



**BeDifferent**  
Federation

# **THE BEDIFFERENT FEDERATION**

# **MATHEMATICAL DEVELOPMENT POLICY**

**Revised September 2024**

**Mrs Hart, Mrs Killick and Mrs Jenkins**



**BeDifferent**  
Federation



## Rationale

Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to communicate, 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, understanding and developing skills, children learn to appreciate the contribution made by many cultures to the development and application of Mathematics.

When Mathematics is not taught effectively children can become easily frustrated and the inclination is to give up when faced with a challenge. It is vital that a positive attitude towards Mathematics is encouraged amongst all of our children in order to foster confidence and achievement in a skill that is essential in our society. In the BeDifferent Federation we use the principles taken from Singapore Mathematics and Mathematics Mastery to develop children's mathematical ability and confidence because the emphasis is centered on their mathematical understanding, rather than ability to follow procedures.

The National Curriculum for Mathematics (2014) describes in detail the objectives that children must learn in each year group and is recorded through the use of our year group Success and Challenge cards. Combined with our Calculation Policy, this ensures continuity, progression and high expectations for attainment in Mathematics for all of our children from Nursery to Year Six.

We use the National Curriculum for Mathematics (2014) as the basis of our Mathematics programme. Additional guidance for the planning of small steps is adapted from the White Rose online materials and the Ready to Progress criteria from the NCETM (National Centre of Excellence for Teaching Mathematics). We are committed to ensuring that all children achieve mastery in the key concepts of Mathematics, appropriate for their age group, in order that they make genuine progress and avoid gaps in their understanding that provide barriers to learning as they move through education. Assessment for Learning, an emphasis on investigation, problem solving, the development of mathematical thinking and development of teacher subject knowledge are therefore essential components of the Federated approach to this subject. Dedicated time is planned to support children's ability to prove, explore, explain and reason (PEER approach).

Using the Singapore Mathematics principles, children learn by working through the CPA (Concrete-Pictorial-Abstract) approach to solve complex problems that otherwise are impenetrable. By mastering topics before moving on they develop the deep foundation needed to build confidence and ability. The persistent development of a strong number sense gives them the fluency to make decisions without having to revert to remembering procedures.





**Within the BeDifferent Federation we aim to:**

- promote enjoyment and enthusiasm for learning through practical activity, exploration, investigation and discussion;
- develop mathematical skills and knowledge and quick recall of basic facts based on concrete experiences;
- develop cross-curricular learning opportunities that ensures that the mathematics is meaningful and has a clear purpose;
- promote confidence and competence with numbers and the number system;
- support children's recall of key concepts enables them to remember more over time;
- develop the ability to solve problems through decision-making and reasoning in a range of contexts;
- develop a practical understanding of the ways in which information is gathered and presented;
- explore features of shape and space, and develop measuring skills in a range of real-life contexts;
- develop an appreciation of the creative aspects of Mathematics and awareness of its aesthetic appeal;
- and understand the importance of Mathematics in everyday life and real-life contexts.

**Teaching and learning styles**

Within the BeDifferent Federation we use a wide variety of teaching and learning styles in our Mathematics lessons. Our principal aim is to develop children's knowledge, skills and understanding in Mathematics through real life, purposeful and cross-curricular problems. We do this through a daily lesson that has a high proportion of investigation and guided group teaching alongside whole class teaching. During these lessons we encourage children to ask, as well as answer, mathematical questions. Children are provided with concrete resources and problems to allow them to investigate and explore their conjectures and hypotheses; learning through practical experience.





Careful planning of key questions, promotes higher order thinking skills. Children have the opportunity to use a wide range of resources such as unifix cubes, egg box base 10 models, diennes rods, Numicon tiles, number lines, number squares, digit cards and other such small apparatus to support their learning.

They use ICT in Mathematics lessons where it will enhance their learning: modelling ideas and methods. Wherever possible, we encourage the children to use and apply their learning in everyday situations.

We use the bar model method in our schools to support the children's ability to solve problems. In Key Stage 1 children can solve word problems by acting out the situation. Initially real life objects are used to illustrate the problem. Subsequently, generic **concrete** materials such as cubes are then used to represent the cupcakes, for example. The **pictorial** representations become increasingly less realistic and more **abstract**. Children are taught to use the model method for part-whole situations.



The part-whole situations involve discrete quantities, such as the number of children in a group. Another type of part-whole situation involves continuous quantities. In contrast with the discrete quantities shown continuous quantities exist in fractional parts. The model method lays the foundation for learning formal algebra. Rectangular bars are used to represent unknown quantity. Using the model method with algebraic word problems there are a number of distinct advantages that supports the children's ability to derive, construct and then simplify algebraic equations more readily.

In addition to incorporating a range of concrete, pictorial and abstract elements (CPA) within each Mathematics lessons, teachers continue to secure and develop children's mathematical knowledge and understanding using a P.E.E.R approach (Prove, Explore, Explain, Reason). Within lessons, children are encouraged to use their reasoning skills and mathematical knowledge to **prove** their answers or thinking. This allows children to think critical and reflective on their own calculations or those of others. At the start of a new topic or lessons, children are given an opportunity to **explore** new learning, allowing them to build on the skills and understanding they already have and work collaboratively with other children. Children are then asked to **explain** and **reason**, using and applying what they have learned, along with mathematical language, to deepen their understanding and solve problems.





In all classes there are children of differing mathematical abilities. We recognise this fact and provide suitable learning opportunities for all children through careful matching of the challenge of the task to the ability of the child. We achieve this through a range of strategies – in some lessons through differentiated group work, and in other lessons by organising the children to work in pairs on open-ended problems or games. Children are involved in the difficulty of challenge they access as will be able to self-select from either a mild, spicy or hot activity based on both their confidence and ability. Teachers closely monitor children's choices and will intervene where necessary in order to either scaffold or challenge accordingly.

### **Inclusion**

The Mathematics curriculum should be delivered in a flexible, cross-curricular way, which gives equal access to all children regardless of gender, race or ability. Teachers provide differentiated learning opportunities matched to the needs of children. Children with Special Educational Needs in Mathematics have specific targets set in their Passports to Success.

Interactive teaching methods are employed to engage all children in mathematical learning experiences. Teachers set appropriate challenges for all children. Where children's attainment falls significantly below the expected levels in different mathematical strands for a variety of reasons (e.g. language difficulties, acute reticence, hearing impairment, English as an additional language) then special provision is made for additional support through guided activities

We aim to provide a broad and balanced education to all children. Effective tracking of individual attainment enables the identification of children who may benefit from early 'intervention' at an appropriate level, i.e. Numicon group, Wave 3 or Springboard 5. Mathematical tasks take into account the targets set for individual children in their Passports to Success.

### **Curriculum planning**

Mathematics is a core subject in the National Curriculum, and we use the revised programme of study as the basis for implementing the statutory requirements. We plan in line with the structures and recommendations outlined in the renewed framework for Mathematics 2014. Our planning lists the specific learning objectives and success criteria for each lesson and give details of how the lessons are to be taught. In conjunction with our Scientific Enquiry policy the skills children will develop within individual sessions are also identified.







These include:

- raising questions - asking questions, have ideas
- ways of enquiry - making decisions about how to answer questions
- planning to answer questions - deciding how to test ideas, which equipment to use, suggesting ways to test ideas safely
- predicting, conjecturing and hypothesising
- estimating
- making observations
- making a record of evidence - deciding how to best way to present their findings
- considering evidence - looking for and identifying patterns in evidence
- evaluating results - reflecting on how reliable and accurate their findings are
- developing ideas from evidence - giving possible explanations for evidence
- evaluating evidence decide how they may communicate and explain their ideas to others
- reflecting on how Mathematics influences our lives and the lives of other

Class teachers are responsible for short term planning (weekly planning) on a format agreed by the Senior Leadership Team. This planning is regularly monitored by Leaders and feedback is given to support the quality of teaching and learning.

### **Early Years Foundation Stage**

Within the Early Years Foundation Stage children follow the Early Years Foundation Stage Curriculum, supported by the small steps outlined in the White Rose Mathematics scheme. We give all children the opportunity to talk and communicate in a widening range of situation and to practice and extend their range of vocabulary and numeracy skills. They have the opportunity to explore, enjoy, learn about, and use Mathematics in a range of situations. Problem Solving, Reasoning and Number is planned for on a weekly basis with opportunities for independent learning always present in the unit. Mathematics is taught both as a discrete subject and within the whole Early Years Curriculum to give children opportunities to use their Numeracy skills in real life situations. Role play, the outdoor area and small world play are planned for to include opportunities for children to practice and develop their Problem Solving skills as well as their knowledge of number.





## **Contribution of Mathematics to teaching in other curriculum areas:**

### **English**

Mathematics actively promotes the skills of reading, writing and speaking and listening. For example we encourage children to read and interpret problems in order to identify the Mathematics involved. The children explain and present their work to others during sessions. Speaking and Listening opportunities are regularly planned for, which can also include feedback on the work of others. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts.

### **Information and Communication Technology (ICT) and Computing**

Children use and apply Mathematics in a variety of ways when solving problems using ICT. Younger children use ICT to communicate results with appropriate mathematical symbols. Older children use ICT to produce graphs and tables when explaining their results or when creating repeated patterns, such as tessellation. When working on control, children use standard and non-standard measures for distance and angle. They use simulations to identify patterns and relationships. All children play games to reinforce mathematical concepts.

### **Personal, health and social education and citizenship**

All mathematical tasks encourage independent study and helps children to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views. We present children with real-life situations in their problem solving and money work. Trips are planned to include a mathematical focus.

### **Assessment For and Of Learning**

In our schools we recognise that Assessment for Learning (AfL) lies at the heart of promoting learning and in raising standards of attainment. We further recognise that effective AfL depends on using the information gained.





The purpose of formative assessment can be used to identify what children know, what children have learnt, what they can do and what their next steps in learning should be. While children are engaged in learning, teachers will 'conference' with the children i.e. talk to them about the work whilst they are doing it as this is considered one of the most effective forms of assessment. Teachers initial and write VF (verbal feedback) in the child's book as a prompt to the child to note and respond to the issues discussed with the teacher.

The assessment procedures within our school include:

- Making ongoing assessments and responding appropriately to children during 'day-to-day' teaching. These 'immediate' responses are mainly verbal and are not normally recorded, other than a VF and initial in books;
- Written feedback in books is in response to the success criteria of the lesson and used to inform achievement and evidence for the Success and Challenge cards;
- Using knowledge of all children drawn from ongoing attainment and tracking records and from the 'prior learning' section at the beginning of each unit of work within the Renewed Framework to guide our planning and teaching;
- Adjusting planning and teaching within termly Success and Challenge cards in response to children's performance;
- Self and peer assessment are at the forefront of every teacher's mind. It forms a clear part of the lesson and children are aware of where they are and where they need to be.

## Homework

Homework is set on a weekly basis using our Mathletics platform to consolidate, practise, enrich and extend skills taught and learnt in the classroom. Teachers have regular access to the performance of the children in their class and can monitor or adjust activities set accordingly.

Children from Years 2-6 are set weekly times tables to learn, appropriate to those included in the Programmes of Study. Children are tested on a weekly basis to monitor progress over time.

All children in Year 4 across the BeDifferent Federation are part of the National Multiplication Tables Check. The aim of the check is to test children's multiplication table fluency at the end of Year 4 and ability to recall times tables under time constraints.







Primary-school children are expected to know all their times tables up to  $12 \times 12$ . Under the current National Curriculum, children are supposed to know their times tables by the end of Year 4, but they are not formally tested on them other than through multiplication questions in the Year 6 Mathematics SATs tests.

Children in Key Stage Two (Years 3-6) complete daily '5 minutes Mathematics' during the afternoon registration period. Regular repetitive arithmetic questions are used to support children's recall and confidence when working with number and calculation.

### **Monitoring and Review**

Monitoring the standards of children's work is completed termly. This takes place through a workscan where books are monitored and feedback is given to the staff concerned. The work of the Mathematics Subject Leader 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 has leadership and management time in order to enable her to review samples of the children's work and complete lesson observations of Mathematics teaching across the school. The subject leader reports to the Curriculum and Standards Committee regularly. There is a named governor responsible for Mathematics.

