

Maths Plan

Introductory Statement:

This plan was developed over a number of years beginning in the school year 2001-2002 by all the teaching staff. This document is an amalgamation of discussions, which took place at staff meetings and at dedicated planning days. We availed of the services of two Maths Cuiditheoirí- Rosemary Dunne in 2003/2004 and Fiona Walsh.

This plan was reviewed in February 2009, March 2013 and Oct 2014 and subsequent changes are contained within.

Rationale:

As a result of changes to the Maths curriculum, it was decided to review and update our existing Maths plan to conform with the principles as outlined in the Revised Curriculum. Our primary motivation was to benefit teaching and learning in our school.

Vision:

Our school vision seeks to ensure that each child develops educationally and grows emotionally in an atmosphere of tolerance, respect and appreciation of others and the world around them. Maths is an important area in a child's life and how a child learns maths is very important. Our overriding principle places the emphasis on fun, practical activity and activity related to the world around.

Aims:

We endorse the aims and objectives of the curriculum for Mathematics and in addition we emphasise the following:

- The need to develop mathematical concepts and skills through the use of concrete materials
- The importance of children engaging in activity based learning that stimulates their imagination and arouses their curiosity
- The need to appreciate the everyday application of maths and appreciate the everyday role of maths in the environment
- 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
- The importance of constant revision of basic number facts and achieve proficiency in fundamental mathematical skills

We aim to do this through having a co-ordinated and comprehensive programme in accordance with the Mathematical curriculum to set out an approach to the teaching and learning of mathematics, which caters for the needs of all the children in our school and ensures continuity and progression in their learning. This plan will form the basis for teachers' long and short term planning. It will also inform new and temporary teachers of the approaches and methodologies used in our school.

1. Mathematics curriculum

For content overview see Mathematics Curriculum: Infants p.17; First & Second classes p. 37; Third & Fourth classes p. 61; Fifth & Sixth classes p. 85)

- It is up to all teachers to be familiar with the curriculum for their class level. This will be reviewed periodically at staff meetings.
- In order to ensure that continuity and progression is maintained if teachers change classes or if new teachers join the staff, copies of Cuntas Miosúil are available in the office. All new or temporary teachers would be provided with the school plan for mathematics.

2. Timetable

- Teachers will refer to the recommended times allocated in the curriculum.
- When drafting timetable for withdrawal of pupils for supplementary teaching, learning support teachers include these pupils for as much of the mainstream mathematics programme as possible. (See Learning Support Policy)

3. Approaches and methodologies

(Refer to Teacher Guidelines: Mathematics pp. 30 - 67)

3.1 General

- All children should be provided with the opportunity to access the full range (all strands) of the mathematics curriculum. This happens through teacher discussion, collaboration and consultation with Learning Support and Resource Teachers.
- There is less emphasis and reliance on textbooks and workbooks and more on active learning strategies as we have invested time and money in building up resources and developing maths in the environment.
- Textbooks in use are in line with content objectives for the class level.
- Concrete materials are available and in use in all classrooms.

- Calculators are in use for all children from fifth to sixth class to check answers and to explore the number system. Calculators also may help to remove computational barriers for weaker children or to focus on problem solving.
- Number limits are being adhered to particularly at first and second classes where the emphasis is on the development of the concept of place value.
- Formulae are being “discovered” by children rather than being taught by rote.
- There is an emphasis on simple fraction families in the senior classes.
- Pupils collect real data in other areas of the curriculum and use it to represent their findings i.e. data from other subjects such as geography, history or science to find the answer to a question.
- Estimation skills are being developed and refined with the emphasis on using estimation in all areas of mathematics.
- Estimation strategies are being used such as clustering, rounding and through talk and discussion.
- As identified in SIP numeracy all children are introduced to ROSE strategy.

3.2 Talk and discussion

Guided discussion and discussion skills

- Talk and discussion forms a large part of the lesson - this occurs in whole class work, pupils working in small groups and in pairs as well as teacher/pupil and pupil/teacher.
- Opportunities are provided for pupils to explain how they got the answer to a problem, discuss alternative ways of approaching a problem or give oral descriptions of group solutions.

Scaffolding

- The teacher actively models the language to be used, particularly when talking through the problem-solving process.

Integration

- Other subjects where mathematical processes are appropriate and useful, e.g. gathering data in history and geography, measuring temperatures in science are incorporated into the curriculum.

Linkage

A thematic approach is used for linkage, e.g. when dealing with decimals are we also aware of their use in measures and money.

Mathematical language in context

- There is an agreed emphasis on the language of mathematics for each class level
- There is a conscious effort made to use the children's own ideas and environment as a basis for reinforcing mathematical language, e.g. you are taller than he is, teacher's table is longer (wider) than yours.
- Teachers have identified common approaches to the language used in
 - Addition –Infants to 2nd (add ,plus, count on and more than) 3rd to 6th (add, plus, total and sum of) . Colour: red
 - Subtraction - Infants to 2nd (minus, take away, less than, count back, subtraction and difference) 3rd to 6th (minus, take away, less than, subtraction, difference) Colour: green
 - Multiplication – 2nd class –groups of 3rd to 6th (3 fours are) product of, groups of, multiples . Colour: blue
 - Division - divide, share, split, groups of.. . Colour: black
 - Equals - same as, is, will be, answer is, means, equivalent, total
 - October/November 2014 staff agreed that on a whole school approach for addition, subtraction, division and multiplication, and to have a colour coded display in each classroom.

Although the whole-school plan has identified particular terms to be used at different class levels, children, during their school career, are exposed to the different terms used in relation to the symbols, particularly when engaging in problem-solving activities..

Number Facts

- There is a common approach to the teaching of number facts (tables), e.g. for 3 X 4, we say three fours.
- Children are encouraged to become aware of the commutative properties of multiplication tables and of their relationship with division.
- We teach addition & subtraction tables in 1st & 2nd, multiplication and inverse for division in 3rd & 4th, and multiplication tables in 5th & 6th.

3.3 Active learning and guided discovery

There are agreed strategies for teaching:

- Addition - top to bottom i.e. vertically, and left to right i.e. horizontally.
- Subtraction - use of materials and renaming
- Multiplication - vertical/horizontal presentation, skip counting, using mental strategies such as identifying doubles, near doubles, understanding multiplication as repeated addition, multiplying by 5 and 10, using games to reinforce facts, developing estimation skills.
- Division - concept of sharing, understanding division as repeated subtraction
- We add and subtract fractions vertically and horizontally
- The children are encouraged to develop personal benchmarks, particularly in the measures strand, e.g. noting their height in relation to a metre, the width of their finger as close to a centimetre. 4 carpet tiles covering square.
- Mathematical games are in use at each level and it is hoped to purchase more. They include dice, cards and dominoes. These games are developed appropriately at middle and senior levels
- During 2012 it was decided that all classes would engage in fun maths activities on a regular basis.

3.4 Collaborative and co-operative learning

- Skills are taught to ensure that children work as a group by developing listening to others, problem solving, turn taking and these skills are developed across the curriculum.
- Each class use a variety of organisational styles, e.g. pair work, group work and whole class work.
- During Maths Week children from 3rd-6th class are provided with opportunities for collaborative and co-operative learning when engaging in problem-solving activities/games as a whole.

3.5 Problem-solving

Following analysis of standardised tests during 2009 we observed that many children were encountering difficulty in the area of problem solving. We, as a staff are endeavoring to address this by an increased emphasis on problem solving activities. We recognize that the ability to solve problems is at the heart of mathematical activities. During review of this plan March 2013 and following from analysis to prepare school improvement plan in the area of numeracy we as a staff have decided to adopt the ROSE approach to problem-solving. All classrooms display,

explain and utilize this strategy. According to the strategy children will be encouraged to:

- Read the problem
- Organise the problem
- Solve the problem
- Evaluate the solution to the problem

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

Children are also encouraged to use approaches such as drawing pictures, using concrete materials, discussing problems and substituting smaller numbers.

The following are types of problems we will present to the children: word problems, practical tasks, open-ended investigations, puzzles, games and mathematical trails.

Using the environment

We are attempting to use the school environment to provide opportunities for mathematical problem solving by:

- Putting numbers on doors.
- Using large dice in PE to pick teams.
- Set number of laps to run.
- Using cones for sorting children in the GP room.
- We are beginning the process of developing mathematical trails for use within and outside of the school building.
- Children are given opportunities to present/display their mathematical work in the class/corridor/school as in all subjects.
- Treasure Hunts/Scavenger Hunts.

Skills through content

Skills are being actively developed through the content (See Teacher Guidelines: Mathematics pp. 68-69)

- **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 encourage the use of mental mathematics.

Presentation of work

- There is an agreed approach to numeral formation in the junior classes - the Ten-Town method is utilized occasionally.
- Presentation of written work - use of pencil, neatness is encouraged, page numbers and ruled pages - cm square is in use up to middle of 2nd class. A smaller squared copy is used from end of 2nd to 4th. A large hard backed A4 copy is used in 5th and 6th.
- We provide a variety of options for recording work. Utilising ROSE strategy.

Assessment and record keeping

(See Curriculum pp. 114-121, Teacher Guidelines pp. 64-65 and the school's Assessment Policy)

- Records are stored in line with the school's policy on record keeping.
- A broad range of assessment tools is being used which include:
 - Teacher observation.
 - Teacher-designed tests and tasks.
 - Work samples.
 - SALF folders
 - Diagnostic tests (mainly resource/learning-support).
 - Standardised tests.
- Afl Assessment is being used to direct teaching and learning as the teachers examine test results and observations to see if there are areas of mathematics that can be improved and also discuss results with learning support and resource teachers. Assessment is continuous, informative and evaluative and leads to further planning. It is both informal and formal.
- Standardised tests once a year. All classes 1st -6th
- Oral Summary - to parents at parent/teacher meetings.
- Record of concepts mastered by children to be kept.
- Teacher designed tests and observation are in use.
- Diagnostic tests are administered by Resource and Learning Support teachers depending on individual needs of children.

Children with different needs

Children with learning difficulties

(See Learning Support Policy)

- 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. The availability of supplementary teaching depends on the extent to which there are spaces in the Learning Support Teacher's case load having applied the recommended selection criteria for receiving Learning Support as laid down by the DES.
- Parents will be informed of the need for their child to attend the Learning Support and will be involved in formation of ILP.
- If there are children who qualify for supplementary teaching but for whom there is no possibility of receiving formal supplementary teaching the Learning Support teachers will liaise with the class teacher on resource books and materials that could be used by the class teacher and the child in the mainstream class setting.
- If the child is already attending the Learning support teacher for English it may be possible on occasion for the child to receive some help with their maths work as part of their supplementary teaching sessions.
- The progress of such children will be reviewed on a regular basis and will be apparent through IEP's and ILP's.
- The same provision will apply for children who do not qualify for supplementary teaching but yet demonstrate difficulty with Mathematical activities either on an on-going basis or with particular concepts.
- (Multi-Class Setting: Advantage will be taken of the potential of the multi-class situation to allow such children to revise and consolidate their understanding of any strand-unit they may have difficulty with).
- Children with special needs are provided with access to all strands of the mathematics curriculum.
- Teachers in mainstream classes provide differentiated programs to cater for children with learning difficulties.
- ICT is used to support teaching and learning for children with special needs.

Children with exceptional ability

- For those children who have a natural aptitude for mathematics, every effort will be made to provide them with more challenging work such as reasoning tests, further individual work and use of ICT.

- (Multi-Class Setting: Advantage will be taken of the potential of the multi-class situation to allow such children to explore appropriate strand-units at a higher level).
- Collaboration with parents of such children will take place during parent/ teacher meetings.

Equality of participation and access

All children are afforded equality of participation and access.

7. Homework

(See Homework policy)

Teachers will strive to give maths homework including learning of tables which will involve children in everyday maths with parents - measuring bedroom, using capacity, cars, distance etc.,

8. Resources

(Refer to Teacher Guidelines: Mathematics p. 18, pp 72-73)

Equipment, textbooks, supplemental materials, calculators

Mathematics resources/materials are

- Stored in classrooms.
- Ordering of new resources will be assigned as part of a position of responsibility.
- Calculators are individually purchased and are in use by children in 5th and 6th Classes.
- Children in 4th class use calculators at intervals prescribed by the teacher.

See Teacher Guidelines: p.60, relevant sections of calculators, Guidelines for Second Level Schools (DES & NCCA)

- Specific resources which are required by the learning-support/resource teachers have been purchased and will be updated, as these teachers require.

ICT (See School Policy)

(See Teacher Guidelines: Mathematics pp 60-61)

- Suitable software is purchased by individual teachers and is in classrooms.
- Useful websites are included in school plan.

Individual teacher's planning and reporting

Each teacher will draw up a scéim bliana in accordance with the objectives for their relevant class levels. Short term planning will be based on the individual scéim bliana of each teacher. The Cuntas Miosúil will be a record of maths taught and will be available to substitute, temporary and the subsequent class teachers where relevant.

Staff development

- Teachers have access to current research, reference books, resource materials websites, associations dealing with mathematics and such material is available in the school. Each teacher takes responsibility for monitoring developments and sourcing/obtaining materials.
- Time is allocated at staff meetings to discuss issues related to the mathematics programme.
- Ann Mc Intyre is the numeracy link teacher in our school.
- As we developed our SIP numeracy both Ann Mc Intyre and Deirdre Kelly attended in-service.
- Where teachers identify a need outside help/expertise will be sought from Sligo Education Centre/ PDST.

Parental involvement - Home school links

(Refer to Teacher Guidelines: Mathematics p. 21 and Primary School Curriculum, Your child's learning, Guidelines for parents).

- At the introductory meeting of new infants the approach to Maths in the junior classes is outlined.
- Reference to maths will be included in the newsletter where appropriate
- Parent - teacher meetings also provide a means of communication
- The homework policy refers to tables and maths homework received by the children.

Community links

- Members of the school community who can provide support across the curriculum are identified at staff meetings.

Success criteria

- How will we know that the plan has been implemented?
 - Teachers' preparation based on this plan
 - Procedures outlined in this plan consistently followed

Objectives for 2011-2013

1. Display children's maths work throughout the school.
2. ICT – use more extensively through internet and interactive boards
3. To purchase more resources in maths
4. To purchase games e.g. multiplication games, large cards, board games etc.
5. Source, purchase and use maths diagnostic tests.
6. Use the standardised tests to identify two key areas of concern and to follow-up by focusing on these areas. This has occurred.
7. Display of Birthdays
A mathematical element in SESE display.

Actions

To achieve target to increase scores attained in the area of shape and space we will

- increase the amount of time dedicated to the strand shape and space including developing cross curricular links.
- ensure that the strand shape and space is taught during Term 2 and that the strand will be revised in Term 3
- ensure shape and space strands will be introduced at different times to ensure resources are available to all teachers.
- use agreed mathematical language as per Maths Plan
- utilise PDST resource book based on Shape and Space.

To achieve target to increase scores attained in the skill of problem-solving we will

- utilise ROSE strategy in all classrooms.
- display ROSE strategy in all classrooms.
- pupils will engage in problem-solving activities based on all strands and on a regular basis.
- Encourage pupils to discuss problems and possible solutions in groups and to share ideas/alternative methods with peers
- Focus on using correct /appropriate mathematical language during numeracy activities.
- Ensure all classrooms display and utilise a similar colour coded chart highlighting mathematical language/operations
- extension activities to develop problem solving skills will be available in all classrooms

To increase opportunities for pupils to work collaboratively we will

- teachers will plan effectively to ensure the inclusion of opportunities for pupils to work collaboratively
- include group work/pair work as an integral part of numeracy lessons.
- Provide opportunities for pupils and teachers to reflect and review the process of working collaboratively
- This review process will inform and improve our capabilities to work collaboratively.

To develop assessment practices in our school we will

- Utilise WALT/WILF strategy to ensure pupils are aware of learning objectives and assess attainment of these.
- SALF folder will have area designated to numeracy which will allow opportunities for self/peer assessment.
- Provide opportunities for pupils to engage in both self-assessment and peer assessment
- AfL assessment methods will be utilised to inform teacher planning of areas requiring further attention/ teacher input.
- provide increased feedback to the children as appropriate.
- Update our schools assessment policy to reflect changes as outlined

To ensure consolidation of learning in numeracy occurs we will

- allocate one week per term to consolidate work completed in numeracy.

To increase parental awareness regarding methods to further their child's learning in the area of numeracy we will

- Provide necessary information at Sept information meetings to help ensure parents can support children when completing numeracy homework.
- Reinforce the role of parents in developing numeracy skills at home .
- Provide links for parents to numeracy resources e.g. PDST information leaflets to parents, lists of useful websites.
- Encourage parents to be familiar with our numeracy policy available on school website.
- Encourage parents to discuss numeracy pages included in SALF folders with children.

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- To provide information regarding pupils learning in numeracy to parents through copies, homework journals, SALF folders, parent teacher meetings and end of year reports.

To sustain/increase the high percentage of our pupils who enjoy maths we will

- continue to promote maths in ways that maintain the current positive attitude towards maths including, positive learning experiences during maths lessons.
- Provide fun/stimulating activities including games based on the particular strand/unit been taught where possible
- continue our participation in nationwide numeracy events.
- Encourage children to contribute to class blog based on activities undertaken during numeracy lessons.
- Provide regular feedback to children.
- Allocate a designated numeracy display area in the GP room.

To increase the % of children who feel confident asking for help during numeracy we will

- Create a culture of support for all children to request help/assistance during class.

This plan was drafted, circulated to all parents and subsequently ratified. This plan was reviewed in 2009 reviewed in 2013 and 2014.