**St. John’s N.S., Kenmare**

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**Whole School Plan for**

**Mathematics**

**Mathematics School Plan**

**Introductory Statement**

This document is a statement of the aims and objectives, principles and strategies for implementing the mathematics programme at St. John’s N.S., Kenmare. It was formulated by the school staff and informed by the Curriculum Statements and Curriculum Guidelines, needs of the children and the expertise and experience of the staff.

**Vision and Aims**

**(a) Vision**

* To give all pupils an opportunity to succeed regardless of ability.
* To provide the child with the necessary skills to live a full life as a child and later as an adult.
* To emphasise the practical aspects of maths using problem solving and social maths.
* That maths is fun and can be enjoyed by all members of the school community.

We see maths as being very important in relation to our school and very necessary in the development of all our pupils. It is a subject, which has many values, including practical and aesthetic and can benefit all our pupils.

**(b) Aims:**

We endorse the aims and objectives of the curriculum for mathematics.

* To develop a positive attitude towards mathematics and an appreciation for its practical and its aesthetic aspects.
* 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 acquire an understanding of mathematical concepts and processes to his / her level of development and ability.
* To enable the child to acquire proficiency in fundamental mathematical skills and in recalling with ease number facts.
* To develop the ability to think clearly and logically in mathematics.
* To develop imagination, initiative and flexibility of mind and to develop the skills of working systematically, independently and co-operatively.
* To provide pupils with a supportive atmosphere in which to develop their mathematical skills.

**Objectives**

We endorse the aims and objectives of the Curriculum for mathematics, including the following:

**Skills development**

That the children would be enabled to:

* apply mathematical concepts
* communicate and express mathematical ideas
* make mathematical connections within mathematics itself
* recall and understand mathematical terminology, facts, definitions and formulae
* reason, investigate and hypothesise.

**Number**

That the children are enabled to:

* understand, develop and apply place value
* understand and use properties of number
* understand the nature of four number operations
* approximate, estimate and calculate mentally
* understand the links between fractions, percentages and decimals
* use acquired concepts, skills and processes in problem solving

**Algebra**

That the children

* explore, perceive, use and appreciate patterns and relationships in number
* identify positive and negative integers on the number line
* understand the concept of a variable and substitute values for variables in simple equations
* translate verbal problems into numeric expressions and solve same
* acquire an understanding of properties and rules concerning algebraic expressions
* use acquired concepts, skills and processes in problem-solving

**Shape and Space**

That the children will be enabled to:

* develop a sense of spatial awareness
* investigate, recognize, classify and describe the properties of lines, angles and two and three dimensional shapes
* deduce informally relationships and rules about shape
* combine, tessellate and partition two-dimensional shapes and combine and partition three-dimensional shapes
* draw, construct and manipulate two and three dimensional shapes
* identify symmetry in shapes and in the environment
* describe direction and location using simple co-ordinate geometry
* use acquired concepts, skills and processes in problem-solving

**Measure**

That the children will be enabled to:

* know, select and use appropriate instruments of measurement
* estimate, measure and calculate length, area, weight, capacity and speed, angles, time and money
* recognize and appreciate measures in everyday use
* use acquired concepts, skills and processes in problem-solving

**Data**

That the children are enabled to:

* collect, classify, organize and represent data using concrete materials and diagrammatic, graphical and pictorial representations
* read, interpret and analyse tables, diagrams, bar charts, pictograms, line graphs and pie charts
* appreciate, recognize and express the outcomes of simple random processes
* estimate and calculate
* use acquired concepts, skills and processes in problem-solving

**Content of Plan**

**Curriculum**

**Strands and Strand Units**

**Infant Classes:**

**Strands Strand Units**

Early mathematical Activities Classifying

 Matching

 Comparing

 Ordering

Number Counting

 Comparing and ordering

 Analysis of number:

 Combining

 Partitioning

 Numeration

Algebra Extending patterns

Shape and Space Spatial awareness

 3-D shapes

 2-D shapes

Measures Length

 Weight

 Capacity

 Time

 Money

Data Recognising and interpreting data

**First and Second Classes**:

**Strands** **Strand Units**

Number Counting and numeration

 Comparing and ordering

 Place value

 Operations:

 Addition

 Subtraction

 Fractions

Algebra Extending and using patterns

Shape and Space Spatial awareness

 2-D shapes

 3-D shapes

 Symmetry

 Angles

Measures Length

 Area

 Weight

 Capacity

 Time

 Money

Data Representing and interpreting data

**Third and Fourth Classes**:

**Strands** **Strand Units**

Number Place value

 Operations:

 Addition and subtraction

 Multiplication

 Division

 Fractions

 Decimals

Algebra Number patterns and sequences

 Number sentences

Shape and Space 2-D shapes

 3-D shapes

 Symmetry

 Lines and angles

Measures Length

 Area

 Weight

 Capacity

 Time

 Money

Data Representing and interpreting data

 Chance

**Fifth and Sixth Classes**:

**Strands** **Strand Units**

Number Place value

 Operations

 Fractions

 Decimals and percentages

 Number theory

Algebra Directed numbers

 Rules and properties

 Variables

 Equations

Shape and Space 2-D shapes

 3-D shapes

 Lines and angles

Measures Length

 Area

 Weight

 Capacity

 Time

 Money

Data Representing and interpreting data

 Chance

**(See maths section at** [**www.curriculumonline.ie**](http://www.curriculumonline.ie) **for further details)**

**Integration**

A cross curricular approach will help the child to make connections between different curricular areas, add to the childs enjoyment of mathematics and encourage the transfer of learning.

**Linkage**

All the strands of the mathematics programme will be seen and taught as interrelated units in which understanding in one area is dependent on and supportive of ideas and concepts in other strands.

**Tables**

**Schematic Teaching of addition tables**

**Addition and Subtraction Tables**

1st class: Addition 1-10

2nd class: Subtraction 1-10

Language used: 2 plus 2 equals 4

 4 take away 2 is 2

**Multiplication and Division Tables**

3rd class: Multiplication 1-10

4th class: Division 1-10

* Multiplication / Division tables will be introduced as repeated addition and repeated subtraction.
* Begin with 2X, 4X and 8X, followed by 3X, 6X, 9X times tables.
* Then teach 5X and 10X tables
* Then teach 7X
* Pupils develop an awareness that multiplying by 2 is the same as doubling the number, multiplying by 3 is trebling the number.
* Division is taught in the same order
* Children will be taught strategies to assist understanding and easy recall of the basic facts.
* Commutative law ie. 3 x 2 = 2 x 3. This also applies for addition ie. 3+6 = 6 + 3
* Placing multiples on the hundred square. Highlighting the distinctive patterns formed especially for 9s and 10s.
* Use of cubes, e.g., making sets of 6.. pick up 3 of these, 3 X 6 = 18
* Pupils will understand that division is the inverse of multiplication, subtraction is the inverse of addition.

**Activities for tables**

* Use of games, e.g., bingo, etc.
* Loop games
* Competitions e.g. Last man standing, Buzz, Beat the clock (My Personal Best)
* ICT, e.g., tables Challenge, Folens online, singing the tables, clapping rhythms

Tables are linked with course content in all classes from 1st to 4th. Tables are introduced through practical activities and examination of number patterns.

Preparatory work includes practical sorting and grouping, understanding concepts, reasoning, counting in sequence.

Tables are linked to Mental Maths by problem solving.

Cubes, lollipop sticks and counters are used as practical aids in learning and understanding tables.

Parents have a very active role in assisting children learn tables as part of their homework assignment.

The 100 square is used to demonstrate the functions of tables.

For children with special needs or learning difficulties a practical approach is adopted so that material is always available in small group settings.

Progress in tables is assessed through quizzes, online games and teacher designed tests.

**Talk and Discussion**

Talk and discussion in maths is an integral part of the learning process.

Pupils will be given opportunities to explain how they got an answer to a problem, exploring alternative ways of approaching a problem, giving oral descriptions of group solutions.

The language used in maths teaching will be modelled by the teacher, e.g. “difference between”, “smaller than”, “less than”, subtraction”, “altogether”, “in total”, “greater than”.

A thematic approach will be used for linkage, e.g. using decimal fractions and their use in data, pie charts, measuring money, etc.

There will be an agreed emphasis on the language of mathematics.

The children’s own environment and ideas will be used to reinforce maths language, e.g. comparisons – “taller”, 2longer”, “wider”, etc.

The following common language will be used:

* Addition – total, sum of, add, plus
* Subtraction – minus, take away, difference, less than, leaves
* Multiplication – times, product of, multiply, groups of
* Division – divide, share, split, groups of
* Equals – is the same as, is, will be, means

There will be a common approach to the teaching of number facts.

**Multiplication Tables**

Multiplication tables are expressed in the following manner by saying 3 2s are 6, 4 2s are 8.

Standardised procedures and mathematical language to be used in relation to computation are outlined in this plan.

**Division Tables**

As division is the inverse of multiplication it will be taught in this manner. Lots of preparatory work will be done initially on multiplication, e.g.

Multiplication tables

Pattern work on the 100 square

Learning the multiples

The school will adopt a common approach to all areas to ensure continuity and consistency especially when transferring from the Junior groups to the Senior groups. The school as a whole will encourage the accurate and effective use of mathematical language.

**Estimation**

Estimation skills are developed in all strands and at all levels.

In teaching Measures at all levels we take every opportunity to have the children practise estimation of

* Lengths
* Heights
* Widths
* Distances
* Weights
* Volume
* Capacity

Key strategies for Measures

1. Estimate
2. Discuss or consider
3. Measure or do
4. Record or report

Estimation Procedure for number

* Estimate first
* Write down your estimate
* Solve the problem
* Compare your estimate with the actual result

Calculators: Children from fourth class upwards are facilitated in the use of calculators. They are encouraged to estimate first what the answer to a problem should be.

**Mental Maths**

It is school policy that mental arithmetic is a feature of daily mathematical activity. The approaches used include the following:

* Number lines
* Hundred squares
* Games
* Tables Activities
* Questioning with response to be calculated mentally by children

**Collaborative and Co-Operative Learning**

Three / four members in a group

Mixed abilities

Explaining and allocating roles

Golden rule in group work: Nobody is finished until everybody is finished. Children will be trained in discussion skills before they effectively use them in a group.

**Discussion skills**

* Turn-taking
* Active-listening
* Responding positively to the opinions of others
* Confidence in putting forward an opinion
* Ability to explain clearly their point of view

**Problem-Solving**

The focus is on real life problem solving

Types of problems

* Word problems
* Practical tasks
* Open-ended investigations
* Puzzles
* Games
* Projects
* Mathematical trails

Strategies used

* RUDE (read, underline, draw, estimate)
* RAVE CCC (read, attend to key words, visualize, estimate, choose numbers, calculate, check)

**Using the Environment**

The children are learning all the time from the people and materials around them. In our teaching we look to the environment of the classroom, the school grounds, the locality of the school, the children’s homes and the wider world for opportunities to make maths more real, more interesting and more fun.

**Creating a maths rich environment**

* Maths area / maths table in every classroom
* Maths games
* Maths trails
* Number rich environment in Infant rooms
* Playground markings

**Skills through Content**

* Applying and problem-solving
* Communicating and expressing
* Integrating and connecting
* Reasoning
* Implementing
* Understanding and recalling

The skills and the methodologies to develop them are modelled by the teacher.

**Assessment and Record Keeping**

Assessment is an integral part of the teaching and learning process. All strand units of the maths programme will be assessed using a variety of assessment tools.

* **Teacher observation**

The teacher observes the child’s activity, written work, discussion and questioning during class or group work.

* Class Discussion
* Error analysis
* Homework / Parental feedback
* Work samples, projects
* Teacher designed tasks and tests

Oral tests of recall skills (tables, counting in groups, number patterns continued)

Written tests

* Standardised Tests

Sigma-T tests will be administered in June each year. Records will be kept safely in the filing cabinet. As well as yielding a sten score and percentile rank these are useful diagnostic tools to determine strengths and weaknesses on the parts of pupil / class /school. They can also be used to determine children who need learning support hours.

**Children with Different Needs**

Children in each class will show a wide range of ability, attainment and learning styles. Consequently the mathematics programme will be flexible to accommodate children of different levels of ability and will reflect their needs.

**Adapting to the needs of Lower Attainers**

* Use easily computed figures when introducing new concepts or as an aid to problem solving.
* While the children will be exposed to all aspects of the curriculum, certain areas must be prioritised.
* Adapting the programme to suit their ability.
* More individual attention
* More concrete approach
* Emphasising maths language
* Maths games
* Resources
* Learning support guidelines

**Suggesting strategies for challenging Higher Attainers**

* Problem solving books / Brain Teaser Books
* Maths Facts Book
* Maths games
* Guidelines for Gifted children

**Organisation**

**Timetable**

Maths will be allocated – 4 hours 10 minutes per week in Classes 1 – 6

 3 hours 25 minutes per week for Infants

Some discretionary time can also be allocated.

**Homework**

Generally maths homework will be given every day, Monday to Thursday. Homework should not require teaching at home. It should be reasonable and achievable. Concepts for homework should be already well established in classroom practice.

**Types of homework**

* Written consolidation of work done in class
* Tables
* Problem solving
* Practical assignments
* Collecting data

**Active Learning and Guided Discovery**

It is school policy to use materials at all levels and appropriately because

* Concrete materials play an important role in concept development. They provide a link to connect the operational to real world problem-solving situations.
* Experience with concrete materials also facilitates the development of appropriate language as children communicate about what they are doing and what they see happening.
* As they use models children should also begin to understand the symbolism related to the operation.
* Models can then be used to help children learn new thinking strategies.

**Resources and ICT**

**Teaching materials will be provided at all class levels and in every strand.**

Children will experience a variety of materials and will have the freedom to choose from these when exploring a mathematical task. A variety of teacher designed worksheets, photocopiable master books, teacher reference books and textbooks will be used in order to present work to the children in a variety of ways. Calculators, (4th to 6th), and computers will enhance the implementation of the curriculum.

**Textbooks**

Textbooks will be evaluated by the Staff and will include a balanced treatment of all strands, varied presentation of problems and an emphasis on the use of manipulatives. St. John’s N.S. has adopted Operation Maths by The Educational Company as the core textbook up to and including 4th classes. Mathemagic is the general textbook in use in 5th and 6th classes. New Wave Mental Maths by Prim Ed. Is also used widely in the school. However, a wide range of maths textbooks and resources is available to teachers to supplement the mainstream textbooks.

**Maths and ICT**

**Calculators**

Pupils in 4th, 5th and 6th class learn to use calculators for some maths activities. Children will always be encouraged to estimate first before calculating exact result on the calculator.

**Using a calculator**

* The first reason for using a calculator is for **checking answers**.
* If **problem solving** is the main objective of the exercise, use a calculator.
* Use a calculator for **teaching place value**: e.g. 7846 – change to 7046
* (800 has to be subtracted, not 8) 7846 – change to 7806 etc.

**Computers**

Like the calculator, the computer is a tool to enhance the implementation of the Curriculum.

* Some of the uses of ICT in Mathematics are:
* drill and practice
* adventure programs, eg. Folen’s Online Interactive Activities
* using the internet to access materials and information.

It is open to staff to use computers in the delivery of the Maths curriculum in the best way and to the extent to which they feel best enhances learning on the part of the pupils.

**Equality of Participation and Access**

Boys and girls are given equal access to the maths curriculum. Strengths and weaknesses are noted and dealt with. Children with special needs and / or learning difficulties are accommodated and plans modified to suit their needs. To this end the Principal and class teachers will discuss with the learning support / resource teachers how best to ensure equality of access and participation to all students. More able children will be challenged appropriately.

**Individual Teachers’ Planning Reporting**

This whole school plan and the curriculum documents for mathematics provide a great deal of information and guidance to teachers in their long and short term planning. All teachers follow the methods which they feel suit their class and their individual needs best.

Teachers review the methodologies of teaching mathematics at staff meetings / Croke Park hours etc. and the staff endeavour to plan for the most effective delivery of the maths curriculum for our pupils.

**Success Criteria**

We hope this plan will make a difference to the teaching and learning of mathematics in our school.

* We as teachers will communicate on a regular basis and ensure consistency between classes.
* We will plan our individual work with due regard for the level of attainment and understanding the child has reached prior to entering our class and when leaving to begin in another class.
* We will know the plan has achieved its aims by seeking feedback from one another at staff meetings, from parents at parent-teacher meetings, from results collated in pupils assessments, from listening to the language the pupils use when working on a problem and explaining how they arrived at an answer.

The greatest indicator of our success will be that the plan will enhance our pupils

learning and understanding, will enhance problem solving abilities and will facilitate the application of mathematics to everyday life.

**Implementation**

1. **Roles and Responsibilities:**

The plan will be supported, developed and implemented by the whole school staff under the direction of the Principal and the post holder with responsibility for maths who will co-ordinate the progress of the plan, encourage and accept feedback on its implementation. Time will be allocated at staff meetings to discuss the plan and its implementation.

1. **Timeframe:**

The plan will be monitored, reviewed every second year and certain areas will be identified for amending or improving upon.

**Review**

1. **Roles and Responsibilities:**

We will review this plan on a regular basis to ensure optimum implementation of the mathematics curriculum in the school.

The Principal will have responsibility for co-ordinating the review.

The Principal and post holder having responsibility for Maths will record feedback from staff at staff meetings.

1. **Timeframe:**

The mathematics plan will be reviewed informally and formally in April 2019.

**Ratification and Communication**

All teachers endeavour to implement this programme. A copy of this will be given to each teacher and will be ratified by the Board of Management.

This plan was ratified by St. John’s N.S. Board of Management on \_\_\_\_\_\_\_\_\_\_\_\_\_

Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Chairman, BoM)