# Mathematics Policy
# 2019 – 2020

***KEY AGREED PROCEDURES:***

- Maths must be taught every day.
- Daily basic skills practice of number bonds, multiplication and division facts.
- Fluency practise of basic skills can be included in the main teaching session or moved to another time in the school day.
- A teaching for mastery approach is delivered meaning the focus is ensuring all pupils understand a concept before moving on.
- Children work in mixed ability groups in KS1 – Year 4.

***AIMS:***

***At BASE Academy, we encourage***

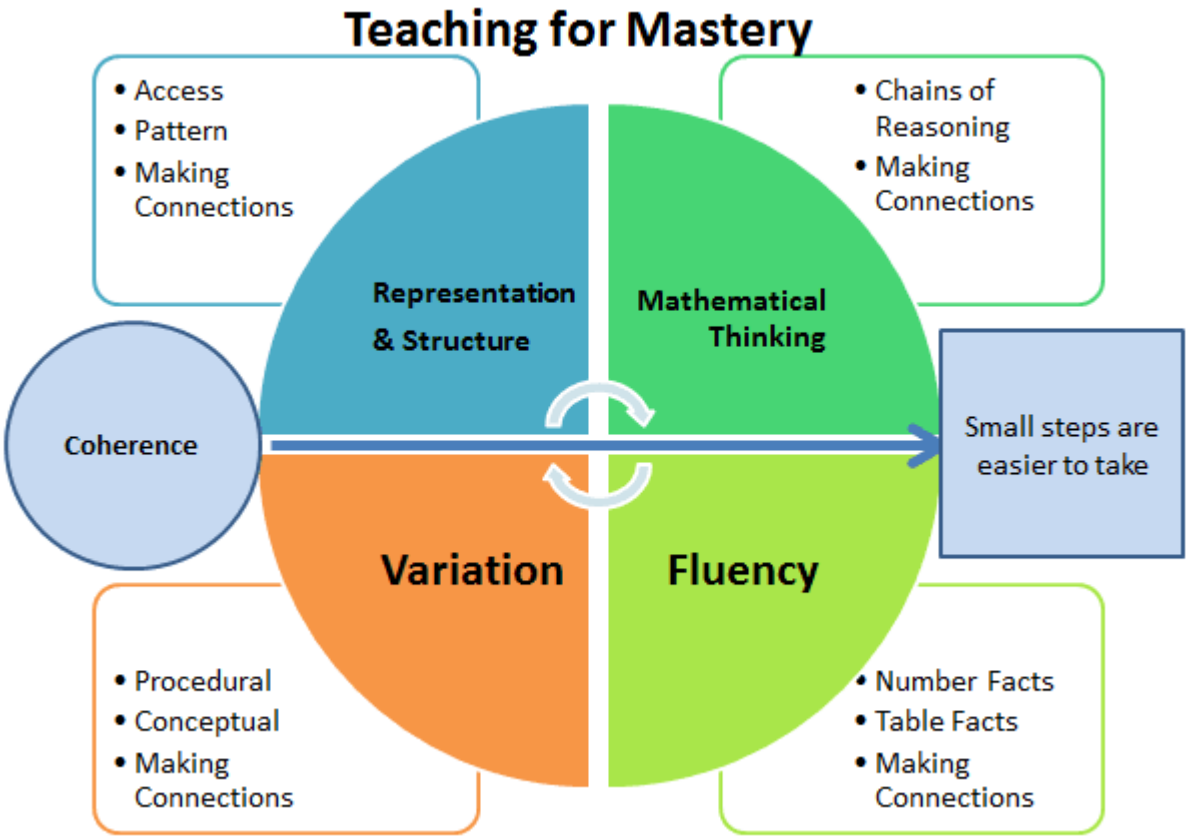
- Resilience alongside a positive and reflective attitude towards Maths
- An excitement of discovery through teaching and learning of mathematical concepts, leading to a fascination of the subject
- The ability to be competent, confident and flexible in using mathematical knowledge, concepts and skills.
- An ability to recall basic skills, including number bonds and times tables, and apply knowledge rapidly and accurately.
- An ability to explain and justify thinking when solving problems and facing mathematical challenges.
- An ability to use and apply mathematics across the curriculum and in real life.
- Independence and co-operation with others in being able to understand different points of view.
- Use of correct technical mathematical vocabulary and recognise its importance as a language for communication and thinking.
- Equal opportunities within our Mathematics curriculum for all children, taking into account age, gender, ability, disability, ethnic origin, faith, culture and social circumstances.

**March 20**

L Behan & L Nicholson

Review Date: March 21

***What is a Teaching for Mastery approach?***




NCETM

Underpinning BASE Academy's Teaching for Mastery approach is a belief that all pupils **can achieve** in Maths. The approach 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. If pupils fail to grasp a concept or procedure, this is quickly identified and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson. When lessons are designed, the new mathematics to be taught, the key points, the difficult points and a carefully sequenced journey through the lesson is planned for. Key facts such as multiplication tables and addition facts within 10 are learnt to automaticity to avoid cognitive overload in the working memory and thus enables pupils to focus on new concepts.

The National Centre of Excellence in Teaching of Mathematics (NCETM) has developed Five Big Ideas of Mastery. They are as follows:

**Coherence**

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

**Representation and Structure**

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation.

**Mathematical Thinking**

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

**Fluency**

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics.

**Variation**

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Videos and further information can be found at: https://www.ncetm.org.uk/resources/47230

***How is Maths taught?***

In EYFS, children experience learning of mathematical concepts through various means, including and not limiting to, whole group and small group adult-led sessions, focus task adult-led sessions, access to mathematical challenges in indoor and outdoor continuous provision and within the context of other subjects.

Teachers base plans for discrete teaching sessions (but are not limited to) using NRich and Development Matters in Nursery, and the White Rose Scheme of Learning and Development Matters in Reception.

In KS1 and KS2, teachers base plans for maths lessons on the White Rose Scheme of Learning. Teachers plan individual lessons using the small steps providing in this scheme, but can support lesson design with materials from other places, including Third Space Learning and NCETM.

Each morning as children arrive into school they complete the Flashback 4 challenge. Flashback 4 slides provide four questions revising learning from the previous day, the previous week, the previous block and previous term. No recording is required.

During KS1 Enrichment, all children rotate to take part in a 30 minute practice session of skills identified by the class teacher. During KS2 Enrichment, identified children rotate to take part in a one hour practice session where basic skills are practiced.

The structure of a daily Maths lesson is as follows for Years 1 – 6:

**Fluency practice:** This can take place at the beginning or end of the timetabled Maths lesson or moved to another part of the school day. Pupils will practise recall of basic facts including number bonds up to and including 10 and 20, doubles and halves, multiplication and division facts.

**Vocabulary:** Key vocabulary is to be discussed at the beginning of a lesson to remove barriers in understanding. It may be appropriate to introduce vocabulary for the week and revisit each day to help pupils revise and revisit.

**Explore:** A question, challenge or activity is given to 'open the mind' about the learning in today's session.

**Teach:** The new concept is taught in small coherent steps. The teacher will identify and point out the difficult points for pupils to avoid misconceptions being made. PowerPoint or Smart Notebook slides are appropriate and should be used to move the lesson forward at good pace. The five big ideas of mastery will be considered, in particular, how the structure of the mathematical concept is represented. The teacher should plan to expose the concept using concrete manipulatives initially, moving through to pictorial and abstract representations. This is required to help all children understand rather than just those who understand the abstract models.

**Guided practice:** A practice task is given to individuals, pairs or small groups to work through that links to the task children will complete in the application section of the lesson. The adults in the class (unless already supporting an identified group) will move around the room and assess how the pupils are managing the task. Pupils who are struggling should be identified and should work with an adult during the independent application. If most children are struggling with the task the teacher must stop pupils and readdress any misconceptions.

**Independent application:** The children who were able to access the guided practice task will apply their new skills and demonstrate new understanding by completing a series of tiered challenges.

*Bronze challenge:* This challenge allows the pupil to demonstrate an understanding of the small step or concept learned this session. The task should be designed so that children demonstrate their understanding sufficiently but not to unnecessary excess.

*Silver challenge:* This challenge allows the children to go deeper. The task may involve a simple problem solving activity or the opportunity for children to explain their reasoning, for example, '*say whether these statements are true or false and explain your reasoning'.*

*Gold challenge:* A very small number of children are likely to achieve gold within a session. These challenges will involve more complex problem solving tasks and will require higher order thinking. Logic puzzles incorporating a range of skills may be appropriate.

Please note: No child is limited to a certain level of challenge. This is to 'lift the ceiling' on what we perceive children to know or not know. Children may be less confident in one aspect of maths and more confident in another.

**Differentiation:**

As a general rule, all pupils will access the same task and differentiation will be by outcome.

Professional judgement must be applied in all contexts. If it is felt that children do not have enough prior understanding to access the lesson being taught, for example they are working well below their age group, their activity should be differentiated to ensure they can still make progress. Struggling learners

could have a differentiated input from the teaching assistant before completing a differentiated task. It is important that struggling learners work with some independence at different points in the lesson so they do not become reliant on adult support.

The same applies to those children who quickly understand a concept. Rapid graspers may start a challenge sooner than other children but only if the teacher is confident they fully understand the concept. Children should not move straight onto silver challenge as it should not be assumed children have a solid understanding, however, completing the bronze challenge should not hinder the children's chance to move to silver challenge and then gold. Teachers may change the number of questions the rapid graspers need to complete before starting the next challenge.

## ***How is progress monitored?***

Teachers use questioning and observe pupils within lessons to check children are making progress. Where children are making slower progress the teacher is expected to intervene and support at the time of learning. Equally, where children are making rapid progress the teacher is expected to provide a deeper of challenge.

Over a longer period, progress is monitored through regular book scrutiny activities, lesson observations, pupil interviews, data tracking and regular moderation. Through completion of these activities, children can be highlighted for intervention on the class action plan and therefore identified as pupils who need more support. Pupil progress meetings held termly hold teachers and leaders to account. Regular academy and cluster moderations help teachers ensure they are in line with schools in the area. Data analysis is used to detect patterns and trends for vulnerable groups.

The subject leader is responsible for monitoring attainment and progress and feeding back to staff.

## ***How is Maths assessed?***

Maths assessment is a continuous process that is integral to informing future teaching and understanding what pupils have learned. It is the responsibility of the class teacher to assess all pupils in their class through:

- The marking of daily maths sessions
- Feedback from other adults who work with the children and the children themselves
- Fortnightly arithmetic tests (KS2)
- White Rose End of Block Assessments
- Half termly Assertive Mentoring tests
- In Years 2 and 6 - past SATs tests
- Times Tables Tuesday grids (Y2 once multiplication taught – Y6)
- Bonds Progression Phase system (KS1)
- Children's individual targets generated half termly by the Assertive Mentoring system

## ***How does the classroom environment support Maths?***

Each classroom has a bank of manipulatives readily available for children to access should they need them. These include, but are not limited to:

| | |
|---|---|
| • Double sided counters<br>• Tens frames<br>• Beadstrings<br>• Base 10<br>• Numicon<br>• Cuisenaire rods | • Place Value counters<br>• A set of 3d shapes<br>• 100 squares<br>• Number lines<br>• Dice<br>• Multiplication grids |

Each classroom displays a working wall that is updated to reflect the White Rose block being taught. High quality working walls display examples of children's work (WAGOLL), technical mathematic vocabulary, key representations e.g. manipulatives stuck on wall or pictorial representations, generalisations learned and additional challenges or questions to challenge thinking.

## ***What resources are available to support teaching?***

Planning support materials can be found on W:/19-20/Maths/01 Planning Support.

- White Rose Scheme of Learning
- Third Space Learning slides (accompany each White Rose Small Step)
- NCETM PD materials - teacher guides and a lesson slides
- Learning By Questions – each year group has a teaching manual
- Year 1 – 6 Hands On Maths books

School has access to premium online resources from White Rose and Third Space Learning. The subject lead has passwords for these accounts.

Resources to use in lessons can come from the above places in addition to the following:

- TT Rockstars (Y2 – 6) All pupils have access at school and opportunity to use at home
- NumBots (Y1 upwards) All pupils have access at school and opportunity to use at home
- NumberFun songs, including Tables Troopers
- Can you convince me cards
- I See Reasoning and Problem Solving
- NRich

Resources to support struggling learners:

- Power of 2 Intervention resource
- Intervention in Mastery Context games packs

Useful websites:

- www.mathsbot.com
- www.garyhall.org.uk
- www.mathslearningcentre.org
- www.ncetm.org.uk
- www.topmarks.com
- www.ictgames.com
- www.bbc.co.uk/teach/supermovers