

# St. Patrick's Primary School



## Mathematics and Numeracy Policy

Ratified by the Board of Governors on Wednesday, 23<sup>rd</sup> April, 2014

Reviewed Annually

Next Review Date: Autumn, 2025.

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## **CONTEXT**

Whilst this policy has been agreed by all staff to define our particular principles, practices and provision, it should be noted that our work lies within the wider context of the NI education system. The following are the main structures within which we operate:-

- The stated vision of the Department of Education for Northern Ireland: 'to ensure that every learner fulfils his or her potential at each stage of his or her development.'  
(DE 2010).
- The overall aim of the NI Curriculum: 'The Northern Ireland Curriculum aims to empower young people to achieve their potential and to make informed and responsible decisions throughout their lives.'  
(DE 2008)
- The characteristics of effective practice, defined in Every School a Good School – a Policy for School Improvement (DE 2009), grouped under the four headings:
  - Child Centred Provision
  - High Quality Teaching and Learning
  - Effective Leadership
  - A School Connected to its Local Community
- 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)
- Count, Read, Succeed (2011)

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## **DEFINITION OF MATHEMATICS AND NUMERACY**

We, at St. Patrick's Primary School, believe that Mathematics and Numeracy provides a way of viewing and making sense of the world. It is a creative, dynamic curricular area where children are challenged to think mathematically. It is concerned with the organisation, manipulation and communication of information according to well defined rules and processes. Mathematics is broader than the mastery of computational skills and incorporates number, measures, shape and space, handling data and mathematical thinking as in processes. These elements of mathematics are essential for, and can be enhanced by, other areas of the curriculum. Mathematics And Numeracy will therefore be promoted in a cross curricular fashion.

We have adopted the definition of Numeracy from *Count, Read: Succeed* (para. 1.10): '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.'

## **VISION AND AIMS**

### **1. MATHEMATICS AND NUMERACY FOR ENJOYMENT**

- To encourage a positive approach to maths as an interesting, enjoyable subject in which all children can experience success.
- To develop the following qualities: enjoyment, confidence, interest, curiosity, independence of thought, enthusiasm, creativity, co-operation, open-mindedness, perseverance, awareness of safety, exploration, focus, being systematic and open to self evaluation.

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## **2. MATHEMATICS AND NUMERACY AS A CURRICULAR AREA**

- To develop within the children, mathematical skills, attitudes, knowledge, understanding and language.
- To develop an appreciation of the relationships and patterns in maths, the following skills will be developed: calculating, classifying, communicating, comparing, constructing, counting, generalising, making hypotheses, measuring, ordering, recording and sorting.
- To develop the knowledge content of our Mathematical and Numeracy programme, the four areas specified by the N.I. Curriculum will be covered: number, measures, shape and space and handling data.
- The fifth element, processes in maths, will be developed through the application of the other areas - children will be encouraged to think mathematically, to talk about their work and to select appropriate mathematical tools and resources to undertake tasks set.

## **3. THE VALUE OF MATHEMATICS IN EVERYDAY LIFE**

To develop the mathematical skills, attitudes, knowledge, understanding and language useful and necessary throughout their life.

## **4. THE APPLICATION OF MATHEMATICAL SKILLS, UNDERSTANDING AND KNOWLEDGE TO OTHER SUBJECTS**

To encourage the pupils to see the links between maths and other curricular areas, especially those where maths is a tool to understanding other subjects. A range of other subjects provide relevant contexts to teach maths:-

- Shape and Space in the World Around Us.
- Measurement in Science, Technology, Geography and History.
- Collection and presentation of data in Science, History and Geography.
- Use of a range of educational technologies to enhance Numeracy and other curricular areas e.g. I.C.T e.g. NewsDesk, Just2easy, Mathletics, Earl, calculators, and the Internet e.g. <https://nrich.maths.org.uk>.
- Processes across the curriculum, especially Literacy where pupils can use appropriate maths language to express themselves.

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## **5. TO DEVELOP THINKING SKILLS AND PERSONAL CAPABILITIES**

In line with the Northern Ireland curriculum, the teaching of Numeracy will focus on developing the following strands:

- Managing information
- Thinking, problem solving and decision making
- Being creative
- Working with others
- Self-management

## **6. TO DEVELOP PROBLEM-SOLVING SKILLS AND STRATEGIES**

The teaching of Numeracy on a Monday will focus on developing the following Problem-Solving types;

- Finding All Possibilities
- Logic and Reasoning.
- Exploring Patterns and Relationships.
- Visual/Diagram Problems.
- Word Problems.

Mathematical thinking and reasoning will be developed through a range of skills and problem – solving strategies. Teachers will model the use of these skills and strategies during problem – solving activities. Strategies appropriate to each Key Stage/pupils' level of development are displayed in each classroom and are referred to regularly throughout lessons.

(See Problem-Solving Strategies in Appendix One).

## **LEARNING/TEACHING STYLES**

A variety of learning and teaching styles inclusive of assessment for learning strategies will be utilised so as to achieve the stated aims of the policy. These styles will include:

### **1. DEVELOPING A POSITIVE ATTITUDE TO NUMERACY**

- Pupils will be involved in a range of mathematical activities, appropriate to their level of understanding and attainment, where all can experience success and develop an interest in Numeracy.
- Numeracy concepts will be introduced and developed in a stimulating and interesting manner. The classroom environment (both indoor and outdoor) will enhance the development and stimulation of Numeracy topics. Fun mental maths activities will be used to reinforce learning in an interesting way, e.g. puzzle of the week, daily challenges, quizzes, duels, rhymes and songs.
- Pupils will be involved in whole class, group or one to one teaching. They will work as individuals, in pairs or in small groups/teams, thereby developing the ability to collaborate whilst also emphasising the importance of being able to work independently.

### **2. DEVELOPING NUMERACY SKILLS, UNDERSTANDING AND KNOWLEDGE**

- Each mathematical attainment target will be developed so that pupils experience and acquire the full range of mathematical skills required to support their knowledge and understanding of a variety of Numeracy topics.
- Pupils will be involved in a variety of well planned mental, practical and written activities in which they can experience success.
- Emphasis will be placed upon the development of maths activities appropriate to each child's stage of development. Work of an increasing depth will be presented throughout a school year to the various Numeracy groups within class, and also work of increasing depth and difficulty will be planned to ensure progression from Year 1 to Year 7.

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### **3. USING MATHEMATICAL LANGUAGE**

- From Year 1 to Year 7 pupils will progressively become familiar with the correct mathematical terms, definitions, signs, symbols and formulae appropriate to their level of understanding.
- Emphasis will be placed upon the progressive development of a maths language appropriate to each child's stage of development in maths. Different levels of discussion will be encouraged to enable pupils to clarify and articulate their mathematical thinking e.g. pupil-to-pupil, pupil-to-teacher, pupil-group, pupil-to-whole class.
- Pupils will be encouraged to use conventional mathematical terms and to express their answers and their methods of solving problems in mathematical language.

### **4. DEVELOPING PUPILS' ABILITY TO THINK MATHEMATICALLY**

Numeracy will be presented in a well planned, structured way in which work is progressively developed from Year 1 to Year 7. Each year, pupils' knowledge, understanding and skills will be further developed in a structured, stepped manner. As their level of understanding increases, pupils will be encouraged to see that maths is a logical subject where facts can be manipulated according to certain rules/formulae, where standardised measurements can be universally applied and where information can be collated, classified, recorded and communicated clearly. This logical, procedural component of maths needs to be balanced by a creative, imaginative dimension where children's own methods and procedures are valued and encouraged.

### **RESOURCES**

Each classroom will be provided with the appropriate maths resources and equipment relevant to the maths programme for their year group(s). A central bank of resources is available in the Numeracy cupboard, which is located in the corridor of the school. A variety of schemes support the teaching of Mathematics. Numicon is also available for use throughout the school.

### **CONTINUITY AND PROGRESSION**

Teachers will follow the N.I curriculum for the majority of pupils in their class. Those requiring special provision, both reinforcement and extension, will be taught at a level appropriate to their ability to ensure that they progress and experience success.

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Teachers' own skill and knowledge will be updated through INSET and other in-service training.

At St. Patrick's Primary School, we intend that, by the end of Key Stage 2 and at a level appropriate to their ability, children will be able to:

- Choose the appropriate materials, equipment and mathematics to use in a particular situation;
- Use mathematical knowledge and concepts;
- Work systematically and check their work;
- Use mathematics to solve problems and make decisions;
- Develop methods and strategies including mental mathematics;
- Explore ideas, make and test predictions and think creatively;
- Identify and collect information;
- Read, interpret, organise and present information in mathematical formats;
- Use mathematical understanding and language to ask and answer questions, talk about and discuss ideas and explain ways of working;
- Develop financial capability;
- Use ICT to solve problems and present their work.

## **RECORD KEEPING/ASSESSMENT**

Teachers will continue to monitor progress using a variety of formal and informal methods.

### **Formal methods will include:**

- Annual standardised Maths tests – NfER Mental Maths and PTM;
- Update of pupil profile annually;
- NRIT Assessments are utilised to provide a quantitative IQ for comparative use against mathematics performance in standard assessments.
- This data is retained during a child's time in St. Patrick's P.S. This information is accessed by the Principal, the Numeracy co-ordinator, the SENCo/LSC and teaching staff, who can then identify children with specific difficulties. Where relevant, this information will be forwarded to appropriate external agencies e.g. child psychologist.

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The diagnostic use of statistics gathered will ensure that low, under and high achievers can be identified and appropriate steps will be put in place to ensure that their needs are addressed.

### **Informal methods will include:**

- Ongoing teacher monitoring of class work, homework and mental maths participation.
- Regrouping pupils when success is achieved or when difficulties are encountered.
- Records of class tests e.g. tables, mental maths.

### **SPECIAL EDUCATIONAL NEEDS**

Responsibility for the identification of pupils requiring additional provision rests with the class teacher. Following identification, differentiated provision should be delivered for the pupils concerned, advice and guidance are available from the Numeracy co-ordinator and the SENCo/LSC. In addition, learning support (P2-P7) will be provided, where possible, for pupils identified by both class teachers and through results from diagnostic tests.

### **MARKING**

- Marking is diagnostic and supportive and as far as possible done through conversation with the child. Correct solutions are marked with a (✓) and written comments are constructive and supportive.
- Wrong solutions are marked with a (.), and the incorrect digits in a computation exercise are identified to encourage pupils to reason/seek the correct solution.

The various strategies outlined in assessment for learning will be utilised appropriately to support the various marking and assessment approaches implemented.

### **TIME ALLOCATION**

Numeracy will be taught daily to all classes with Problem-Solving being the focus on a Monday. Times may increase when topics etc are initiated or as deemed appropriate by the class teacher given the educational needs of the assigned group. These times include provision for a daily slot (10-15 mins) for mental maths. In Year 1 and 2 the mental maths slot may include rhymes, songs and stories to develop mathematical

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concepts. Teachers will also provide time periodically for practical and/or Outdoor Learning through Mathematics. Electronic and other media resources will be utilised to further enrich mathematics.

It is anticipated that mathematic skills, knowledge and understanding will be developed both within mathematics and across many cross curricular areas throughout the school.

## **THE ROLE OF THE CO – ORDINATOR**

Our Numeracy co-ordinator, Mrs. Josephine Mulligan, has overall responsibility for the development of Numeracy in St. Patrick's Primary School. This responsibility includes leading staff/curriculum development, attending external in-service training and providing in-house staff training. Staff will receive annual curriculum feedback at both year group and individual level. The co-ordinator is also responsible for the acquisition and management of appropriate and relevant books and materials. The development of Numeracy also involves a collective responsibility by all teachers so that all children from Year 1 to Year 7 will have been exposed to an enriching experience and the development of mathematical language, knowledge, understanding and skills.

Teachers will plan maths topics/areas through long-, medium- and short-term planning for their year group(s), ensuring that all classes receive the same maths content.

## **CROSS CURRICULAR THEMES**

The children will be encouraged to use maths across the curriculum and to see the relevance of maths in the different areas in which it pervades. Maths will be seen as a means of communicating in Literacy, World Around Us, P.E., The Arts, Religion, I.C.T. Health Education, PD&MU, etc. During problem solving and investigative work/play – based learning, pupils will be encouraged to develop Critical and Creative Thinking Skills. They will develop interpersonal skills through paired, small group and whole class work.

Numeracy will be specifically developed through I.C.T. in the following ways:

- Computers: graphs, pie charts, databases, modelling activities encompassing a range of mathematical tools, interactive whiteboard, websites, Mathletics.
- E.A.R.L. programme using a sequence of commands/forwards backwards, left, right and angles of movement (any angle from  $1^\circ$  to  $360^\circ$ ,  $\frac{1}{4}$  turn,  $\frac{1}{2}$  turn,  $\frac{3}{4}$  turn, clockwise, anti-clockwise).
- My School and all C2K maths provision e.g. J2Data.

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- Calculators: use of calculators, when appropriately introduced, can extend class work when pupils computational skills do not match the level of work they wish to explore.

## **HOMEWORK**

In line with school policy on homework, children will receive a range of mathematical tasks to carry out at home. These will include reinforcement of number work through Mental Arithmetic books, rote learning of tables, Mathematics tasks and a variety of topic-based or practical tasks e.g. finding out..., measuring, timing, etc. Teachers will ensure that all homework is corrected on a timely basis and that feedback is given to pupils.

## **ROLE OF PARENTS**

Parents are encouraged to participate in the development of their child's Numeracy skills and knowledge. Parents are informed of the Numeracy curriculum through Parent Information sessions at the beginning of the new school year, dissemination of monthly Learning Support sheets, the school's website, regularly set maths homework and through the use of Numeracy Facts books and Pocket Poster books in Year 6 / 7, explaining the content and methods taught. In addition, parents receive the opportunity to discuss maths progress at the Annual Parents' meeting, as well as receiving the Annual Report. Workshops for parents may also be arranged.

## **CURRENT STANDARDS AND TARGETS**

It is the responsibility of all staff to secure appropriate outcomes for all pupils. In order to achieve this, staff, the Numeracy co-ordinator, the Principal and the SENCo/LSC will continually monitor the achievement of such standards. The specific targets and associated activities will be outlined in the School Development Plan.

## **MONITORING AND EVALUATION**

The Principal, Numeracy co-ordinator and staff will monitor and evaluate the use of Numeracy in the long, medium and short term planners to ensure progression and breadth. Excellence in Numeracy use is celebrated in displays around the school.

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Evidence used to inform such evaluations will include:

- a. Children's work.
- b. Teachers' planners.
- c. Pupil performance in Standardised tests, end of Key Stage Assessments, etc.
- d. Diagnostic use of pupil performance in standardised tests and other assessments
- e. Effective analysis of performance data
- f. Teacher assessments of pupils' work.
- g. Regular meetings with Learning Support Staff / Classroom Assistants
- h. Book Looks
- i. Classroom observations
- j. Questionnaires / Feedback

### **Monitoring and Review of Policy**

This policy was adopted by the Board of Governors on 23<sup>rd</sup> April, 2014.

It is reviewed on an annual basis by staff and governors. A Review Record is stored in Mrs. Mulligan's coordinator file and in the Principal's office.

**Next Review Date:** Autumn, 2025.

## Appendix One: Problem – Solving Strategies

### The Problem - Solving Process

#### Step 1: Understand the Problem



- Highlight or underline key words in the problem.
- Read the problem multiple times and simplify, if needed.
- Read the question carefully.
- Rewrite the question in your own words.

#### Step 2: Devise a Plan



- Choose a strategy to use.
- Decide which operation to use.
- Collect any objects that may be needed.

#### Step 3: Carry Out the Plan



- Estimate an answer to the problem.
- Use the planned strategy.
- Change the strategy, if the planned strategy is not suitable.
- Show all working out.
- Complete any calculations.
- Answer the question.

#### Step 4: Check Solution

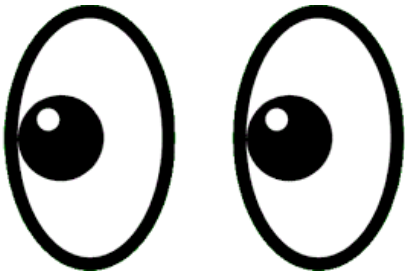







- Compare the answer to the estimation.
- Check the reasonableness of the answer.
- Use inverse operations to check the answer.
- Review the effectiveness of the strategy used.

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## EYFS Problem Solving Strategies

<p><b>Look</b></p> 	<p><b>Talk</b></p> 	<p><b>Make</b></p> 
<p><b>Draw</b></p> 	<p><b>Check</b></p> 	<p><b>Act</b></p> 

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## KS1 Problem-Solving Strategies

Break  
problem  
into smaller  
parts



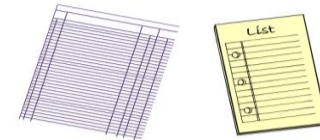
Estimate,  
check and  
improve



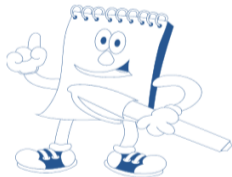
Make a  
model



Make a  
table or  
list



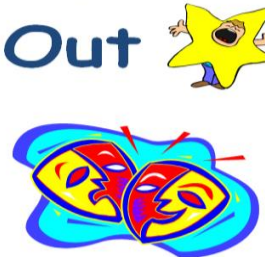
Draw a  
picture or  
diagram



Look for  
a pattern



Act It  
Out



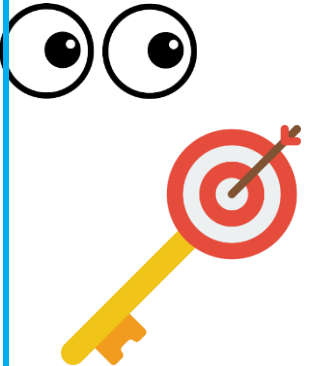

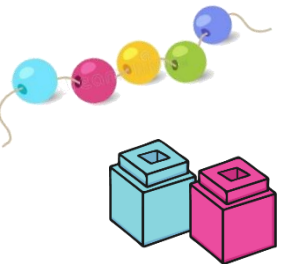
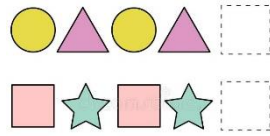
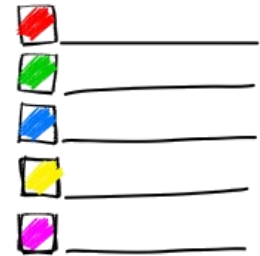
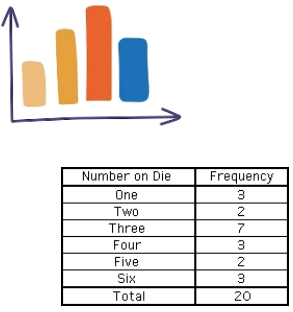

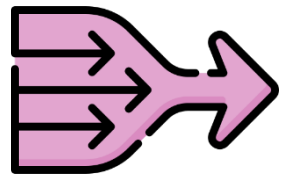
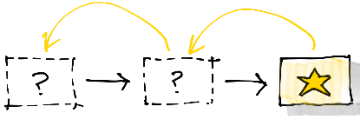


Solve a  
simpler  
problem



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# KS2 Problem-Solving Strategies

<p><b>Find Key Information</b></p> 	<p><b>Draw an Image</b></p> 	<p><b>Use Objects/Make a Model</b></p> 	<p><b>Find a Pattern</b></p> 	<p><b>Make a List</b></p> 	<p><b>Make a Table or Chart</b></p>  <table border="1" data-bbox="1859 598 2094 742"> <thead> <tr> <th>Number on Die</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>One</td> <td>3</td> </tr> <tr> <td>Two</td> <td>2</td> </tr> <tr> <td>Three</td> <td>7</td> </tr> <tr> <td>Four</td> <td>3</td> </tr> <tr> <td>Five</td> <td>2</td> </tr> <tr> <td>Six</td> <td>3</td> </tr> <tr> <td>Total</td> <td>20</td> </tr> </tbody> </table>	Number on Die	Frequency	One	3	Two	2	Three	7	Four	3	Five	2	Six	3	Total	20
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One	3																				
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Three	7																				
Four	3																				
Five	2																				
Six	3																				
Total	20																				
<p><b>Write an Equation</b></p>  <p><math>(n \times 2) + 1</math></p>	<p><b>Simplify the Problem</b></p> 	<p><b>Work Backwards</b></p> 	<p><b>Guess, Check, Improve or Estimate</b></p> 	<p><b>Act It Out</b></p> 																	

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