

Maths Plan

Introductory Statement and Rationale

(a) Introductory Statement

The maths plan was reviewed using the review template from the PPDS website by all staff members at a number of planning meetings over a period from December 2010 – January 2012. The plan was then amended accordingly and presented to staff in June 2012.

(b) Rationale

It was decided to review this plan in order to reflect current school practice in relation to the teaching of maths, and document best practice.

Vision and Aims

(a) Vision

The teaching and learning of mathematics is of central importance in providing each child with the necessary skills to live a full life as a child and later as an adult. As a school community our vision is to foster and develop enthusiasm, understanding, confidence and competence in each child to enable each child to acquire a range of mathematical skills which they can apply to real life situations. The program will be adapted to meet the need of individual children.

(b) 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 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 appropriate level of development and ability
- To enable the child to acquire proficiency in fundamental mathematical skills and in recalling basic number facts

1. Strands and Strand Units

All teachers are familiar with the strands, strand units and content objectives of the Maths Curriculum and refer to them regularly when planning for their classes, ensuring all strands and strand units are covered. When taking class splits into account teachers will plan in conjunction with partner teacher and/or support teacher to ensure all areas of the Maths curriculum are covered and work is differentiated where need be. The school plan will be available to all teachers and accessible on school website.

STRANDS	STRAND UNITS
Early Mathematical Activities (Infants)	Classifying, Matching, Comparing Ordering
Number	Counting, Comparing and Ordering, Analysis of Number (introduced in Infants) Numeration, Place Value, Operations: Addition, Subtraction, Fractions (introduced in 1st 2nd) Multiplication, Division, Decimals (introduced in 3rd/4th) Percentages, Number theory (introduced in 5th/6th)
Algebra	Extending patterns (introduced in Infants) Extending and using patterns (introduced in 1st/2nd) Number patterns and sequences, Number sentences (introduced in 3rd/4th) Directed numbers, Rules and properties, Variables, Equations (introduced in 5th/6th)

Shape and Space	Spatial Awareness, 2D shapes 3D shapes (introduced in Infants) Symmetry, Angles (introduced in 1st/2nd) Lines and angles (introduced in 3rd/4th)
Measures	Length, Weight, Capacity, Time, Money (introduced in infants) Area (introduced in 1st/2nd)
Data	Recognising and interpreting data (introduced in Infants) Chance (introduced in 3rd /4th)

Children are encouraged to collect real data i.e. infant and junior classes collect personal information and represent it on a pictogram for example; use of census to gather data, integrate with SESE e.g. famine, older children create and interpret bar charts and pie charts, children are also given opportunities to use excel to form graphs from data. Children are made aware of the importance of entering relevant data and asking clear questions to extract the required information from the data.

Raising the profile of Mathematics

As a school community we are most conscious of the importance of developing and raising the profile of maths across the school, some strategies include:

- Maths for Fun
- Activities during Maths and Engineering week
- Maths trails
- Maths displays
- Use of online maths games –mathletics

2. Approaches and Methodologies

The following approaches and methodologies are used throughout the year:

- **The use of Manipulatives:** Children will have access to and use a broad range of mathematical equipment during lessons, children in the younger classes will have additional support throughout the year through the Ready, Set, Go Maths programme. (see attached list of resources)
- **Talk and Discussion:** Talk and discussion is seen as an integral part of the learning process and opportunities should be provided during the Maths class for children to discuss problems with the teacher, other individual children and in groups.
- **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.
- **Collaborative and Co-operative Learning**

Collaborative and co-operative learning in Junior – 6th classes is promoted using the following strategies:

- Encouraging the children to listen
- Encouraging the children to take turns
- Seeing that others opinions are important
- Children working in pairs/groups while playing mathematical games.
- Undertaking paired/group activity during Maths For Fun

Teachers use a variety of organisational styles to encourage co-operative and collaborative learning: pair work, group work and whole class work.

Using the environment/community as a learning resource:

The school building is used as a resource to support the Maths programme. Teachers use the school environment to provide opportunities for mathematical problem solving e.g. use of trails.

Mathematical games have been taken into account while sourcing yard markings, there are games that incorporate number strategies at all class levels. The senior classes have m² on each ceiling, in addition to which a metre length has been marked along the corridor, the junior classes have height charts. Mathematical Trails are used outdoors to help teach mathematical concepts to

children and make them aware of mathematics in their environment. Children display their mathematical work in their classrooms and or in the hall.

3. General

Teachers ensure through regular communication and planning, that all children have the opportunity to access all strands of the maths curriculum. Classroom teachers work in conjunction with support teachers, where the need arises. **All classrooms have a range of concrete materials available to them, these are shared between the classes and support teachers (refer attached inventory).**

Children also have access to mathletics software to supplement the maths curriculum.

The Mathemagic maths book is used as a core textbook across the school, children also use a mental maths book; however, children engage in active learning strategies where applicable. This is most relevant within the strands of shape and space, measure, data and aspects of number. Much of the work in the junior classes is practical by nature, as a DEIS rural school we have implement the Ready, Set, Go Maths program in Infants. **Children from fourth-sixth class make use of calculators to check answers, explore number patterns etc. Children who have particular difficulty with maths are encouraged to use a calculator.**

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

Language

There is an agreed set of terminology in use for each class level. This language has been agreed at whole school level (2011– 2012) in order to ensure continuity and consistency from one class to the next and also to help avoid confusion for children having difficulties with Mathematics. Our agreed strategies/language are on the following pages:

JUNIOR INFANTS:

No signs used

Addition:	Language: and, makes, add, is the same as, altogether makes
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SENIOR INFANTS:

Introduction of signs: +, =

Vocabulary to match this:

+: 'and' (initially used as in junior infants), 'plus'

=: 'is the same as' (initially used in junior infants), 'makes', 'equals'

$\begin{array}{r} 2 \\ + 1 \\ \hline 3 \end{array}$	Top down: 2 plus 1 equals 3 2 + 1 equals 3
$2+1=3$	reads 2 plus 1 equals 3 or 2 and 1 makes 3

FIRST CLASS

Subtraction:	- is introduced as a symbol in First class Language: take away, less than, left
$\begin{array}{r} 16 \\ - 4 \\ \hline \end{array}$	Vertical: start from the top using the words 'take away' 16 take away four equals

5 – 1 =	Horizontal: Read from left to right using the words 'take away' 5 take away 1 equals
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PLACE VALUE:

THE WORD 'UNITS' WILL BE USED RATHER THAN 'ONES'

RENAMING/REGROUPING WILL BE THE METHOD USED THROUGHOUT THE SCHOOL

- I change one ten into ten units.
- I change one hundred into ten tens.
- I change one hour to sixty minutes.

SECOND CLASS

Addition:	
7+3+8= 18	7 plus 3 plus 8 equals 18 (7 plus 3 equals 10 plus 8 equals 18)
6 3 <u>+6</u> 26 <u>+37</u>	6 plus 3 plus 6 encourage 6 + 6 + 3 6 and 7 is 13 <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;">Make</div> a ten out of 10 units → This leaves 3 units in the units </div> <div style="display: flex; align-items: center;"> place/column and one <div style="border: 1px solid black; padding: 2px; margin: 0 10px;">More</div> ten in the tens place/columns </div>
Subtraction	Language: subtraction, decrease, subtract, take away, from, less than, minus, difference

$\begin{array}{r} 27 \\ -18 \\ \hline \end{array}$	<p>Step 1. Start with the bigger number 27.</p> <p>Step 2. Start with the units</p> <p>7 take away 8 I cannot do, so I change a 'ten' to ten units. This gives me 17 units in the units place/column and one less in the tens column.</p> <p>Note: Cross out diagonally from left to right e.g. $\begin{array}{r} \cancel{1} 1 \\ 27 \end{array}$</p>
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THIRD CLASS/ FOURTH CLASS

Rounding:

1, 2, 3 and 4 hey, ho, down we go

5, 6, 7 8 and 9 hey, ho up we go

Half way there which way we go?

Round me up hey, ho, ho.

Tables: All classes make use of the following uniform approach to tables:

0 X 7 =

1 X 7 =

2 X 7 =

3 X 7 =

Multiplication/	÷ and x are introduced as symbols in Third Class. The following vocabulary will be used:
Division	÷ division, divide, divided by, split, share, shared between, group, how many in ...
	X multiplication, multiply, times, of, groups of
Short multiplication	Start with say "4 groups of 3" move onto... "4 threes"
[Language]	"4 times 3"

	<p>"4 multiplied by 3" starting from the bottom</p>
Long multiplication	Starting from the bottom, using units first. Language as above.
Multiply by 10	Add a zero (our digits move one place to the left)
Multiply by 100	Add two zeros
Division	Language: Divisible by/ not divisible by, share among
12 ÷ 4	<p>12 shared among 4 or</p> <p>12 divided by 4 or</p> <p>4 into 12 goes ...</p>
Fractions	
$\frac{1}{2} + \frac{1}{4} =$	<p>$\frac{_}{4} + \frac{_}{4} = \frac{_}{4}$ Change to a family of quarters</p>
$\frac{1}{4}$ of 32 =	<p>Share 32 among 4 or</p> <p>32 divided by 4</p>
$\frac{7}{2}$	7 divided by 2
Decimals	<p>$\frac{1}{10}$ is equal to 0.1 $\frac{1}{100}$ is equal to 0.01</p> <p>Include zero before decimal point</p>
Tesselation	Fit together with no spaces

FIFTH/SIXTH CLASSES

<p>Number:</p> <p>Multiplication/</p> <p>Division</p>	<p>Language: square, prime, composite, rectangular numbers.</p> <p>Finding common multiples by listing numbers</p> <p>Finding common factors by listing factors</p> <p>The words 'product' and 'quotient' are introduced. Problems involving sum, difference, products, quotients</p>
<p>Fractions:</p>	<p>All children are taught to MEMORISE TABLE OF EQUIVALENT FRACTIONS, DECIMALS AND PERCENTAGES</p> <p>Numerator, denominator</p>
<p>$\frac{1}{2} + \frac{1}{4} =$</p>	<p>$\frac{\quad}{4} + \frac{\quad}{4} = \frac{\quad}{4}$ Change to a family of quarters</p> <p>(use of term family is very important for children experiencing difficulty in this area, other appropriate mathematical language will also be used at this stage)</p>
<p>$\frac{1}{2} - \frac{1}{4}$</p>	<p>$\frac{\quad}{4} - \frac{\quad}{4} = \frac{\quad}{4}$</p>
<p>Mixed numbers</p> <p>+ and –</p> <p>$3\frac{1}{2} - 1\frac{3}{4} =$</p>	<p>Learn to read a mathematical sentence, both vertically and horizontally.</p> <p>In this case:</p> <p>$3\frac{1}{2} - 1\frac{3}{4} =$</p> <ol style="list-style-type: none"> 1. Change $3\frac{1}{2}$ into an improper fraction, this gives us $\frac{7}{2}$. 2. Change $1\frac{3}{4}$ into an improper fraction, this gives us $\frac{7}{4}$. 3. Follow method as outlined for addition/subtraction of fractions. <p style="margin-left: 20px;"> $3\frac{1}{2}$ $- 1\frac{3}{4}$ </p>
<p>Multiplication</p> <p>$\frac{1}{3} \times \frac{1}{5}$</p>	<p>Multiply top number by top number</p> <p>Bottom number by bottom number</p> <p>Simplify/ break down</p>

Division of whole number by fraction	$5 \div \frac{1}{4} =$ Change your whole number into a fraction and turn your second fraction upside down and multiply. How many quarters in 5 units $\underline{5} \times \underline{4} = \underline{20}$ Visual aids used by teacher 1 1 1
Decimals	1/10, 1/100, 1/1000 – tenths, hundredths, thousandths
Addition	to 3 decimal places (with/without calculator)
Subtraction	to 3 decimal places (with.without calculator)
Rounding decimals	to the nearest whole number to 1 decimal place to 2 decimal places.
Multiplication of decimals	Multiplying a decimal by a whole number Multiplying a decimal by a decimal Count the digits after the decimal points in the question and make sure that there are the same amount of digits after the decimal point in the
Division by decimals	answer. Multiply the divisor by 10/100 to change to whole number. If you multiply the divisor by 10/100 you must multiply the quotient by 10/100.
Converting a fraction to a decimal	You divide the numerator by the denominator (divide the top by the bottom) or if possible you change the number to tenths/ hundredths and then convert to decimal. Look out for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{100}$ Decimals: How many digits are after the decimal point in the question, the same amount of digits should be after the decimal point in the answer. Think of money when referring to decimals where applicable.

	<p>the area of the whole shape and take away the difference.</p> <p>Surface area</p> <p>Find the area of one face. Count the faces and multiply by no. of faces.</p> <p>Cube and Cuboid</p>
Circle	<p>Radius, diameter, circumference, arc, sector. Relationship between radius, diameter and circumference.</p> <p>Relate the diameter of a circle to its circumference by measurement.</p> <p>Measure the circumference of a circle using a piece of string.</p> <p>Construct a circle of given radius/diameter</p> <p>Examine area by counting squares.</p>
Length	<p>Irregular Shapes</p> <p>Look for regular shapes. Divide the shape and draw diagrams.</p> <p>Add areas a, b and c.</p>
Lines and Angles	<p>Right angle, acute, obtuse, reflex, straight, degrees, protractor, ruler.</p> <p>Less than right angle = acute</p> <p>Greater than right angle = obtuse</p>
2D shapes	<p>Sum of the angles in a triangle = 180</p> <p>Sum of the angles in a quadrilateral = 360</p> <p>Sum of angles in a circle = 360</p>
3D shapes	<p>Identify regular tetrahedrons, nets, construct</p>

Tables

Number facts up to 10 will be memorised. Addition facts up to 10, subtraction facts up to 10 will be memorised by the end of Second Class and multiplication facts up to 12 by the end of Fourth Class. All will be revised up to the end of Sixth Class. The number of the tables that the child is doing will go in the middle e.g. $1 + 2 =$, $2 + 2 =$, $3 + 2 =$.

Multiplication is a natural progression from extended addition e.g. 3 groups of 3, 4 groups of 3, 5 groups of 3 etc. Thus tables are recited throughout the school as follows: $3 \times 3 = 9$ (three threes nine), $4 \times 3 = 12$ (four threes 12), $5 \times 3 = 15$ (five threes fifteen). All teachers are expected to teach tables this way in order to ensure consistency and avoid confusion as children move from one class to the next. **Subtraction and division tables are taught separately initially, and integrated with addition and multiplication tables, depending on the class level.**

A variety of methods will be used including counting 2s, 3s, 4s ..., reciting, loop games, speed tests, actions, use of ICT, using music tapes etc. Subtraction and division tables will be learned as the inverse of addition and multiplication.

Children from 2nd – 6th classes recite their tables regularly and tables are reinforced during maths. Children are encouraged to memorise tables. Class teachers identify children having difficulties with tables and with them set realistic targets ensuring steady progression. Mathematical games are used at each class level, refer to attached inventory.

4. Skills

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

- Applying and Problem Solving
- Communicating and Expressing
- Integrating and Connecting
- Reasoning
- Implementing
- Understanding and Recalling
- Estimation

Estimation:

Strategies are used at each class level to develop estimation skills, these are reflected in individual teacher's planning. Estimation will form part of every Maths lesson. Children will be encouraged to use each of the following strategies selecting the most appropriate for the task in hand:

- **Front end**
- **Rounding**
- **Special numbers**

These strategies are explained on pages 32 – 34 of the Teacher Guidelines for Mathematics. Every strand studied must provide opportunities for acquiring skills. Opportunities should also be provided for the transfer of these skills to other areas e.g. Science, Geography, Music, PE.

Problem Solving:

Children are encouraged to use their **own ideas as a context for problem solving.**

The **R** (Read) **U** (Underline) **D** (Draw) **E** (Estimate) method for problem solving is used across the school. All children should be exposed to this model regularly and be very familiar with it by the time they reach 6th class. Each class teacher will endeavour to ensure that they allocate two maths classes per month to puzzles.

5. Presentation of work

There is an agreed approach to numeral formation in the junior classes. The rhymes or stories may vary but the formation is as follows:

1. *Straight down from the dot*
2. *Around from the dot, then down, then straight*
3. *Start at the dot, then round and round*
4. *Straight down from the dot it goes, then across and down again*
5. *Go down from the dot, around and put its hat on*
6. *Start at the dot then down and around*
7. *Across and down*
8. *Around like an **S** and close it up*

9. *Start at the dot around then down*

In all classes Maths work is presented using a number of formats namely:

- **Oral Presentation**
 - *Teacher designed work sheets based on strand unit being taught.*
 - *Work in class Maths Book which is an activity book*
 - *Recording work.*
 - *Using concrete materials to draw a picture, pictogram*
 - *Number stories, Number rhymes (Junior classes)*
 - *Birthday chart/ graph of favourite fruit/ colour etc.*

A pencil is used for writing numbers, and problems in Maths right up until the end of 6th class.

Children are allowed to use erasers.

6. Assessment and Record Keeping

Assessment is used by teachers to inform their planning, selection and management of learning activities in order to differentiate learning outcomes to reflect the differing learning styles of children. The following are other assessment tools used by teachers:

- Teacher observation
- Worksheets and work in copies
- Assessment games
- Extension and enrichment activities based on the strand unit being taught. Assessment based on unit of work from Mathemagic assessment books
- Ongoing teacher-designed tests. Test results may be kept by the class teacher and passed on to the next teacher.
- Oral tests (tables, speed tests, look games etc)
- Problem solving exercises that use a variety of mathematical skills
- Use of tracking maths software to assess children's competence in particular area, and ensure that more able children are challenged.

Assessment may be carried out on an informal basis, taking the Assessment Guidelines into account, and formally through class tests and Standardised Tests. The Sigma T test is administered each year,

from time to time the Drumcondra test maths test may be administered. Parents are informed of any formal test results through parents-teacher meetings, end of year report cards and informally during the year. Information gathered from assessment will inform future class and school planning, in addition to informing provisions for children with differing needs. Records are managed and kept in line with the school policy on record keeping.

7. Children with different needs

The Maths programme aims to meet the needs of all children in the school. **This will be achieved by teachers varying pace, content, methodologies and expected outcomes to ensure learning for all children.** All children in junior and senior infants attend the Learning Support teacher for early intervention/prevention maths program; however, this will depend on the case load of the Learning Support teacher.

Those children who receive scores at or below the **10th percentile** on the standardised tests will have priority in attending the Learning Support teacher for supplementary teaching for Maths. The availability of supplementary teaching for Maths, as Literacy is our main priority; however this depends on the case load of the Learning Support teacher. Arrangement will be in accordance with the recommended selection criteria as determined by the DES.

Children with exceptional ability in Maths will be given extra work based on the concept being taught in class. ICT allows children to work at their own level and challenges children of all abilities. Teachers have a range of software available to them in order to assist in the accommodation of children with differing needs. Parents will be consulted and opportunities for further development will be explored i.e. contact Centre for Talented Youth. This differentiated approach will be documented in teachers individual planning.

8. Time-table

Three hours and twenty five minutes is allocated for Mathematics for Infant classes.

Four hours and ten minutes is allocated for Mathematics for children in first – sixth class. Discretionary time must be used for Literacy and Numeracy based activities.

9. Homework

Homework will be given in line with the school policy on Homework.

10. Resources

Refer to the attached inventory for resources. Resources are stored in individual classrooms and area available for all teachers. Children are permitted to use calculators from fourth upwards to check answers and undertake specific maths problems. They may also be used as an aid for children with specific difficulties in relation to maths. Maths software is available for children to use. A full list is attached with the inventory. Children also have access to Mathletics software.

11. Individual Teachers' Planning

Teachers should base their yearly and short term plans on the whole school plan for Maths. Work covered will be outlined in the Cuntas Míósúil which will be submitted to the principal.

12. Staff Development

Teachers are made aware of any opportunities for further professional development through participation in courses available in Education Centres or other venues. Skills and expertise within the school are shared and developed through inputs at staff and planning meetings.

13. Parental Involvement

Parents are encouraged to support the school's programme for Maths. Teachers hold an informal information evening at the beginning of the year. Parents are informed of all areas of the curriculum, including maths at these meetings. Parent/teacher meetings usually take place in the first term. At these meeting parents will be informed of their child's progress in relation to Maths, furthermore they will be informed of their child's performance in standardised tests.

Parents are invited to take part in school based Maths activities e.g. Maths for Fun. Parents with particular expertise in the area of Maths, may be invited to speak with the children.

14. Community Links

Members of the local community may be invited to assist the school's Maths programme. Such individuals are invited after consultation with the Principal and school staff.

15. Success Criteria

The success of this plan will be measured using the following criteria:

- Ongoing 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.
- Analysis of standardised test results to determine strengths and weaknesses.
- Implementation of the school plan will be evident in teachers' preparation and monthly reports.
- Consultation with class teachers and support teachers
- Feedback from children and parents.

16. Implementation, Review and Ratification

Class teachers are responsible for the implementation of the Maths programme for their own classes. Class teachers are responsible for maths resources in their individual classrooms. Teachers will prioritise replacement and/or purchasing maths equipment when necessary, usually at the beginning of the school year.

The Principal is responsible for the overall implementation of the Maths plan. This plan will be reviewed in line with our curricular priorities over a three year cycle. All teachers will be involved in the review.

This plan was ratified by the Board of Management in November 2012