**Scoil Naomh Cualán, Borrisoleigh, Co. Tipperary, 20451V**

**Mathematics- Whole School Plan**

**Introductory Statement**

This plan was drawn up and co-ordinated by the principal and teaching staff of the school as a guideline in delivering the maths curriculum.

**Rationale**

**The Maths plan was reviewed with the following in mind:**

* To review the existing plan for maths in our school.
* To conform to the principles of learning outlined in the Primary School Curriculum.
* To improve the standard of maths in the school.
* To benefit teaching and learning in our school.
* To ensure there is a structured approach to the teaching of maths and resources are researched and shared.

**Vision and Aims**

**Vision:**

**Our vision for our school, which provides equality of opportunity for all pupils is:**

* to promote and develop every child’s mathematical potential to the full in a positive and meaningful way.
* to enable the children to apply what they have learned in maths to real life and the environment.

**Aims:**

**We endorse the aims of the Primary School Curriculum for mathematics;**

* To develop a positive attitude towards mathematics and an appreciation of both its practical and 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 appropriate level of development and ability.
* To enable the child to acquire proficiency in fundamental mathematical skills and to recalling basic number facts.

**The plan will be addressed under the following headings:**

**Curriculum Planning**

1. Strands and Strand Units
2. Approaches and Methodologies
3. Assessment and Record Keeping
4. Children with Different needs
5. Equality of participation and Access

**Organisational Planning**

1. Timetable
2. Homework
3. Resources and ICT
4. Individual Teachers’ Planning and Reporting
5. Staff Development
6. Parental Involvement – Home-School Links
7. Community links.
8. **Strands and Strand Units**

**Infant Classes:**

|  |  |
| --- | --- |
| ***Strands*** |  ***Strand units*** |
| **Early mathematical activities** | * Classifying
* Matching
* Comparing
* Ordering
 |
| **Number** | * Counting
* Comparing and ordering
* Analysis of number*CombiningPartitioningNumeration*
 |
| **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 Class:**

|  |  |
| --- | --- |
| ***Strands*** |  ***Strand units*** |
| **Number** | * Counting and numeration
* Comparing and ordering
* Place value
* Operations*AdditionSubtraction*
* 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 Class**Third an |
| *Strands* | *Strand units* |
| **Number** | * Place value
* Operations*Addition and subtractionMultiplicationDivision*
* 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 Class**

|  |  |
| --- | --- |
| ***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
 |

1. **Approaches and Methodologies**

**General**

All children should be provided with the opportunity to access the full range of the Maths curriculum. In our school we will ensure this happens as follows:

* There is more emphasis on active learning strategies.
* There is a hands on approach to encourage children to understand Maths concepts using concrete materials/everyday objects.
* Provide opportunities for the older classes to use calculators.
* Ensuring that pupils use mathematical language correctly.
* Pupils collect and record data in other subject areas e.g. Science, Geography, History.
* Pupils use estimation in measures, shape and space and not just in numbers.
* Encouraging a Maths rich environment.

**Teaching of tables**

* Start with addition, subtraction, multiplication and division
* Senior infants begin with concrete addition tables and then progress to abstract tables from 1st to 6th
* Mulitplication tables are taught as repeated addition and formally begin in third Class.
* Division tables are taught as repeated subtraction and formally begin in third class.

**Resources/games for tables**: TableShootout, Table Toppers, Tables Wheel ,

Last One Standing, Beat the Clock, Who wants to be a Millionaire? Wrap ups, Smart Chute, Loop game and Card Layout

**Procedures for teaching operations**

See Appendix 1 for language used in relation to operations in Scoil Naomh Cualán.

**Talk and Discussion**

**Discussion skills**

* Discussion skills need to be developed by

-Turn taking

-Active listening

-Positive response to the opinions of others

-Confidence in putting forward an opinion

-Ability to explain clearly their point of view.

**Scaffolding**

* Teacher actively models mathematical language when talking through the problem-solving process.

**Integration**

* Identify areas in the curriculum where mathematical processes are appropriate e.g. collecting data in history and geography, measuring temperature in science/ingredients when cooking and baking.
* When opportunities arise using a thematic approach across other subject area.

**Mathematical Language in context**

* An agreed emphasis on the language of mathematics – and agreed list of terminology, language for each class group.
* Using the child’s own environment and ideas as a basis for reinforcing mathematical language e.g. you are taller than he is, Is teacher’s table wider than yours?
* Teachers to identify common approaches to language used in

-Addition -- total, sum of, add….

-Subtraction -- minus, subtract, take away, difference, less than, rename….

-Multiplication -- times, product of, multiply by, groups of ….

-Division – divide by, share, split groups of……

-Equals -- same as, makes, is, will be, answer is, means….

* Giving the due regard to the importance of exposing children to the different terms used in relation to the symbols.

**Number facts**

* A common approach to the teaching of number facts (tables) e.g. 1x4 pupils say “one fours are four”, 2x4 pupils say “two fours are eight”, etc.
* Children are aware of the commutative properties of multiplication tables and of their relationship with division.
* We teach subtraction separately from addition and division separately from multiplication.
* When subtracting , we work from the top down e.g. “nine minus five” or “nine take away five”.

**Estimation strategies for number**

Throughout all the strands of this curriculum emphasis has been placed on the development of estimation strategies. Estimation is the process of taking an existing problem and changing it into a new form that is easier to compute mentally and gives an approximate answer. This skill is essential for real-life mathematics, for example shopping or measuring time and distances.

* **Front-end strategy**

This strategy has its strongest application in addition. The left-most digits (front-end) are the most significant in forming an initial estimate and can be used on their own in the earlier stages to establish a rough estimate:

€

1.54

6.35

0.99

2.51 +

Front-end process:

add the front-end amounts: €1 + €6 + €2 = €9

adjust by grouping the cents to form euro 54c + 35c makes €1 approx.

99c is nearly €1

51c is nearly 50c

cents estimate: €2.50 overall estimate is €11.50 (€9 + €2.50).

This strategy can be introduced by using money initially but works equally well with whole numbers, fractions and decimals. The adjustment stage can be introduced gradually as the children become familiar with the concept of 'nearly €1' or 'nearly 50c'. It can also be accomplished with multiplication for example,

369 x 6

300 x 6 = 1800

70 x 6 = 420 Estimate is 2220

* **Clustering strategy**

This is best suited to groups of numbers that 'cluster' around a common value, for example

**Numbers of people who came to our concert**

Monday 425

Tuesday 506

Wednesday 498

Thursday 468

Friday 600

The average attendance was about 500 per night.

500x5 nights = 2500.

* **Rounding strategy**

Numbers can be rounded in many different ways. The choice of rounding process will produce different but reasonable results, and this can be refined according to the child's ability to compute mentally. It is necessary to give children plenty of mental practice with this method and demonstrate how it can be refined by choosing closer rounding factors. Using this strategy can generate plenty of discussion about why one child's answer is different from that of another.

37 x 59: in this case it would be best to round both numbers up:

40 x 60 = 2400

51 x 22: here we would round both numbers down to 50 and 20:

50 x 20 = 1000

24 x 65: they are both close to the middle so you can try rounding one

down (20) and one up (70):

20 x 70 = 1400

Rounding can be used with the four operations but is very useful in division. In division it is often better to round up:

419 ÷ 65 could be rounded to

420 ÷ 70.

* **Special numbers strategy**

This strategy looks for numbers that make patterns, for example tens or hundreds

(a)

3

5

7

4

6 +

(b)

37

54

71

42

69+

(a) 3 and 7 are ten, 6 and 4 are ten, that's 20; add the 5, this totals 25

(b)older children could group the tens using a mixture of rounding and compatibility, for example

37 and 42 is about 80 ...

Estimation skills are essential throughout the strands and at all class levels. These skills can be used in Measures in conjunction with using a known unit, for example nearly a metre, less than a litre,

about half a kilogram and infractions and decimals: close to 0, close to a half, close to 1.

**Mental Maths**

Each teacher from 1st to 6th class will do a 10 minute oral daily activity. This is usually based on the mathematical topic being taught that week. However to assess all areas of the curriculum regularly, the Work it Out book is a resource used from 1st to 6th classes where a written answer is required.

 **Active Learning and Guided Discovery**

It is essential that children use concrete materials as it allows them to understand the symbolism related to the operation. Teachers try to allocate a day in each month for maths games which allows active learning to take place.

**Collaborative and Co-operative Learning** see active learning

**Problem-Solving**

* Practical situations will be used as a basis for some problem solving.
* Children will be made aware of different strategies to solve problems, eg. acronyms, mnemonics, bookmarks, laminated pages.
* The solutions to problem solving questions could be checked by children themselves (in the higher classes) or by calculator.
* Children at all class levels will be provided with opportunities to experience problem solving activities. Eg: oral problems, using objects, using smaller numbers, referring to items in the environment Brainsnack etc.

**Problem-solving strategies**

• constructing a model

• drawing a diagram to illustrate a problem

• making a chart or table of the information

• looking for patterns in a problem

• 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, for example balance, measuring instrument, calculator, blocks

• solving a simpler version of the problem, for example using smaller numbers.

• R-U-D-E approach Read Underline Draw Estimate is the most recent approach used in our school.

 **Using the Environment – School/Local Environment**

 Maths Rich Environment - Playground markings on the yard, walls, number lines on infant desks, maths area in each classroom changed topically.

The teachers use the school environment to provide opportunities for Mathematical problem solving e.g. maths in P.E.

Integration allows for opportunities to use the school environment for: Measuring (baking).

Recording

Graphs

Surveys

**Skills using Content**

• Applying and problem-solving

• Communicating and expressing

• Integrating and connecting

• Reasoning

• Implementing

• Understanding and recalling

***3. Assessment and Record Keeping:***

**Standardised testing** in May each year from second class to sixth class- Sigma-T.

Parents are informed orally of results in PT meeting which take place in the first term.

Learning Support caseload formed from Sigma results.

Results can be accessed by the teachers on Data-base.

Other forms of assessment include

* Teacher observation
* Children’s work samples
* Homework
* Teacher designed tests and tasks
* Checklists
* Parental feedback
* Speaking to the child formally and informally
* Diagnostic tests for numeracy( refer to LS/ Resource)

**4. Children with Different Needs:**

The maths programme is flexible to accommodate children with different abilities. This includes more individual attention emphasising maths language and collaborating with the LS /Resource teacher.

For the child with learning difficulties;

* greater use of concrete materials.
* greater use of interactive resources, maths software, games etc.
* extra support from the LS/Resource teacher.

For the more able child the following strategies could be used.

* Maths software for ICT
* Maths games
* Problem-solving books

**5. Equality of Participation and Access:**

* All children have equal access, regardless of gender, nationality or cultural and social backgrounds.

**Organisation:**

**6. Timetable (per week):**

* Infants – 3 hours 25 minutes
* 1st-6th – 4 hours 10 minutes

**7. Homework:**

* Maths homework will usually be given daily, Monday to Thursday. Homework can consist of either work to reinforce the topic been covered in class at the time or revision work.

**8. Resources and ICT:**

Provided to all classes and all strands

1. Maths Equipment Inventory( See Appendix 2)

2. Calculators

3. ICT software/interactive games and various mathematical websites (See Appendix 3)

4. Textbooks – Planet Maths, Work It Out, Cracking Maths, Action Maths etc.

**9. Individual Teachers’ Planning and Reporting*:***

* This maths plan informs the teachers’ yearly and fornightly plans.
* The Cúntas Míosúil is standard throughout the school.

**10. Staff Development:**

* Staff are made aware of workshops/courses and are free to attend and share good practice.

**11. Parental Involvement - Home School Links:**

* Parents are informed of test results in PT meetings in November.
* Parents and teachers also have opportunities to make individual arrangements to discuss matters of relevance at other times throughout the school year.

***12. Community Links:***

Children are made aware of the various uses of maths within the community through the use of maths trails and or/ the following examples;

* **Number** Keeping score at a local hurling match, Directed number-local temperatures
* **Measures** Time of local events, measuring distances, measuring area of local playing field, measuring ingredients for baking and cooking of foods that are taken home, getting totals and giving change at various charity events i.e. cake sale
* **Algebra** Studying patterns of population, weather
* **Data** Surveys and presenting data.
* **Shape and Space** 2-D and3-D shapes within the community, lines and angles.

 **Success Criteria**

The plan will be assessed by using –

* The assessment tools in the Revised Curriculum documents.
* Feedback from pupils, parents, teachers and the wider community.
* Department of Education Inspector’s suggestions and/or reports.
* Feedback, if it arises, from second-level schools in our area.
* Future developments in mathematical thinking.

 **Implementation**

It is the responsibility of the teaching staff, principal and BOM that this plan is implemented.

**(a) Timeframe:**

**Review**

The plan will be monitored by all members of staff under the guidance of the principal. The first formal review will take place in \_\_\_\_\_\_\_\_\_\_\_\_\_\_..

**Ratification and Communication**

This Plan was ratified by the Board of Management of Scoil Naomh Cualán on 20/06/2016.

Signed: Jody Spooner, Chairperson

Date : 20/06/2016.

**Appendix 1: Language used in Operations**

**Addition**

In Junior Infants only the symbols + and = are introduced. The language

formally used is plus & equals for these symbols e.g. 3+2=5/ 3 plus 2 equals 5.

The children are made aware of various other language used in association with + and =.

In First class adding with/without renaming is introduced. Operations included

at this stage are both horizontally and vertically presented. When completing an operation using addition in a vertical manner, always start at the top unit e.g.

 25 *“****5 and 3 is eight.***

+ 13 ***2 and1 is three****”*

**Subtraction**

Again in subtraction there are both ways in presenting a subtraction operation;

vertical or horizontal. When completing simple subtraction exercises in first

class, always start at first number, read from left to right

i.e. 9-5= *“ 9 take away 5 equals four”*

When completing vertical subtraction with/without renaming start at the top unit e.g.

 56 ***“6 take away 8 I cannot do, I must rename a ten.***

-28 ***Cross out the 5 put down a 4 and bring over the 10.”***

**Multiplication**

Multiplication is taught as a faster method of repeated addition.

Formally begins in third class and all language is presented. Children learn

tables using multiples of the last number i.e. 5 x 5 = 25 ***“Five fives are***

***twenty-five.”***

Long multiplication is taught formally in Fourth class and uses the following

language. E.g.

 26 **“*three sixes are eighteen, put down the eight and***

x 23 ***carry the one. Three twos are 6 and one is seven. Put a zero in the units place (Because I’m now multiplying by two tens/twenty).Two***

***sixes are twelve. Put down the two and carry the one. Two twos are four and one is five. Add the two lines together to get final answer.”***

**Division**

Division is taught as a faster method of repeated subtraction.

Formally begins in third class and all language is presented i.e. divided by, into,

shared, parts, groups, segments. Children learn tables using “into” e.g. 10 ÷5=2

*“Five into ten is two.”*

Long division is formally taught in fifth class and uses the following language.

425÷25=

*Estimate answer first.*

*\_\_\_\_*

25¦ 425 **“*25into 4 doesn’t go. 25 into 42 goes once. Subtract***

***25 from 42 to ascertain the remainder. Instead of***

***carrying the remainder, bring down the 5 instead.***

***Now 25 into 175 goes 7 times. To show there is no***

***remainder subtract the multiple from the bottom line.***

***The answer is 17. ”***

**Fractions**

Fractions are linked with many areas of the mathematics curriculum i.e.

measures, shape and space, algebra etc. However uniformity is essential when

teaching operations within fractions. It was decided to use the following

langauge and method in Scoil Naomh Cualán.

*¾+½* ***“I cannot add these two fractions. I must find a***

***common denominator. The common denominator is 4 so the half must be changed into quarters. Now it’s three quarters and two quarters equals five quarters. This is one and one quarter.”***

When adding mixed numbers, the mixed number is changed into an improper

fraction and the above method is used. The answers are always changed back to a mixed number when the operation is finished. The above method is also used for subtraction of fractions or mixed numbers. The better-able student may notice that in addition, the whole numbers may be added first and then the fraction.

 The conventional methods are used for multiplying and dividing fractions. Numerator multiplied by numerator and denominator multiplied by denominator. In the instance of division of fractions, the denominator moves to the numerator’s position and vice-versa in the second fraction. Then the first fraction is multiplied by the now newly changed second fraction (numerator multiplied by numerator and denominator multiplied by

denominator).

**Appendix 2: Inventory of Maths Resources**

**Junior classes:**

* Unifix cubes
* Dinosaur counters
* Small and large pegs and boards
* Packet of dice
* Large Magnetic hundred square
* Covers for hundred square
* Links and link cards
* Geo shapes
* Building blocks
* Lego
* Counting sticks
* Number flip chart blank
* Number flip chart 1-20
* Blank hundred squares
* Hundred square cut outs
* Ten frames
* Arrow cards
* Number bingo
* Shape bingo
* Counting bus
* Coins – magnetic and plastic
* Addition ball
* Your Numbers Up game
* Sort it out games – colours, shapes sizes, animals.
* Number floor jigsaw
* Action Maths posters
* Small clocks
* Number fans
* Target boards

**Senior classes:**

* Problem solving cards
* Brainsnack
* Jenga blocks
* 170 flashcards -multiplication to 12x12
* Fraction/decimal blocks
* Tangram sets
* Box of cubes
* Weighing scales
* Weights
* Fraction wall
* Large calculators
* Maths dictionary
* Protractors
* 1 large triangle
* Fraction cards
* Fraction pieces in circles
* 1 x pie charts
* Intro to area box
* Rods (cuboids)
* Measuring jugs
* Percentage/fraction/decimal wooden blocks
* Plastic multiplication sums
* Number fans
* Sudoku cards
* Word problem cards
* Dice
* Large and small clocks
* hundred squares
* Nexus foam die
* Wrap up’s – addition/subtraction/multiplication/division
* Percentage/fraction/decimal flip chart

**Learning Support Room:**

* Metre sticks
* Clock jigsaw
* Shape sorters
* Shape Mania game
* Shape Shuffle game
* Sand paper numerals 1-10
* Fraction walls
* Telling the time game
* Box of 3D shapes
* Hundred squares – big and small
* Set squares
* Percentage, decimal and fraction stand
* Base 10 blocks
* Stile books and trays
* Books on shape
* Books on number
* Books on calculations
* Number puzzles
* Containers for capacity – 10ml to 1L
* Big and small cardboard clocks
* Unifix cubes
* Packs of playing cards
* Boxes of tangrams
* Coloured counters
* Egg timers
* Dominoes.
* Peg boards and pegs
* Lollipop sticks
* Smart Chute and games
* Flip cards
* Maths books and mental maths books( Cracking Maths, Work It Out, Planet Maths, Action Maths )

**Appendix 3: ICT Software and Useful websites**

\_ www.cleavepuzzles.

\_ www.senteacher.org.uk

\_ Woodlands/kent (site: maths option)

\_ www.sparklebox.co.uk

\_ www.mathsphere.co.uk

\_ [www.sparklebox.co.uk](http://www.sparklebox.co.uk)

[www.primaryresources.co.uk/maths](http://www.primaryresources.co.uk/maths)

[www.teachingtables.co.uk](http://www.teachingtables.co.uk)

[www.scoilnet.ie](http://www.scoilnet.ie)

[www.topmarks.co.uk](http://www.topmarks.co.uk) www.planetmaths.ie