



Barwell C of E Academy Mathematics Policy 2017-2018

We want happy, confident, successful children.

The children will be **mastering** a carefully crafted **cohesive** curriculum that is accessed by **all**. We want confident children with **high aspirations: communicating, problem solving, reasoning**, that **make connections** using **fluency**. Mathematics will be taught in an atmosphere where depth is explored and mistakes are celebrated – we believe there is no such thing as a “maths brain!”

Our ambitious target for feedback this academic year is: to be in line or above with national standards by July 2018 in all year groups.

Aims and objectives:

Our aim is for all children to enjoy and excel in mathematics.

We believe that mathematics is essential to everyday life, critical to science, technology and engineering, and necessary in most forms of employment. Our high-quality mathematics education therefore provides a: foundation for understanding the world; the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

The National Curriculum for Mathematics (2014) aims to ensure that all pupils:

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

We appreciate that mathematics is an interconnected subject so therefore our learners need to be able to move fluently between representations of mathematical ideas. Our programme of study (supported by Maths No Problem) is, by necessity, organised into apparently distinct domains, but learners should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to other subjects covered in year group Learning Journey topics.

Our approach:

We are proud to be one of the early adopters of the Teaching for Mastery approach. Lisa Bishop, our Maths Leader, is a Teaching for Mastery Specialist. This interactive and engaging approach to mathematics focusses on the children developing a deep understanding of mathematical concepts, inspired by approaches in Singapore and Shanghai.

What is "Teaching for Mastery?":

Since mastery is what we want learners to acquire (or go on acquiring), we use the phrase 'teaching for mastery' to describe the range of elements of classroom practice and school organisation that combine to give learners the best chances of mastering mathematics.

Mastering mathematics means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil's journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that's been taught to enable him/her move on to more advanced material.

Appendix 1- published by the NCETM contains the Essence of the Teaching for Mastery Approach

What will Mastery look like in our school?

Structure of mathematic lesson:

Mathematics lessons occur daily; the lesson usually occurs before and after break however there are some exceptions, due to timetable clashes. The lesson structure is split into 2 parts:

- i) The first part starts with an 'anchor task' (a word problem or statement); children then explore how they would solve this task generally following a set agenda – exploration, structuring learning, journaling, reflection. The first half ends with a section called 'guided practice' – this allows for assessment opportunities and identify which children need intervention etc.
- ii) The second half of the lesson is for independent learning where children complete a set workbook task based on the first half's learning. This time is also for the intervention of those children who need more support.

During this time, support staff and teachers are deployed appropriately.

Whole class teaching:

The expectation is that the majority of learners will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Learners who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice (pre and post teaches), before moving on. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Depth before breadth:

The design of our curriculum focuses on the children acquiring a deep understanding of the mathematical concepts which means that we spend longer time on topics really enabling the children to explore and apply ideas, rather than accelerate through new topics. This approach enables learners to truly grasp a concept, and the challenge comes from investigating it in new, alternative and more complex ways.

Rapid intervention:

New learning is built upon previous understanding, so in order for learning to progress and to keep the class together, learners need to be supported to keep up and areas of difficulty must be dealt with as and when they occur. We do this through same day or next day – post and pre teaches. In addition, we still run intervention sessions outside of the maths lesson for some children who need additional support.

SEND pupils:

SEND pupils may be supported by additional adults, different resources and differentiated activities. They will also complete additional activities outside of the mathematics lesson. We do not label our children; we have high expectations of all children and strongly believe that all children are equally able in mathematics. Some may take longer to grasp concepts and may need careful scaffolding or extra time/support (guided groups, same day catch-up, additional homework, pre-teaching, intervention group, specific parent support).

Developing character - a growth mind-set and high expectations:

We reject the idea that you are born with a maths gene or are a born mathematician. Instead we encourage a growth mind-set in which we believe that all children are capable of achieving in maths with determination, hard work and resilience. We believe that all children should achieve together by 'keeping up, not catching up' we teach the children the value of making mistakes in mathematics and foster the '....not YET!' approach.

Problem-solving and uncovering the structure of the maths:

Problem solving is at the heart of our approach and every maths concept is introduced through a real life contextualised problem. This enables the children to draw on real life experiences, make connections between different ideas and apply mathematical principles. We support the children by adopting a 'Concrete, Pictorial, Abstract (CPA)' approach where time is spent using mathematical resources and manipulatives in lessons uncovering the structure of the maths which, when acquired, can then enable them to move onto the more pictorial and then abstract where the maths is represented using mathematical symbols.

Using Mathematical Language:

Our aim is for the children to have excellent reasoning skills, discussing patterns and relationships, make connections and make conjectures which can be tested and explored. To

support us in this, we encourage the children to use mathematical vocabulary in all lessons, giving responses in full sentences, not just accepting the answer and within the context of the problem. We want the children to explain the why and the how in order to develop those reasoning skills.

Written feedback:

There is an expectation that the children will mark their own work thus providing instant feedback. Following our feedback policy, pink and blue highlights are used to self-mark:

Blue highlighter – indicates that an answer is incorrect.

Pink highlighter - indicates that an answer is right.

Marking in these two distinct visually it allows teachers to assess and make instant decisions to intervene.

Gap tasks may appear for individual children in their books, but usually gaps are addressed through pre/post teaches and therefore may not be recorded in books. A teacher comment is only made if/when a teacher feels this is necessary to move learning forward as we believe the most valuable feedback is given during a lesson through pupil and teacher discussions.

Appendix 2- An example of Mathematics Feedback

Appendices:

Appendix 1 – NCETM’s Essence of the Teaching for Mastery Approach (June 2016)



The Essence of Maths Teaching for Mastery

- Maths teaching for mastery rejects the idea that a large proportion of people 'just can't do maths'.
- All pupils are encouraged by the belief that by working hard at maths they can succeed.
- Pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time, as happens in Shanghai and several other regions that teach maths successfully. This ensures that all can master concepts before moving to the next part of the curriculum sequence, allowing no pupil to be left behind.
- If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.
- Lesson design identifies the new mathematics that is to be taught, the key points, the difficult points and a carefully sequenced journey through the learning. In a typical lesson pupils sit facing the teacher and the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion.
- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice used is **intelligent practice** that both reinforces pupils' procedural fluency and develops their conceptual understanding.
- Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning. The structure and connections within the mathematics are emphasised, so that pupils develop deep learning that can be sustained.
- Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

Appendix 2 – Mathematics Feedback Policy

Mathematics Feedback Guidance (NOV16)

15/11/16

Lesson 12


This space is for mathematical workings in response to the 'In Focus' task/learning question. Formal presentation is not expected but answers need to be clear.

Guided Practice
Formal presentations expected.

This book is to be marked by learners using their pink and blue highlighters. Teachers to look at this book during the break in the lesson; feedback is not expected unless appropriate and will benefit the learner.

CH – Challenges are put in this book

At the end of a topic stick in and complete success criteria.



Name: _____ Class: _____ Date: 15/11/16 Date

Worksheet 10

Multiplying 4-Digit Numbers

1 This is how Emma finds the product of 4-digit numbers.

$6231 \times 3 = ?$
 $6231 \times 3 = 18\ 693$

$6000 \times 3 = 18\ 000$
 $200 \times 3 = 600$
 $30 \times 3 = 90$
 $1 \times 3 = 3$
 $6231 \times 3 = 18\ 693$

Multiply using _____'s method.

(a) $3796 \times 4 =$ $14\ 830$ $15\ 184$

Write out the calculation.

(b) $5454 \times 6 =$ $32\ 724$

$3000 \times 4 =$	$12\ 000$
$700 \times 4 =$	2800
$90 \times 4 =$	36
$6 \times 4 =$	24
$3796 \times 4 =$	$14\ 830$
$5000 \times 6 =$	$30\ 000$
$400 \times 6 =$	2400
$50 \times 6 =$	300
$4 \times 6 =$	24
$5454 \times 6 =$	$32\ 724$

Whole Numbers: Multiplication and Division Page 67

Ladders/ correct steps

Ladders only needed to push learning, offer support, to correct general mistakes etc.

Purple pen comments

I made links using $\times 10$, $\times 100$, $\times 1000$

Marked incorrect in blue

If it is a quick-fix, where incorrect learners are expected to alter - ladder not needed.

Marked correct in pink