. It is important for our teachers to supplement White Rose Maths with questions, activities, images, teacher notes and investigations from NCETM's Professional Development Materials, Hamilton Trust, I See Reasoning and I See Problem Solving (Gareth Metcalfe) and NRICH. We encourage our teachers to draw from other high quality sources and to create their own... with the proviso that they must have a good reason why any task or resource will work to achieve excellent learning outcomes, and how they are in line with our principles above. Termly maths curriculum maps are 'live' documents which are regularly updated so that these links and ideas are captured and shared. These maps have been shared with other Camden schools with whom we collaborate and capture what works at each of our schools.

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, and to share lesson resources such as power points on our shared drive so that we can hone these lessons in future and work collaboratively. An overview of learning to take place each week should then be shared with other members of staff working with the class. Teachers are expected to annotate termly maps reflectively, and keep note of formative assessments, marking books after each lesson wherever possible and planning the next lesson in response to their assessment.

Teachers at Eleanor Palmer 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'.

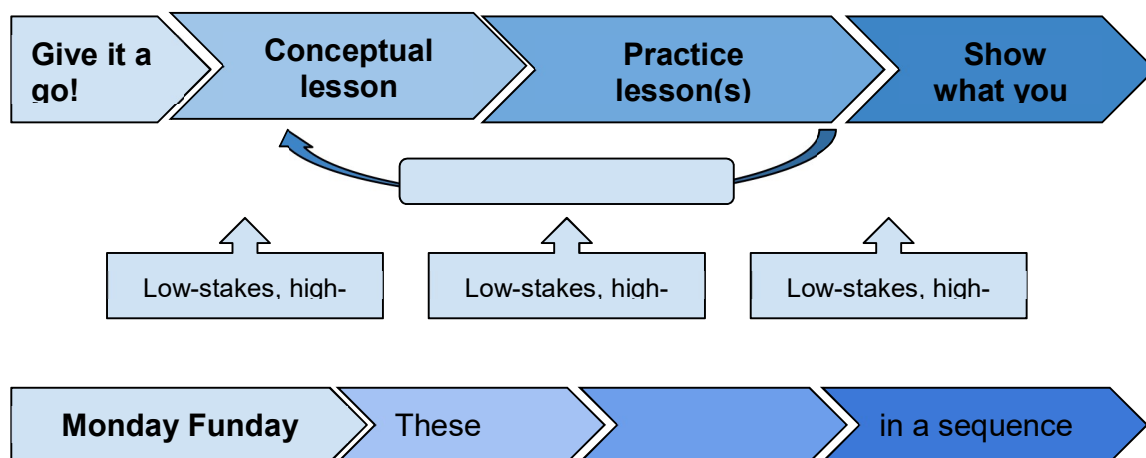
Plans are monitored by the maths lead at the start of each term, and books are monitored by the SLT in half-termly book looks, with feedback given to teachers based on an agreed set of criteria (see appendix 3).

Coding, part of the Computing Curriculum, shares lots of links with mathematics as does science, particularly when learning about statistics. We believe that the reasoning, debugging and problem solving involved in these subjects is brilliant for mathematical development, so we ensure we are explicit about the links between subjects when we teach.

### Maths in EYFS

In the Nursery and Reception, children form the foundations of mathematics so it cannot be overemphasised that mathematics is a crucial subject to be developed in the early years. There must be whole class sessions, child-initiated/adult-developed, and adult-initiated/ child-developed mathematical learning happening every day. Children in Reception have a daily maths lesson, in which the whole class comes together to learn. Reception teachers and their teaching team then initiate further mathematical learning with individuals or small groups within the planned continuous provision, or developing child-initiated mathematics throughout the day and week. Planning is based on the stages outlined in Development Matters 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, subitising and counting, for example) and use the NCETM's early years materials, White Rose Maths and Learning Trajectories to do so. Maths learning must be planned indoors and outdoors, and nothing should be left to chance in terms of mathematical development!

Each unit of work, which may last for one week or up to four weeks, follows this sequence:





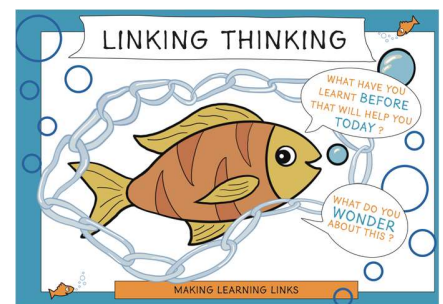
### **Give it a go!**

Using White Rose 'End of Block Assessments', children complete this in the first lesson of a sequence, with enough time planned in for the teacher to adjust the subsequent lessons accordingly. Children will know and feel comfortable with the fact that they may not be able to answer many of the questions, and that the point of Give it a Go! is for the teacher to get the next lessons right.

### **Conceptual lesson**

This introduces the big idea(s) to the whole class, together, using White Rose Small Steps. This might just focus on just one small step, or several. The idea is that no-one should be left behind and the class broadly works together at the same pace. Base questioning on White Rose worksheet and powerpoints. Features of conceptual lessons are:

- **Linking Thinking starter:** rehearsal of a prerequisite skill.
- Reference to prior learning... 'What have you learnt before that will help you today?'
- Teacher ping pong, I do, you do style or you do a few... teacher works room.
- Modelling images, children using manipulatives on desks
- Procedural variation in each question; small steps through the concept.
- A shorter independent task, or independent tasks interspersed throughout.
- Plenary means 'coming together' which should/can happen at any point to dispel misconceptions and tackle common issues. At the end of the lesson, there should be a plenary that closes the learning for that session, which might be a discussion of tricky parts, what they might do next, or sharing a solution.
- Reflective message: guided by the teacher, children write a short message reflecting on their learning that lesson. These are explained below in the **Presentation and recording section**.

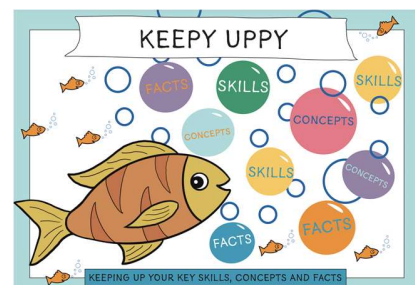


### **Practice lesson(s)**

Teachers may not always feel this is needed, and can just move on to the next concept, practice sessions could fit into shorter lessons or just a smaller group session, or you might need to have several practice lessons before the next concept is taught.

Features of a practice lesson:

- **Keepy uppy starter:** a question from 3 weeks ago, 2 weeks ago, 1 week ago... and one from last lesson. This should be tackled independently and should take no longer than 10 mins.
- Give children the opportunity to look back at work and marking from the lesson before. Is there debugging to be done? Which solution did they find most easily? Why? Which were harder?



- Teaching is focused on misconceptions/ 'good mistakes' from the previous lesson or common misconceptions that you want to unpick. Teachers could make a deliberate mistake for children to explain, or tackle an 'empty box' reasoning question such as those in I See Reasoning, Open Middle or Classroom Secrets, with the whole class. This teaching should be shorter than in a conceptual lesson, giving children more opportunity for practice.
- Practice! This should be differentiated according to the needs of your class on that day, based on your formative assessment. No new concepts should be introduced *but* reasoning and depth should be embedded in the questions for all.

<b>For all:</b>	<b>For highest attainers or whole class with more support/direct teaching:</b>	<b>For those who struggled with the concept or with a whole class difficulty point:</b>
White Rose practice books		
Hamilton	Hamilton Investigations	NCETM Spine slides delve into the concept at a slower pace. You could work with a group, and tackle more questions like the ones you did in the previous lesson.
Classroom Secrets	Gareth Metcalfe I See Problem Solving	
Teacher created	Nrich (chosen carefully for practice)	
Robert Kaplinsky <i>Open Middle</i>		
Gareth Metcalfe <i>I See Reasoning</i>		
Features of useful practice activities: <ul style="list-style-type: none"> <li>• Designed with careful procedural variation to draw attention to links and difficulty points as children 'proceed' through questions.</li> <li>• Designed with careful conceptual variation to draw attention to the concept, how it applies in different contexts and to look at the concept in different ways.</li> <li>• Include non-concept variation, drawing attention to what is NOT the concept e.g. good mistakes.</li> <li>• Give the teacher lots of information about what the children understand and do not understand, guiding future teaching.</li> <li>• Might be based upon a series of questions.</li> <li>• Might be based around just a few questions linked e.g. I See Reasoning or Open Middle tasks.</li> </ul>		

- Teachers should aim to work the room and live mark. Often in the first practice lesson, teachers should support the children who struggled with the conceptual lesson for most of that lesson. In a second or third practice lesson, pitch practice for the lowest attainers so that they can work independently and you can support children on the cusp of working at depth, or those working at greater depth.
- Children write a reflective message, as described in the **Presentation and recording** section below.



### **Show What You Know!**

Returning to the White Rose 'End of Block Assessments' the children did at the Give It A Go! stage, children complete this in the last lesson of a sequence. Teachers should draw attention to the progress the children have made, and any future learning that might be needed. Where appropriate, this Show What You Know could be done on the Give It A Go test (photocopied) in a different pen.

### **Adaptations, differentiation and extra support**

Children who are working significantly below or beyond age-related expectations still work on the same mathematical topic/concept. Our teachers will adapt their teaching and differentiate tasks to ensure progress and achievement from each child's starting point, supporting their development as needed through a sequence of lessons. This may be done in partnership with other adults from the class team and our maths subject leader, but we expect class teachers to take responsibility for the learning of every child in their class, even if a child has one to one adult support.

Differentiation can be through adult support, questioning, peer work, use of models, explaining, justifying and proving their thinking, as well as working on different tasks. Sometimes, exceptionally high attainers will be asked to work independently on questions, or to complete challenges as they go, taken from I See Reasoning or Open Middle and labelled 'questions 1a)', for example. Of course, any child can have a go at these but may need more support to unlock their thinking. 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. In rare cases, a child might work consistently on a different programme of study, particularly in number. However, the EP class ethos remains, 'We're all working on the same concept together!'

Eleanor Palmer is an inclusive school and special care is 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. Teaching teams should ensure that images represented in resource material represent diversity and motivate all children equally. Classroom presentation and organisation should represent the achievement of all the children; we have high expectations of all children.

At Eleanor Palmer we have a consistent approach to deepening understanding in mathematics lessons, focused on 4 areas: **good mistakes, linking thinking, inverse and playing with the structure/context**. Of course, our teachers go beyond this, designing tasks and questions which are appropriate to each lesson and to their class. However, this has proven a useful lens to simplify differentiating and to ensure consistency:

Four ways to deepen, once you and they know the concept...

*If I know the story of 10, then I know...*

1) Good mistake

$$2 + 8 \neq 11! \text{ Or } 6!$$

2) Linking thinking

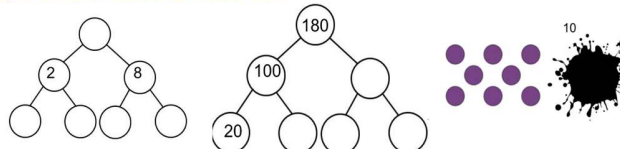
$$20 + 80 \text{ or } 32 + 8 \text{ or } 2 + 9$$

3) Inverse

$$2 + \square = 10 \text{ or } 32 + \square = 40$$

or  $\triangle + 9 = 11$

4) Play with the structure / context



## Maths lessons - timing

All classes should have a daily mathematics lesson equivalent of at least 1 hour a day or 45 minutes at Key Stage 1, usually during the first session of the day. 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. 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, Natalie Stevenson, Co-headteacher, teaches a weekly problem-solving lesson to Year 5, releasing our maths leader to work alongside colleagues across the school.

## Fluency and Maths Interventions

A short, pacey time is dedicated to factual and procedural fluency, and mental calculation each day, across the school. This might take the form of chanting, choral counting, counting collections, speed grids or low stakes quizzes for example. Objectives and appropriate activities are outlined in our Maths Curriculum Maps and our [Calculation Progression Guide](#).

The majority of the class work together in this session, while some children work with adults in small groups or one to one, in interventions we call Maths Club. Maths Club focuses on key maths facts and is outlined in our [Maths Club](#) booklet.

Whole class fluency is regularly and predominantly led by the class teacher, so that children ALL get the opportunity to learn together with our most experienced teachers. Class teachers will plan and resource this learning, differentiating questions and activities but keeping all children working on the same maths concept. Resources on [Twinkl](#), fitting in with White Rose's small steps approach and sequencing, are excellent to support this, beyond the class teacher's adaptations and differentiation. These resources might also be appropriate for teaching assistants to use when supporting children with EHCPs, for whom they regularly design lessons with the class teacher. Here is an [example](#) of this, with links to all supporting materials. We aim that this 'stealth differentiation' does not make children feel marginalised or like they are failing. Success should be encoded in all lessons. Children

should be sitting alongside children working on the same concept, at a different stage in their learning journey.

Regular pre-teaching and follow-up teaching, for example during assembly times, are another form of intervention which will allow class teachers to plan more specific and detailed learning which feeds into and reinforces whole class lessons. However, unless our teaching assistants are planning for a child they support due to an EHCP, they are not expected to plan such detailed sessions, and will lead the Maths Club interventions described in [this](#) booklet.

Our Maths Club Interventions are led by teaching assistants and are either additive or multiplicative. They use quizzing, formative assessment and games to help children become factually fluent, and to use these facts to reason. We work in partnership with parents and carers to help children practice these facts and games at home.

## Monday Funday Lessons

We have mapped **problem solving** lessons and **games** across the school for each class, to ensure progression and coverage of everything we know to foster depth and enjoyment in maths lessons. Some problems are discrete, and form just one lesson, while others are part of a sequence. We teach these on a Monday so that they are never marginalised or forgotten in the busy week. We also use consistent images and names for [skills](#) used during problem solving lessons, developed in line with NRICH skills:



We have mapped progression and coverage of games, reasoning routines and problems [here](#).

## Interrupting forgetting

Our research into memory has led us to embed **high-frequency, low-stakes maths quizzes** across the school, with the aim of improving upon personal bests, as well as **Linking Thinking** and **Keepy Uppy starters**. These ensure that children are recalling and practising key facts and knowledge which might be forgotten over time.

## Presentation and recording

Each lesson has a clearly stated objective referred to as the title. This must start with a verb which focuses both adults and children on what is being learnt, not just 'done'. Each lesson is dated with the 'short date'. Sometimes teachers will print this out, using Letterjoin font, along with a description which reflects the lesson's place in the learning journey. This may be printed so that writing does not get in the way of the maths! However, it must be shared and understood by the children.

Eg.

01/01/22

Partitioning, regrouping, and adding three-digit numbers

In our last lesson we partitioned three-digit numbers using base 10 equipment and added them together. However, none of our digits bridged 10. Today, we will work on additions where we need to regroup!

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It is very important that children write, draw and record in maths lessons, rather than only filling in boxes or spaces on a worksheet. Children recording maths for themselves forges memories and builds knowledge and understanding. Children recording maths enables the teaching team to 'see their thinking' and it reveals misconceptions.

For these reasons, we aim for a good balance of children's recording and models and images printed out. 'Fitness for purpose' should always be considered. Top tips to achieve this balance are:

- Children writing their own date and title, but sticking in a printed 'blurb' description.
- Printing calculations x 15 and children copying these into their books, one between two
- Children copying calculations or questions from the white board
- Where it's better for models, images or questions to be printed, teachers snippy-tooling them and arranging them on their own worksheet, or cutting them up for children to stick in and then add their own recording beneath/around.
- Use whiteboards by all means but also encourage children to make jottings and drawings in their maths books. Just ensure they add a title that reflects what they are doing.

## Teacher worksheets

- Wherever possible, use Letterjoin font, never less than 12 pt. Ariel is second choice.
- Snippy tool White Rose worksheets but where appropriate, children copy these into their books. Use your own title, date and description.

## Feedback

Dialogue between teachers and children in maths lessons is essential for assessment and progress. At Eleanor Palmer, we use the early years practice of OWLing throughout the school - Observe, Wait, Listen - and we aim to be as close to the 'teachable moment' as possible when giving feedback. Wherever possible, the child should be present whilst their work is 'marked' and we are clear that marking and assessment are not synonymous; marking is the written part of assessment.

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 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.

**All the children's work/recording should be ticked and acknowledged and we use a dot to show a mistake.** Sometimes it is appropriate for children to mark their own work - for example when they've done a low-stakes quiz, and they should do so in **green pen**, neatly. Teachers should not waste valuable time, or that of support staff, marking quizzes. However, teachers must always look at these and draw summative assessments from them.

At the end of each lesson, children from Year 2 upwards write a reflective message to the teacher. This might simply be 'MPP', more practice please! Or something longer, such as which strategies they used or want to learn more about. The teacher may guide the children in what to focus on, perhaps giving them correctly spelt key words. Eg.

Dear Ms Stevenson,

I was proud with how much I persevered today, and I found regrouping IOs tricky.

In addition to ticking correct work and dotting mistakes, **teachers write a brief comment** to reply to the children's reflective message.

All marking should help the children to learn and make progress by:

- celebrating and boosting confidence
- showing correct work with ticks and praise
- Dotting incorrect work to be addressed next lesson
- Commenting on BEAP - **behaviour for learning, effort, attainment** and/or **progress**.

At EP we encourage teachers to draw little doodles such as stars or children 'flying', and to use phrases such as 'You really cracked it!' too. This is all part of our mantra that 'you get more of whatever you pay attention to!' There is no rigid formula and comments will vary in length. Here are some examples, showing how comments can focus on BEAP:

**Behaviour for learning**

Great contributions to class discussion today!

Keep sharing ideas like you did today - it helps you and the class!

Try more of the partner work I saw today... you really encouraged each other.

Tomorrow let's work on keeping focus for the whole lesson.

Great focus when we worked as a whole class. Let's work on this in independent work.

**Effort**

100% effort today - you can do hard things with that attitude!

Your perseverance really paid off - keep it up.

We need a bit more effort tomorrow because when you try, you can do this!

**Attainment**

You've got the hang of this! Totally ready for our next step with mixed numbers.

You made some slips - don't worry. We'll go over this together next lesson.

**Progress**

Look how far you've come with understanding this - I can see it from your drawings.

Time for a harder challenge... let's see what I can do mwahahaha!

If children say they found something too difficult, teachers should respond, saying how they will support the child in the next lesson. If there are dots showing incorrect work, either the teacher will give children time to correct / 'debug' OR include this in the next day's lesson, particularly if it is a common misconception in the class. If there are lots of dots, the teacher may write a quick 'Let's unpick this tomorrow...' and then they must!

**Teachers must ensure that children have a few minutes at the start of the next lesson to look back at teacher comments.** We know that children at the start of Year 1 would struggle to read long comments from the teacher, so teachers must use their judgement and ensure children's work is acknowledged and they know their next steps.

At Eleanor Palmer, any member of the teaching team can and should write in maths books, but teachers have ultimate responsibility for this. Teachers address comments directly to the child, and other adults in the teaching team write comments in third person, supporting the teacher in assessment. For example:

Sami found this tricky, so we used place value counters and worked on this together - Janet.

## Assessment

Each child's progress should be continually assessed and should inform day to day planning. No assessment at Eleanor Palmer will be done unless it will inform teaching and learning and improve outcomes for children.

Assessment at Eleanor Palmer looks like:

- **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';
- anticipating and teach away from **misconceptions**;
- comments and **questions** which find and probe children's zone of proximal development;
- **plenaries** (coming together) to clarify difficulty points and share thinking;
- using **Give it a go!** and **Show what you know!** at the start and end of units of work;
- low-stakes, high frequency **quizzes** of additive or multiplicative facts;
- **summative assessment** tasks as follows:
  - Big times table tests (100 questions) each term in Years 4 and 5
  - Termly White Rose tests. Class teachers mark the papers themselves in order analyse gaps in knowledge and to inform future planning. Scores are recorded in our mega-tracker.
  - MTC - Multiplication Tables Check statutory test in Year 4.
  - End of Key Stage SATs. These are marked internally in Year 2 and externally in Y6.

Teachers should keep informal assessment records on individual pupils, groups and their class to inform their end of year report writing. Towards the end of each term, teachers use all of these assessments to record in our mega-tracker whether children are meeting age expected levels, are below these levels or are working at a greater depth standard in that year group. This allows the Co-headteachers, SLT, maths leader and class teams to analyse progress and attainment, then plan next steps to improve impact on the children. More broadly, the mega-tracker also enables SLT and the maths leader to identify any school-wide trends.

## Recording

In the EYFS, Profile Books are used to keep a record of adult observations and children's mathematical mark-making, talk and activities. In Key Stage 1, A4 2cm squared maths books are used. In Key Stage 2, A4 1cm squared books are used. Completed books must be stored to monitor progress and may be taken home at the end of the academic year.

Recording in maths lessons might be for the child's own understanding/calculation, or to share and explain their thinking to other children or teachers. Teachers set high expectations of presentation but value informal mathematical jottings, which have a place in books, not just on whiteboards!



## 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, labelled 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. For ease of access, 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 must have key visuals displayed and referred to in lessons: - FS and KS1 should have number lines, washing lines, number tracks, Numicon number lines, 10 frames and 100 or 200 squares/grids. In Year 2, a multiplication square is a good idea as well as a fraction wall that includes  $\frac{1}{4}$  family. KS2 classrooms should have 100 squares, 200 grids, multiplication squares and fraction walls clearly visible. In Years 4, 5 and 6, teachers 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 cupboard – down the corridor next to Year 1.

Calculators should be used as a tool for exploring number from the Nursery upwards and as a calculating tool in KS2. They are not used where core paper and pencil methods such as multiplication are being taught, but rather for checking answers, or applied problem solving where calculation is not the aim, but finding patterns is.

## Working with families

When a child joins our school in Reception, a [maths pack](#) is sent home, containing a booklet explaining our approach to maths in the early years, and how parents can support mathematical development in their children. The pack includes what we believe are core resources to help parents foster maths learning at home. This includes Numicon tiles, for example, to help children develop number sense. These maths packs will be explained and presented to parents by either the Foundation Stage Leader, Maths Subject Leader or one of the Co-headteachers.

Each year, a document showing age related expectations for maths and key mental maths facts will be sent home to support families to know which facts should be memorised and practised, and what mathematical achievements should be accomplished by the end of that year group. They can be found on our website, and below in appendices 1 and 2. In line with our homework policy, only the learning and practice of core facts is sent home for practice in maths.

Parents and carers are invited to monthly **Stay and Play** sessions, where they play a maths game with their child. This gives parents and carers a stock of tried and tested EP games, helps them to see our approach to maths teaching in action, and gives them a precious chance to enjoy maths with their child at school. In addition, in Year 6, since 2016, we have been part of Hegarty Maths, in which Year 6 pupils access online video materials to support their curriculum and a successful transition into Key Stage 3.

## Appendix 1 - Mental Maths By the End of Year X

EP's MENTAL MATHS - KEY SKILLS

**MULTIPLICATION AND DIVISION**  
In addition to the fluent recall of 2, 5 and 10-times tables, know your 3s, 4s, 6s, 8s, 9s and 12s tables inside out and recognise their multiples.

3 Times Table	4 Times Table	8 Times Table
0 x 3 = 0	0 x 4 = 0	0 x 8 = 0
1 x 3 = 3	1 x 4 = 4	1 x 8 = 8
2 x 3 = 6	2 x 4 = 8	2 x 8 = 16
3 x 3 = 9	3 x 4 = 12	3 x 8 = 24
4 x 3 = 12	4 x 4 = 16	4 x 8 = 32
5 x 3 = 15	5 x 4 = 20	5 x 8 = 40
6 x 3 = 18	6 x 4 = 24	6 x 8 = 48
7 x 3 = 21	7 x 4 = 28	7 x 8 = 56
8 x 3 = 24	8 x 4 = 32	8 x 8 = 64
9 x 3 = 27	9 x 4 = 36	9 x 8 = 72
10 x 3 = 30	10 x 4 = 40	10 x 8 = 80
11 x 3 = 33	11 x 4 = 44	11 x 8 = 88
12 x 3 = 36	12 x 4 = 48	12 x 8 = 96

And - facts  
For example:  
3 x 3 = 9  
12 ÷ 3 = 4  
27 ÷ 3 = 9

And - facts  
For example:  
8 x 4 = 32  
16 ÷ 4 = 4  
36 ÷ 4 = 9

**PLACE VALUE AND COUNTING**  
Count from 0 in multiples of 4, 8, 50 and 100.  
Find 10 more or 10 less than any given number.  
Find 100 more or 100 less of any given number.  
Partition numbers into 100s, 10s and 1s (e.g. 253 = 200 + 50 + 3).  
Compare and order numbers to 1000.  
Read and write numbers to 1000 (in numbers and words).  
Round to the nearest 10 and 100.

**CALCULATION (+, -, ×, ÷)**  
Add and subtract mentally to 100 and 1000 to any 2-digit number.  
Mentally add or subtract any pair of 2-digit numbers.  
Multiply any 2-digit number by 10 (e.g. 24 × 10 = 240).  
Multiply any 1-digit number by 100 (e.g. 7 × 100 = 700).  
USE AND APPLY YOUR TIMES TABLES (with 2-digit numbers).  
For example: If you know that 2 × 3 = 6  
You also know: 20 × 3 = 60 or 60 ÷ 2 = 30.

USE PARTITIONING TO DOUBLE OR HALVE ANY NUMBER  
(e.g. Half of 56: Half of 50 = 25, Half of 6 = 3, 25 + 3 = 28).

**FRACTION ACTION!**  
Count up and down in tenths (and understand tenths) e.g. 1/10, 2/10, 3/10.  
Recognise fractions AS numbers (amounts between two whole numbers) e.g. 1/10, 1/2, 3/4.  
Understand, recognise and use fractions OF numbers (e.g. find 3/4 of 32 = 24).  
Add and subtract fractions with the same denominator with one whole (e.g. 5/7 + 1/7 = 6/7 and 5/7 - 2/7 = 3/7 or 1 whole).

**NUMBER PAIRS THAT TOTAL 100**  
For example:  
20 + 80 = 100  
25 + 75 = 100  
32 + 68 = 100  
45 + 55 = 100

And INVERSE:  
100 - 20 = 80  
100 - 25 = 75  
100 - 32 = 68  
100 - 45 = 55

Interactive Resources: Multiple Wipeout, Wipeout Walls, Tune Table, Connect it, Eggs on Legs


	0	1	2	3	4	5	6	7	8	9	10
0	0+0=0	0+1=1	0+2=2	0+3=3	0+4=4	0+5=5	0+6=6	0+7=7	0+8=8	0+9=9	0+10=10
1	1+0=1	1+1=2	1+2=3	1+3=4	1+4=5	1+5=6	1+6=7	1+7=8	1+8=9	1+9=10	1+10=11
2	2+0=2	2+1=3	2+2=4	2+3=5	2+4=6	2+5=7	2+6=8	2+7=9	2+8=10	2+9=11	2+10=12
3	3+0=3	3+1=4	3+2=5	3+3=6	3+4=7	3+5=8	3+6=9	3+7=10	3+8=11	3+9=12	3+10=13
4	4+0=4	4+1=5	4+2=6	4+3=7	4+4=8	4+5=9	4+6=10	4+7=11	4+8=12	4+9=13	4+10=14
5	5+0=5	5+1=6	5+2=7	5+3=8	5+4=9	5+5=10	5+6=11	5+7=12	5+8=13	5+9=14	5+10=15
6	6+0=6	6+1=7	6+2=8	6+3=9	6+4=10	6+5=11	6+6=12	6+7=13	6+8=14	6+9=15	6+10=16
7	7+0=7	7+1=8	7+2=9	7+3=10	7+4=11	7+5=12	7+6=13	7+7=14	7+8=15	7+9=16	7+10=17
8	8+0=8	8+1=9	8+2=10	8+3=11	8+4=12	8+5=13	8+6=14	8+7=15	8+8=16	8+9=17	8+10=18
9	9+0=9	9+1=10	9+2=11	9+3=12	9+4=13	9+5=14	9+6=15	9+7=16	9+8=17	9+9=18	9+10=19
10	10+0=10	10+1=11	10+2=12	10+3=13	10+4=14	10+5=15	10+6=16	10+7=17	10+8=18	10+9=19	10+10=20

## Appendix 2 - By the End of Year X Year Group coverage


<b>Mathematics: Planning and Assessment from National Curriculum Year 3</b> For statements to be completely embedded they should be demonstrated in a range of contexts and subject areas if applicable.					
Number & Place Value	Addition & Subtraction	Multiplication & Division	Fractions	Measurement	Geometry: Properties of Shapes
<ul style="list-style-type: none"> <li>Count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number.</li> <li>Recognise the place value of each digit in a three-digit number (hundreds, tens, ones).</li> <li>Compare and order numbers up to 1000.</li> <li>Identify, represent and estimate numbers using different representations.</li> <li>Read and write numbers up to 1000 in numerals and in words.</li> <li>Solve number problems and practical problems involving these ideas.</li> </ul>	<ul style="list-style-type: none"> <li>Add and subtract numbers mentally, including:                             <ul style="list-style-type: none"> <li>a three-digit number and ones;</li> <li>a three-digit number and tens;</li> <li>a three-digit number and hundreds.</li> </ul> </li> <li>Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.</li> <li>Estimate the answer to a calculation and use inverse operations to check answers.</li> <li>Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction.</li> </ul>	<ul style="list-style-type: none"> <li>Recall and use multiplication and division facts for the 3x table.</li> <li>Recall and use multiplication and division facts for the 4x table.</li> <li>Recall and use multiplication and division facts for the 8x table.</li> <li>Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.</li> <li>Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.</li> </ul>	<ul style="list-style-type: none"> <li>Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.</li> <li>Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.</li> <li>Recognise and use fractions as numbers: unit fractions (numerator of 1) and non-unit fractions with small denominators.</li> <li>Recognise and show, using diagrams, equivalent fractions with small denominators.</li> <li>Add and subtract fractions with the same denominator within one whole (for example, <math>\frac{5}{7} + \frac{1}{7} = \frac{6}{7}</math>).</li> <li>Compare and order unit fractions, and fractions with the same denominators.</li> <li>Solve problems that involve all of the above.</li> </ul>	<ul style="list-style-type: none"> <li>Measure, compare, add and subtract lengths (m/cm/mm).</li> <li>Measure, compare, add and subtract mass (kg/g).</li> <li>Measure, compare, add and subtract volume/capacity (l/ml).</li> <li>Measure the perimeter of simple 2-D shapes.</li> <li>Add and subtract amounts of money to give change, using both £ and p in practical contexts.</li> <li>Tell and write the time from:                             <ul style="list-style-type: none"> <li>an analogue clock and 12-hour and 24-hour clocks;</li> <li>an analogue clock, including using Roman numerals from I to XII.</li> </ul> </li> <li>Estimate and read time with increasing accuracy to the nearest minute.</li> <li>Record and compare time in terms of seconds, minutes and hours.</li> <li>Use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight.</li> <li>Know the number of seconds in a minute and the number of days in each month, year and leap year.</li> <li>Compare durations of events (for example to calculate the time taken by particular events or tasks).</li> </ul>	<ul style="list-style-type: none"> <li>Draw 2-D shapes and make 3-D shapes using modelling materials.</li> <li>Recognise 3-D shapes in different orientations and describe them.</li> <li>Recognise angles as a property of shape or a description of a turn.</li> <li>Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.</li> <li>Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.</li> </ul> <p style="text-align: center;"><b>Statistics</b></p> <ul style="list-style-type: none"> <li>Interpret and present data using bar charts, pictograms and tables.</li> <li>Solve one-step and two-step questions (for example, 'How many more?' and 'How many fewer?') using information presented in scaled bar charts and pictograms and tables.</li> </ul>

Appendix 3: Book Look proforma to monitor maths

## EP Book Look - Maths

Class:	Teacher:	Date:
		
Children's Names		
<p><u>Questions to guide our thinking</u></p> <p><b>Presentation:</b> Is learning well presented? Is work dated? Is the book well looked after? Does it show pride in learning? Is there a good balance between children's recording and adult guidance? Is there a 'blurb' beneath titles explaining the learning journey?</p> <p><b>Feedback and marking:</b> Is the marking policy being followed? Is 'live' annotation happening in the lesson? Are all tasks ticked or dotted with room for debugging? Are children writing reflective messages? Have teachers responded to messages and planned an appropriate next lesson?</p> <p><b>Progress</b> Is there evidence of appropriately pitched activities? Is there enough challenge? Is learning differentiated effectively where appropriate? Is there evidence of progress over time?</p> <p><b>Specific to Maths</b> Can we see weekly Monday Funday games and problem solving? Are there tasks to prompt reasoning each lesson for all? Is there a balance of conceptual lessons and practice? Are models and images used to reveal the structure of mathematics? Is there procedural and conceptual variation in practice questions? Are there low-stakes high frequency quizzing for fluency? Is there keepy uppy to help children remember prior learning?</p>		
What's going well?		
Even better if.....		
Other notes		

## EP Book Look - Maths

Class:	Teacher:	Date:
		
<b>Children's Names</b>		
<p style="text-align: center;"><u>Questions to guide our thinking</u></p> <p><b>Presentation:</b></p> <p>Is learning well presented? Is work dated? Is the book well looked after? Does it show pride in learning?</p> <p>Is there a good balance between children's recording and adult guidance? Is there a 'blurb' beneath titles explaining the learning journey?</p> <p><b>Feedback and marking:</b></p> <p>Is the marking policy being followed? Is 'live' annotation happening in the lesson? Are all tasks ticked or dotted with room for debugging? Are children writing reflective messages? Have teachers responded to messages and planned an appropriate next lesson?</p> <p><b>Progress</b></p> <p>Is there evidence of appropriately pitched activities? Is there enough challenge? Is learning differentiated effectively where appropriate? Is there evidence of progress over time?</p> <p><b>Specific to Maths</b></p> <p>Can we see weekly Monday Funday games and problem solving? Are there tasks to prompt reasoning each lesson for all? Is there a balance of conceptual lessons and practice? Are models and images used to reveal the structure of mathematics? Is there procedural and conceptual variation in practice questions? Are there low-stakes high frequency quizzing for fluency? Is there keepy uppy to help children remember prior learning?</p>		
<b>What's going well?</b>		
Even better if.....		
Other notes		