



MATHS AND NUMERACY POLICY

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INTRODUCTION

In St. John's PS the term "Mathematics" is synonymous with the term Numeracy throughout our school.

"Numeracy is 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:

- An understanding of key mathematical concepts and their interconnectedness
- Appropriate reasoning and problem-solving skills
- The proficient and appropriate use of methods and procedures (formal and informal, mental and written)
- Active participation in the exploration of mathematical ideas and models."

(Count Read: Succeed 2010)

GUIDANCE MATERIALS USED

Whilst this Policy document is the result of extended discussion amongst all staff, with a lead role taken by our Numeracy Development Team, due consideration was given to externally produced guidance materials, specifically:

- Every School a Good School- a policy for school improvement (DE 2009)
- Better Numeracy in Primary Schools (E.T.I. 2010)
- Count Read: Succeed – A strategy to improve outcomes in Literacy and Numeracy (2010)

These helped define an agreed framework within which our Numeracy Policy was developed.

AIMS

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. John'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 cooperatively 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:

“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

The content of the mathematics curriculum taught at St. John’s PS 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 staff have used this content to produce a School Scheme of Work for Mathematics which sets out the areas to be covered and the learning intentions to be achieved in each term.

Our aim is to ensure each area of Mathematics is covered each term.

Although the content of this Scheme of Work is already specified by the Revised Lines of Development for Mathematics (CCEA), the staff of St. John’s PS have agreed a set of principles which will inform and guide the nature of the learning experiences of our children, designed to achieve the aims detailed above.

These principles are listed below, grouped under each of the five areas of mathematics.

Processes

The NI Curriculum specifies a progression of Processes skills for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in St. John’s PS will ensure:

- Activities which allow the children to develop and enhance processes skills will be a regular feature of classroom life
- Opportunities will be provided for pupils to work collaboratively so that through discussion they can develop their use of mathematical language and organise their thinking
- Children will be asked to show an increasing level of independence in their planning and recording of work as they progress through the school

- Children will be asked to show an increasing level of independence in their selection of mathematics and materials as they progress through the school
- Opportunities will be provided for children to become familiar with and apply a range of problem-solving strategies
- Opportunities will be provided for children to search for patterns and use relationships in investigative work, leading to an appreciation of generalisations
- Opportunities will be provided for children to use an increasing range of mathematical language to facilitate their ability to communicate their mathematical ideas.

Number

The NI Curriculum specifies a progression of Number-based skills for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in St. John's PS will ensure:

- Children will be encouraged to use mental calculations where appropriate
- Children will have the opportunity to discuss and develop a range of calculation strategies
- Teaching will encourage flexibility of thinking and utilisation of connections within mathematics
- Children's computational skills will be developed and consolidated using a balance between practice, and application in meaningful contexts, including Financial Capability
- Opportunities will be provided for children to develop their estimation skills and will be encouraged to estimate answers before completing calculations
- Teaching will place a strong emphasis on ensuring children gain a sound understanding of the Place Value basis of the number system

Measures

The NI Curriculum specifies a progression of skills in Measures for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in St. John's PS ensure:

- Children will use a range of measuring equipment in meaningful contexts, and be encouraged to make choices regarding the most suitable equipment
- Children will follow a progression beginning with direct comparison, through measuring with non-standard units, to measuring with standard units with increasing accuracy
- Children will be given opportunities to develop estimation skills in all measures
- Teaching will place strong emphasis on ensuring that children understand that all measurement is approximate, and that they can make sensible decisions on the accuracy necessary in different situations

Shape and Space

The NI Curriculum specifies a progression of skills in Shape and Space for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in St. John's PS will ensure:

- Teaching will place emphasis on observing and understanding the properties of 2D and 3D shapes
- Opportunities will be provided for the practical construction and investigation of shapes
- Children will be given opportunities to explore position and movement in real-life contexts, utilising ICT where appropriate

Handling Data

The NI Curriculum specifies a progression of skills in Handling Data for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in St. John's PS will ensure:

- Teaching will be designed to ensure that children understand that the collection, representation and interpretation of data is a means through which real-life decisions can be made
- Handling data skills are used as a means of solving problems, through a four-point process: Pose a question; Collect data; Organise, display & interpret data; Answer original question
- Children will be given opportunities to make decisions regarding what information is collected, how it is collected, how information is processed and how it is displayed
- Children will be given opportunities to apply data handling skills in a range of contexts, across subject areas
- Children will be given opportunities to develop an increasing range of ICT based handling data skills.

TEACHING APPROACHES

Although each teacher is an individual, with their own personal style of teaching, the staff has agreed that the following points will be a feature of all teaching in Mathematics/Numeracy in St. John's PS. 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/numeracy a relevant and satisfying part of their school experience

Teachers will ensure that children make appropriate progress in their acquisition of the Skills, Understanding, Concepts, Facts and Competences as laid out in the NI Curriculum for Mathematics and Numeracy, through providing suitably differentiated learning activities to ensure that individual needs are properly addressed.

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-focussed 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:

- Communication
- Using Mathematics
- Using ICT

CONTINUITY AND PROGRESSION

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. In order for continuity and progression to occur, staff have agreed:

- The curriculum the children follow is defined by the CCEA Lines of Development, which is based upon the progression in each of the 5 areas of mathematics contained within the NI Curriculum
- The Yearly Overviews are planned collaboratively to ensure there are no gaps or unnecessary overlaps, but progression as the children move through the school. These identify the content from each area of mathematics to be taught within each term
- The Half Termly planning details teaching approaches in all areas of maths
- 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 identify 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 Coordinator to evaluate the levels of continuity and progression achieved

MONITORING AND EVALUATING CHILDREN'S WORK

Assessment is an integral and a continuous aspect of the teaching and learning process at St. John's PS. Much of the assessment occurs informally as part of each teacher's day to day work. (See St. John's Primary Schools Assessment/Marking Policy). Feedback is given to pupils, giving clear guidance as to how their learning can be improved. More Formal methods of assessment are used to determine the levels of achievement of children at various times during the school year:

- Class tests: These are used throughout the school apart from the Foundation Stage (P1 and P2) where this particular type of assessment is inappropriate. Class tests are usually used at the end of a particular topic, to assess achievement of individual's skills/knowledge/understanding which has been taught within that topic as well as at the end of each half term.
- Mental Maths Core Competences: The staff have agreed a set of learning outcomes for mental calculations for each year group. It is intended that as many children as possible should achieve these. The achievement of Mental Maths Core Competences is assessed on an ongoing basis and updates are placed in children 's assessment folders in September and May.
- Assessment for Learning: Teachers ensure that all pupils are actively involved in their own learning through an Assessment for Learning approach:
 - o Learning Intentions are shared and discussed with pupils to ensure that they clearly understand the actual learning which should take place.
 - o Success Criteria are discussed and agreed, so that pupils are aware of the standards by which their work will be assessed and will be able to evaluate the quality of their own work against the agreed Success Criteria.
 - o Feedback, both oral and written, is given to pupils which details how they can improve their learning by reference to the agreed Success Criteria.
- Assessment outcomes are used by the teacher to inform future planning. Pupils are given regular opportunities to:
 - o Assess their own and their peers work
 - o Evaluate the quality and extent of their own learning
 - o Set their own goals for improvement, and evaluate their achievement of these goals
- Standardised Testing: Progress in Maths (GL Assessment) standardised tests are used twice a year, PTM (P3-P7) in early Term 1 and in Term 3. Term 3 scores will show a value added from Term 1 whilst allowing the school to measure each

child's attainment in all areas of mathematics and compare this with an "average" for children of that age. The results are used to monitor individual's progress year on year, to rank order a class and to identify those children who have Special Needs in mathematics. Individual results are also aggregated, to allow the school to identify strengths and areas for improvement in the provision for mathematics across the whole school, across individual Key Stages and within particular groups and classes

- Statutory End of Key Stage Assessment: This is a statutory requirement at the end of Key Stage 1 (P4) and at the end of Key Stage 2 (P7) that each child following ongoing assessment is assigned a Level of Attainment for each of the 5 areas of mathematics.
- The results of these assessment are shared with parents via a Parent Interview, with the results being utilised to inform future planning for the individual pupil's learning, and within each class, Key Stage and across the whole school. In addition to this, parents received a written report about their child's progress in June.

RECORD KEEPING

A record of achievement of Mental Maths Core Competences is passed from class to class in their pupil portfolio which will also contain half termly tests, school reports, PTM test scores and any other relevant information.

TARGET SETTING

We use the results of Statutory Assessment as a vehicle for setting performance targets for mathematics. Each August the relevant teachers meet and share information (e.g. PTM) related to individual children's learning to date and undertake a process to set targets for what percentage of children are expected to reach each level in each class based on previous learning knowledge.

These Targets are then compared with the actual percentages achieved in KS1 and KS2 Assessment in Term 3 and benchmarked to the NI average.

Each year group sets targets based on children's achievement. Relevant data e.g.: pre-school information, PTM, Mental Maths Competences and CATS feed into whole school targets for improvement in Mathematics/Numeracy.

IDENTIFYING AND ADDRESSING UNDERACHIEVEMENT

"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 provide appropriate and effective intervention to support them."
(Better Numeracy in Primary Schools 2010)

In St. John's PS we consider it to be absolutely essential that each and every pupil fulfils their full 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. Every pupil's current PTM standardised score is compared with their most recent CATS

quantitative standardised score. If a pupil's PTM score is 10 or more points below their CATS quantitative score, this is an indication that the pupil is under-achieving in mathematics. This is monitored from year to year and targets are set throughout the year and reviewed at the end of each term as progress is monitored.

CALCULATORS

Our Mental Maths progression sets great value and importance on children knowing appropriate number facts off by heart and being able to use a variety of strategies to calculate in their heads.

We also believe that it is vital that children are able to perform pencil and paper calculations efficiently and effectively, which is reflected in our yearly overviews for Mathematics/Numeracy.

We also recognise, however, that calculators are widely used in everyday life, and we strive to ensure that the children are able to use a calculator efficiently and effectively. To this end, children in St. John's PS will, at a level matched to their mathematical progress:

- Explore the use of calculators through play and number games.
- Check the calculator result, by estimating before calculating and /or by performing an inverse operation.
- Interpret a calculator display, e.g. in the context of money, or where decimal numbers are involved.
- Use calculators in real-life problem-solving activities, where the data used will not be so amenable to written or mental calculations. In these situations the emphasis is on selecting the appropriate calculation more than the actual working out of the calculation.
- Use calculators in investigative work, e.g. trying lots of examples to find patterns, using trial and improvement methods to find an answer. Here the calculator supports rather than replaces mathematical thinking.

MENTAL MATHS

At St. John's PS we recognise the vital importance of a child's ability to calculate mentally. We believe that an ability and inclination to calculate mentally leads to greater proficiency and understanding in all areas of Mathematics and is a crucial skill in the application of mathematics in the world outside the classroom.

We strive to ensure:

- Children build up a bank of number facts which they know off by heart, to include addition, subtraction, multiplication and division facts.
- Children are able to use these known facts to perform an increasing range of calculations in their heads, using a variety of methods.
- Children build up a good understanding of the Number System, based on Place Value of Base 10.

In order to facilitate this, teachers:

- Ensure children are taught a minimum of 10 minutes mental maths per day.
- Implement a structured progression of mental maths, based on specific intended learning outcomes.

- Regularly assess children's achievement of these learning outcomes.
- Use a variety of teaching activities, including mathematical games and ICT, in whole class, group and individual work.
- Ensure that a record of the children's achievement in mental maths is kept and passed on to their next class teacher.
- Include Mental Maths as a separate item in half termly maths planners as a method of tracking progression in teaching.

ICT

(See also 'St. John's PS ICT Policy')

In St. John's PS we 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 at of all abilities.
- Facilitate access to sources of information from a wide variety of resources.
- Foster the development of information skills that teach pupils to be astute in their use of information and to be able to shape and present it in ways appropriate to the context.
- Increase motivation to learn through a stimulating and non-threatening learning environment and thus engaging children more deeply in their learning.

In St. John's PS, ICT activities will include:

- Whole class or group work, often led by the teacher. These involve the use of an Interactive Whiteboard which is used as a direct teaching aid, used to demonstrate ideas and promote discussion and clear mathematical thinking.
- Individual or small group activities. These usually involve the children working independently at a computer or with an iPad, usually to complement current work on a particular topic. Resources include software available through the C2K Managed Service and also via the Internet. (See 'St. John's PS Acceptable Use of Internet Policy')
- ICT activities form part of the range of activities detailed in teachers' half-termly planners for Mathematics.

SPECIAL NEEDS

(See St. John's PS Special Needs Policy)

As children are taught in a composite class child who have special needs may be taught with the group above or below depending on their ability. Despite this, the targets identified in their IEP will be developed as well through additional work. In some cases it may not be possible to group children together particularly if the child has specific needs. A child's needs will be addressed through the targets set in their IEP.

LEADERSHIP AND MANAGEMENT OF NUMERACY:

In St. John's PS, Mr Morgan fulfils the role of Numeracy Co-ordinator and has responsibility for the management of Numeracy development within the school. Specifically these responsibilities include:

- In collaboration with the rest of the teaching staff, identifying priorities for development within Mathematics/Numeracy.
- Contributing to the production of the School Development Plan if it is to include Mathematics/Numeracy Development.
- Producing Action Plans to address these issues.
- Monitoring and Evaluating the implementation of these Action Plans and the achievement of their Success Criteria.
- In conjunction with relevant teachers producing annual targets for standards achieved in Statutory Assessment.
- Monitoring and Evaluating pupil achievement and producing whole school performance data from these results.
- Updating the School Programme of Study, and School Mathematics/Numeracy Policy, to keep in line with curriculum changes.
- In conjunction with the whole staff, participating in a programme of self-evaluation of the quality and effectiveness of Mathematics/Numeracy provision.
- Organising and leading school based INSET and School Development Days.
- Liaising with Education Authority to ensure staff receive suitable and sufficient support and training.
- Maintaining a file of evidence indicating standards achieved within the school.
- Providing support to all members of staff.
- Discuss developments/issues with the SMT and lead school Numeracy Team.

ROLE OF PARENTS

In St. John's PS we believe that parents have a vital role to play in ensuring their children make appropriate progress and realise their potential in mathematics. We actively seek strong partnerships with parents and will work to ensure that parents feel involved in their child's education.

In St. John's PS parents will:

- Be able to discuss their child's progress in mathematics, or any areas of concern, at any time during the year by appointment with the class teacher.
- Be invited to meet more formally with the class teacher once per year at Parent: Teacher Interview, which will include discussion of the results of diagnostic tests.
- Receive one written report on their child's strengths, weaknesses and progress per year, usually in June.
- Be encouraged to participate with their children in mathematical homework activities.

- Be encouraged to attend Numeracy training every 3 years or sooner if training opportunities are available.

HOMEWORK

(See also St. John's PS Homework Policy)

The nature of homework given will vary according to the age and level of progress of children, but will always be designed to complement current class work, to:

- Inform parents of the type of work their child is currently involved with.
- To allow the child to practice and improve skills introduced in class.
- To give the child the opportunity to improve their ability to work independently and organise themselves.
- To give the teacher information on the extent to which children have achieved the skills/knowledge and understanding of what has been taught.

In order to achieve these objectives we would request parents, as far as is possible to:

- Provide a suitable quiet area for homework activities.
- Discuss with their child what they are expected to do before they start.
- Ensure their child spends a reasonable time on their homework; enough time to do it neatly and to the best of their ability without spending too long that it becomes stressful.
- Present children with practical activities e.g. Shopping which will reinforce concepts taught.
- Identify Mathematics/Numeracy in the children's everyday environment e.g. Road signs, counting steps.

EVALUATION OF TEACHING MATHS

In St. John's PS we are committed to a process of continuous improvement, based around the four characteristics of a successful school as set out in "Every School a Good School- a Policy for School Improvement" (DE 2009) :

- Child Centred Provision
- High Quality Teaching and Learning
- Effective Leadership
- School Connected to its Local Community

We believe that constant self-evaluation of our provision for Mathematics/Numeracy is the most effective way of ensuring we provide high quality teaching and learning experiences for our children, and that all our children realise their full potential in Mathematics/Numeracy.

Self-evaluation takes place on two levels:

- Each class teacher monitors and evaluates their own teaching on an ongoing basis. This involves assessing children's achievement of intended learning outcomes. The information generated is used to determine the effectiveness of the teaching approaches used and to inform planning for further teaching and learning.

- The Numeracy Coordinator leads the monitoring and evaluating of the whole school's provision of Mathematics/Numeracy through:
 - o Monitoring implementation of Mathematics/Numeracy Action Plans.
 - o Evaluating the achievement of Success Criteria contained within Action Plans.
 - o Coordinating self-evaluation through monitoring of the half-termly planners.
 - o Monitoring the results of Statutory Assessment at KS1 and KS2 using benchmarked performance data.
 - o Detailed analysis of pupil performance data from standardised assessment and statutory assessment outcomes.
 - o Leading an on-going, collegial approach to whole school self-evaluation such as detailed in "Better Numeracy" (ETI 2010), the quality indicators taken from "Together Towards Improvement" (ETI 2010) or the Self Evaluating Performa (ETI).

In St. John's PS self-evaluation is an ongoing process which is a component of our Cycle of Development. The information gained through self-evaluation feeds back into the cycle to enable us to plan for future improvement and determine training and development needs.

CROSS CURRICULAR SKILLS: USING 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/ 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. Some of these include:

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 - Accessing information from tables, charts and graphs
- Carrying out surveys and interpreting results

- Sorting materials according to properties
- Positional language / Directions / Points of Compass / Coordinates
- Scale in maps and plans
- Estimating and Measuring skills
- Timelines and sequences
- Accessing information from computer databases

Physical Education

- Directions and movement
- Positional language
- Shape and symmetry
- Timing events
- Measuring events (e.g. long jump)

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

REVIEW PROCEDURES

This Policy is designed to reflect current practice within the school environment. Although the overall aims for Mathematics/Numeracy teaching and learning are likely to remain fairly constant, the practices evolve over time as the school progresses in its development of Mathematics/ Numeracy provision. Accordingly, this Policy is under a process of constant review and will be updated regularly to ensure it continues to reflect current practice and to achieve its designated purposes.