



Where learning's an adventure

# Mathematics Policy

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## Introduction

This policy outlines the teaching, organisation and management of mathematics learnt and taught at Copenhagen Primary School.

## Aims

Mathematics is a core subject in the National Curriculum and Primary Advantage Programme as the basis for implementing the statutory requirements of the programme of study for mathematics.

At Copenhagen Primary School, we are committed to raising the standards of learning and teaching of mathematics. We aim to:

- To meet the statutory requirements of the New National Curriculum 2014.
- To develop positive attitudes towards mathematics and lifelong learning
- To develop competence and confidence in mathematical knowledge, concepts and skills e.g. estimate with confidence.
- To develop the ability to solve problems, to reason, to think logically and to work systematically and accurately use the 'language' of maths.
- To develop an ability in the children to choose and explain appropriate methods or strategies for their calculations and when solving real-life problems.
- To develop ability to think clearly and logically with independence of thought and flexibility of mind.
- To develop an understanding of mathematics through a process of enquiry
- To use a variety of approaches to find the most appropriate method
- Encourage the effective use of maths as a tool in a wide range of activities and experiences within school and subsequently, adult life.
- Provide work that is differentiated or at an appropriate level.
- To foster an environment that will enable all the children to continually aim high, succeed, become responsible, independent and reflective learners, and who will take risks and ownership of their learning.

## Learning and Teaching

The school uses a variety of teaching styles to cater for the variety of learning styles of pupils in mathematics lessons.

### *Our principle aim:*

To develop children's knowledge, skills, understanding and application of mathematics.

We do this through a daily lesson that has a high proportion of whole-class and group-direct teaching. During these lessons we encourage children to ask as well as answer mathematical questions. They have the opportunity to use a wide range of vocabulary and resources to support their learning. Children use computers and technology in mathematics lessons where it will enhance their learning, as in modelling ideas and methods.

In all classes there are children of differing mathematical ability. We recognise this fact and provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this through a range of learning and teaching methods and strategies and provide opportunities through:

- Teacher modelling.
- Speaking and listening techniques.
- Real-life models and scenarios.
- Cross-curricular links.
- The development of mental/oral strategies.
- Written methods and questioning techniques.
- Appropriate and challenging practical work.
- Investigative work.
- Problem solving.
- Mathematical discussion.
- Consolidation and practice of fundamental skills and routines.
- Whole class, grouped, paired and individual work.
- Reflective learning, cooperative learning.
- Self and peer assessment strategies.
- Teacher assessment i.e. SMART (*Simplistic, Measurable, Attainable, Realistic, Timed*) targets.

### *Teaching Time*

To provide adequate time for developing Mathematics skills each class teacher will provide a daily mathematics lesson. This may vary in length from Nursery to Key Stage 2. In Nursery, the curriculum is cross linked and integrated with different aspects of early years learning. In reception and Key Stage 1, the lesson can last up to 45 minutes. In Key Stage 2, the lesson will be about 60 minutes.

Links will also be made to mathematics within other subjects so pupils can develop and apply their mathematics skills.

### *Class Organisation*

All pupils will have a dedicated daily mathematics lesson. Within these lessons there will be a good balance between whole-class work, group teaching and individual practice.

### *A Typical Lesson*

A typical 45 to 60 minute lesson in Year 1 to 6 will be structured like this:

- Oral work and mental calculation (about 5 to 10 minutes).  
This starter will involve whole-class work to rehearse, sharpen and develop mental and oral skills. It can be differentiated based on the ability level of the class.
- The main teaching activity (about 30 to 40 minutes).  
This will include both teaching input and pupil activities and a balance between whole class, grouped, paired and individual work.
- A plenary (about 10 to 15 minutes).  
This will involve work with the whole class to sort out misconceptions, identify progress, to summarise key facts and ideas and what to remember, to make links to other work and to discuss next steps.

### Planning and Marking

Mathematics is a core subject in the National Curriculum, and we use the Primary Advantage Maths Programme as the basis for implementing the statutory requirements of the programme of study for mathematics.

The Primary Advantage Maths programme is designed to build good practice in schools to ensure maths teaching and learning is of the highest quality and all children to make good progress.

The PA Maths programme supports progression throughout the primary years and has a strong concrete, pictorial and abstract thread running throughout. This means that children are exposed to conceptual ideas at a **concrete** level with a range of apparatus (e.g. counters, beads and Deines) before moving on to **pictorial** representations. This may mean diagrams, sketches or using the Singapore bar model. Doing so develops children's deep conceptual understanding and skills proficiency which supports the next move into **abstract** mathematics, such as long division.

Maths lessons are designed to be interactive with a significant emphasis on children's talk. Through discussing their ideas, children construct new understanding, engage in a supportive community of practice, take responsibility for their learning and allow the teacher a window into their thinking which enables appropriate action to help them progress. Fluency, reasoning and problem solving are three themes of the maths [National Curriculum](#) (DfE, 2014) and inform all maths teaching in our school.

We carry out the curriculum planning in mathematics in line with Primary Advantage which is based on the National Curriculum. Each topic area within maths follows a line of progression from EYFS to Year 6.

It is suggested that a medium term plan is to be completed a week at a time. The rationale behind this is – a weekly plan is a working document and it enables the teacher to evaluate learning and teaching, make appropriate changes and adaptation to meet the needs of the children and set challenges in subsequent lessons.

Each flipchart prepared must contain details of the learning intention, the success criteria to be achieved and the differentiation for that particular lesson. Each flipchart is to be saved within any adaptations.

The weekly plans are derived from planning documents from the Primary Advantage planning documents which support the medium term planning document. The learning objectives are methodically planned to support progression. A medium term plan will list the specific learning objectives for the mental/oral starter and main activity.

The Mathematics Leader and SLT are responsible for monitoring the mathematics planning within our school.

Marking in maths follows the school's marking policy. The pupils are given a triangle for a developmental comment and a thought bubble stamp is used for a child to display maths thinking within a response.

## Resource Management and Computing

Materials are constantly updated as new and relevant items become available. The orders of new resources are made by the Mathematics Leader in consultation with staff.

At Copenhagen, there is a range of resources available to support the teaching of mathematics. All classrooms have a range of appropriate small apparatus. Additional equipment and topic specific items are stored centrally. Resources borrowed from the storage cupboard are to be returned back once they have been used, so they can be made available to other members of staff.

### ***Resources and Display***

In our school we have various teachers resource books available in the work room and in classrooms:

- A range of Models and images age appropriate equipment (class based) practical mathematics equipment (centrally stored)
- Dienes throughout FS, KS1 and KS2
- Children are encouraged to work independently where appropriate within the classroom, selecting the equipment they need, using it properly and appropriately and returning it to its correct place when an activity is completed.
- We recognise the importance of a stimulating learning environment. The school provides an environment, which is rich in a wide variety of print, pictures, diagrams, charts, tables, models and images.
- Each classroom has a mathematical display area, which includes a working wall with mathematical vocabulary, visual aids and interactive activities where appropriate.
- Computing will be used in various ways to support teaching and motivate children's learning across all aged groups. Integrated computing lessons will involve the computer, calculators and audio-visual aids. They will however only be used in a daily mathematics lesson when it is the most efficient and effective way of meeting the lesson objectives.

### Assessment and Monitoring

Assessment will take place at three connected levels: short-term, medium-term and long-term. These assessments will be used to inform teaching in a continuous cycle of planning, teaching and assessment.

#### *Short-term*

These are an informal part of every lesson and are matched to the teaching objectives displayed in the medium term planning. These are recorded within each flipchart and saved daily.

#### *Medium-term*

This will be a working document and updated weekly. .

#### *Long-term*

These will take place towards the end of the school year to assess and review pupils' progress and attainment.

Monitoring of the standards of children's work and of quality of teaching in mathematics is the responsibility of the Head Teacher and link governor supported by the Mathematics Coordinator.

The work of the coordinator 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.

A named member of the school's governing body is briefed to overview the teaching of Mathematics. This governor meets regularly with the Mathematics Coordinator to review progress.

### Arithmetic

It is a daily 20 minute programme of arithmetic practice with a strong emphasis on the four operations of mathematics and an opportunity to practice learned skills from maths lessons. These sessions will be planned for by teachers and will be in accordance to the learning needs for the class.

### Health and Safety

All mathematical equipment will be shared and used sensibly by all pupils. Any defective equipment will be removed from use and replaced by new ones. For more detail, please refer to the school's Health and Safety Policy.

### Inclusion

Copenhagen Primary School believes that every child has the right to develop their full potential, irrespective of ability, race, gender, creed or physical ability. We aim to ensure that, in partnership with parents, we offer all pupils equality of access and opportunity for successful learning.

We recognise and celebrate the diversity of our pupils, staff and parents, who are encouraged to share their experiences and culture to enhance the quality of learning for all. Pupils' classroom work and displays will celebrate diversities in society.

All pupils are entitled to a broad, balanced, relevant and differentiated curriculum. They will be given every opportunity to be successful in their learning and achieve as high a standard as possible.

We actively seek to remove barriers to learning and participation so each pupil can achieve their personal potential.

When teaching Mathematics we need to plan, assess and provide for a wide range of abilities, aptitudes and interests. When planning provision for pupils with Special Educational Needs, Gifted and Talented, or EAL pupils we recognise the need to

- Set suitable learning challenges
- Respond to pupils' diverse needs
- Work to overcome barriers to learning

Please also refer to the school's SEN, Gifted and Talented, and EAL Policies.

In planning for SEN pupils' learning, we consider the curriculum, the physical and social environment and the nature of support from peers and adults. The selection of appropriate learning objectives, teaching styles and resources will enable access to curriculum, according to each pupil's specific needs. Support from the teacher or Learning Support Assistant will be used effectively to achieve these aims. The SENCO is available to advice on differentiation in planning and classroom strategies.

### *Gifted and Talented*

Gifted and Talented pupils are identified, and teachers plan opportunities for those pupils to develop their abilities, skills and talents. They are provided with appropriately differentiated and stimulating tasks, with challenging learning outcomes. These may include enrichment or extension activities, and additional opportunities such as clubs, or outside agencies' programmes. The Gifted and Talented

Coordinator is available to advice on differentiation in planning, classroom strategies and resources for this area of the curriculum.

### EAL pupils

EAL planning and learning will take account of pupils' stage of learning English. Within this subject area, pupils will be given opportunities to develop their spoken and written English, including the use of accessible texts, materials and ICT, and the use of their home language where appropriate. The EAL Coordinator is available to advice on differentiation in planning, classroom strategies and resources.

### Early Years Foundation Stage

We teach Mathematics in the Early Years Foundation Stage as an integral part of the school's work. As the nursery and reception class is part of the Early Years Foundation Stage, we relate the Mathematics aspects of the children's work to the objectives set out in the Early Learning Goals as well as the Primary Advantage Maths document. We give all the children 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. (For further details see Early Years Foundation Stage Policy)

## Calculation Policy

The calculation policy is based upon the Primary Advantage Maths document which provides models and images on how each topic is to be represented and delivered. Each topic e.g. addition, subtraction, multiplication etc is separated into year groups.

These can be found in **Teacher Share Drive (T: ) > 2015 -2016 > Primary Advantage**

Below is an example of the Models and Images used for addition in Year 2.

Year 2 – Addition			
Progression (a combination of these models and images can be used for every objective)			
<b>To use the counting on strategy</b> <b>Number line</b> $38 + 5$  Moving to jump of 2 then 3. (jump to next 10)	<b>To make ten</b> also shown in y1 progression <b>Dienes</b> $38 + 5$ 	<b>To partition</b> $38 + 5 = 40 + 3 = 43$ 	<b>To add a two digit number &amp; ten</b> Add tens using: <b>Hundred square (pattern)</b> Jumps of ten on a number line Counting stick add ten from any given number 23, 33, 43 etc. Add 'ten' Dienes each time.
<b>To add a two digit number and ones without regrouping. (not bridging 10)</b> also shown in y1 progression 	<b>To add 2 two-digit numbers without regrouping (not bridging 10)</b> 	<b>To regroup and rename</b> Concrete representation important. (Could use Dienes.) <b>17 regrouped = 1 ten and 7 ones (renamed)</b> 	<b>To add three one-digit numbers</b> Use number bonds to make ten. $6 + 7 + 4 = 6 + 4 + 7 = 17$ Or partition numbers: $6 + 8 + 5 = 10 + 4 + 5 = 19$ 
<b>To add numbers regrouping in ones (bridging 10)</b> (Expanded method) $27 + 8$ 	<b>To add numbers regrouping in tens. (bridging 100)</b> (compact method) $53 + 71$ 	<b>Use the inverse to solve missing number problems</b> Understand that: $17 + 34 = 34 + 17$ but that $34 - 17$ is not the same as $17 - 34$ And $12 + 2 + 7 = (12 + 2) + 7$ or $12 + (2 + 7)$ Solve: $17 + \square = 30$ $\square + 13 = 30$ $30 - 17 = \square$ $30 - 13 = \square$	<b>To solve one step word problems:</b> <b>Part, Whole:</b> Laura has 25p and finds another 30p. How much does she now have?  <b>Adding on:</b> There are 68 sweets in the jar. How many more are needed to make 100? $68 + 2 + 30 = 100$ 
<b>Using the bar model: comparing (addition)</b> Sam has 10 red unifix cubes and 12 green unifix cubes. How many unifix cubes does he have altogether? 			
Lina has 15 unifix cubes and Nadir has 7 more. How many does Nadir have? (make with cubes) 			