



The
Boleyn
Trust



Cleves
PRIMARY SCHOOL

Mathematics Policy

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1 Introduction

- 1.1 Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and pattern in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics. To ensure this 'The New Mastery Curriculum' enables the pupils to acquire a range of mathematical experiences, relevant mathematical language and skills. This is so that we promote and develop greater depth of learning in order to build the next generation of mathematicians who are able to solve mathematical problems with confidence.

2 Aims and objectives

- 2.1 The aims of mathematics are:
- to provide opportunities to practise and develop skills, knowledge and understanding to equip pupils to apply mathematics to real life situations as well as understanding the importance of mathematics in everyday life;
 - to promote enjoyment and enthusiasm for learning by making teaching and learning practical, exploratory and investigative using a wide range of resources to ensure the curriculum is accessible as possible;
 - To encourage co-operation as well as independence.
 - to promote confidence and competence with numbers and the number system;
 - to develop the ability to solve problems through decision-making and reasoning in a range of contexts;
 - to develop a practical understanding of the ways in which information is gathered and presented;
 - to explore features of shape and space, and develop measuring skills in a range of contexts;
 - To ensure that every pupil achieves their fullest potential.

3 Mathematics Programmes and Structure

3.1 Maths Mastery Teaching Timeline and Approach:

We have daily Maths lessons which are approximately 1 hour. Within this we adopt a **four-part structure** of:

- Quick Maths (Opportunity for pupils to recap their learning from the previous year)
- General Starter (Opportunity for pupils to recap their learning from the current year, ready to build on this learning in the lesson)
- Hook (Opportunity for elicitation and exploration)
- Guidance (Main teaching where the teacher models examples)
- Independent (Opportunity for pupils to practice examples by themselves)
- Reflection (opportunity to review learning and misconceptions and deepen the learning – mini-plenaries, plenaries)

3.2 A heavy emphasis is placed on the C-P-A approach. Research in Learning from key theorists* in education is heavily referred to in promoting students' positive attributes to learning. The following are fundamental in ensuring that such key aspects are being delivered daily in the classroom:

- Opportunities for students to interact with their peers (Vygotsky)
- Concrete activities
- Exploration (Piaget)
- Safety of learning environment (Promoting 'productive failure' – learning from mistakes)

*(*Dienes, Bruner, Vygotsky, Skemp, Piaget)*

3.3 We want pupils at Cleves to become independent mathematical learners who are encouraged to reason and explain their learning. Such skills can be reinforced, embedded and developed further in order to be used and applied in different contexts.

4 Teaching and learning style

4.1 Thinking skills:

Thinking skills and heuristics are essential for mathematical problem solving. Thinking skills are skills that can be used in a thinking process such as classifying, comparing, analysing parts and whole identifying patterns and relationships induction, deduction generalising and spatial visualisation.

Heuristics are general rules of thumb of what students can do to tackle a problem when the solution to the problem is not obvious. These include using a representation (e.g. drawing a diagram, tabulating), making a guess (e.g. trial and improvement/guess and check making a supposition), walking through the process (e.g. acting it out, working backwards) and changing the problem (e.g. simplifying the problem, considering special cases)

4.2 Key approaches to learning:

Learning is about making connections:

- The **spiral curriculum** (curriculum approach) – connecting to extend existing knowledge and skills
- The **Concrete-Pictorial-Abstract** (C-P-A) development of concepts (pedagogical approach) that connect to make sense of learning

- **Learning experiences** (Learning approach) – connections to realise the curriculum

In order for students to make all-important connections that are pivotal to learning, we promote the following in the learning environment:

- Real – world model
- Visual model
- Oral explanation
- Written explanation
- Challenge (enrichment activity)

The Teaching and Learning of Mathematics at Cleves should be reflective of these key principles and provide daily opportunities for these connections and skills to be taught.

4.4 Mental Maths

Why mental mathematics and visualisation?

Mental mathematics is part of any mathematical activity and is the quickest way to raise standards in school. As children become more confident at seeing mathematics and working things out in their heads they become better at problem solving and reasoning as well as calculating or working with shape and measure.

Mental activity needs teaching and practice to develop efficient and effective ways of thinking and organising thoughts and ideas. We need to help children to:

- Carry and manipulate information in their heads.
- Visualise images and to interpret and analyse what they see.
- Select and organise information in a systematic and logical way identifying patterns and applying logical reasoning.

Visualisation

To use visualisation successfully, children need practical experience, along with opportunities to talk about the equipment they are using and the images they are forming in their head. They also need to learn and use the related mathematical language. Visualisation could also involve the children making some notes or jottings to help them. These should not replace the visualisation but provide support when children can no longer hold everything in their minds. Being able to listen to description, interpret the context or task and manipulate the image can be

challenging for some children, so making jottings of this kind might be an important step in the development of their visualisation.

4.5 Teaching mental maths at Cleves

The teaching of mental maths at Cleves should consist of objectives taken from the key learning document and visualisation activities. Mental maths is taught everyday through: quick maths/five minute fillers which reinforces the fluency of calculations from the previous academic year; and general mental starters linked to the concept your teaching. Mental maths activities should focus predominately on number.

4.6 Practical Learning in mathematics

Practical learning in mathematics is essential because it helps bring together both abstract and practical everyday learning to mathematical concepts. Practical maths puts learning into a real-life context and makes it relevant. A child's learning and development in mathematics will be deeper and they will become more competent mathematicians.

4.7 Practical learning at Cleves

The teaching of mathematics at Cleves should give opportunities for children to develop their mathematics skills through practical activities. Children must have the opportunity to complete a short practical task followed by time for them to record their findings.

Areas of the mathematics curriculum where practical learning is necessary are weight, length, capacity, money and sometimes fractions. In KS1 practical learning is also needed when the children are beginning to understand multiplication and division. All children at Cleves should experience some practical learning each term. Practical learning could form the basis of the problem solving lesson on a Friday. The practical task could be used as a means of solving the problem followed by the children recording what they have found out. This should only be the case when the whole school topic being covered is measure.

5 Mathematics curriculum planning

5.1 Mathematics is a core subject in the National Curriculum, and we use the following key documents when planning:

- New Maths Curriculum
- Maths Overviews
- Abacus
- Cleves Primary calculation policy

- Test Base

- 5.2** The curriculum overview is organised within the four operations of number (Numerical reasoning; Additive reasoning; Multiplicative reasoning and Geometric reasoning). These skills are to be taught over a 3 to 4 week block with frequent opportunities to use and apply within varying contexts such as measure and statistics.
- 5.3 Long term planning:** is based on the Cleves Whole School overview in Mathematics. The concepts to be taught and covered are listed accordingly.
- 5.4 Medium term planning:** are the objectives and concepts that are set out in the 'Securing Progression in Mathematics'. Teachers select the objectives and concepts that fit with the topic that is outlined in the Cleves overview and ensure that the targets are broken down into child friendly objects that are seen to be progressive in its learning journey over the week.

The medium term planning is collected and monitored by the maths co-ordinator and SLT every half term.

- 5.5 Short term planning:** is carried out on a weekly basis. All planning includes a skill-based learning objective with succinct success criteria, a quick maths starter, a general starter, a guided practice activity, a progressive teaching sequence, key AFL strategies, key questioning, relevant vocabulary and resources.

Short term planning is collected weekly and monitored by the maths co-ordinator and SLT.

- 5.6** The class teacher keeps the weekly planning visible in the classroom and then is expected to highlight which targets are met or exceeded in order to inform the next week's planning. Each class teacher and teaching assistant then discusses the planning on a weekly basis.
- 5.7** Teachers should have high expectations of their pupils and must ensure that work is appropriately challenging and engaging. Teachers should make explicit to the pupils the objectives, success criteria and expectations for the lesson which must be displayed on the board and referred to before any lesson commences.

6 The Foundation Stage

- 6.1** We teach mathematics in our reception class. As the class is part of the Foundation Stage of the National Curriculum, we relate the mathematical aspects of the children's work to the objectives set out in the Early Learning Goals, which underpin the curriculum planning for children aged three to five. We give all the children ample opportunity to develop their

understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics.

7 Teaching mathematics to children with special educational needs

- 7.1 At our school we teach mathematics to all children, whatever their ability. Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our mathematics teaching we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning targets and responding to each child's different needs in consultation with the Inclusion Manager. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels. If a child's needs are particularly severe they will work on an individualised programme written in consultation with the appropriate staff.
- 7.2 Teaching styles should be interactive allowing for pupil participation. A combination of open and closed questioning should also be used by teachers which allow all pupils to participate in the lessons. When planning, teachers will try to address the child's needs through simplified or modified tasks or the use of support staff.

8 Assessment and recording

- 8.1 As soon as pupils are inducted into the school they complete a baseline assessment. **Progress in Understanding Mathematics Assessment (PUMA)** tests the pupil's mathematical knowledge not their reading, writing or spelling ability. It provides the school with **diagnostic** information as well as a **standardised score**. PUMA assessments are carried out with the whole class at the end of each term. Alongside this pupils may sit a SAT's style test which enables us to monitor progress every half term.
- 8.2 There is on-going informal assessment carried out by the teachers every day which informs our weekly planning. These results are then tracked onto Pupil Tracker where the progress, strengths and weaknesses can be tracked and are informative for the next half term/term/academic year
- 8.3 For each attainment area every pupil is given between 1 and 4 targets which relate directly to the National Curriculum. Every half term these targets are then reviewed to see if they have been met through both informal and formal assessment to see whether the target is appropriate and/or whether the pupils still need to consolidate the target(s).
- 8.4 All data is analysed by senior management, the mathematics coordinator and the Inclusion team.

- 8.5** All parents receive an annual written report on which there is a summary of their child's effort and progress in mathematics over the year. In addition to this, parents will also receive a half termly report card which provides information on the child's current level, the progress grade and the effort grade.

At the end of Key Stage 1 and Key Stage 2 each pupil's level of achievement against national standards is included as part of their written report.

9 Resources

- 9.1** The skills, experience and knowledge of all staff are valued and all contribute within the school. There is a range of resources to support the teaching of mathematics across the school. All classrooms have the basic resources and equipment within their classroom. Any extra resources needed are accessible to the entire school in the maths resources room which is used as the central storage area. A range of software is available to support work with the computers.

10 Monitoring and review

- 9.1** Monitoring of the standards of children's work and of the quality of teaching in mathematics is the responsibility of the mathematics subject leader and SLT. The work of the mathematics subject leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school. The mathematics subject leader gives the head teacher a termly report in which s/he evaluates strengths and weaknesses in the subject and indicates areas for further improvement. The head teacher allocates regular management time to the mathematics subject leader so that s/he can review samples of children's work and undertake lesson observations of mathematics teaching across the school. A named member of the school's governing body is briefed to oversee the developments of mathematics. This governor meets regularly with the subject leader to review progress.