THORN GROVE PRIMARY SCHOOL

MATHEMATICS POLICY

The Importance of Mathematics

'Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history's most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.'
(National Curriculum 2013)

Mathematics is delivered in accordance with the principles stated in our Teaching, Learning and Marking policies, supported by our Behaviour and Discipline Policy.

Our Aims

We aim to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Objectives

We aspire to fulfill our aims by:

- enabling each child to develop, within his/her capabilities, mathematical skills and understanding for adult life;
- enabling each child to tackle and solve real life problems;
- providing children with skills that can be used in other areas;
- developing children's enjoyment and appreciation of mathematics and explore its structure so they appreciate its beauty and creativity and;

- giving children experiences in analysing and communicating information and ideas.

Teaching and Learning

Planning

The objectives in the yearly teaching programmes cover all aspects of the National Curriculum for mathematics in Key Stages 1 and 2. The programme for Reception and Nursery follows the objectives taken from the Revised Early Years Foundation Stage, and provides a bridge to the National Curriculum.

At Thorn Grove Primary School, Mathematics is taught as a discreet subject but has strong contributions to make on the whole school curriculum. Cross-curricular work is planned to make effective the relevance of mathematics to other subjects.

Pre and post learning

To begin each unit of teaching (weekly), teachers provide students with a pre-learning assessment. This pre-learning is a mash up of questions based on the objectives which will be delivered over the next week. The pre-learning should be conducted the previous week and before the member of staff has PPA. The MAIN PURPOSE of the pre-learning is to show teachers what a child can already do so then the learning can start at the most appropriate point.
The pre-learning should be a mixture of assessing skills and the application of these. This means that standard calculations should be accompanied by mastery and fluency style questions.
Once Pre-learning is complete, children should be grouped appropriately and then learning should be planned which allows for skills to be developed and mastery to be attained.
At the end of the week, the same assessment should be given to all pupils – this is the post assessment and shows progress made by pupils over the course of a weeks' teaching.

'Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.' National Curriculum 2013

Continuity and Progression

The individual nature of learning and understanding requires a flexible approach towards organisation, planning and presentation.

The programmes of study for mathematics are set out year-by-year for key stages 1 and 2. The relevant programme of study is taught by the end of each key stage. Within each key stage, content is set out on a week by week basis with teachers working through these objectives building up the programme of study. Each week's objectives are used to plan work which allows pupils to practice a skills, develop mastery of that skill and then solve complex problems using that skill. This is the model which we believe allows children to thrive as mathematicians and one which we embrace at Thorn Grove.

Teachers plan to ensure the majority of pupils move through the programmes of study at broadly the same pace. Decisions about when to progress are based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts rapidly are challenged through being offered rich and sophisticated problems before any acceleration through to new content and the exceeding standards within each year group. Those who are not sufficiently fluent with earlier material consolidate their understanding, including through additional practice, before moving onto any mastery or deepening of learning. Interventions are introduced to match the specific needs of the children and include a basic skills intervention as well as catch up maths. This is where children are worked with in additional sessions by the teacher or teaching assistant to catch up on the day's work if misconceptions have occurred. These sessions take place on the same day as the wave one teaching occurs.

Children are taught in their cohorts. The children can be taught as a whole class, in groups or individually. We encourage split teaching which enables children to be taught at the appropriate level of challenge. The children are encouraged to work independently as well as collaboratively. They are presented with tasks that help to develop knowledge and understanding and to develop the ability to tackle real life problems.

The learning in school is structured using these principles:
<u>Pre and post learning (see above for full details)</u>
Using pre and post learning to assess effect starting points for each child and then teaching lessons which all children to practice their skills, use them for mastery purposes and finally apply them in sophisticated problems.

Mastery and depth

At Thorn Grove we have spent a long time working on fluency and mastery. We have collated numerous resources which are all on the shared area to help us develop fluent mathematicians. Here at Thorn Grove we insist the teaching of fluency skills needs to be in every teaching unit, for every child. It is not sufficient to plan for it at the end of the week, it should come throughout the week as part of everyday teaching.

As part of developing mastery if is recommended that pupils use the following strategies, this is known as the mathematical toolkit:

- Missing numbers
- 4 pictures
- Correct or not correct
- All possibilities
- Explain why
- True or false
- My answer is, what is the question
- Know my neighbour

There are examples of all of these types of questions on the shared area as well as in the resources from focus. Additionally, in each classroom we have problem solving tins and access to numerous websites which prompt problem solving, reasoning, mastery and fluency.

Times tables

Times tables is a major element for the development of fluency in school. Children have to learn their times tables so that they are able to access the different levels of mastery and fluency which they require in the stages of the curriculum.

We operate a times table award scheme where children work through their bronze, silver, gold and platinum awards. These awards are given for showing that they know specific tables and can recall them in a quick time (3 minutes). Children are provided with these challenges on a weekly basis. In order for the children to develop in this scheme it is obviously not enough for just testing, the children have to be taught how to work with times tables. This should be completed as part of starters in maths as well as in discreet sessions.

Arithmetic

Reasoning of course is large part of the curriculum but in order to access the reasoning element of the curriculum children need to be fluent in arithmetic and the way in which calculations can and should be solved.
Arithmetic needs to be taught and calculation skills developed throughout the year so that they can be used effectively by the pupils. This needs to be completed as part of the units and tested as part of pre and post learning. Arithmetic should form a large part of starters as it will keep calculation strategies close to hand and also remind pupils about what they will need to use as part of their learning.

Skills and knowledge developments

There is a balance between the following modes of learning:

- Speaking and Listening (using precise, mathematical vocabulary)
- Reading and writing
- Reflecting
- Selecting and using equipment
- Carrying out practical work
- Observing teacher lead demonstrations
- Trial and improvement
- ICT (Calculators are not used as a substitute for good written and mental arithmetic and are introduced near the end of Key Stage Two.)
- Resources pertaining to the Foundation Stage

Equal opportunities

We aim to reflect a positive attitude towards all equal opportunities and we are careful to avoid stereotyping when organising activities and selecting materials. It is also recognised that some children will have specific learning difficulties and some will be more advanced than their peers. With this in mind, individual programmes are provided, with the help of the SENCO and G&T Co-ordinator. Learning enhancement groups/interventions are incorporated into the curriculum as specific needs arise.

Resources

A wide range of tools and equipment is available including:

- Abacus scheme of work, including IWB software

- Photocopiable books and textbooks
- Calculations policy
- Interactive maths packs software
- Internet (including Mymaths and Mathletics) and Microsoft office
- Construction kits
- Measuring apparatus
- Calculators
- Drawing instruments
- 2D and 3D shapes
- Number lines and 100 squares
- Counting apparatus
- Mathematical paper
- Games, spinners and dice

Assessment and Recording

Teachers set realistically challenging targets for each child based on clear identification of learning needs related to fluency within that particular year group. Teachers use targets to track children's progress, to inform their teaching and raise standards. Individual pupil targets are monitored each half term.

On-going, informal teacher assessment has always been an integral part of good practice. Teachers assess children's work within and between lessons, using the assessment information gathered to inform future planning, teaching and learning.

In Key Stage One and Two, testing takes place each half term during assessment weeks and the results, along with ongoing teacher assessment, provide levels for the pupils, which are reported to children and families termly and discussed at half-termly pupil progress meetings with the headteacher. Strategies for accelerated learning are then put into place for any vulnerable children.

In Year Six and Year Two, national assessments (SATs) are carried out in the summer term and in the foundation stage, children are assessed against the two early learning goals of number and Shape, Space and Measure.

Achievement in Mathematics is formally reported to parents on the end of year written report. Parents have the opportunity to discuss the progress of their child two times a year at parents' evenings.

Role of the subject leader

- to provide guidance and support to staff in implementing the mathematics curriculum;
- to attend any relevant courses on new developments and communicate these developments back to colleagues;
- to attend maths cluster meetings and communicate any issues back to colleagues;
- to organise, review and maintain an inventory of policies, schemes and resources;
- to ensure staff use 'best practice' in the teaching of mathematics and attend courses relevant to their mathematical needs;
- to ensure continuity and progression throughout the school by performing book and planning scrutiny's, coaching staff, leading staff meetings and monitoring the effectiveness of implemented actions;
- to evaluate assessment information and address any areas for concern.

Role of the Headteacher

- to encourage staff to teach mathematics effectively by ensuring the policy is being adhered to and that at least 'good teaching practice' is taking place throughout the school;
- ensure that all staff are familiar with statutory documents;
- to be available for discussion and support and;
- to utilise data to ensure targets are achieved and to identify and address underperformance;
- to provide the necessary finance to update and renew resources.

November 2018