St. Mary's N.S.

Whole School Plan for

Mathematics

Contents

Introductory Statement and Rationale

Vision and Aims

Content of the Plan

Strands and Strand Units
Approaches and Methodologies
Assessment and Record Keeping
Children with Different Needs
Equality of Participation and Access
Timetable
Homework
Resources and ICT
Individual Teachers' Planning and Reporting
Staff Development
Parental Involvement
Community Links

Success Criteria

Implementation

Review

Ratification and Communication

School Plan for Mathematics

Introductory Statement:

This document is a statement of the aims and objectives, principles and strategies for teaching Mathematics at St. Mary's N.S. It is a record of whole school decisions and is intended to guide teachers in their individual planning.

The plan for the teaching of Mathemetics was developed in 2000-2001 school year through a process of process of consultation at staff level and in class level groups. It was redefined during 2002-2003, with particular emphasis on the language of Maths. In 2003-2004 the staff identified priorities and developed action plans associated with using concrete materials, different approaches to consolidate number facts and problem solving. The whole school plan was revised in 2005-2006 and in 2011-2012 to make it more accessible

Rationale

We recognize the importance of developing a positive Mathematics culture in St. Mary's National School and wish to conform to the principles of the Revised Curriculum.These principles include furnishing the child with a means of manipulating, recording and communicating concepts that involve magnitude, number, shape and space and their relationships.

We realize the importance of developing the child's numeracy skills, mathematical language, problem solving skills and the ability to predict and estimate. We also recognize the need for good assessment and record-keeping, the importance of updating resources and the benefits of home-school links.

This document was prepared to communicate all the above to interested parties and to provide clear guidelines for existing and future teachers in our school.

Vision

St. Mary's National School recognizes the unique position of Mathematics in the curriculum because of its importance in everyday life as a process of managing and communicating information. We see Mathematics education as central in providing the child with the necessary skills to live a full life as a child and later as an adult. Furthermore, Mathematical applications and skills are required in many other subject areas of the Curriculum.

Aims

We endorse the aims of the Primary Curriculum for Maths as set out on page 12 of the Curriculum

- To develop a positive Mathematics Culture in the School.
- To enable the child to acquire proficiency in fundamental mathematical skills and in recalling basic number facts.
- To develop problem – solving abilities and a facility for the application of mathematics to everyday life.
- To enable the child to use mathematical language effectively and accurately.
- To enable the child to use mathematical language effectively and accurately.
- To enable the child to acquire an understanding of mathematical concepts and processes appropriate to his/her level of development and ability.
- To provide the pupils with a structured and uniform approach toward the development of their computational skills.

Curriculum

Strands and Strand Units: The curriculum objectives are used as the objectives for each class level in our school:

Junior & Senior Infants: pp.20 – 35 Curriculum
1st and 2nd Class: pp.40 – 59 Curriculum
3rd and 4th Class: pp.64 – 83 Curriculum
5th and 6th Class: pp.88 – 111 Curriculum.

At the start of each year teachers will familiarise themselves with the objectives for their class and make sure that their individual planning for the year incorporates all strands of the Maths curriculum.

Whole School Decisions in Relation to Curriculum Content

St. Mary's National School recognize that a common teaching approach to areas of difficulty such as subtraction, division and multiplication of fractions is very important in ensuring continuity and consistency. We also recognize the significant role that the correct use of mathematical language plays in the development of mathematical concepts for the child and as a school have agreed to adhere to the language and teaching approaches used in the Planet Maths scheme.

Discussion plays a significant role in the acquisition of mathematical language and in the development of mathematical concepts. Some of the language will be encountered only in a maths lesson. Therefore, the child will need many opportunities to use it before it becomes part of their vocabulary. The child should be given opportunities to discuss mathematics problems with other children as well as with the teacher. The use of symbols and mathematical expressions should only follow extended periods of oral reporting and discussion.

A review of teaching and learning in our school suggests that operations with whole numbers, involving subtraction and division and problem solving were the areas of greatest difficulty. In 2011-2012 we decided to concentrate on improving teaching and learning in these areas by adopting a unified approach to the use of mathematical language, teaching methods and steps, mental strategies for number facts (Planet Maths Resource Book 1, 2, & 3).

We decided to start each Maths lesson with a period of mental maths and to use mastery records to record progress.
We decided to use a multiplicity of approaches to consolidate number facts and to use table books

Number
The following number limits for each class will be adhered to:

Class	**Numerals**
Junior Infants	0-5
Senior Infants	6-10
1st Class	to 99
2nd Class	to 199
3rd Class	to 999
4th Class	to 9999
5th Class	
6th Class	

Senior Infants

Combine and Partition: Symbols '+' and '=' are introduced in Senior Infants
In Junior Infants when children combine groups they say '2 and 3 make 5

Senior Infants use symbols + and = to construct word sentences involving addition. For example:

- √ 3 and 3 makes 6 altogether
- √ 3 add 3 is the same as 6
- √ '+' means 'and' and 'add' when 2 and more groups are added together
- √ '+' has a special name – 'plus'
- √ '=' means 'the same as' 'equals' 'is equal to'
- √ 2=2 + 0 means that 2 is equal to 2 and no more

Number Stories: 8 = 3 + 5. eight is the same as (equals; is equal to) 3 and/add 5

1st Class: Symbol ' – ' is introduced. Subtraction is presented as deducting/taking away, difference/comparing two to find which is bigger, and by how much, complementing – the task is to equalise or build up the smaller number to the same size.

Language: Take away, subtract, minus, leave, difference between, compare, how much less

2nd Class: Operations with whole numbers involving Addition & Subtraction with renaming.
Language of subtraction pp 7 – 11 Pupil's Book 2
Language of renaming pp 87 – 94 Pupil's Book 2

3rd Class : Symbols 'x' and '÷' are introduced

Language of 'x' : equal groups of, times, multiply by

Language of '÷' : share equally, shares, two each, groups of, divide, divided into, divided by

Division is presented as 'share equally' 'shares' 'groups of' 'grouping' 'repeated subtraction' 'sharing and repeated subtraction
Teaching approach for subtraction without and with renaming to 999 pp 15 – 18 Pupil's Book 3
Teaching approach for multiplication pp 28, 31, 34, 54 pupil's book 3
Language of division pp 37, 39, 40, 41, 61 Pupil's Book 3
In Fifth and Sixth Class the words "product" and "quotient" are included.

Language of Addition & Subtraction Tables/Number facts:

3 + 4 =7	We say ' three **and** four are 7	(add, plus)
□ +4 =7	We say 'something' and 4 are 7	
7 – 4 = 3	We say 7 **take away** 5 leaves 2	(minus, subtract)

Language of Multiplication & Division Tables/ Number facts:

6 x 4 = 24	We say 'Six fours are 24	(times, multiply by)
□ x 4 = 24	We say 'Something/box multiply by 4 equals 24'	
24 ÷ 6 = 4	24 divided by 6 equals 4	
□ ÷ 4 = 6	We say 'What/Something divided by 4 equals 6'	

Place Value In place value, the word "units" will be used rather than "ones".

Written Methods

To ensure a common approach to the teaching of subtraction and fractions, we have agreed the following:

Subtraction

Vertical: Start from the top using the words "take away." 'I Can/I cannot take'
Horizontal: Start on left to using the words "take away"
On numberline: Start at 7. Count back 3. Where am I?
Renaming/regrouping will be the method used throughout the school.

Tables:

- Number facts up to ten are memorised in Senior Infants
- Addition facts are memorised by the end of First Class
- Addition & Subtration facts are memorised by end of Second Class
- Multiplication facts are memorised by the end of Third Class
- Multiplication & Divison facts are memorised by end of Fourth Class
- Addition & Subtraction, Multiplication & Division facts are revised and consolidation in 5th & 6th Class

Methods Used to Learn Number Facts

Senior Infants

Building to 10
Combining & Partitioning
Commutative & Associative properties

1st & 2nd Addition facts — Number Grid, Number Patterns, Memory Tricks
Building to 10
Combining & Partitioning
Doubles e. g. 2 + 2
Near doubles e. g. 2 + 3
Adding 0
Adding 1
Adding 10/ Adding numbers to 10
Commutative, Associative properties
Subtraction as inverse of addition

3rd & 4th Multiplication Facts/Tables — Number Grid, Number Patterns, Memory Tricks
Counting, pattern in counting
Even numbers first, 2, 4, 8,
Families: 3, 6, 9 (near 10)
10, 5, 7
Property of Zero
Link with division facts/tables : Number trios for consolidation
Mirroring the approach to fractions
Division as inverse of multiplication

5th & 6th Revise and consolidate number facts — Number Grid, Number Patterns, Memory Tricks

Data

Children are encouraged to collect real data. In the Infant classes children collect personal information and represent it on a pictogram, while older children create and interpret bar charts and pie charts. Children in 5th and 6th Class create a database using ICT and learn how to interpret large amounts of information. They are made aware of the importance of entering relevant data and asking clear questions to extract the required information from the data.

Skills

The following skills will be acquired by the children through the study of the various strands in the Curriculum:

- Reasoning
- Implementing
- Understanding and Recalling
- Estimation.
- Every strand studied provides opportunities for acquiring these skills. Opportunities are also provided for the transfer of these skills to other areas e.g. Science, Geography, Music.

Approaches and Methodologies

The following approaches and methodologies are used

The use of Manipulatives: Children use a broad range of mathematical equipment during lessons. Each class level has a resources box with a list of the items supplied, which is shared between two teachers. Children are encourage from Junior Infants through to 6th class to work with concrete materials, either individually, in pairs or in groups. This hand-on approach is supported by the updating of resources where necessary (See Resources Section of this plan)

Talk and Discussion: We see Talk and Discussion as seen as an integral part of the learning process and opportunities are provided during the Maths class for children to discuss problems with the teacher, other individual children and in groups. Discussion skills include turn-taking, active listening, positive response to opinions of others, confidence in putting forward an opinion and ability to explain clearly their point of view.

Active Learning/Guided Discovery: As part of the Maths programme for each class, children are provided with structured opportunities to engage in exploratory activities under the guidance of the teacher to construct meaning, to develop mathematical strategies for solving problems and to develop self motivation in mathematical activities. These activities are outlined in the teachers' long and short-term planning.

Using the environment/community as a learning resource: We recognize the importance of using the environment while studying mathematics e.g.

- √ Numbered doors
- √ Measurement charts
- √ Timetables
- √ Catalogues
- √ Registration numbers
- √ Shapes in environment
- √ Shopping
- √ Till receipts

- √ Speed limit signs
- √ Road signs
- √ Nature walks
- √ Packaging & Advertisements
- √ Newspapers
- √ Real life stories
- √ Counting & measuring

Problem Solving The"scaffolding" method of solving problems is encouraged i.e. building on the problem step-by-step.

1st & 2nd Class

Understanding the problem

- Read/repeat the problem
- Look for a pattern
- Guess and check
- Write number sentence
- Say/Write answer
- Say/Write the answer in a full sentence

Additional Help

- Draw a picture
- Use objects/people to act out the problem
- Children check

3rd – 6th Class

Understanding the problem

- Read the problem
- Read it again
- State/say in your own words what you know
- State/say what you are asked to find out
- Look for key phrases – find important information
- Write what you know

Solving the problem

- Look for a pattern
- Guess and check
- Write an equation
- Break the problem down and solve each part.

Additional Help

- Construct a model
- Draw a picture
- Make an organised list or table
- Use easier numbers
- Work backwards.

Answering the problem

- Use all the important information
- Check your work
- Decide if the answer makes sense
- Write the answer in a complete sentence

Estimation: Estimation is part of every Maths lesson. Children are encouraged to use each of the following strategies, selecting the most appropriate for the task in hand:

- Front end
- Clustering
- Rounding
- Special numbers

These strategies are explained on pages 32 –34 of the Teacher Guidelines for Mathematics.

Integration: The integration of mathematics with other subject areas helps to broaden and develop the child's interest in Mathematics and his/her understanding of Mathemetical concepts. For example, the child's understanding of time and money could be enhanced through links to history - investigation of sundials, water clocks, roman numerals and using old coins.

Linkage is integration within a subject area and this provides balance in the teaching of all the stands. For example, when studying weight (measures) a class may decide to chart the weight of pupils in the class onto a bar chart (data) linking the two strands, measures and data.

Assessment and Record Keeping

Assessment is used by teachers to inform their planning, selection and management of learning activities so that they can make the best possible provision for the varied mathematical needs of the children in our school. Teachers keep records of pupil progress using Maths Mastery checklists and Planet Maths Seasonal assessments.. Records of standardised tests are stored in the main office and results are reported to parents in line with circular 0018/2012.

In addressing individual differences each cognitive area is addressed using Planet Maths seasonal Assessments and/or teacher designed tasks

- √ Conceptual knowledge and understanding.
- √ Problem – solving ability (approaches, strategies).
- √ Computational proficiency.
- √ Recall skills (tables).
- √ Mastery of specific content areas.
- √ Ability to communicate and express mathematical ideas.
- √ Attitudes towards maths (confident, interest, willingness)

Assessment Approaches

Teachers use a variety of assessment approaches:

- Teacher observation of knowledge, skills development and participation in activities
- Teacher designed tests and tasks
- Work-samples, portfolios and projects
- Children are encouraged to assess their own work on a continuous basis

Teacher Observation

The curriculum makes reference to the validity of teacher observation as a means of building a broad understanding of a child's strengths. Teachers will note anything that they feel is important in relation to a child's progress in Maths.

Observations may include the following:

- The level of engagement in or attention to activities

- Strengths and concerns in relation to written work
- Involvement in discussions
- The response to and initiation of questioning during class or group-work.

Teacher designed tests and tasks

The following are used throughout the school to inform the class teacher and parents of each child's progress in Maths:

- Oral tests
- Written tests of numerical competence
- Problem-solving exercises that use a variety of mathematical skills
- Projects that require compilation of data or the drawing of a diagram

Standardised Testing

Achievement tests are used as follows:

- Planet maths Seasonal Assesments Tests are used from 1st – 6th class at end of each module
- Children bring the tests and the results of such tests home for signing
- Test results are kept in a file in the classroom & results entered in mastery checklist
- Copy of test results are kept by the class-teacher and passed on to the next teacher

Norm-referenced standardised tests:

- Children are formally assessed at the end of each year using of the Sigma-T tests
- All children from 1st – 6th class are tested in May of each year
- Each child's test paper is kept in the school office for one school year
- Sigma-T results are communicated to parents in summer report and discussed at the parent-teacher meetings
- In line with the school's policy on record keeping school files are kept until the child reaches the age of 21.
- Results of standardised tests are reported to Parents at the end of each school year and to secondary schools at the end of 6th class in line with circular 018/2012
- Results of standardised tests are reported to Department of Education of Skills at the end of 2nd class, 4th class and sixth class in line with circular 018/2012

Children with Different Needs

The Maths programme aims to meet the needs of all children in the school. With this in mind teachers vary the pace, content and methodologies used, to ensure effective learning for all children in the classroom. Evidence of this differentiated approach is recorded in teachers' planning.

Supplementary Teaching: Children who score at or below the 10th percentile on the standardised tests are given priority in selecting children for supplementary teaching. The supplementary teacher may administer diagnostic tests. Parental permission is obtained before these tests are administered.

Where children are deemed to require supplementary teaching by vitue of their score on standardised test or where a child has a difficulty with a particular concept or area, the Special Education teacher and class teacher work together to ensure that they have appropriate learning materials and resources in the mainstream setting. The progress of such children is reviewed on a regular basis.

Children of exceptional ability are given opportunities to work independently on more challenging activities.

Early Identification & Remediation of Difficulties in Mathematics

- Day to day observation by the class teacher will form an important element in identification of difficulties in Mathematics
- Children are screened used Sigma T in May of each year.
- Special Education Teachers liaise with class teacher in devising an appropriate programme
- As far as is practicable, the planning and work of Support Teachers is linked to the work of the classroom.
- Joint decisions regarding systems of intervention and instructional term are agreed by L.S.T. and class teacher
- The programme of work is reviewed at the end of each instructional term.

Prevention Strategies

- Whole School approach to the teaching of Mathematics
- Focus on hands-on approach and guided discussion
- Fostering of parental involvement in the child's education
- Access to equipment and materials
- Observation and early identification of problem areas
- Assessment and review

Equality of Participation and Access

All children are provided with equal access to all aspects of the Maths curriculum. Boys and girls are provided with equal opportunities to engage in mathematical activities.

Organisation

Timetable

The time allocated to mathematics as outlined in circular 056/2011 Initial Steps in the implentation of the National literacy and Numeracy Strategy is as follows:

Senior Classes: 4 hours 10mins
Infant Classes: 3 hours 25mins

The Revised Curriculum provides for discretionary curriculum time in the weekly timetable amounting to 2 hours per week in Senior Classes and 1 hour per week in Junior Classes. This affords the teacher and the school the flexibility to accommodate different needs and circumstances and to provide for the differing aptitudes and abilities in Mathematics or other subject areas.

In planning attention is paid to use of the environment and to linkage and integration. For example, patterns in number may be linked to design in art. Similarly, data collected in Geography to may be used in bar-charts in Maths lesson.

Homework

St. Mary's N.S. recognizes the crucial role the interactive experiences of the home plays in language acquisition and mathematical skills development.

The importance of the hands-on approach, together with guided discussion is raised at Parent/Teacher meetings and in conversation with parents generally.

Important Considerations in relation to homework

- Homework should be line with the approaches as set out in the curriculum for Maths
- Maths homework should be given each night homework is given
- Homework allocated should take account of the differing levels of ability in the class and should be a positive experience for all
- Children should generally be given a mixture of number work, the current concept being taught and mental Maths
- Tables may also be given for homework but children should be given an opportunity to begin the process of learning these in class
- Practical activities should be given from time to time (e.g. measuring) bearing in mind the age and independence of the children
- Time should be allocated as part of the Maths lesson for correction of Maths homework and the review of any problems arising
- From time to time children may correct each other's work

Resources and ICT

The following areas are discussed in this section:

- Manipulatives
- E-Manipulatives, including spinners, 2D and 3D shapes, place value blocks, etc.
- Calculators
- ICT
- Textbooks and workbooks
- Supplementary materials.

Manipulatives

Concrete materials are important in the development of mathematical concepts for children in all classes.
Infant classes have a supply of suitable materials in each classroom and are responsible for checking resources and identifying needs on a regular basis.
1st – 6th class: The two teachers at each class level have access to a suitable Maths equipment resource box. They are jointly responsible for checking these resources at the end of the year and for listing needs as they arise. A list of items to be repaired/replaced or additional items needed should be sent to the designated person in charge of Maths, Ms Ailish Mc Manus

Reminders:

- An inventory of all Maths equipment is available from the office
- All Maths equipment bought with school funds remains the property of the school
- Teachers may borrow equipment from other classes but must make sure that it is returned promptly

Calculators

In 4th class children learn how to use the calculator. In 5th and 6th class calculators are used alongside traditional paper-and-pencil methods, for handling larger numbers, to check answers, to explore the number system and to remove computational barriers for weaker children. The skill of estimation is developed along with the use of the calculator.

ICT

All classrooms have access to a stand alone PC and to a fully networked computer room. Computer software programmes are available on the network and from the staff room/computer room. A list of software to be purchased for individual classroom use/replaced should be sent to the designated person in charge of ICT is Ms Ailish Mc Manus.
Planet maths Digital is in use in all classrooms which are equipped with an interactive whitboard.

Software used: Baggin the Dragon, Numbershark, Maths Circus, Computer in the Classroom, Milley's Maths House, Maths Made Easy, Teddy Games, Learn More Through Games internet games

Textbooks/workbooks
The school recognizes the role of a structured mathematics scheme as a convenient source of graded material, as a support for uniformity of language and methodologies and as a focus for whole class teaching and review.

- In September 2011 we commenced using Planet Maths as a maths textbook throughout the Junior section of the school as a pilot project. This was reviewed in May 2012 and it was decided to use Planet Maths throughout the school. This scheme complies with the language and methologies of the Revised Curriculum and deals with strands and Strand Units covered in the Curriculum.
- This scheme is used in all classes from Junior Infants to 6th class as the basic text. Planet Maths seasonal Assessment tests are used 1st – 6th class
- Teachers should not use the text chosen for the next class level in the same scheme as this may lead to difficulties in terms of continuity and progression in the following year.
- Teachers may also use other textbook to supplement the basic text
- Mental Maths resources: New Wave Mental Maths, Maths Challenge

Individual Teachers' Planning and Reporting

All teachers base their yearly and short term plans on the approaches set out in this whole school plan for Maths. The agreed template for short-term planning and cuntas míosiul is submitted to the principal at the end of each month. Alternatively, teachers may plan and record in a different way using these headings.

Staff Development

Teachers are made aware of opportunities for further professional development in Education Centre or other venues. From time to time, skills and expertise within the school are shared and developed through inputs at staff meeting.

11. Parental Involvement – Home School Links

Parents are encouraged to support the school's programme for Maths through their involvement with their child's homework. Individual parent/teacher meetings are arranged in November each year but parents and teachers also meet at other times throughout the year as the need arises
Maths for Fun is encouraged throughout the school and Parent courses in relation to Maths are organised by the Home School Liasion Teacher.

Particular attention could be drawn to:

- The importance of trial and error, estimation, the use of concrete materials and the role of calculators
- The school's approach to operations with whole numbers, especially subtraction and division is outlined
- School homework policy
- The homework journal provides for two-way communication between teacher and parent on progress in Mathematics and other issues.

Community Links

Teachers may invite members of the local community to assist the school's Maths programme. In this context, the proposed invitations must be discussed in advance with the principal.

Success Criteria

Criteria used to evaluate plan

- Pupil/ Teacher/ Parent /Community Feedback
- Implementation of revisions in the Maths curriculum will be evident in teachers' planning and work
- Continuity of content and methodology will be evident in teachers' preparation and monthly reports
- On going assessment, formal and informal, will show that pupils are acquiring an understanding of mathematical concepts and a proficiency in maths skills appropriate to their age and ability.

Implementation

Roles and Responsibilities: Class teachers are responsible for the implementation of the Maths programme for their own classes. The post holder with responsibility for Maths, Ms Ailish Mc Manus, supports the implementation of the Maths programme and is responsible for distribution and monitoring of resources..

The Special Education team is responsible for colating the results of standarised tests and for monitoring overall standards in Maths in our school.

Timeframe: 2017-2020

Review

There will continue to be regular review of practice at staff meetings and class groups to ensure that particular curriculum and organisational decisions on the teaching of Mathematics are being implemented.

We will also examine, what effect if any, our revised plan is having on Maths standards in June of each year.