ST. DAVID'S NATIONAL SCHOOL

MATHS POLICY

INTRODUCTION:

This policy was originally drafted in 2010. It has been reviewed at a staff meeting in April 2019.

RATIONALE:

This document outlines the principles, aims and objectives, approaches and methodologies and emphases for teaching maths in St. David's National School.

VISION:

Each child in our school is viewed as an individual with unique needs and strengths. We endeavour to give each child an enthusiasm for Maths activities and enable them to see the relevance of Maths in everyday life. Each child is encouraged to attain a level of proficiency in fundamental mathematical skills and numeracy, while allowing for differences in aptitude and developmental needs.

AIMS:

The aims of the primary mathematics curriculum are:

- to develop a positive attitude towards mathematics and an appreciation of both its practical and its aesthetic aspects
- to develop problem-solving abilities and a facility for the application of mathematics in 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 appropriate level of development and ability
- to enable the child to acquire proficiency in fundamental mathematical skills and in recalling basic number facts

OBJECTIVES:

When due account is taken in intrinsic abilities and varying circumstances, the mathematics curriculum should enable the child:

Skills Development

- apply mathematical concepts and processes, and plan and implement solutions to problems, in a variety of contexts

- communicate and express mathematical ideas, processes and results in oral and written form
- make mathematical connections within mathematics itself, throughout other subjects, and in applications of mathematics in practical everyday contexts
- reason, investigate and hypothesise with patterns and relationships in mathematics
- implement suitable standard and non-standard procedures with a variety of tools and manipulatives
- recall and understand mathematical terminology, facts, definitions, and formulae

Number
- understand, develop and apply place value in the denary system (including decimals)
- understand and use the properties of number
- understand the nature of the four number operations and apply them appropriately
- approximate, estimate, calculate mentally and recall basic number facts
- understand the links between fractions, percentages and decimals and state equivalent forms
- use acquired concepts, skills and processes in problem-solving

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

Shape and Space
- develop a sense of spatial awareness
- investigate, recognise, classify and describe the properties of lines, angles, and two-dimensional 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-dimensional and three-dimensional shapes
- identify symmetry in shapes and identify shape and symmetry in the environment
- describe direction and location using body-centred (left / right, forward / back) and simple co-ordinating geometry
- use acquired concepts, skills and processes in problem-solving

Measures

- know, select and use appropriate instruments of measurement
- estimate, measure and calculate length, area, weight, capacity and average speed using non-standard and appropriate metric units of measurement
- estimate, measure and calculate angles, time, money and scale using non-standard and appropriate units of measurement
- recognise and appreciate measures in everyday use
- use acquired concepts, skills and processes in problem-solving

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

SKILLS:
Through mathematical teaching and learning, the children enhance and develop the skills of:-

Infant to Second Classes:-
- applying and problem-solving
- communicating and expressing
- integrating and connecting
- reasoning
- implementing
- understanding and recalling

Third to Sixth Classes:-
- applying and problem-solving
- communicating and expressing
- integrating and connecting
- reasoning
- implementing
- understanding and recalling

STRAND AND STRAND UNITS:
It is the responsibility of each class teacher to be familiar with the content objectives of each strand and strand unit at her class level and to ensure a balanced treatment of each strand. It is also important that there is consistency between teachers in the use of mathematical language:

1. Numbers
2. Algebra
3. Shape and Space
4. Measures

5. Data

6. Early Mathematical activities (infants only)

The Revised Curriculum has a number of emphases in approach and methodology which we will endeavour to implement as outlined.

Strands	Infant Classes Strand Units	First and Second Classes Strand Units
Early mathematical activities	- Classifying - Matching - Comparing - Ordering	
Number	- Counting - Comparting and ordering - Analysis of number Combining Partitioning Numeration	- Counting and numeration - Comparing and ordering - Place value - Operations Addition Subtraction - Fractions
Algebra	Extending patterns	Exploring and using patterns
Shape and space	- Spatial awareness 3-D shapes 2-D shapes	- Spatial awareness 2-D shapes 3-D shapes - Symmetry - Angles
Measures	- Length - Weight - Capacity - Time - Money	- Length - Area - Weight - Capacity - Time - Money
Data	Recognising and interpreting data	Representing and interpreting data

Strands	Third and Fourth Classes *Strand Units*	Fifth and Sixth Classes *Strand Units*

Number	- Place Value - Operations
	   Addition and subtraction
	   Multiplication
	   Division - Fractions - Decimals
		- Place Value - Operations
		   Addition and subtraction
		   Multiplication
		   Division - Fractions - Decimals and percentages - Number theory

Algebra	- Number patterns and sequences - Number sentences	- Directed numbers - Rules and properties - Variables - Equations
Shape and space	2-D shapes 3-D shapes - Symmetry - Lines and angles	2-D shapes 3-D shapes - Symmetry - Lines and angles
Measures	- Length - Area - Weight - Capacity - Time - Money	- Length - Area - Weight - Capacity - Time - Money
Data	- Recognising and interpreting data - Chance	- Recognising and interpreting data - Chance

APPROACHES AND METHODOLOGIES:

1. ***A hands-on approach / concrete materials***

Pupils will have, opportunity to work with a variety of concrete materials from Infants through to 6th Class. Exploring new concepts and ideas with concrete equipment <u>should always precede</u> the written mathematical recording.

2. ***Guided Discussions***

Opportunity will be given for pupil-pupil and pupil-teacher discussion in order to help pupils clarify their thinking and gain confidence in expressing their approach to solving a particular problem.

To achieve this, pupils need practice in turn-taking, active listening and responding positively to the opinions of others.

3. ***Estimation***

A particular emphasis is placed on estimation in all strands of the curriculum. Pupils should see the relevance of this for real life mathematics e.g. shopping, measuring distances etc. Pupils will be led to see an estimate as a sensible guess and as they progress they should consistently follow the estimation procedure:

- estimate first
- write down your estimate
- solve the problem
- compare your estimate with the actual result

Pupils may also be taught estimating strategies e.g. front-end strategy, clustering strategy, rounding strategy and special numbers strategy.

4. ***Problem-Solving***

It is noted that this is an area of Maths where pupils often experience failure. Pupils need to be taught problem-solving skills. The problems which are presented to pupils should be relevant to their real-life experience. Large awkward numbers should be avoided so as to concentrate on the actual problem-solving skill involved.

Pupils need to be taught to analyse problems carefully:

- what does it tell me?
- what does it ask me to do?
- how will I do it?
- have I all the information I need?
- solve the problem
- have I done what I was asked to do?

Pupils should be taught a variety of strategies and should experiment with applying the same strategy to different problems and different strategies to the same problem.

Some problem-solving strategies which can be taught to children are:

- drawing a diagram to illustrate a problem
- making a chart of the information
- making a guess and testing it out
- breaking the problem down and solving each part
- writing a number sentence for the problem
- using appropriate equipment to solve the problem
- solving a simpler version of the problem e.g. using smaller numbers

The teacher will need to structure the problems given so that the children experience success.

MATHEMATICAL LANGUAGE:
The importance of using Mathematical Language accurately and consistently throughout the school is underlined in the Revised Curriculum. The following outlines the school policy in a number of areas where inconsistency and confusion might occur:

1.   *Place value*
     The term 'units' will be used rather than 'ones'.

2.   *Subtraction*
     The decomposition (regrouping) method is used in subtraction. The relationship with subtraction will be explained.

3.   *Multiplication Tables*
     We say "five twos are ten, five threes are fifteen". The relationship with division will be explained.

4.   *Division*
     We say "two goes into six three times" or "two into eight goes four times", "two into ten goes five times". The relationship with multiplication will be explained.

     Pupils will be made aware of the two aspects of division i.e. the share aspect and the group aspect.

     For example:
     (a) SHARE – divide 21 sweets between 3 children. How many sweets will each get? $21 \div 3 = 7$. Each gets seven

     (b) How many GROUPS of 3 can I make from 21? (commence using repeated subtraction).

$$21 - 3 = 18$$
$$18 - 3 = 15$$
$$15 - 3 = 12$$
$$12 - 3 = 9$$
$$9 - 3 = 6$$
$$6 - 3 = 3$$

$$3 - 3 = 0$$

Can be written as a division sentence 21 ÷ 3 = 7.

A booklet for parents is available online on the school website to assist them with mathematical language and concepts.

Use of Calculators
In line with the Revised Curriculum calculators will be used for some Mathematical activities from 4th to 6th Classes.

Some occasions when calculators might be used are:

- when developing problem-solving skills to allow the pupil to concentrate on the structure of the problem and the number operations needed to solve it rather than on the calculations aspect
- to check estimates
- to perform long and complex computations
- to provide exact answers to difficult problems e.g. when using data from newspapers

Pupils should be encouraged to discuss with the teacher when it would be appropriate to use a calculator.

The following points should also be noted with regard to the use of calculators:

- use of calculators is not a substitute for practical activities with concrete materials
- use of calculators is not a substitute for mastery of basic number facts

USING THE ENVIRONMENT:
When approaching all strands an emphasis will be placed on practical relevant assignments e.g. collect real data from pupils in class, measure items in the classroom and at home, observe shapes in the environment etc, maths trails in the school environment.

ORAL AND MENTAL MATHS:
Time is given to development of proficiency in mental maths at all class levels.

HOMEWORK:
In general homework is seen as reinforcement and consolidation of the work begun in the classroom. Homework assignments should be realistic, practical and relevant. The following types of activity might be set for homework:

- further practice of written numerical tasks which have been carried out in class
- practical tasks e.g. measuring length and width of your bedroom, noting capacity of different items in your fridge / cupboard

- observational: tasks which further emphasise the relevance of Maths in everyday life e.g. read signposts, how far from Naas to Newbridge? Can you notice any shops which have sales on? What is the percentage reduction etc?
- Tables will be given regularly:
    - 1st Class addition tables
    - 2nd Class subtraction tables and revision of addition. Subtraction as the inverse of addition should be noted
    - 3rd Class multiplication tables
    - 4th Class revision of multiplication and division. Division as the inverse of multiplication will be highlighted
    - 5th and 6th Class revision of tables

HOME SCHOOL LINKS:

Communication:

Parents should be encouraged to play an active and positive role in their children's Mathematical education.

Much of this can take place informally e.g.

1) by encouraging children to observe Mathematical Language in their environment e.g. signposts.
2) by encouraging children to solve problems in real-life situations. If we use 2 litres of milk per day, how many litres would we need to last the week?

It is important that there is consistency in methodology and use of Mathematical Language between home and school. An information sheet highlighting tips and guidelines for helping your child with Maths is circulated each year to Junior Infant Pupils and on entering First Class.

USE OF TEXT BOOKS:

When choosing the text books the following points are considered to be important:

- A balanced treatment of all the strands
- An emphasis on the use of concrete materials
- Varied presentation of real-life problems
- An emphasis on estimation
- Developing the correct use of Mathematical Language
- Frequent in-built revision sections

ASSESSMENT:

Assessment for learning and assessment of learning occurs in the classroom.

A broad range of assessment tools are used by each class teacher:

- Teacher observation

- Assessment Tests – in Maths text books
- Look Back Chapters
- Teacher Designed Tests
- Questioning
- Self-assessment e.g. traffic lights, thumbs up, thumbs down
- Standardised Testing – the Sigma-T Maths Test is administered each May to pupils in 1st – 6th classes. Results of standardised tests are recorded on individual pupil's progress records. Parents are made aware of child's STEN score in the end of year report.
- Where needed and if in doubt of the Sigma-T results the Drumcondra Revised Primary Maths test may be administered to some pupils

DIFFERENTIATION:
- Class Teachers will provide a differentiated programme to cater for children with learning difficulties
- Children who are experiencing significant difficulties also attend the SET (Special Education Teacher)
- Children with exceptional ability – such pupils may be given opportunity to work on separate independent Mathematical tasks

EQUALITY OF PARTICIPATION AND ACCESS:
- Equal opportunities are given to boys and girls to participate in all strands and all aspect of the Maths curriculum

INTEGRATION:
- Where possible and where appropriate, teachers will integrate mathematical concepts and skills with other areas of the curriculum

STAFF DEVELOPMENT:
- Teachers are encouraged to attend courses in Maths as part of their ongoing professional development
- Opportunity may be given at staff meetings to report on such courses and to discuss other issues in Maths

POLICY REVIEW AND RATIFICATION:

This Policy was ratified by the Board on **date below**. This Policy will be regularly reviewed by the Board.

Ratified by Board of Management on: _____

Signed: _____   _____
        Chairperson   *Principal*