

**ST MARY'S GLENVIEW**



**TOGETHER FOR CHILDREN**

# **Mathematics and Numeracy Policy.**

March 2010

**ST MARY'S PRIMARY SCHOOL, GLENVIEW  
MATHEMATICS/NUMERACY POLICY**

**BACKGROUND STATEMENT**

St Mary's P.S caters for the educational needs of approximately 300 children in the town of Maghera. The teaching staff is comprised of Principal, Vice Principal, 10 mainstream teachers and 2 LSC teachers.

**DEFINITION OF NUMERACY**

In St Mary's Primary School we have decided to adopt the following definition of Numeracy .

*"Numeracy means knowing about number and number operations. More than this it requires an ability and inclination to solve numerical problems, including involving money or measures. It also demands familiarity with the ways, in which numerical information is gathered by counting and measuring and is presented in graphs, charts and tables. It relates to a sense of shape and movement".*

The term Numeracy brings with it connotations of real life applications and the use of Mathematics as a natural tool across the curriculum.

**Thus Numeracy is both a *key skill* within school, and a *life skill* to be utilised throughout every person's day to day experiences.**

We see the term "Mathematics "as being synonymous with the term Numeracy throughout our school.

**MISSION STATEMENT FOR NUMERACY**

"In St Mary's Primary school we value every pupil and the contribution they have to make. As a result we aim to ensure that every child achieves success and that all are enabled to develop their skills in accordance with their level of ability."

## PURPOSES OF POLICY

The purposes of this Policy are:

- To promote a high standard of excellence and consistency of approach amongst all staff
- To communicate the main features of the teaching and learning of mathematics in our school
- To form a reference document for all staff members

Its intended audience is :-

- Existing and newly appointed staff members
- Members of the Board of Governors
- Existing and prospective parents

In order to meet, and to continue to meet these purposes, the Policy will be regularly reviewed and updated.

## 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 Mary's. They form a set of basic principles upon which the teaching of mathematics in our school is based.

- To foster a positive attitude to mathematics 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 in line with the Thinking skills strand of the Revised Curriculum.
- To develop a deeper understanding of mathematics 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 in the wider world
- To develop the ability to use mathematics as a means of communicating ideas
- To develop an ability and inclination to work both alone and cooperatively to solve mathematical 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

## **TEACHING AND LEARNING**

The content of the mathematics curriculum taught at St Mary's is guided by our statutory requirement to deliver the Mathematics Programme of Study for Northern Ireland. It divides the mathematics curriculum into 5 Attainment Targets: Processes, Number, Measures, Shape & Space and Handling Data. The co-ordinator, working with staff, has used this content, the NEELB Number scheme, and topic progressions in New Heinemann Maths and Steps Mathematics, to produce a Scheme of Work for Mathematics in St Mary's.

Although the content of this is largely already specified by the NI Programme of Study, the staff of St Mary's 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 Attainment Targets:

### **Processes**

The Programme of Study 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 Mary's will ensure that:

- 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
- The link to Thinking Skills in the Revised curriculum is appreciated and materials from NEELB training are integrated into classroom teaching.

## **Number**

The Programme of Study 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 Mary's will ensure that:

- Children will be encouraged to use mental calculations where appropriate in line with the NEELB recommendations from the National Numeracy Strategy.
- 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
- 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 Programme of Study 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 Mary's will ensure that:

- 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 Programme of Study 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 Mary's will ensure that:

- Teaching will place emphasis on observing and understanding the properties of 2-d and 3-d 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 Programme of Study 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 Mary's will ensure that:

- 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 the 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 have agreed that the following points will be a feature of all teaching in Mathematics in St Mary's.

- 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
  
- Teaching will ensure that children make appropriate progress in their acquisition of the Skills, Understanding, Concepts, Facts and Competences as laid out in the NI Programme of Study for Mathematics
  
- Teachers will use a range of teaching strategies :
  - Exposition 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.
- All staff are familiar with Sharma's 6 Levels of Understanding in the teaching of mathematical concepts and have attended SDD training on it.

## 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. We believe this is best achieved when:

- Children's learning experiences follow a well planned progression, at a pace suitable for the 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 Attainment Targets for Mathematics contained within the NI Programme of Study
- 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 Attainment Target to be taught within each half term
- All new ideas and concepts which the children encounter will be introduced from a starting point within the child's knowledge and understanding ( SHARMA'S 6 Levels of 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 Coordinator to evaluate the levels of continuity and progression achieved

## MONITORING and EVALUATING CHILDREN'S WORK

This section details the various assessment methods and practices used in St Mary's through which we ensure that children are making appropriate progress and that the activities they take part in are suitably matched to their ability and level of development.

Assessment is an integral and continuous part of the teaching and learning process at St Mary's and much of it is done informally as part of each teacher's day to day work. Teachers continually assess children's performance and progress, and the effectiveness of their teaching approaches and strategies. Teacher's planning is based upon the identification of Intended Learning Intentions and Success Criteria for the children; assessment is therefore based upon deciding whether or not those Learning Intentions have been achieved. Information is gathered in a variety of ways:

- Discussion between child and teacher
- Observation whilst children are participating in activities
- Marking written work produced by the children as a result of a mathematical activity

More formal methods are used to determine the levels of achievement of children at various times during the school year:

- Weekly and Monthly class tests. These are used throughout the school apart from early KS1 (P1 and P2) where this particular type of assessment is not appropriate. They are usually used at the end of a particular topic, to assess achievement of the group of sub-skills which are contained within that topic.
- Mental Maths Core Competences. The staff have agreed a set of learning outcomes for mental calculations for each Primary which it is intended that as many children as possible should achieve. The achievement of these will be assessed on an ongoing basis. Core competences have been agreed from NEELB number scheme and progressions for Measures, Shape and Handling Data are in place.
- Standardised Testing. NFER-Nelson standardised tests are used once a year, towards the end of the year. They allow 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 and to identify those children who have Special Needs in mathematics.

- **Statutory End of Key Stage Assessment.** The NI Curriculum requires that each child is assessed, and assigned a Level of attainment for each of the 5 Attainment Targets in Mathematics. This is to be carried out at the end of Key Stage One (i.e. towards the end of the P.4 year) and at the end of Key Stage Two (i.e. towards the end of the P.7 year). The KS 1 Level for a child will normally be within the range of Level 1 to Level 3, with most children achieving Level 2. The KS 2 Level for a child will normally be within the range Level 1 to Level 5, with most children achieving Level 4. Although Levels are assessed for each Attainment Target, parents will normally be informed of one overall Level for mathematics, calculated by averaging the Levels achieved in each of the 5 Attainment Targets. Assessment is carried out by the teacher, and may be externally moderated by CCEA. The teacher uses a set of Assessment Units to help arrive at an assessment level for each child.

### **TARGET SETTING**

We use the results of Statutory Assessment as a vehicle for setting performance targets for mathematics. Each September the principal, vice principal and coordinator undertake a process to set targets for :

#### **KS1**

- % of children achieving Level 2 and above
- % of children achieving Level 3

#### **KS2**

- % of children achieving Level 4 and above
- % of children achieving Level 5

These targets are arrived at through consideration of each child's performance to date, their NFER Standardised scores for mathematics in previous years and their Level of attainment at KS 1 (applicable for KS2 Assessment only)

These Targets are then compared with the actual %s achieved in KS1 and KS2 Assessment in May.

(See Appendices 1-4)

## **CALCULATORS**

In St Mary's we believe that the availability of calculators should never be a reason for children not learning basic number facts, nor being able to calculate mentally and using written methods.

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 Scheme of Work for Mathematics.

However we also recognise that calculators are widely used in everyday life and will strive to ensure that the children are able to use a calculator efficiently and effectively. To this end, children in St Mary's 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; eg 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 Mary's 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 will strive to ensure that:

- 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 will:

- 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 children's achievement in mental maths kept and passed on to the next teacher when children move classes

## **ICT**

(For more detail on the role of ICT in enhancing Teaching and Learning in general, please see ICT Policy) In the NI Programme of Study for KS 1

and KS2, ICT is not a separate subject area. Rather its role can be considered as a tool by which teaching and learning can be enhanced. This is very applicable in Mathematics, eg.

- Number Facts
- Graphical Representation
- Concept of angle
- Co-ordinates
- Ordering measures
- Organising and interpreting data

In St Mary's the staff will use a variety of ICT activities as part of the range of mathematical experiences which the children participate in, referring to the 'Integrating ICT into Numeracy' document from NEELB. 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 pupils 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 Mary's ICT activities will include:

- Whole class or group activities, often led by the teacher. These may involve the use of a digital projector and will be a direct teaching aid, used to demonstrate ideas and promote discussion and clear mathematical thinking
- Individual or small group activities. These will usually involve the children working independently at a computer, usually to complement current work on a particular topic
- Resources will include software available through the C2K Managed Service and also via the Internet. (See Use of Internet Policy)

ICT activities form part of the range of activities detailed in our Scheme of Work for Mathematics.

### Number

#### 123 CD

Helps children become familiar with counting and early number.

#### Tizzy's Toybox

**Buttons/Counting** - Simple counting games.

#### Thomas the Clown

Postman Thomas, Ice Cream Break etc.  
- develop patterns, sequencing etc.

### Measures

#### Tizzy's Toybox

Pencils - Short/tall pencil

#### My World

##### **Goldilocks**

Help Goldilocks explore the house of the bears (Large, medium, small etc)

### Shape and Space

#### Thomas the Clown

*Building Blocks* - Build coloured blocks  
*Postman Thomas* - Follow routes, backwards, forwards etc.

#### My World

##### **Blocks1**

Make '3D' patterns using cubes

#### Tizzy's Toybox

##### **Bucket and Spade**

Find the spade - develops positional language

#### Painter

Draw simple shapes.

#### Roamer/Pixie

Move Roamer/Pixie forwards/backwards.

### Handling Data

#### Counting Pictures 2 (Teacher led)

Produces simple pictograms. Topics include hair and eye colour, favourite colours, foods etc. Information can be also be presented as block graphs.

#### Pick a Picture (Teacher led)

Simple introduction to data handling - topics include Ourselves, Houses, Weather and Minibeasts.

#### My World

##### **Chart**

Create a block chart/pictogram - topics include transport and weather.

##### **Sorting**

Sort fruit according to type, colour etc.

### Number

#### 123 CD

Helps children become familiar with counting and early number.

#### Thomas the Clown

Postman Thomas, Ice Cream Break etc.  
- develops number, sequencing etc.

#### Number Train

(Number activities within 20 - 3 levels - defaults to open at level 2 - Click Options on main screen to change level)

#### *Ordering Numbers*

Sequence numbers to 20 by putting the correct hat on Beach Bunny.

*Subtraction as taking away*

Make simple number sentences

e.g. 5 ducks subtract 1 duck, how many ducks are left?

*Addition as counting on*

Roll die to count on - number line to 10

*Odd & even numbers*

Decide if numbers are odd or even (number

within 20) My World

Number Sentences

Make your own number sentences *Number*

*Bonds* Investigate number bonds to 10

#### Time & Money

*Coin Hopper*

Recognition of coins

(Go to Settings on Main screen to select coins displayed)

### Measures

#### Time & Money

**Clocktower** - Position numbers on clock

### Shape and Space

#### My World

**Blocks1**

Make '3D' patterns using cubes

#### Roamer/Pixie

Move Roamer/Pixie forwards/backwards. Use simple sequences.

#### Painter

Draw shapes; experiment with simple symmetry.

### Handling Data

#### My World

**Chart**

Create a block chart/pictogram (transport/weather etc)

#### Counting Pictures 2 (Teacher led)

Produces simple pictograms. Topics include pets, journey to school and favourite toys. Information can be also be presented as block graphs.

#### Pick a Picture (Teacher led)

Simple introduction to data handling - topics include Ourselves, Houses, Weather and Minibeasts.

#### My World Sorting

Sort objects by own selected method (Fruit, pondlife, minibeasts, transport, home)

## Year Three

### Number

#### My World

##### *Hundred Square*

Investigate number to 100 - counting in 5s, 10s etc.

##### *Number Sentences*

Make your own number sentences

##### *Number Bonds*

Investigate number bonds to 20

#### Number Train

(Number activities within 20 - 3 levels - defaults to open at level 2 - Click Options on main screen to change level)

##### *Ordering Numbers*

Sequence numbers to 20 by putting the correct hat on Beach Bunny.

##### *Odd & even numbers*

Decide if numbers are odd or even

### Shape and Space

#### Roamer

#### My World

##### *Tiles*

Experiment with shapes to create and label 2D shape pictures  
*Blocks* I Make '3D' patterns using cubes

#### Thomas the Clown

*Building Blocks* - Build using 3D shapes

*Strawberry Garden* - Direct Robot to gather strawberries - forward/backward/right/left etc.  
Let's Go 1-3

Let's go to the Garden - Locate objects on the left or right  
Let's go to the Park - Move left/right to find objects in the park

### Measures

#### Time & Money

(Go to Settings on Main screen to change Time setting to analogue only)

##### *Whizz Club*

Find 2 clocks showing the same time

##### *Sportstime*

Pick appropriate words to indicate times shown on clock

##### *Clocktower*

Position numbers on clock face

#### Trudy's Time and Place House

*Calendar Clock* - change the calendar to see the effect on the seasons.

### Handling Data Counting Pictures

Produces simple pictograms. Topics include minibeasts, homes and favourite fruits. Information can be presented as block graphs or tally charts and sorted in ascending or descending order.

Pick a Picture Simple introduction to data handling - topics include Ourselves, Houses, Weather and Minibeasts.

#### My World

##### *Sorting*

Sort objects by own selected method (Fruit, pondlife, minibeasts, transport, home)

#### Starting Graph(yellow)First Workshop/Information Workshop(yellow)

Collect information on curricular topics and represent graphically. Interpret results.

### Number

#### My World

##### **Hundred Square**

Investigate number to 100 - multiples, number patterns etc.

#### Number Works (Levels 1/2)

Activities designed to reinforce place value, money, fractions, multiples, rounding etc.  
(Go to Teacher Control from the Main Menu to change levels)

#### Number Train

(Number activities within 20 - 3 levels - defaults to open at level 2 - Click Options on main screen to change level)  
Activities designed to reinforce number

### Measures

#### Trudy's Time & Place House

##### **Calendar Clock**

Move backward or forward in an animated movie by months, days, hours, mins & secs.

##### **Time Twins**

Analogue/digital time - whole hour, half hour and quarter hour.

#### Time & Money

(Go to Settings on Main screen to change setting to analogue/digital)

##### **Whizz Club**

Find 2 clocks showing the same time

##### **Home Sweet Home**

### Shape and Space

#### My World

##### **Tiles**

Experiment with shapes to create and label 2D pictures  
Experiment with tiling and tessellation

##### **Blocks1**

Make '3D' patterns using cubes

#### Trudy's Time & Place House

**Jelly Bean Hunt** - Direct ant N, S, E, or W to find jelly beans

#### Let's Go 4-7

Let's go to the Town, Safari, School or Camping. Navigate using compass points.

### Handling Data

#### My World

##### **Sorting**

Sort objects by own selected method (Fruit, pondlife, minibeasts, transport, home)

#### Starting Graph(green)

#### First Workshop/Information Workshop(green)

Numberbox ('Quicksheets include 'Our Favourite foods', 'Journey to School' and 'Our Homes')

Collect information on curricular topics and represent graphically. Interpret results.

## Year Five

### Number

#### My World Hundred Square

Investigate number to 100 - multiples, number patterns etc.

#### Number Works (Levels 1/2/3)

(Go to Teacher Control from the Main Menu to change levels)

Activities designed to reinforce place value, money, fractions, multiples, rounding etc.

#### Time & Money

##### *Luncherama, Coin Hopper, Supermarket*

Money activities - recognition of coins, change etc.  
(Go to Settings on Main screen to change level)

#### Smart Spender

*Ice Cream Van, Pizzeria, Lunchbox etc.*  
Problem solving activities involving money.

### Measures

#### Trudy's Time and Place House *Time Twins*

Analogue/digital time - whole hour, half hour and quarter hour.

#### Calendar Clock

Move backward or forward in an animated movie by months, days, hours, mins & secs

#### Time & Money

(Go to Settings on Main screen to change setting to analogue/digital)

#### *Whizz Club*

Find 2 clocks showing the same time - analogue and digital - whole hour, half hour and quarter hour.

#### *Home Sweet Home*

Digital time - set home appliances to correct time

#### *Sports Time*

Pick appropriate words to indicate times shown on clock

### Shape and Space

#### My World

##### *Tiles*

Experiment with tiling and tessellation

##### *Blocks2*

Make '3D' patterns using cubes and prisms

#### Let's Go 4-7

Let's go to the Town, Safari, School or Camping. Navigate using compass points.

#### Trudy's Time & Place House

(for reinforcement)

*Jelly Bean Hunt* - Direct ant N, S, E, or W to find jelly beans

#### Roamer/ BlackCat Logo(green level)/ RoamerWorld

Create patterns and shapes. Use Repeats.

#### Painter/Colour Magic

Draw shapes; experiment with simple symmetry.

### Handling Data

#### Starting Graph(green)

#### Information Workshop(green)

#### Numberbox2 (yellow/green)

(Quick sheets include 'League Table' and 'Dinner Register')

#### Number Magic (yellow/green)

#### Decisions

Collect information on curricular topics and represent graphically. Interpret results. Save/perform sorts, searches etc.

### Number

#### My World

##### **Hundred Square**

Investigate number to 100 - prime, square numbers etc.

#### Number Works

(Levels 1/2/3)

Go to Teacher Control from the Main Menu to change levels

Activities designed to reinforce place value, decimals, money, fractions, multiples, rounding, sequences etc.

#### Time & Money

##### **Luncherama, Coin Hopper, Supermarket**

Money activities - recognition of coins, change etc.  
(Go to Settings on main screen to change money setting to £20)

#### Smart Spender

*Ice Cream Van, Globetrotter, Pizzeria, Lunchbox, Room for Change* etc.  
Problem solving activities involving money.

### Measures

#### Time & Money

(Go to Settings on Main screen to change setting to analogue/digital)

##### **Whizz Club**

Find 2 clocks showing the same time.

##### **Home Sweet Home**

Digital time - set home appliances to correct time

##### **Sports Time**

Pick appropriate words to indicate times shown on clock.

### Shape and Space

#### My World

##### **Tiles**

Experiment with tiling and tessellation.  
Use rotate buttons to create more complex patterns

##### **Blocks2**

Make '3D' patterns using cubes and prisms

#### Let's Go 4-7

Let's go to the Town, Safari, School or Camping.  
Navigate using compass points.

[Roamer/BlackCat Logo](#)(blue/red level)/ [RoamerWorld/MSW Logo](#)

Create more complex patterns and shapes. Use Repeats and Procedures.

#### Colour Magic

**Draw shapes; experiment with symmetry.**

### Handling Data

#### Information Workshop(blue/red)

#### Numberbox2 (blue/red)

(Quick sheets include 'TV Time' and 'Weather')

#### Number Magic (blue/red)

#### Decisions

Collect information on curricular topics and represent graphically. Interpret results.  
Save/perform sorts, searches etc.

### Number

#### My World

**Hundred Square** - Investigate number to 100 – prime, square numbers etc.

#### Number Works

(Levels 1/2/3)

Go to Teacher Control from the Main Menu to change levels

Activities designed to reinforce place value, decimals, money, fractions, multiples, rounding, sequences etc.

#### Time & Money

**Luncherama, Coin Hopper, Supermarket**

Money activities - recognition of coins, change etc.  
(Go to Settings on main screen to change money setting to £20)

#### Smart Spender

*Ice Cream Van, Globetrotter, Pizzeria, Lunchbox, Room for Change* etc.  
Problem solving activities involving money.

### Measures

#### Time & Money

(Go to Settings on Main screen to change setting to analogue/digital)

#### *Whizz Club*

Find 2 clocks showing the same time.

#### *Home Sweet Home*

Digital time - set home appliances to correct time

#### *Sports Time*

Pick appropriate words to indicate times shown on clock.

### Shape and Space

#### My World

#### *Tiles*

Experiment with tiling and tessellation.  
Use rotate buttons to create more complex patterns

#### *Blocks2*

Make '3D' patterns using cubes and prisms

#### Let's Go 8-10 (challenging!)

Let's go Sailing, Flying or Orienteering.  
Develops direction and bearings skills.

Roamer/BlackCat Logo(red level)/ RoamerWorld/MSW Logo

Create more complex patterns and shapes. Use Repeats and Procedures.

#### Colour Magic

Draw shapes; experiment with symmetry.

### Handling Data

Information Workshop(blue/red)

Numberbox2 (blue/red)

(Quick sheets include 'Growing a Plant', 'Temperature', 'Pulse rates' etc.)

Number Magic (blue/red)

#### Decisions

Collect information on curricular topics and represent graphically. Interpret results.  
Save/perform sorts, searches etc.

## **ROLE OF NUMERACY COORDINATOR**

In St Mary's we have a member of staff who fulfils the role of Numeracy Co-ordinator, who 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 numeracy
- Contributing to the production of the School Development Plan, if it is to include 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 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 numeracy provision
- Organising and leading school based INSET and School Development Days
- Liaising with NEELB CASS service to ensure staff receive suitable and sufficient support and training

## **ROLE OF PARENTS**

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 Mary's 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 in October.
- 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.
- Take part in Maths Week by helping their child with 1 investigative homework.

## **HOMEWORK**

(For more detail on the role, purposes and requirements of homework in St Mary's please refer to the 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 current intended learning outcome(s)

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 starts homework early enough so they can complete it by a reasonable time

## EVALUATION OF MATHEMATICS TEACHING

We believe that constant self-evaluation of our provision for Numeracy is an 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 Numeracy.

Self evaluation takes place on two levels:

- Each class teacher monitors and evaluates their own teaching on an ongoing basis. This involves judging whether children are achieving intended learning outcomes, and the information generated is used to gauge the effectiveness of the teaching approaches used and to inform planning for further teaching.
- The Numeracy Coordinator leads the monitoring and evaluating of the whole schools provision of numeracy through:
  - Monitoring implementation of Numeracy Action Plans
  - Evaluating the achievement of Success Criteria contained within Action Plans
  - Monitoring the results of Statutory Assessment at KS1 and KS2 using benchmarked performance data
  - Matching 6 week planners to the year group scheme

In St Mary's 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. The ESaGS document formed the basis of NEELB co-ordinator training March 2010.

## NUMERACY ACROSS THE CURRICULUM

With reference to the agreed definition of Numeracy at the beginning of this document, we recognise that mathematical skills are used by children in many other areas of the curriculum besides mathematics lessons. Indeed other curriculum areas provide ideal opportunities for the practical application of mathematics skills. 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

### Science and Technology

- Comparative language
- Estimating and Measuring skills
- Handling Data ( eg displaying the results of an experiment in graphical form)
- Carrying out surveys
- Sorting materials according to properties
- Accessing information from tables, charts and graphs

### Geography

- Positional language
- Directions
- Points of Compass
- Coordinates
- 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

## PE

- Directions and movement
- Positional language
- Shape and symmetry
- Timing events
- Measuring events (eg furthest long jump)

## History

- Timelines and sequences
- Accessing information from tables, charts and graphs
- Measuring (eg for a WW 2 Recipe)
- Accessing information from computer databases

## Art and Design

- Shape and symmetry
- Repeating patterns
- Language to describe 2D and 3D shapes
- Tessellating designs
- Proportion

## **ADDITIONAL ARRANGEMENTS**

### **Maths as part of Extended schools Programme.**

#### **School year**

- 2008 -2009 - Springboard Maths Intervention programme for P5 & P6 children experiencing difficulty. ( 10 weeks)
- 2009 -2010 - Springboard Maths Intervention programme for P4, P5 & P6 children who scored just below average scores in INCAS of October 2009. ( 6 weeks)

## **REVIEW PROCEDURES**

This Policy is designed to reflect current practice within the school environment. Although the overall aims for Numeracy teaching and learning are likely to remain fairly constant, the practices evolve over time as the school progresses in its development of Numeracy provision.

Accordingly this Policy is under a process of constant review and will be updated regularly to ensure it continues reflect current practice and to achieve its designated purposes.

**This policy has been reviewed March 2010.**

**APPENDIX 1:  
CURRENT TARGETS FOR NUMERACY**

**The School's Key Maths Targets 2009 - 2010**

- By June 2010, 100% of children will achieve Level 2+ in Mathematics and 50% at Level 3 in Mathematics.
  
- By June 2010, 94% of children will achieve Level 4+ in Mathematics and 40% at Level 5 in Mathematics.

These targets have been set using data available from INCAS and TESTWISE. They consider individual cohort trends and we hope they are more precise than the blunt use of trends across various cohorts which proved so in previous years.

Detailed analysis of this data will also be given to teachers to identify groups of children who are to be targeted to achieve improvements Mathematics & Numeracy.

**APPENDIX 2:**

**Analysis of School Targets for KS performance June 2009**

**Target**

<b><u>KS1 Maths</u></b>	<b>98% Level 2+</b>	<b>50% Level 3</b>
<b>Achieved</b>	<b>95%</b>	<b>42%</b>

<b><u>KS2 Maths</u></b>	<b>90% Level 4+</b>	<b>50% Level 5</b>
<b>Achieved</b>	<b>88%</b>	<b>33%</b>

The differences for Level 2+ and 4+ Maths targets are small and represent only one or two children short of the set targets. Improving an individual child makes a significant difference!

The higher Maths targets were more significantly below those set. The need to continue to review Maths teaching approaches and to use AfL to track individual progress in Maths is obvious. We need to be more ambitious for our children to achieve higher maths scores.

### Analysis of GL Maths Test Scores

P7

The mean standard age score of this group is still significantly below the national average. Compared to last year, however, there were noticeable improvements. The boys' means standardised score went up from 92.6 to 95.4 and the girls' went from 92.8 to 93.9 Two girls went from above average to well above average, two boys and one girl moved from a better average to above average and about 6 children moved from weak average into the average bracket. 3 boys and 3 girls in the weaker bracket regressed to the weakest category. Careful analysis of the specific needs of the weakest children is needed to ensure they continue to learn successfully.

Solving routine problems and algebra continue to be our pupils' biggest challenges.

? - 125 = 49 or ?  $\div$  33 = 3.353535 are not approached with success.

Continue a sequence of numbers going up by 0.1

One bus carries 48 people. How many buses for 465 people?

What is John's number if he divides by 100 and gets 7.5?

Click on the shapes that are  $\frac{1}{3}$  yellow?

Van carries 152 boxes. How many vans for 2576 boxes?

Complete the missing rows of a table

Reading scales for a passenger with and without their suitcase. What is the weight of the case?

Click on the net that will fold to make a cube.

1 part orange to five parts water. 75mls orange, how much water?  
Write an expression for the area of a pattern

These are typical questions which between 15% and 70% of our children answered incorrectly compared to national averages.

P6

The mean standard age for this group remains significantly below the national average. Again, however, there are marked improvements on last year. The boys mean score rose from 90.0 to 93.0 and the girls score went from 91.7 to 93.5. Only one boy remains in the weakest category - the two girls who were in that category have improved to the next category. There has also been a noticeable shift from the below average category into the just below average bracket. We still have double the national average at stanines 2 and 3. Across the average bracket we have also seen a shift to the higher categories. At the above average level, we have not seen any new children enter the top bands - but the one boy moved from stanine 7 to stanine 8. We need to continue these positive trends and seek better average children moving into the above average band. Targeted, differentiated and challenging teaching needs to occur as opposed to textbook led maths.

Areas such as Algebra, routine problem solving, space shape and measurement and data handling continue to pose challenges for our pupils - with under performance in the 8% - 15% range.

$$167 \times ? = 4175 \quad 167 + ? = 4175 \quad 16 + ? + 6 = 31 \quad ? \times ? \times ? = 36$$

Make the biggest odd number you can with a set of numbers cards.  
A TV programme starts at a given time. It lasts 35 minutes. When does the next programme begin?

What number is exactly half way between 985 and 1045?

$$295 \times 22 = 6490 \quad 295 \times ? = 3245 \quad 345 + 23? = 580$$
$$234 + 3?1 = 575$$

Reading train/bus TV timetables

Robotic angle turns, shapes with the same areas and mirror lines all posed problems

Write 2 500 metres in kilometres

16 eggs in a tray. 14 trays in a box, 32 boxes. How many eggs?

Each glass holds  $\frac{1}{5}$  litre. How many glasses from  $3\frac{1}{2}$  litres?

What fraction is equivalent to 60%?

All resulted in under performance of between 5% and 30% in our pupils compared to national standard scores.

P5

The scores for this group of children still remain significantly below the national average. However there was noticeable improvement within the average category with children moving from weak average to average and from average to good average. One boy moved into the above average category. The boys mean score moved from 87.7 to 89.3 and the girls moved from 84.5 to 86.2 but remain well below the national average of 100.

One third of the girls are now in the weakest possible bracket! They were below average but now the numbers have doubled from 14% to 31% of girls in this lowest bracket. This can only be addressed by identifying specific learning needs and differentiated teaching.

In general there is under performance in all areas.

$20 - 6 = ? - 16$      $15 + 4 = 5 + ?$      $95 - 27 = ?$      $6 \times 3 = 2 \times ?$

Reading league tables, bar graphs on sunshine in cities, reading thermometers and showing 15 degrees more, turning through right angles and quarter turns all proved challenging.

Sorting into Carroll diagrams for two criteria.

Symmetry

Completing sequences when numbers go up by eight.

Place value of digits up to 9999

8 players in a team. How many in five teams?

How many seconds in 1 minute 38 seconds?

The use of language such as twice as much, one third of children being girls, multiplying by ten and halving the answer.

All caused problems with underperformance ranging from 10% - 50% below national averages.

Only on the two questions -

What fraction of the shape is green and a table seats six, how many tables for 38?

did our children perform better than the national average!

P4

We have no comparison for last years P3. The mean score for boys is 89.6 and for girls is 92.7.

45% of our boys and 51% of our girls in P4 scored in stanines 1 - 3 more than double the national averages. Our KS1 maths programme is weak.

55% of our boys and 39% of our girls scored in the average bracket.

Only two children, both girls, scored in the above average category. They both scored in the highest category and no other pupils appeared near them.

In a queue 4 people are behind John. Click on John

Make it so that Jim and Mary have the same number of apples.

Complete a number wall.

Add up the cost of one fish and one chips from a given price list.

Drag and drop number cards to make 6.

$100 - 45 = ?$

What is the change from £1 when a book costs 73p?  
Add dots to two or three dice to add up to twelve.  
Complete the sequence - each number is half of the one before.  
League tables

*Basic number was the greatest weakness. Children appear to lack the ability to apply mathematics to simple life tasks after four years.*

P3

We have now extended the testing to years three and two. Results show that year 3 children are significantly below the national average also. The mean score for boys was 90.9 and for girls was 90.7.

No children achieved in the above average category.

62% of children were average.  
38% were below average - 15% higher than the average nationally.  
No significant differences between girls and boys achievement.  
Solving routine number problems was the greatest area of difficulty.

Make an odd number greater than 80 from digit cards.  
Which glass is less than half full?  
How many sticks used to make a pattern.  
Sort shapes by straight and curved sides.  
Number line - click on a number greater than 82 but less than 88  
Click and type 527 in figures not words.  
A pencil cost 45p. How much change from £1

P2

Showed average distribution of scores. No-one scored in the top two stanines. Is the new curriculum working? Maybe but the higher achievement levels are not readily apparent. Two boys and four girls need immediate assistance.

We need to continue to change our Maths teaching across the school.  
Our current approaches are not allowing our children to succeed.

**APPENDIX 3:  
NUMERACY TARGETS AND RESULTS**

**Maths Benchmarking Data 02 - 09**

**St Mary's**

**NI Schools**

<u><b>KS 2</b></u>	<u><b>Level 4+</b></u>	<u><b>Level 5</b></u>	<u><b>Level 4+</b></u>			<u><b>Level 5</b></u>		
'09	87.8%	32.8%	92.9	82.8%	75%	50%	40%	30%
'08	72.4%	13.8%	92.3%	84%	75%	50%	39%	28.6%
'07	83%	50%	45.8%			50%		
'06	81.8%	50%	52.8%			52.3%		
'05	78%	56%	52.8%			50%		
'03	95.65%	59.42%	45.0%			51.4%		
'02	95.59%	54.41%	42.0%			51.0%		

**KS1**    **Level 2+**    **Level 3**

**NI Schools**

			<u><b>Level 2+</b></u>			<u><b>L3</b></u>		
'09	94.4%	44.4%	100%	100%	92.1%	56.3%	42.9%	29%
'08	97.4%	25.6%	100%	98.1%	91.7%	57.9%	41.9%	27.8%
'07	100%	52%	58.7%			59.5%		
'06	100%	59.65%	46.9%			59.2%		
'05	96.3%	35.2%	50%			57.1%		

'03	95.45%	54.55%	48.1%	59.3%
'02	92%	62%	48.2%	56.9%

**APPENDIX 4:  
BENCHMARKED PERFORMANCE DATA**

**Northern Ireland Averages and St Mary's Primary School Summary  
Record**

**Maths Key Stage Results May 2009**

	<b><u>NI Average</u></b>	<b><u>St Mary's</u></b>
<b>Maths Level 2 or higher P4</b>	<b>94.6%</b>	<b>94.4%</b>
<b>Maths level 3 P4</b>	<b>46.5%</b>	<b>44.4%</b>
<b>Maths Level 4 or higher P7</b>	<b>80.6%</b>	<b>87.8%</b>
<b>Maths level 5 P7</b>	<b>41.1%</b>	<b>32.8%</b>

**APPENDIX 5: RESOURCES  
(COMMERCIAL SCHEMES, PRACTICAL EQUIPMENT, ICT AND  
WEB-BASED RESOURCES)**

Our scheme references

- NHM Teaching Files
- Steps Mathematics.
- Interactive Mental Maths ( Peter Patilla)

Teachers use a variety of other textbooks and websites to deliver the scheme of work.

Each class teacher is responsible for their maths resources.

All classes have Cuisenaire Materials and teachers have received training from NEELB CASS support.

BEAM materials have been purchased (Feb. 2010).

A new class pack of calculators have been provided by NEELB and are kept in P7 classroom.

Apex maths has been purchased as a aid to the teaching of processes/problem solving.

BEAM- Using and applying Maths challenges ' We can do it' by Peter Clarke has been purchased for P2 -7.

