

Rationale

The National Curriculum for Mathematics (2014) describes in detail what pupils must learn in each year group. Combined with our Calculation Policy, this ensures continuity, progression and high expectations for attainment in mathematics. It is vital that a positive attitude towards mathematics is encouraged amongst all of our pupils in order to foster confidence and achievement in a skill that is essential in our society. At Swillington we use the National Curriculum for Mathematics (2014) as the basis of our mathematics programme. We are committed to ensuring that all pupils 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 Swillington approach to this subject.

Aims

To foster a positive attitude to mathematics as part of the curriculum.

To develop a deeper understanding of mathematics through a process of enquiry and investigation.

To develop an understanding of the connectivity of patterns and relationships within mathematics.

To develop the ability to apply knowledge, skills and ideas in real life contexts outside the classroom, and become aware of the uses of mathematics in the wider world.

To develop the ability to use mathematics as a means of communicating ideas.

To develop an ability and inclination to work both alone and cooperatively to solve mathematical problems.

To develop personal qualities such as perseverance, independent thinking, cooperation and self-confidence through a sense of achievement and success.

To develop an appreciation of the creative aspects of mathematics.

Principles of Teaching and Learning

The school uses a variety of teaching and learning styles in mathematics lessons during each lesson. Our teachers strive to:

- Build children's confidence and self esteem
- Develop children's independence
- Allow all children to experience regular success
- Contextualise mathematics
- Use practical approaches to mathematics (models and images)
- Encourage children to select independently resources to help them
- Challenge children of all abilities.
- Encourage children to enjoy mathematics
- Develop a child's understanding of mathematical language
- Learn from teachers, peers and their own mistakes.
- Allow children to ask questions as well as answer them.

Our pupils should:

- have a well-developed sense of the size of a number and where it fits into the number system (place value)
- know by heart number facts such as number bonds, multiplication tables, doubles and halves
- use what they know by heart to figure out numbers mentally
- calculate accurately and efficiently, both mentally and in writing and paper, drawing on a range of calculation strategies
- recognise when it is appropriate to use a calculator and be able to do so effectively
- make sense of number problems, including non-routine/'real' problems and identify the operations needed to solve them
- explain their methods and reasoning, using correct mathematical terms
- judge whether their answers are reasonable and have strategies for checking them where necessary

- suggest suitable units for measuring and make sensible estimates of measurements
- explain and make predictions from the numbers in graphs, diagrams, charts and tables
- develop spatial awareness and an understanding of the properties of 2D and 3D shapes

Maths Curriculum Planning

Mathematics is a core subject in the National Curriculum and we use the objectives from this to support planning and to assess children's progress.

Staff use Maths Hubs long term planning to ensure coverage of all areas of the National Curriculum and medium term planning to differentiate objectives according to the set which they teach. It is the class teacher who completes the weekly plans for the teaching of mathematics. These weekly plans list the specific learning objectives for each lesson and give details of how the lessons are to be taught. The class teacher keeps these individual plans, which they annotate according to the success of the lesson.

Assessment

Various assessment methods and practices are used to ensure that children are making appropriate progress and that the activities they take part in are suitably matched to their ability and level of development.

Formative Assessment (AfL) - (monitoring children's learning)

Assessment is an integral and continuous part of the teaching and learning process at Swillington and much of it is done informally as part of each teacher's day to day work. Teachers integrate the use of formative assessment strategies such as: effective questioning, clear learning objectives, the use of success criteria, effective feedback and response in their teaching and marking and observing children participating in activities. Findings from these types of assessment are used to inform future planning.

Early Years Foundation Stage (EYFS)

We follow EYFS curriculum guidance for Mathematics. However, we are committed to ensuring the confident development of number sense and put emphasis on mastery of key early concepts. Pupils explore the 'story' of numbers to ten and the development of models and images for numbers as a solid foundation for further progress.

Mastery approaches to mathematics and the new national curriculum

Curriculum design

A detailed, structured curriculum is mapped out across all phases, ensuring continuity and supporting transition. Effective mastery curricula in mathematics are designed in relatively small carefully sequenced steps, which must each be mastered before pupils move to the next stage. Fundamental skills and knowledge are secured first. This often entails focusing on curriculum content in considerable depth at early stages.

In our lessons, you will see:

- Context for real life
- Open ended problems
- Manipulatives for all pupils
- Teaching using reasoning questions
- Teaching with sentence repetition
- Teaching with Concrete-Pictorial-Abstract
- Guided practice as a model for pupils
- Answering in full sentences
- Independent tasks
- Opportunities to master class/ address misconceptions
- Deepen learning for higher ability with questioning

Mastery questions for deepened learning throughout a lesson:

What does each part of the number sentence represent?

Show me another way.

Explain how you know- full number sentences

What's the same? What's different?

Write a number story to represent the number sentence (First, Then, Now)

Do you agree? Why? Why not?

What do you notice?

Can you see/explain the pattern?

Prove it

Teaching resources

A coherent programme of high quality curriculum materials is used to support classroom teaching. Concrete and pictorial representations of mathematics are chosen carefully to help build procedural and conceptual knowledge together. Exercises are structured with great care to build deep conceptual knowledge alongside developing procedural fluency.

The focus is on the development of deep structural knowledge and the ability to make connections. Making connections in mathematics deepens knowledge of concepts and procedures, ensures what is learnt is sustained over time, and cuts down the time required to assimilate and master later concepts and techniques.

Lesson design

Lessons are crafted with similar care and are often perfected over time with input from other teachers, drawing on evidence from observations of pupils in class. Lesson designs set out in detail well-tested methods to teach a given mathematical topic. They include a variety of representations needed to introduce and explore a concept effectively and also set out related teacher explanations and questions to pupils.

Teaching methods

Teachers are clear that their role is to teach in a precise way which makes it possible for all pupils to engage successfully with tasks at the expected level of challenge. Pupils work on the same tasks and engage in common discussions. Concepts are often explored together to make mathematical relationships explicit and strengthen pupils' understanding of mathematical connectivity.

Precise questioning during lessons ensures that pupils develop fluent technical proficiency and think deeply about the underpinning mathematical concepts. There is no prioritisation between technical proficiency and conceptual understanding; in successful classrooms these two key aspects of mathematical learning are developed in parallel.

Pupil support and differentiation

Taking a mastery approach, differentiation occurs in the support and intervention provided to different pupils, not in the topics taught, particularly at earlier stages. There is no differentiation in content taught, but the questioning and scaffolding individual pupils receive in class as they work through problems will differ, with higher attainers challenged through more demanding problems which deepen their knowledge of the same content. Pupils' difficulties and misconceptions are identified through immediate formative assessment and addressed with rapid intervention - commonly through individual or small group support later

the same day: there are very few "closing the gap" strategies, because there are very few gaps to close.

Productivity and practice

Fluency comes from deep knowledge and practice. Pupils work hard and are productive. At early stages, explicit learning of multiplication tables is important in the journey towards fluency and contributes to quick and efficient mental calculation. Practice leads to other number facts becoming second nature. The ability to recall facts from long term memory and manipulate them to work out other facts is also important.