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| Policy title | : | Mathematics Curriculum Policy |
| Date approved | : | September 2022 |
| Review date* | : | September 2023 |

*Please note that should any further national guidance be issued by external agencies that are relevant to this policy, it will be updated accordingly prior to the review date shown above and re-circulated.

We at Tollgate Primary School believe 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.' (The National Curriculum in England Framework Document (DfE) 2014)

We have a duty to ensure compliance with the revised National Curriculum and with the application of the new programmes of study and attainment targets. We understand that 'the National Curriculum provides pupils with an introduction to the core knowledge that they need to be educated citizens.'

Our well-balanced curriculum promotes the spiritual, moral, cultural, mental and physical development of pupils and prepares them for the opportunities, responsibilities and experiences of later life. We will develop pupils' spoken language, reading and writing in all subjects and will develop pupils' mathematical fluency.

We wish to work closely with the School Council and to hear their views and opinions as we acknowledge and support Article 12 of the United Nations Convention on the Rights of the Child that children should be encouraged to form and to express their views.

We as a school community have a commitment to promote equality. Therefore, an equality impact assessment has been undertaken and we believe this policy is in line with the Equality Act 2010.

We believe it is essential that this policy clearly identifies and outlines the roles and responsibilities of all those involved in the procedures and arrangements that is connected with this policy.

This policy is to be read in conjunction with the following documents:

- Designing and Timetabling the Primary Curriculum - a practical guide for Key Stage 1 and 2 (Qualifications and Curriculum Authority 2002)
- National curriculum in England: Mathematics programmes of study

Aims

- 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;
- To ensure that all pupils reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language;
- To ensure that all pupils 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;
- To develop an enthusiasm for and fascination with mathematics;
- To increase the confidence of each pupil in mathematics to enable them to apply the knowledge and skills with assurance;
- To promote the teaching of Maths and English within all subjects;
- To share good practice within the school;
- To work with other schools to share good practice in order to improve this policy.

Roles and Responsibility for the Policy

The Local Governing Body has:

- Appointed a member of staff to be responsible for the curriculum leadership of Mathematics;
- Delegated powers and responsibilities to the Headteacher to ensure all school personnel and stakeholders are aware of and comply with this policy;
- Responsibility for ensuring compliance with the legal requirements of the National Curriculum;
- Responsibility for ensuring that the school complies with all equalities legislation;
- Responsibility for ensuring funding is in place to support this policy;
- Responsibility for ensuring this policy and all linked policies are maintained and updated regularly;
- Responsibility for ensuring all policies are made available to parents;
- Nominated a link governor to visit the school regularly, to liaise with the Headteacher and the coordinator and to report back to the Governing Body;
- Responsibility for the effective implementation, monitoring and evaluation of this policy

The Headteacher and the Senior Leadership Team will:

- Ensure all school personnel are aware of and comply with this policy;
- Work closely with the subject leader and the link governor;
- Ensure compliance with the legal requirements of the National Curriculum;
- Encourage parents to take an active role in curriculum development;
- Provide leadership and vision in respect of equality; - Provide guidance, support and training to all staff; - Monitor the effectiveness of this policy by:
Observing teaching and learning;
Planning scrutinies and work trawls;
Discussions with pupils and members of the school council.
- Annually report to the Governing Body on the success and development of this policy

The Subject Leader will:

- Lead the development of this policy throughout the school;
- Work closely with the Headteacher, the nominated governor and SENCO;
- Be accountable for standards in this subject area; - Monitor standards by;

Auditing the subject area;
Review of the scheme of work;
Monitoring teachers planning;
Lesson observations;
Scrutinising children's work;
Discussions with pupils.

- Ensure continuity and progression throughout the school;
- Devise a subject improvement plan;
- Provide guidance and support to all staff;
- Provide training for all staff on induction and when the need arises regarding;
- Attend appropriate and relevant INSET;
- Keep up to date with new developments;
- Undertake an annual audit and stock take of resources;
- Purchase new resources when required and in preparation for the new academic year;
- Manage the subject budget effectively; - Undertake risk assessments when required; -
Review and monitor.

The Link Governor will:

- Work closely with the Headteacher and the subject leader;
- Ensure this policy and other linked policies are up to date;
- Ensure that everyone connected with the school is aware of this policy; - - Attend
training related to this policy.

Teachers will:

- Comply with all aspects of this policy;
- Work closely with the subject leader to develop this policy;
- Devise short term planning;
- Develop mathematical fluency, numeracy and mathematical understanding in all subjects;
- Develop pupils' spoken language, reading, writing and vocabulary in all subjects;
- Plan and deliver good to outstanding lessons;
- Plan varied lessons which are interactive, engaging, of a good pace and have a three-part structure;
- Have high expectations for all children and will provide work that will extend them; -
Assess, record and report on the development, progress and attainment of pupils; -
Achieve high standards;
- Celebrate the success of pupils in lessons;
- Implement the school's equalities policy and schemes;
- Report and deal with all incidents of discrimination;
- Attend appropriate training sessions on equality;
- Report any concerns they have on any aspect of the school community

Pupils will:

- Be aware of and comply with this policy;
- Be encouraged to work in partnership with the school by making decisions and exercising choice in relation to their educational programme;
- Listen carefully to all instructions given by the teacher;
- Ask for further help if they do not understand;
- Participate fully in all lessons;
- Participate in discussions concerning progress and attainment;
- Treat others, their work and equipment with respect;
- Support the school Code of Conduct and guidance necessary to ensure the smooth running of the school;
- Liaise with the school council;
- Take part in questionnaires and surveys.

The School Council will be involved in:

- Organising surveys to gauge the thoughts of all pupils

Parents/carers will:

- Be aware of and comply with this policy;
- Be encouraged to take an active role in the life of the school by attending:
 - Parents and open evenings;
 - Curriculum development workshops.
- Be encouraged to respond to curriculum information newsletter;
- Be informed via termly newsletters of their child's topics;
- Asked to provide suggestions and ideas for improving this subject;
- Be asked to take part periodic surveys conducted by the school on curriculum development;
- Be invited to make presentations to pupils on aspects of this subject area;
- Encourage effort and achievement;
- Encourage completion of homework and return it to school;
- Provide the right conditions for homework to take place;
- Expect their child to hand in homework on time;
- Join the school in celebrating success of their child's learning;

Policy Procedure

Teaching and Learning Style

We have daily Maths lessons which are approximately 1 hour.

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)

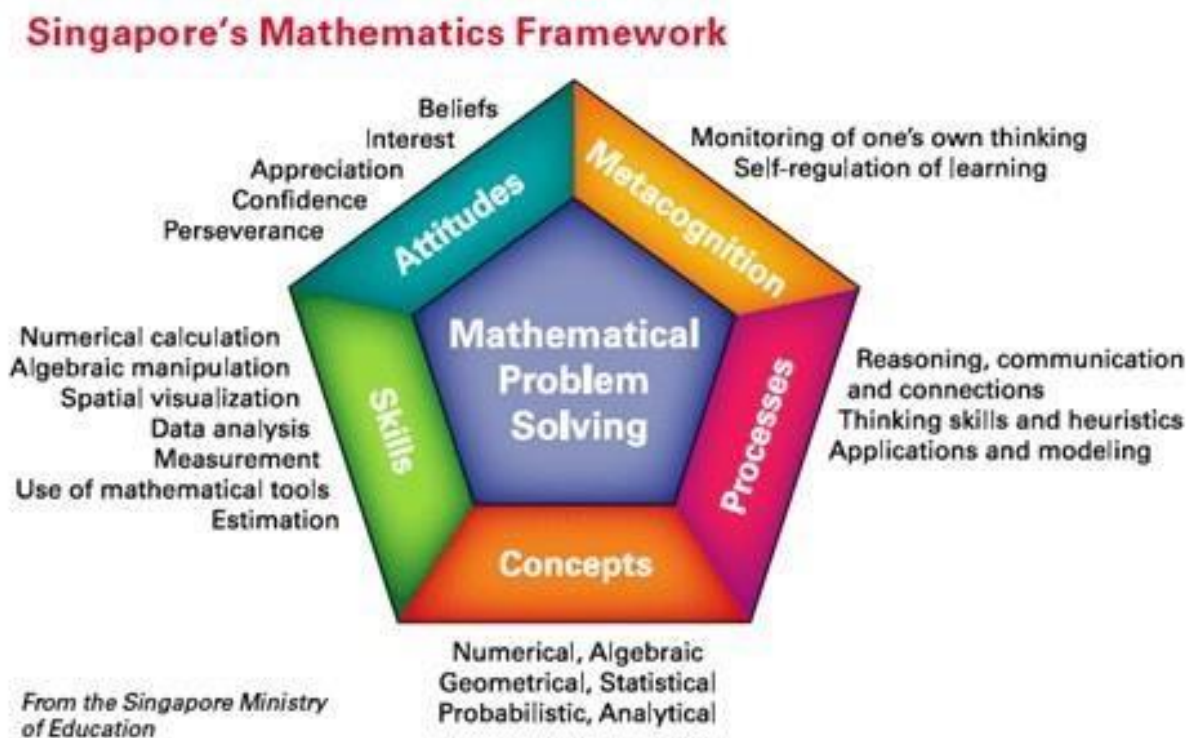
(*Dienes, Bruner, Vygotsky, Skemp, Piaget)

We want pupils at Tollgate Primary School 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.

Teaching and learning style

The Singapore Approach:

Tollgate have adopted the five key principles of The Singapore Mathematics Framework (Metacognition; Processes; Concepts; Skills; Attitudes) to underpin and promote core values that are believed to encourage, enable and enhance student learning whilst ultimately developing mathematical problem solving for everyday real life contexts.



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).

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

‘The Big 5’ – Ban Har:

‘Ideas do not get crystallised unless they get a chance to be articulated.’

Dr Yeap Ban Har echoes the above theorists and educators by supporting their values and endorsing the following principles as key fundamentals that should be included in every Maths lesson:

Exploration: making connections

Structure: to be taken place after exploration has taken place

Journal: *‘Ideas do not get crystallised unless they get a chance to be articulated’*

Reflection: Element of evaluation and judgement of what they(the student/s) have said Practice:
Not to be confused with ‘drills’ or learning by rote repetition

In order for students to make those all-important connections that are pivotal to learning, Ban Har further reinforces and links these to the following, highlighting the dual function and purpose of these examples taking place in the classroom:

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

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

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.

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.

Practical learning at Tollgate Primary School

The teaching of mathematics at Tollgate Primary School 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 Tollgate 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.

Mathematics curriculum planning

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

- Maths Curriculum
- Maths Overviews
- Maths No Problem
- Maths on Target
- Tollgate Primary School calculation policy

- Test Base

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.

Long term planning: is based on the Tolgate Whole School overview in Mathematics. The concepts to be taught and covered are listed accordingly.

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 Tollgate 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.

Short term planning: is carried out on a weekly basis. All planning includes a skill based learning objective with succinct success criteria, **an anchor task**, a progressive teaching sequence, reasoning, Key AFL strategies, key questioning, relevant vocabulary and resources.

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

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 weeks planning. Each class teacher and teaching assistant then discusses the planning on a weekly basis.

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.

The Foundation Stage

We teach mathematics in our Reception. 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.

Teaching mathematics to children with special educational needs

At Tollgate 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.

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.

Assessment and recording

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 sit a SAT's style test which enables us to monitor progress every half term.

There is on-going informal assessment carried out by the teachers every day which informs our weekly planning. These results are then tracked onto Educator where the progress, strengths and weaknesses can be tracked and are informative for the next half term/term/academic year

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).

All data is analysed by senior management, the mathematics coordinator and the Inclusion team.

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 annual written report.

Resources

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.

Curriculum Planning and Organisation

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

- Maths Curriculum
- Maths Overviews
- Maths No Problem

- Maths on Target
- Tollgate Primary School calculation policy
- Test Base

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.

Teachers collaborate on the planning of the subject to ensure parity in provision and to share expertise. Curriculum planning is managed in three phases namely:

Long Term Planning

- Details what is to be taught over the year;
- Provides teaching guidelines and overall objectives for each year group for the whole year

Medium Term Planning

- Organises the subject into termly or half-termly sections;
- Is more detailed and the objectives are more specific in nature;
- Is developed by the teachers, who respond to the needs of their pupils;
- Ensures a balanced distribution of work is undertaken across each term

Short Term Planning

- Details the subject curriculum over the week;
- Plans lessons in detail with specific class objectives; - Sets individual learning goals for each pupil.

Links with ICT

The use of information and communication technology will promote, enhance and support the teaching of this subject area. We use Timestables Rockstars which is primarily a times tables tool which is monitored by our Maths Lead. This is also part of our timetable in Year 4 in the lead up to the multiplication tables check.

At Tollgate we also use the online forums of google classroom and J2e where children will be set tasks to further their learning, homework as well as being directed to other websites that can aid their learning.

Inclusion

We believe that we are an educationally inclusive school as we are concerned about the teaching and learning, achievements, attitudes and well-being of all our pupils. We aim to provide places for all pupils who express a preference to join this school.

We work hard to offer equality of opportunity and diversity to all groups of pupils within school such as children:

- From both sexes;
- Who have Special Educational Needs;
- Who are looked after;
- From minority faiths, ethnicities, travellers, asylum seekers, refugees;
- Who are gifted and talented;
- Who are at risk of disaffection;
- Who are young carers;
- Who are sick;
- Who have behavioural, emotional and social needs; - From families who are under stress.

We believe we have a duty to ensure that all children have equal rights to the opportunities offered by education and that all children will be encouraged to fulfil their potential in their academic, physical and creative achievements.

We want to give all children the right to access high quality educational experiences, to take part in a broad and balanced curriculum and to be part of the social life of the school.

We recognise that within the school we have more able, gifted and talented children. We believe that:

- More able children demonstrate a higher ability to exceed age related expectations than average for the class and often require differentiated tasks and opportunities to learn through challenges;
- Gifted children are those who have the ability to exceed age related expectations in more than one subject;
- Talented children demonstrate an innate talent or skill in creative, cultural or sporting fields

We have an even greater obligation to plan and deliver well-structured lessons with appropriate assessment plus ambitious targets for pupils who have low levels of prior attainment or come from disadvantaged backgrounds.

Also, we have a duty to cater for pupils whose first language is not English by planning teaching opportunities to help them develop their English and to gain full access to the National Curriculum.

Variation

The main purpose of variation is to challenge and raise standards of learning by ensuring that curriculum objectives are accessible to all our children despite their backgrounds or abilities. We see variation as all children succeeding in achieving the learning objective in different ways.

Variation must reflect the learning objective and can be achieved in a variety of ways either by task, by support or by outcome and should be chosen by fitness for purpose.

We want all children to achieve success, therefore we will ensure they are given varied tasks that are matched to their level of attainment so that they can demonstrate successfully what they know, understand and can do.

The main feature of effective variation is good planning resulting in effective teaching and learning with children making good progress. Also we expect to see in all classes interested well motivated children responding to challenges, children working productively on task and being aware of their own progression.

Special Educational Needs

At Tollgate 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.

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.

We want pupils with identified special educational needs to have full access to all subjects of the National Curriculum with teachers planning lessons that have no barriers to pupils achieving and with appropriate targets relating to the subject.

Assessment for Learning

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 sit a SAT's style test which enables us to monitor progress every half term.

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

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).

All data is analysed by senior management, the mathematics coordinator and the Inclusion team.

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 annual written report.

Teachers will:

- Carry out continuous assessment;
- Use short-term assessments matched to the teaching objectives to adjust their planning; -
Make comments in pupil's books related to the teaching objective;
- Carry out medium-term assessments to measure progress against key objectives to adjust planning;
- Carry out long-term assessment to assess progress against school and national targets;
- Administer national tests and assessment in Y2 and Y6;
- Use long-term assessments to help them plan for the next academic year; - Inform parents and carers of their child's progress and targets.

Monitoring & Review of the Subject

Monitoring of standards of children's work and the quality of teaching is the responsibility of the subject coordinator supported by the Headteacher and the Senior Leadership Team.

Standards will be monitored by:

- Looking at pupil's work;

- Subject observations;
- Pupil discussions;
- Audit of subjects;
- Scrutiny of planning;
- General curriculum discussions.

Contribution of the Subject to other Areas of the Curriculum

Mathematics contributes to many subjects within the primary curriculum and opportunities will be sought to draw mathematical experience out of a wide range of activities. This will allow children to begin to use and apply mathematics in real contexts.

Resources

The school has a full range of resources to support the teaching of this subject throughout all year groups. Resources are upgraded and replenished when the need arises. An annual stock takes and audit is undertaken by the subject coordinator in the summer term in preparation for the next academic year.

Raising Awareness of this Policy

We will raise awareness of this policy via:

- The school website;
- The Staff Handbook;
- Meetings with parents such as introductory, transition, parent-teacher consultations and periodic curriculum workshops;
- School events;
- Meetings with school personnel;
- Communications with home such as weekly newsletters and of end of half term newsletters;
- Reports such annual report to parents and Headteacher reports to the Governing Body; - Information displays in the main school entrance

Training

Tollgate Primary School will provide opportunities for all employees to have access to the information, instruction, supervision and training required to enable them to discharge their responsibilities.

Equality Impact Assessment

Under the Equality Act 2010 we have a duty not to discriminate against people on the basis of their age, disability, gender, gender identity, pregnancy or maternity, race, religion or belief and sexual orientation. As such, we believe that it is in line with the Equality Act 2010 as it is fair, it does not prioritise or disadvantage any pupil and it helps to promote equality at this school.

Monitoring the Effectiveness of the Policy

The practical application of this policy will be reviewed annually or when the need arises by the coordinator and the Headteacher.