



Avoca National Sch

Scoil Náisiúnta Phadraig Naofa,
Avoca,
Co. Wicklow.
Roll No 18198A

Whole School Plan: Maths

2020

Introductory Statement

The existing approach to Mathematics was reviewed and changes necessary to implement the Mathematics curriculum were identified. In collaboration with the teaching staff the following plan was drawn up.

Rationale

This plan is a record of whole school decisions in relation to Mathematics in line with the Primary Curriculum, 1999. It is intended to guide teachers in their individual planning for Mathematics.

Vision and Aims

Vision: In our school we recognise the potential of each child in our care and endeavour to develop those qualities that make each child unique.

Aims: We endorse the aims and objectives of the curriculum for maths and, in addition, we aim:

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

Content of Plan

Curriculum Planning

1. Strand and Strand Units

Teachers should familiarise themselves with the strands and ensure that each strand and both strand units are given equal prominence during the maths programme for the year. The content objectives are divided between the two classes at each level. .

The contents of the Strand and Strand Units can be found in the following pages:

Curriculum: Infants p.17-35;

First & Second classes p. 37-59;

Third & Fourth classes p.61-83;

Fifth & Sixth classes p. 85-111

The strands are:

- Early Mathematical Activities (Infants)
- Number
- Algebra
- Shape and Space
- Measures
- Data

2. Approaches and Methodologies

The following approaches and methodologies are used

- Talk and discussion
- Collaborative and co-operative learning
- Active learning and Guided Discovery
- Problem solving
- Estimation strategies for numbers
- Using the environment
- Use of ICT
- Skills through content
- Mathematical trails
- Integration, linkage and cross-strand planning

The following approaches and methodologies will be used throughout the year

2.1 Talk and discussion

Talk and discussion is seen as an integral part of the learning process. Opportunities will be provided during the maths class for children to explain how they got the answer to a problem and discuss alternative approaches to solving it with the teacher, with other individual children and in groups.

Where applicable the following strategies will be used:

- Guided discussions and discussion skills
- Scaffolding

- Integration
- Linkage
- Mathematical Language in context
- Number Facts

2.2 Active Learning & Guided Discovery

Concrete Materials/ Manipulatives

A hands-on approach is essential if children are to understand mathematical concepts. They will need a wide variety of materials when exploring tasks. This is important right through to sixth class and will require access to a considerable amount of equipment. Available equipment is listed at the end of this policy. The use of concrete equipment will be necessary in all strands. Working with equipment can be done individually, in pairs or in groups, depending on the task. Mathematical games are used formally and informally to support and consolidate learning i.e. matching, multiplication facts.

The Busy at Maths programme by is in use from Junior Infants to 3rd class. Busy at Maths Teacher's Books and Resources are in use by the teachers in 4th, 5th and 6th Class. Mathemagic is also in use for 4th to 6th class at present (the school will continue to purchase Busy at Maths pupils books for the senior end of the school when funds are available). These texts cover all strand units in each class. Teachers do not rely totally on the textbook and use active learning wherever possible. The teacher's manual, work cards and other texts are available at the teacher's discretion for use with children who need more challenging exercises and also for the children who need reinforcement of concepts (e.g. Busy at Maths, Mathemagic, shadow book, on line resources, worksheets etc.). We use New Wave Mental Maths from 1st to 6th class. Texts listed are under ongoing review and may be changed with the general consensus of the staff.

Estimation

Estimation must be seen as a strategy to be used throughout all the strands and not merely restricted to number alone. These skills must be developed and refined so that guesses can become more realistic and more accurate. Children should be encouraged to use the following strategies selecting which is most appropriate for the task in hand:

- Front end
- Clustering

- Rounding
- Special numbers

These are explained in the *Teacher Guidelines* pages 32-34.

In strands such as measure and shape and space, the hands-on approach is vital if children are to develop an understanding of quantities such as litres, metres, etc. It is important to teach the children to develop their own personal benchmarks to be used when estimating, particularly in the measures strand e.g. the width of their finger is close to a centimetre.

Calculators

Calculators are in use in 5th and 6th class. Calculators must be stand alone i.e. not incorporated into a ruler and the keys must be of a reasonable size. Children must be taught to make decisions about when it is appropriate to use them such as checking answers or for particularly large numbers. Calculators must not replace competent computational skills. The children will learn that estimation and calculators work hand in hand. Pupils with specific learning difficulties may be given access to calculators when judged to be beneficial after consultation between the special needs teacher and the classroom teacher.

2.3 Collaborative and Co-operative learning.

The maths curriculum allows opportunities for the children to work in pairs/small groups. It provides opportunities to learn the skills needed for turn taking, listening to others and taking on responsibility for particular tasks within a group e.g. measurement.

2.4 Using the Environment

Each teacher will be responsible for creating a maths rich environment in his/her classroom. The maths equipment will be easily accessible and is stored in designated press in learning support room and the children's maths work will be displayed where appropriate.

Some Maths activities which involve use of our environment include:

- Numbers on doors, car registration numbers
- How many rooms/ windows?

- Observe shapes, angles.
- Measuring - drawing 1 metre on playground with chalk,
- Maths work is displayed in classrooms.
- Maths display: Problem of the week- Prizes are given out during assembly... emphasis during Maths week
- In our Active Flag Project we endeavour to integrate maths with many of our activities e.g. surveys, data representation.
- Class teachers can have "Problem of the week" at their discretion where and when appropriate.

Maths trails.

Trails will always be mindful of health & safety- See teachers classroom folders... Maths trails usually form part of Maths week

2.5 Skills through content

Applying and problem solving, e.g. selecting appropriate materials and processes in science

Communicating and expressing, e.g. discussing and explaining the processes used to map an area in Geography

Integrating and connecting, e.g. recognising mathematics in the environment

Reasoning, e.g. exploring and investigating patterns and relationships in music

Implementing, e.g. using mathematics as an everyday life skill

Understanding and recalling, e.g. understanding and recalling terminology, facts, definitions, and formulae

All classes use mental maths.

Use of ICT

Teachers will incorporate ICT into some lessons and will use I-Pads and IWB with on line resources to promote problem solving and to develop skills. Co-curricular coding classes will also take place (this may change from year to year.)

Language of Maths

Mathematics has its own vocabulary and grammar. It must be spoken before being read and read before being written down. It is important that there is an agreed strategy for teaching concepts. Consistency in the language used from class to class is important. The mathematical language for each strand and strand unit is outlined in Busy at Maths Teacher's Book for each fortnight.

We have agreed the following:

JUNIOR INFANTS

	<p>Mathematical Language and Oral Language Development as set out for each of the following strands in the Busy at Maths Teacher's Resource Book:</p> <ul style="list-style-type: none">• Early mathematical activities• Number (0 - 5)• Algebra (and, makes)• Shape and Space (2-D and 3-D shapes, Spatial Awareness, Time)• Measures (Length, Height, Width)• Data• Money
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SENIOR INFANTS

	<p>Mathematical Language and Oral Language Development as set out for each of the following strands in the Busy at Maths Teacher's Resource Book:</p> <ul style="list-style-type: none">• Early mathematical activities• Number (0 - 10)• Algebra (Formal introduction to +, -, =)• Shape and Space (2-D and 3-D shapes, Spatial Awareness, Time)• Measures (Length, Height, Width)• Data
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	<ul style="list-style-type: none"> • Money
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The following is the language used for the Number strand.. we have outlined it here as it links to each strand.

FIRST CLASS Number

$\begin{array}{r} 34 \\ +17 \\ \hline \end{array}$	<p>Addition :Add the units first. Top Down.</p> <p>Put down the units and carry the ten. Now add the tens.</p> <p>Rename units to ten and units</p>
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Subtraction:	Language: take away, less than, left, rename
$\begin{array}{r} 16 \\ - 4 \\ \hline \end{array}$	<p>Vertical: start from the top using the words 'take away' 16 take away 4 equals</p> <p>Informally: 6units take away 4 units is 2, 1 ten take away 0 is 1</p>
5 - 1=	<p>Horizontal: Read from left to right using the words 'take away' minus, subtract , less 5 take away 1 equals</p> <p>Place Value: The word 'Units" will be used rather than "ones".</p> <p>Renaming will be the method used throughout the school.</p>

SECOND CLASS Number

<p>Addition: 7+3+8= 18</p>	<p>7 plus 3 plus 8 equals 18 (7plus 3 equals 10 plus 8 equals 18)</p>
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6 3 +6	6 plus 3 plus 6 Encourage the child to choose the easiest method to add the three digits e.g. 6+6+3
Subtraction	Language: subtraction, decrease, subtract, take away, from, less than, minus, difference
27 -18	7 take away 8, I cannot do so I rename a ten, 7+10= 17. 17 take 8 equals 9. 1 take away 1 leaves 0.

THIRD CLASS/ FOURTH CLASS Number

Multiplication/ Division	÷ and x are introduced as symbols in Third Class. The following vocabulary will be used: ÷ division, divide, divided by, split, share, shared between, group, how many in ...
Short multiplication	X. multiplication, multiply, times, of Start with 4 groups of 3 move onto... 4 times 3, 4 multiplied by 3, 4 threes Start at the bottom
(4th class) Long multiplication	When doing long multiplication children will estimate answers. Start with the bottom number. Multiply by the units first. Then multiply by the tens. Any renamed units go on the line to be added on. Children will have lots of practice in the commutative and distributive properties of multiplication.
Multiply by 10	
Multiply by 100	Add a zero Add two zeros
Division	Language: goes into, Divided by, divisible by, share among
12 ÷ 4	12 shared among 4 12 divided by 4 4 into 12 goes

Fractions	
$\frac{1}{4}$ of 32	Share 32 among/between 4 and/or 32 divided by 4 $\frac{1}{2}$ is equivalent to $\frac{2}{4}$ (4th class) $\frac{1}{2}$ is the same as $\frac{2}{4}$ $\frac{1}{2}$ is equal to $\frac{2}{4}$
Decimals	$\frac{1}{10}$ is equal to 0.1 $\frac{1}{100}$ is equal to 0.01 Include zero before decimal point

FIFTH/SIXTH CLASSES - Mathematical Language for Number

Number:	Language: square, prime, composite, rectangular numbers, square root, units, tens, hundreds, thousands, ten thousands, hundred thousands, rename, relationship, combine, split, compare
Multiplication/Division	Finding common multiples by listing numbers Finding common factors by listing factors. HCF, LCM
Division	The words 'product' and 'quotient' are introduced. Problems involving sum, difference, products, quotients. Times, groups of, remainder Children will have practice in division by 10, repeated subtraction, importance of estimation, front end estimation, find the remainder.
Fractions:	Numerator, denominator, improper, mixed numbers, equivalence, simplify, relationship
$\frac{1}{2} + \frac{1}{4} =$	$\frac{\quad}{4} + \frac{\quad}{4} = \frac{\quad}{4}$ Use the same denominator
$\frac{1}{2} - \frac{1}{4}$	$\frac{\quad}{4} - \frac{\quad}{4} = \frac{\quad}{4}$ Use the same denominator
Mixed numbers + and - $3\frac{1}{2} - 1\frac{3}{4} =$	Make sure the fractions have the same denominator. The process is based on equivalence of fractions. Do you need to rename a unit when subtracting? Make sure final answer is simplified .
Multiplication	Use of repeated addition

<p>3x1/3</p> $\begin{array}{r} 1 \times 1 \\ 3 \quad 2 \end{array}$	<p>X means "of", 1/3 of a 1/2, pupils will see a pattern emerge. Multiply numerator by numerator (multiply the top numbers) denominator by denominator (multiply the bottom numbers) Simplify/ break down</p>
<p>Division of whole number by fraction</p>	<p>$5 \div \frac{1}{4} =$ How many 1/4s are in 5? Pupils will see a pattern emerge.</p> <p>Rename the whole number as a fraction and turn the divisor upside down and multiply. How many quarters in 5 units $5 \times 4 = 20$ Visual aids used by teacher $\begin{array}{r} 5 \\ 1 \end{array} \times \begin{array}{r} 4 \\ 1 \end{array} = 20$</p>
<p>Decimals</p>	<p>1/10, 1/100, 1/1000 - tenths, hundredths, thousandths, order, decimal point, decimal place</p>
<p>Addition Subtraction</p> <p>Rounding decimals</p> <p>Multiplication of decimals</p> <p>Division of decimals</p> <p>Converting a fraction to a decimal</p>	<p>to 3 decimal places (with/without calculator) to 3 decimal places (with. without calculator) Pupils are directed to correctly align the numbers.</p> <p>to the nearest whole number to 1 decimal place to 2 decimal places.</p> <p>Multiplying a decimal by a whole number Multiplying a decimal by a decimal How many digits are after decimal point in the sum? Make sure there are the same no. in the answer</p> <p>Importance of estimation and alignment of decimal points in the answer.</p> <p>You divide the numerator by the denominator or if possible you change the fraction to tenths/</p>

	hundredths and then convert to decimal. Look out for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{100}$
Percentages expressing a fraction as a percentage	Percent, percentages You multiply by a 100/1 or if possible you express the fraction as a hundredth.

**The specific language for the remaining strands is outlined in the Teacher's Resource Book each fortnight. We have outlined "Number" here as it is linked with each strand.

2.7 Tables

Number facts up to 10 will be memorised. Addition facts up to 12 will be memorised by the end of Second Class and multiplication facts up to 12 by the end of 3rd Class. Both will be revised up to the end of Sixth Class. Multiplication is a natural progression from extended addition.

Pupils say tables like this: 1 time 4 is 4, 2 times 4 is 8, 3 times 4 is 12.

A variety of methods will be used including counting 2s, 3s, 4s ..., reciting, using music tapes etc. Subtraction and division tables will be learned as the inverse of addition and multiplication. Skip counting, nursery rhyme tunes

Games will regularly be used to practice tables in class, including Around the World/King or Queen of the Castle, I Have, You Have etc.

Children from 1st - 6th classes recite their tables regularly and tables are reinforced every day. Children are encouraged to memorise tables and tables are given every night for homework. Teachers keep a record of tables that have been learnt and identify children having difficulties with tables and will set them realistic targets ensuring steady progression.

One minute termly tables tests will be administered to the class, involving addition, subtraction, multiplication and division. Pupils get one minute to fill in each section of 30 questions. Teachers will record the results and pupils will be able to see their progress throughout the year.

Skip counting

Senior Infants: 2's=20 5's=50 10's=100

1st revising and adding in 3's + 4's

2nd revising and 6's 7's, 8's and 9's

Problem solving

The ability to solve problems is at the heart of maths. It makes the learning of maths more interesting and enjoyable. It allows them to use the mathematical skills and knowledge they have already acquired. Problems can come in many different forms.

Types of problem solving used in school:

- Real life problems
- Word problems
- Puzzles
- Maths games

- Open problem solving - more than one way of doing it
- Maths trail
- Problem solving activities on line

Children need to be taught strategies to problem solve. The following are strategies that teachers might choose:

Strategies for problem solving:

- Personalise story/problem.
- Visualise - draw it out.
- Act it out.
- Estimation.
- Solve simpler version.

The ROSE Approach

1. Read the problem. Paraphrase the problem Try substituting simpler numbers for larger numbers or fractions or decimals. This makes estimating easier.

2. Organise the mathematical operations you will use
3. Solve the problem
4. Evaluate your answer. Was it the best method? Does it match the estimate?

RUCSAC

- Read
- Understand
- Choose
- Solve
- Answer
- Check

The RUDE Approach (Used in Junior infants)

1. Read the problem.
2. Underline key words
3. Draw a picture or diagram
4. Estimate the answer.

Evaluate the answer (Used in Junior Infants)

2.9 Presentation of Work

Recording of maths work in infants is done in the maths text book and copies (Copies are introduced in Senior Infants).

In 1st and 2nd classes the work is done in the Maths text book and copies.

In senior classes the presentation of written work in

Maths is as follows:

- Each page is to be divided into two categories/columns. The order of writing sums is to be written vertically down the page, as opposed to horizontally.

- A variety of options for presentation will be availed of where appropriate at teacher's discretion for example drawing pictures to show result, concrete materials, diagram, verbally etc.

Integration

Maths is a living subject with endless possibilities for integration such as in art and science e.g. measuring temperature. We believe that the integration of mathematics with other subjects is an important factor in broadening the child's education. Elements of number, time and measure - length can be applied to activities in physical education. Work in mathematics is needed when conducting surveys for the Active Flag School Project. Artwork is a very effective way of consolidating learning in shape - e.g. tessellations. A thematic approach to mathematics brings cross-curricular activities into play - e.g. in Aistear, SESE, SPHE, Language, Physical Education, Arts education.

3. Assessment and Recording Keeping

Assessment is an essential element of the school plan for mathematics. It is used to monitor pupil progress and to inform future planning. The following assessment tools are in use.

Knowledge, skills development and participation levels are assessed by teachers.

Teachers select from the following range of assessment approaches:

- Teacher observation
- Teacher-designed tests and tasks
- Work samples, portfolios and projects
- Curriculum profiles
- Mastery records
- Diagnostic tests (mainly resource/learning-support)
- Standardised tests
- Self Assessment.

- As part of our whole school assessment the Sigma are used from first class to sixth
- class.
- In Junior Infants a section of E.Y.E.S. is completed
- In Senior Infants: Early Drumcondra Numeracy

These standardised tests are carried out once a year by the class teachers. The results are recorded on Aladdin and are shared with teachers as necessary.

• Teacher observation provides ongoing assessment of oral and written class work and homework. The children's work in their copies and folders is a record of his/her progress.

See Assessment Policy.

4. Children with Different Needs

(a) Class Teachers use the following strategies to ensure the participation of children with special needs in relation to mathematics:

- Use of concrete materials
- Oral explanation and discussion to ensure pupils with literacy difficulties can participate in the maths class.
- Direct teaching, demonstration and explanation by the class teacher.
- Teaching of the language of mathematics
- Discussion between the teacher and pupils.
- Group Activities
- Opportunities to practise and consolidate fundamental skills and routines using oral as well as written examples.

(b) Children with special needs are provided with access to all strands of the mathematics curriculum.

(c) Teachers in mainstream classrooms provide a differentiated programme to cater for children with learning difficulties.

Supplementary teaching in mathematics is available for children with learning difficulties. Where children have a STEN score of 3 or less in the

Drumcondra/Sigma T standardised test, then one to one assistance is offered. This could be in a group setting or one to one, depending on the need.

Team teaching, station teaching and early intervention are strategies adopted by Avoca NS to assist with children with difficulties.

See Learning Support Policy

Withdrawal of pupils for supplementary teaching

It is important that there is collaboration between class teacher and resource/learning support teacher so as to ensure the child was not consistently absent for maths instruction.

Team teaching is also encouraged, where teachers can work with smaller groups

5. Equality of Participation and Access

The school plan for Mathematics is designed to allow all children full access to all aspects of the Mathematics Curriculum. Equal opportunity is given to boys and girls to access all parts of the curriculum. Pupils whose first language is not English are given extra help within the school. Children with special physical needs catered for to the fullest possible extent

Organisation

6. Timetable

In line with our numeracy & literacy strategy, maths time has been increased by 70 minutes per week:

Junior/Senior Infants: 3 hours 25 mins.

1st-6th Class: 4 hours 10 minutes.

This extra time will be achieved by:

Numeracy will be increased by 70 minutes by supplementing regular maths time by doing mental maths for 10 minutes every day. This will be done using discretionary time.

7. Homework

- Homework is based on the concepts and content covered in class.
- Homework allocated should take account of the differing levels of ability in the class and should be a positive experience for all. Maths homework will generally involve both a written and oral element i.e. computation/problems and tables/mental maths
- Practical activities should be given from time to time (e.g. measuring) bearing in mind the age and level of the class
- Time should be given for the correcting of the maths homework and an opportunity to discuss any problems that arose.

See Homework policy.

8. ICT

Tablets and IWB are used .

There is an Internet connection in each classroom and the pupils under the supervision of an adult can use the Internet to enhance learning in mathematics.

Example of websites that may be used:

topmarks.co.uk

www.mathletics.ie

www.mangahigh.com

www.schoolhub.ie

nrich

multiplication.com

ICT work on Busy at Maths Teacher's Resources

9. Individual Teacher's Planning and Reporting

Teachers should base their yearly and short term plans on the approaches set out in this whole school plan for maths. Work covered will be outlined in the Cúntas Míósúil which will be submitted to the principal.

10. Staff Development

An atmosphere of open communication exists between all the staff members and ideas and expertise is shared. Discussion and planning in class groupings is encouraged. Teachers are informed of maths related courses and encouraged to attend.

Information acquired on these courses is made available to other staff members.

Time is allocated at staff meetings for the discussion of maths related business when necessary.

11. Parental Involvement

The school recognises the importance of parents in a child's education and welcomes their involvement in the implementation of the Mathematics programme. Such involvement could be as follows:

Meeting with Junior Infant parents to give them examples of what type of homework the children will get and how best to support them.

- A letter to infant parents with examples of number formations and recommendations on how to develop their child's mathematical awareness through everyday activities is provided.
- Parents are encouraged to supervise and be involved in maths homework.
- Annual parent teacher meetings provide maths assessment information. Further meetings could be arranged at the request of the parents or teacher.
- Annual written reports are forwarded to all parents in June of every year. These provide details of the child's progress in maths.

Regular assessment results are sent home and signed by parents.

Success Criteria

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

Continuity of content and methodology through the strands and class levels

On going assessment and standardised tests will show pupils are developing a level of appreciation of Maths appropriate to their age and ability.

Feedback from Inspectors, Parents, Second level schools

Implementation

Roles and Responsibilities: Class teachers are responsible for the implementation of the Maths programme for their own classes.

This policy shall be implemented with immediate effect.

Review

It is envisaged that this policy is reviewed over a 2-3 year period.

Ratification

This plan was ratified by the Board of Management on 12th January 2021

