St. Anthony's Primary School

Mathematics and Numeracy Policy

Context:

In St. Anthony's, our school motto, 'To learn, to love, to live' underpins all that we do. We strive to foster a love of learning; developing the knowledge, skills and capabilities each of our children need for life-long learning. This is in line with the overarching vision for the Department of Education (2010):

"To ensure that every learner fulfils his or her full potential at each stage of development."

We see the term "Mathematics" as being synonymous with the term "Numeracy" throughout our school. As such, we have adopted the definition of Numeracy from "Count, Read: Succeed" (para. 1.10) as:

"The ability to apply appropriate mathematical skills and knowledge in familiar and unfamiliar contexts and in a range of settings throughout life, including the workplace.

It involves the development of:

a. An understanding of key mathematical concepts and their inter-connectedness

b. Appropriate reasoning and problem-solving

c. The proficient and appropriate use of methods and procedures (formal and informal, mental and written)

d. Active participation in the exploration of mathematical ideas and models. "

St. Anthony's Primary School's 'Mathematics and Numeracy Policy' identifies the four characteristics of effectiveness as:

- Child centred provision;
- High quality teaching and learning;
- Effective leadership;
- A school connected to its local community.

Source: Every School a Good School (DE 2009)

Aims and Objectives:

In St. Anthony's Primary School, we recognise the characteristics of the most effective practice in numeracy provision in NI primary schools, identified by ETI in, "Better Numeracy in Primary Schools" (ETI 2010)

These are the aims, which the staff have agreed, are realistic and appropriate for our pupils. They represent the benefits which our pupils can expect to gain as a result of learning mathematics in St. Anthony's Primary School. They form a set of basic principles upon which the teaching of mathematics in our school is based.

- To ensure that every pupil fulfils their full potential as a learner of Mathematics/Numeracy.
- To foster a positive attitude to Mathematics/Numeracy as an interesting and attractive part of the curriculum.
- To develop the ability to think clearly and logically, with confidence, flexibility and independence of thought.
- To develop a deeper understanding of Mathematics/Numeracy 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/Numeracy in the wider world.
- To develop the ability to use Mathematics/Numeracy as a means of communicating ideas.
- To develop an ability and inclination to work both alone and co-operatively to solve Mathematical/Numeracy 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 and an awareness of its aesthetic appeal and in so doing create a numeracy rich environment.

These basic principles are designed to contribute towards the achievement of the overall aim of the Northern Ireland Curriculum, CCEA (2007):

"To empower young people to develop their potential and to make informed and responsible decisions throughout their lives as individuals, as contributors to society and as contributors to the economy and the environment."

Teaching and Learning:

STATUTORY REQUIREMENTS:

The content of the mathematics curriculum taught at St. Anthony's Primary School is guided by our statutory requirement to deliver the statutory curriculum for mathematics as laid out in the Northern Ireland Curriculum (CCEA 2007).

It sets out the minimum requirements that must be taught at each Key Stage, grouped into 5 areas:

- Processes
- Number
- Measures
- Shape & Space
- Handling Data

The NI Curriculum (primary) document also sets out guiding principles, which we endorse and have agreed to include in our policy:

Foundation Stage (p.23), including:

- Activities should involve children in playing, exploring and investigating, doing and observing, talking and listening and asking and answering questions
- Through engaging in a wide variety of activities, children should understand mathematical language and then begin to use the language to talk about their work
- Mathematical activities should be presented through contexts that have a real meaning for children and provide opportunities for them to investigate their ideas

Key Stage One and Two (p.57–60), including:

- Mathematical ideas should be introduced to children in meaningful contexts
- Activities should be balanced between tasks which develop knowledge, skills and understanding, and those which develop the ability to apply mathematical learning and solve problems
- Children should use their knowledge of mathematical language to talk about their work and explain their findings
- Children should be given regular opportunities to develop their skills in mental mathematics, to estimate and approximate and to investigate and make predictions and decisions: within mathematics across the curriculum in real-life situation

APPROACHES

Mastery Approach: Underpinning principles (delivered through White Rose Maths)

- Mathematics teaching for mastery assumes everyone can learn and enjoy mathematics.

- Mathematical learning behaviours are developed such that pupils focus and engage fully as learners who reason and seek to make connections.

- Teachers continually develop their specialist knowledge for teaching mathematics, working collaboratively to refine and improve their teaching.

- Curriculum design ensures a coherent and detailed sequence of essential content to support sustained progression over time.

Lesson design

- Lesson design links to prior learning to ensure all can access the new learning and identifies carefully sequenced steps in progression to build secure understanding.

- Examples, representations and models are carefully selected to expose the structure of mathematical concepts and emphasise connections, enabling pupils to develop a deep knowledge of mathematics.

- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.

- It is recognised that practice is a vital part of learning, but the practice must be designed to both reinforce pupils' procedural fluency and develop their conceptual understanding.

In the classroom

- Pupils are taught through whole-class interactive teaching, enabling all to master the concepts necessary for the next part of the curriculum sequence.

- In a typical lesson, the teacher leads back and forth interaction, including questioning, short tasks, explanation, demonstration, and discussion, enabling pupils to think, reason and apply their knowledge to solve problems.

- Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively.

- If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind.

- Significant time is spent developing deep understanding of the key ideas that are needed to underpin future learning.

- Key number facts are learnt to automaticity, and other key mathematical facts are learned deeply and practised regularly, to avoid cognitive overload in working memory and enable pupils to focus on new learning.
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Our staff agree the relevant "Better Numeracy" Characteristics for Learning & Teaching:

- The teachers have realistically high expectations of what the children can achieve; the children are challenged to extend their learning and appropriate support is provided when children are experiencing difficulties.
- Practical approaches are used effectively to develop mathematical concepts and to lay the foundation for more abstract work
- The use of open–ended questions, problem solving tasks and investigative activities develops the children's capacity to reason logically, think flexibly, make and justify decisions.
- The children are given appropriate time and encouragement to communicate and explain their mathematical thinking, to articulate the processes they use, to ask questions and to talk about their learning.
- The children work well together in groups and co-operate effectively during practical sessions.
- The children engage actively in their learning and are confident in working independently and in applying their knowledge, understanding and skills in unfamiliar contexts.
- The children talk confidently about their thinking and learning in mathematics

Although each teacher is an individual, with his/her own personal style of teaching, the staff have agreed that the following points will be a feature of all teaching in Mathematics/Numeracy. These are designed to ensure that every pupil is given the opportunity to experience success and to achieve as high a standard as possible.

Teachers will always strive to:

- Build children's confidence and self-esteem.
- Develop children's independence.
- Allow all children to experience regular success.
- Make mathematics a relevant and satisfying part of their school experience.

Teachers will use a range of teaching strategies:

- Modelling by the teacher
- Practice and consolidation
- Practical work
- Discussion
- Problem-solving
- Investigative work

The choice of strategy will vary according to the age, ability, maturity and interests of the children. Teachers recognise the vital importance of discussion to gain understanding, and to this end a sensible level of work-focused conversation will be a feature of most lessons.

Teachers will ensure that the activities which the pupils experience in mathematics will enable them to develop the statutory Thinking Skills and Personal Capabilities set out in the NI Curriculum:

- Thinking, Problem-Solving and Decision Making
- Managing Information
- Being Creative
- Self-Management
- Working with Others

Teachers will ensure that the activities which the pupils experience in Mathematics/ Numeracy will also enable them to develop the statutory Cross Curricular Skills set out in the NI Curriculum, CCEA (2007):

- Communication
- Using Mathematics
- Using ICT

Continuity and Progression

Relevant "Better Numeracy" characteristics:

Learning and Teaching:

- The teachers build effectively on the children's previous knowledge and experience.
- The children's mathematical knowledge and skills are developed systematically across the school.

Planning:

- There is a comprehensive whole-school programme which clearly outlines the progression for each area of the mathematics curriculum and which provides appropriate guidance for the class teachers to create their medium and short-term planning.
- The planning for each class focuses on the knowledge, skills, understanding and language to be promoted and identifies clearly how the teacher intends to meet the range of needs within the class.
- The teachers take account of the children's previous learning and use this information to inform their planning.
- The teachers evaluate regularly the quality and extent of the children's learning and use the outcomes to inform their future planning.

Continuity and progression refer to the intentions of the school that each child has the opportunity to develop mathematical skills and understanding over time in the most effective manner possible. We believe this is best achieved when:

- Children's learning experiences follow a well-planned progression, at a pace suitable for each child

- There is coherence and compatibility of approach used by all teachers the child encounters as they progress through the school.

In order to achieve these conditions, staff have agreed that:

- The curriculum the children follow is defined by the School Scheme of Work, which is based upon the progression in each of the 5 areas of mathematics contained within the N.I. Curriculum.
- The School Scheme of Work is planned collaboratively to ensure there are no gaps or unnecessary overlaps in that progression as the children move through the school.
- The School Scheme of Work details agreed teaching approaches and methodologies in all areas of maths.
- Yearly overviews of the content to be taught in each class are produced, which allow content from each area of mathematics to be taught within each term.
- All new ideas and concepts which the children encounter will be introduced from a starting point within the child's knowledge and understanding.
- Assessment is designed to allow the teacher to accurately gauge the child's present level of understanding so as to allow appropriate further work to be planned.
- Activities in mathematics will be differentiated so that children are always working at a pace and level of challenge which matches their ability.
- Planning will be regularly monitored by the Numeracy Co-ordinators to evaluate the levels of continuity and progression achieved.

Resources:

Each teacher is provided with appropriate mathematical resources and equipment relevant to the maths programme for their year group. It is also expected that teachers co-operate and share resources, where necessary, (e.g. Shape/Space/Measure).

In addition to maths equipment, each teacher is provided with the White Rose Maths scheme. Teachers have individual access to all years' resources ensuring they can deliver lessons at the appropriate level to all pupils.

ICT and Mathematics:

We recognise the relevant "Better Numeracy in Primary Schools" Characteristics as central to the teaching of mathematics in St. Anthony's Primary School:

- The children's experiences in the use of ICT to support mathematics and numeracy are carefully planned, appropriately supported and evaluated.
- Interactive whiteboards (IWB's), websites and learning platforms (e.g. Mathletics, Top Marks, Khan Kids), are used by children and teachers to ***e**xplore, **e**xpress, **e**valuate, **e**xchange and **e**xhibit understanding and learning.

(*referred to as the Five Es)

Mathematics based computer programs are used effectively to:

- Engage the interest of the children.
- Draw out connections between different aspects of mathematics.
- Consolidate further the children's understanding of important concepts.
- Extend their skill at problem solving.

In the N.I Curriculum, ICT is not a separate learning area. Rather, its role can be considered as a tool by which teaching and learning can be enhanced and permeates throughout the curriculum. This is very applicable in Mathematics.

In St Anthony's the staff will use a variety of ICT activities as part of the range of mathematical experiences which the children participate in. We believe that effective and appropriate use of ICT in Mathematics can:

- Facilitate a differentiated pace and level of learning that takes account of individual pupil abilities, including those who are more able.
- Help provide appropriate support and scope for greater independence for children of all abilities.
- Facilitate access to sources of information from across the world.
- Foster the development of information skills that teach to be discriminating in their use of information and to be able to shape and present it in ways appropriate to the context.
- Increase motivation to learn.
- Provide a stimulating and non-threatening learning environment.
- Engage children more deeply in their learning.

In St. Anthony's Numeracy focused ICT activities will include:

- Whole class or group activities, often led by the teacher. These may involve the use of an IWB and will be a direct teaching aid, used to demonstrate ideas and promote discussion and clear mathematical teaching.
- Individual or small group activities. These will usually involve the children working independently at a computer or on an iPad, usually to complement current work on a particular topic.
- Digital resources include (not restricted to) interactive whiteboards, iPads, laptops, Chromebooks, desktops, BeeBot, Probot, Izak9, Mathletics, Maths Seeds, Just2easy

Resources will include software available through the C2K managed Service and also via the Internet. *(Please see Use of Internet Policy).*

Mathematics Across the Curriculum:

Using mathematics is the skill of applying mathematical concepts, processes and understanding appropriately in a variety of contexts. Ideally these should be relevant to real life situations that require a mathematical dimension.

Children are likely to acquire and consolidate their mathematical knowledge, concepts and skills within the Area of Learning for Mathematics and Numeracy. However, they should be

given opportunities to transfer their understanding, as appropriate, to other areas of the curriculum.

Children can demonstrate their mathematical knowledge, understanding and skills in a variety of ways to communicate, manage information, think critically, solve problems and make decisions.

Literacy

• Sequencing events in daily routines

• Accessing information from tables

• Reading material involving times, dates, shapes, positional prepositions (behind, underneath etc.), comparative language (taller, heavier, etc.)

• Talking and Listening skills resulting from mathematical discussions.

The World Around Us

• Comparative language

• Estimating and Measuring skills

• Handling Data (e.g. displaying the results of an experiment in graphical form)

• Carrying out surveys • Sorting materials according to properties

• Accessing information from tables, charts and graphs

• Positional language

• Directions

• Points of Compass

• Co-ordinates

• Scale in maps and plans

• Estimating and measuring skills

• Timelines and sequences

• Accessing information from tables, charts and graphs

• Accessing information from computer databases

• Carrying out surveys and interpreting and displaying results

History

• Timelines and sequences

• Accessing information from tables, charts and graphs

• Measuring (e.g. for a recipe)

• Accessing information from computer databases

The Arts

• Shape and symmetry

• Repeating patterns

• Language to describe 2D and 3D shapes

• Tessellating designs

• Proportion Physical Education

• Directions and movement

• Positional language

• Shape and symmetry

• Timing events

• Measuring events (e.g. furthest long jump)

Inclusion:

Staff will provide a differentiated learning environment, which takes account of:

- Gender
- High and low achievers
- Children with special educational needs
- Children with English as a second/additional Language

In line with the Code of Practice, the special needs of individual pupils will be catered for through consultation with parents, pupil, SENCO, Mathematics Co-ordinators and other appropriate agencies. To provide early intervention when needed, we will monitor the progress of all pupils on a regular basis.

Relevant "Better Numeracy in Primary Schools" Characteristics:

Leadership and Management

- The school uses the teachers' knowledge and experience, as well as a wide range of standardised tests, to identify early those children requiring additional help in mathematics, and provides appropriate and effective intervention to support them.

As stated above, we consider it to be absolutely essential that each and every pupil fulfils their potential as a learner of mathematics. To this end, we aim to identify any pupils who are under-achieving, and to ensure that an appropriate remediation process is set in place, based on specific identified areas for improvement.

From Primary 4 -7, every pupil's current PTM (Progress Test in Maths) standardised score is compared with their most recent quantitative CAT standardised score. If a pupil's PTM score is 10 or more points below their CAT score, this may be an indication that the pupil is under-achieving in mathematics.

When individual pupils are identified in this way, teacher professional judgement is used to identify additional measures to be put in place to ensure that the pupil achieves in line with their potential. This may include attending Maths Intervention groups with a designated Numeracy withdrawal teacher/assistant.

**NB The after-effects of the disruption to face-to-face teaching during the Covid19 global pandemic are likely to have had an impact on some children's progress in mathematics. This is something the Numeracy team and teaching staff will continue to monitor and address.*

Assessment and Target-Setting:

Assessment for Learning strategies are a key component of the Teaching and Learning in Numeracy. The learning intentions and success criteria are shared with the children. The marking strategies outlined in the school marking and assessment policies ensures the pupils' Numeracy experience involves discussing and reformatting their work for improvement. Ongoing monitoring of pupils Numeracy skills is a key part of the teaching and learning in each class.

The Numeracy coordinator engages in the monitoring of Numeracy class work. Teachers gather work samples for pupil portfolios in Numeracy and use this to gauge pupils' progress.

Use is made of data to inform classroom and whole school practice in Numeracy. We use P1 Baseline assessments, annual PTM and CAT assessments to inform future planning.

Teachers evaluate Numeracy planners on a half termly basis. Assessments and plans can be viewed on RM staff.

Teachers use the assessment tools outlined above to;

1. Identify pupils who are under achieving. Strategies for increasing their attainment are implemented and evaluated on a termly basis.

2. Identify pupils for whom extension and differentiation programmes are to be developed.

3. Identify key factors for their own teaching in the current year.

4. Consider areas of their own teaching that require training/ further development.

5. Set year on year targets for individual classes, key stages and whole school and areas for development.

Effective Leadership:

In line with Every School a Good School, we recognise the central role of effective leadership. Numeracy Co-ordinators at KS1 and KS2 will work collaboratively to develop Numeracy throughout the school, in line with the School Development Plan.

Role of Numeracy Co-ordinators:

To lead the development of Numeracy throughout the school, in conjunction with the Principal and Senior Management Team, reporting to the Principal and/or Board of Governors.

Responsibilities:

- demonstrate expertise, enthusiasm and vision
- promote self-evaluation in order to enhance the monitoring, evaluation and review processes
- monitor, evaluate and record progress on the numeracy action plan
- ensure a regular review and update of the policy with all staff
- encourage staff to use a range of learning and teaching strategies to best meet the needs of pupils
- assist teachers avail of numeracy courses to enhance their understanding and teaching of Numeracy
- To organise school-based INSET as required
- provide guidance in the effective use of comparative performance data, including benchmarking
- encourage management to offer support for identification, dissemination and implementation of good practice in the learning and teaching of Numeracy
- undertake on-going monitoring and evaluation at individual, class and whole school level
- report to Principal and Governors about the school's Numeracy development

A School Connected with its Community:

In St. Anthony's Primary School, we believe that the education of our pupils is a partnership involving teachers, parents, pupils and the wider community. Regular and positive communications will be made between teachers and parents, on a formal and informal basis.

Links with parents:

1. Reporting to parents: Parents' information meetings, verbal and written reports on children's progress, feedback via comments in children's books, posts on Pupil Portfolios (Dojo)
2. Helping parents support their children's learning: applying mathematics learning at home (Mathletics and Maths Seeds programs for curriculum-linked weekly homework

tasks) and in the real world, effective strategies to support learning through homework (including mathematics games), and other family learning programmes (including Family Learning Organisation courses)
3. Use of school website and Dojo to showcase high quality mathematics learning and teaching

Links with other schools:

1. Clusters for staff development,
2. visits to other primary schools to share and compare effective practice,
3. meetings with post primary schools to ensure cross phase consistency and to manage transition for children
4. Shared Education links

Links with Community:

1. Extended Schools projects
2. Credit Union partnerships
3. Visits to local businesses/ from local trades people, where mathematics is used in their work e.g., shops, builders, kitchen and furniture suppliers and fitters, tilers, farmers.
4. Links with external education support agencies: - Staff development sessions from Educational Psychology Service, EA Special Needs service, ACE Team, EA Numeracy Support

CONSISTENCY WITH OTHER SCHOOL POLICIES: The content of the Numeracy Policy is checked to ensure consistency with other school policies for: Learning and Teaching, Assessment, Homework, Special Educational Needs, ICT, Marking, Health and Safety

Works cited:

Count, Read, Succeed

Department of Education 2010

Northern Ireland Curriculum (2007)

Better Numeracy in Primary Schools

Every School a Good School (DE 2009)