



Monkhouse Primary School

Fluency in Mathematics Policy

Education is not the learning of facts, but the training of the mind to think.

Albert Einstein

RATIONALE:

One of the three aims of the 2014 curriculum states that pupils will: *become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.*

At Monkhouse Primary School we recognise that basic skills in mathematics are the building blocks which allow the children to become fluent, confident and accurate mathematicians. Without these skills children cannot solve problems and reason mathematically.

AIMS:

- To allow children to become fluent in the fundamentals of maths so that they are able to recall and apply their knowledge rapidly and accurately to solve problems.
- To provide a consistent and progressive framework across school in the teaching of fluency of skills.
- To foster effective learning in basic skills in mathematics by suggesting appropriate ways of teaching these skills.
- To meet the requirements of the 2014 Primary National Curriculum

TEACHING AND LEARNING:

At Monkhouse Primary School children are offered the following opportunities to rehearse, recall and practice their basic skills in mathematics:

* Four times a week a Hi 5 Maths session, away from the mathematics lesson which focuses on five key skills. See Appendix 2 for structure of the session.

* Four times a week, an arithmetic session, away from the mathematics lessons which focusses on develop arithmetic proficiency and fluency. See Appendix 3 for the structure of a session.

* Displays in the classroom and around school which promote basic skills.

BASIC SKILLS PLANNING:

Planning of activities to develop children's basic skills and fluency is taken from the Primary National Curriculum 2014. This is mapped out to show progression and to ensure that all areas are covered thoroughly, ensuring that no gaps in children's knowledge appear. See Appendix 1

The expectations are that the majority of children will move through the stages at broadly the same pace. However, decisions about when to progress to the next stage will be taken by the

class teacher and will be based on the pupils' security in understanding and application of the skills. Pupils who grasp and apply skills quickly should be challenged by moving to the next level. Those who are not sufficiently secure should be provided with opportunities to consolidate and master their understanding.

RESOURCES:

At Monkhouse we have a range of resources to support children in becoming fluent in basic skills.

Across all phases of children's learning a range of practical equipment is used to secure children's conceptual understanding including Numicon, dienes, place value counters and real life objects.

Through the use of iPads, children, teachers and parents have access to a range of APPs to support children in their learning such as Doodle Maths

ASSESSMENT:

At Monkhouse we use Target Tracker to continually assess children's progress towards attaining skills and to identify challenges. Class teachers and any trainees use gap analysis to identify next steps in children's learning and to ensure that these are planned for.

Alongside the class teacher's assessment for learning, children receive a formal arithmetic test three times a year (October, February, May) and children in y6 and y2 receive a baseline assessment as they enter their year group.

MONITORING:

The monitoring of the teaching and learning of basic skills will be carried out by the school's senior leadership team and will involve:

- Hi 5 maths learning walks
- Analysis of data
- Pupil progress meetings
- Work scrutiny
- Pupil interviews

Any CPD requirements will be identified as part of the monitoring process and staff will be signposted to the relevant CPD either internal or external.

Appendix 1: Progression in fluency of skills

Year	Counting	Place Value	Addition and Subtraction	Multiplication and Division	Time	Fractions
1	Count forwards and backwards from any given number up to 100. 1 more/less than any number to 100	Read and write numbers to 20 in numerals and words. Read numbers to 100 in numerals Compare and order numbers to 100. Begin to recognise place value in two digit numbers.	Recall number bonds to 20 and related subtraction facts. Add & subtract 1 digit & 2 digit numbers to 20, including zero.	Count in steps of 2,5 and 10 Solve one-step multiplication and division using objects, pictorial representation and arrays.	Sequence events in chronological order. Use language of day, week, month and year. Tell time to hour & half past.	To recognise and find $\frac{1}{2}$ and $\frac{1}{4}$ of an object, shape or quantity.
2	Count forwards and backwards in steps of 2, 3 and 5 from 0 and in tens from any number. Count in halves and quarters to 10.	Compare and order numbers up to 100 and use $< > =$. Read and write all numbers to 100 in digits & words. Say 10 more/less than any number to 100. Recognise place value of any two digit number. Partition a number in different ways e.g. $46 = 4\text{tens and } 6\text{ ones or } 3\text{ tens and } 16\text{ ones}$	Have a fluent recall of number bonds of all numbers to 20 and related subtraction facts. Use number bonds to 10 to derive facts to 100 ($10+90 = 100$) Add & subtract: 2-digit nos & ones 2-digit nos & tens Two 2-digit nos Three 1-digit nos Recognise and use inverse (+/-).	Count in steps of 2, 3 & 5 from zero and in 10s from any number (forwards and backwards). Recall and use multiplication & division facts for 2, 5 & 10 tables. Calculate and write multiplication & division calculations using multiplication tables.	Tell and write the time to 5 minutes including quarter past/to the hour on an analogue clock.	To recognise, find, name and write fractions $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{4}$, $\frac{3}{4}$ of a length, shape, set of objects or quantity. Write simple fractions of amounts e.g. $12\text{ of } 6 = 3$ Write and recognise equivalence of simple fractions
3	Count forwards and backwards from 0 in multiples of 4, 8, 50 and 100. Count up and down in tenths counting beyond 1	Recognise the place value of each digit in a three digit number. Compare and order numbers up to 1000. Read & write all numbers to 1000 in digits and words. Find 10 or 100 more/less than a given number. Partition a 3 digit number in different ways e.g. $146 = 1\text{hundred, } 4\text{tens and } 6\text{ ones or } 1\text{ hundred, } 3\text{ tens and } 16\text{ ones}$	Recall number bonds to 100 ($36 + 64$). Add and subtract: 3-digit nos and ones 3-digit nos and tens 3-digit nos and hundreds Add and subtract numbers with up to 3-digits using written columnar method. Estimate and use inverse to check.	Recall multiplication and division facts for 2,3,4,5,8 and 10 tables up to $\times 12$. Multiply 2-digit by 1-digit (formal method) Estimate and use inverse to check.	Tell time using 12 and 24 hour clocks; and using Roman numerals. Tell time to nearest minute. Know the number of seconds in a minute and the number of days in each month, year and leap year.	Identify, name and write unit fractions up to $\frac{1}{12}$. Recognise fractions which are equivalent to 1 whole and pairs which add up to 1 whole. Compare and order fractions with same denominator. Add and subtract fractions with same denominator with whole.
4	Count forwards and backwards in multiples of 6, 7, 9, 25 and 1000. Count backwards through 0 to include negative numbers. Count up and down in hundredths	Recognise the place value of each digit in a four digit number. Recognise the place value of digits in decimal numbers up to hundredths. Read Roman numerals to 100. Compare and order numbers beyond 1,000. Compare and order numbers with up to 2 decimal places. Find 1,000 more/less than a given number. Round any number to the nearest 10, 100 or 1,000.	Recall number bonds to 100 ($36 + 64$) and their related subtraction facts. Add and subtract numbers with up to 4-digits using written columnar method. Estimate and use inverse to check.	Recall multiplication and division facts for all multiplication tables up to 12×12 Multiply: 2-digit by 1-digit 3-digit by 1-digit Estimate and use inverse to check.	Read, write and convert time between analogue and digital, 12 and 24 hour clocks. Convert from hours to minutes; minutes to seconds; years to months; weeks to days.	Recognise and write decimal equivalents of any number of tenths or hundredths e.g. $\frac{3}{10} = 0.3$, $\frac{35}{100} = 0.35$ Recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ Recognise and show families of common equivalent fractions.

		Round decimals with 1dp to nearest whole number.				
5	<p>Count forwards and backward with positive and negative numbers through zero.</p> <p>Count forwards/backwards in steps of powers of 10 for any given number up to 1,000,000.</p>	<p>Recognise the place value of each digit in a six digit number, including decimals.</p> <p>Read Roman numerals to 1000 and recognise years written in Roman numerals.</p> <p>Compare and order numbers up to 1,000,000. Compare and order numbers with 3 decimal places.</p> <p>Round any number up to 1,000,000 to the nearest 10, 100, 1000, 10,000 or 100,000.</p> <p>Round decimals with 2 decimal places to nearest whole number and 1 decimal place.</p>	<p>Recall number bonds to 1000 (360 + 640) and their related subtraction facts.</p> <p>To recall decimals totalling 1 and 10.</p> <p>Add and subtract numbers with more than 4-digits using formal written method.</p> <p>Use rounding to check answers</p>	<p>Recall multiplication and division facts for all multiplication tables up to 12 x 12</p> <p>Identify multiples and factors. Find all factor pairs of a number and common factors of two numbers.</p> <p>Recognise and use square and cube numbers.</p> <p>Use known tables to derive other number facts.</p> <p>Recall prime numbers up to 19.</p> <p>Multiply 4-digits by 1-digit/ 2-digit</p> <p>Divide up to 4-digits by 1-digit</p> <p>Multiply & divide whole numbers & decimals by 10, 100 and 1,000</p> <p>Use rounding to check answers</p>	<p>Read the time with accuracy on analogue, 12 hour and 24 hour digital clocks.</p> <p>Convert between units of time.</p>	<p>Compare and order fractions whose denominators are multiples of the same number.</p> <p>Read and write decimal numbers and percentages as fractions.</p> <p>Recognise and use thousandths.</p> <p>Recognise mixed numbers and improper fractions and convert from one to another.</p> <p>Multiply proper fractions and mixed numbers by whole numbers.</p> <p>Identify and write equivalent fractions.</p>
6	Use negative numbers in context and calculate intervals across zero.	<p>Recognise the place value of each digit in numbers up to 10 million, including decimals.</p> <p>Round any whole number to a required degree of accuracy.</p> <p>Identify the value of each digit to 3 decimal places.</p>	<p>Recall all previous number bonds including decimals.</p> <p>Use knowledge of order of operations to carry out calculations involving four operations.</p> <p>Use rounding to check answers</p>	<p>Recall multiplication and division facts for all multiplication tables up to 12 x 12</p> <p>Identify common factors, common multiples and prime numbers.</p> <p>Use knowledge of order of operations to carry out calculations involving four operations.</p> <p>Multiply 4-digit by 2-digit Divide 4-digit by 2-digit</p> <p>Use rounding to check answers</p>	<p>Read the time with accuracy on analogue, 12 hour and 24 hour digital clocks.</p> <p>Convert between units of time.</p>	<p>Compare and order fractions with different denominators.</p> <p>Recall and use equivalences between simple fractions, decimals and percentages.</p> <p>Add and subtract fractions with different denominators and mixed numbers.</p> <p>Multiply simple pairs of proper fractions, writing the answer in the simplest form.</p> <p>Divide proper fractions by whole numbers. Calculate % of whole number.</p>

Appendix 2: Structure of a Hi 5 session

Each Hi 5 Maths session lasts for 15 minutes and focusses on the practise of 5 basic skills per session. The session is quick paced and interactive

Teachers organise the class how they wish for the session, some use the carpet others have their class sitting at tables. When recording is needed, the children record on their iPad or whiteboards.

All children should be actively involved in a session and included through differentiated questioning, challenge tasks, choice of entry points to tasks and through support.

The session is structured around a series of 5 slides on the Interactive Whiteboard which is used to display resources to support the children in their mental strategies and conceptual understanding (100 squares and number lines for counting, calendars etc) though some of these activities may be based around playing a game which doesn't involve the whiteboard

Each session must include:

- A counting activity where the children count forwards/backwards in steps appropriate to their year group (see progression in fluency of skills document).
- Calendar work where children practise skills such as reading and recording the date, calculating the date in X number of days' time, calculating intervals between dates.
- A word problem which has more than one step needed to solve it. These can be based around images or taken from exemplar materials.
- The remaining three slides or activities focus on rehearsing and practising basic skills appropriate to the year group and the stage in their learning. These activities should promote enjoyment, thinking and reasoning. These activities may remain the same for two-three days (altering the numbers/shapes each day) and then change again to maintain engagement and enjoyment. The following list is a suggestion of activities which could be used:
 - A mad minute where children have one minute to record as many pairs of number bonds to X as they can, to calculate missing numbers in calculations or to complete a tables challenge.
 - Odd One Out – from a selection of numbers, shapes, coins, measures etc children have to explain which is the odd one out and why.
 - Sometimes, Always, Never- children are given a statement which they then have to explain if it is sometimes, always or never true e.g. *every multiple of 4 ends in 4, 6 or 8.*
 - Images: a range of images are used to encourage children to identify shapes, lines of symmetry, estimate, order, count, memorise. They can also be used as stimulus for word problems, or to pose questions such as Where is the Maths in that?
 - Opinion line: Children are given a statement and have to place themselves along a continuum to show if they agree or disagree.

Appendix 3: Arithmetic Sessions

Four times a week, children receive an arithmetic session which is delivered away from the any session with a maths focus. This focuses solely on arithmetic computation and is intended to build fluency and stamina independently.

The session may not be delivered to the whole class at the whole time, teachers decide when it is appropriate. Teachers organise the session how they wish. Some children work independently, while some work with the teacher on a particular challenge area. It is expected that at least twice a week, children work independently.

The class teacher sets series of questions (see below) which cover all four areas of operation and, where appropriate for the year group, fractions. These match the progression in skills document, though in Key Stage 2, these may come from previous year groups in order to consolidate and practice a skill. The questions may be displayed on the whiteboard, or may be printed. All questions are recorded in arithmetic books and children should be encouraged to use the formal written method appropriate to their year group and current stage of learning.

Children's responses can be self-marked, peer-marked or marked by the class teacher. Where the responses are not marked, there is an expectation that staff check the child's work in order to identify areas of challenge. Subsequent maths sessions, master classes and support in arithmetic sessions can then be planned for.

Year	Time of session	Number of questions
R - -Summer term only and only children identified by class teacher	5 minutes	3
1 (Autumn term children identified start immediately, rest start after half term, or earlier if applicable)	Autumn – 5 minutes Spring – 10 minutes Summer – 10 minutes	Autumn – 3 Spring – 5 Summer – 7
2	Autumn – 10 minutes Spring – 10 minutes Summer – 15 minutes	Autumn – 10 Spring – 10 Summer – 15
3	15 minutes	15
4	15 minutes	15
5	15 minutes	20
6	15 minutes	20