

Broombridge Educate Together National School

Whole School Plan Mathematics

1. Introductory Statement and Rationale

2. Visions and Aims.

3. Curriculum Planning

- 1) Strands and Strand Units
- 2) Skills
- 3) Approaches and Methodologies.
- 4) Maths Rich Environment
- 5) Presentation of Work
- 6) Assessment and Record Keeping

4. Children with Differing Needs

5. Organisational Planning

- 1) Timetable
- 2) Homework
- 3) Resources and Planning
- 4) Individual Teachers reporting and Planning.
- 5) Staff Development
- 6) Parental Development
- 7) Community Links

6: Success Criteria:

7: Implementation and Review:

8: Ratification and Communication:

1: Introductory Statement and Rationale:

Introductory Statement:

Broombridge Educate Together is a developing school under the Educate Together Patronage, opening with one Junior Infant class in September 2016. We currently have classes up to 4th class and will continue to develop and grow up to our first 6th class in the school year 2023/2024.

This policy was developed as part of our school Self-Evaluation process. It draws on the voices of our children, parents, teachers, and management. It also affords attention to national trends in Mathematics, current best practice in Mathematics and research findings in Mathematics.

The plan was drafted in September 2021 and given its concurrent development within our School Self-Evaluation, many of the actions within our school improvement plan will be embedded within. The policy received input from the whole school community.

Rationale:

This plan was designed to:

- Provide a unified approach to the teaching of Mathematics in our school.
- Outline the approach and philosophy of learning Mathematics at Broombridge Educate Together.
- Identify and support the development of best practice Mathematics teaching and learning in the school.
- Establish a structure of class planning and collaborative staff development across all class levels.
- Act as a resource for teachers and parents in the planning and supporting a yearly overview in Mathematics.
- Facilitate the induction of new staff members, as well as support the movement of teachers between class levels and in a support setting.

2: Vision and Aims:

Vision:

At Broombridge Educate Together our vision is to support each child in our school to achieve their full potential in Mathematics. Children will be provided with learning experiences that are challenging and promote the development of their mathematical reasoning at a level that is developmentally appropriate. We endeavour to provide mathematical education that helps children to use Mathematics in their everyday lives, to apply and problem solve, to integrate and connect, communicate, and express and reason mathematically.

Aims:

At Broombridge Educate Together, our aims in Mathematics are as follows:

- To provide all children with the opportunity to access the full range (all strands and skills) of the Mathematics curriculum.
- To develop problem-solving abilities and a facility for the application of mathematics to everyday life.
- To encourage a positive attitude towards mathematics and an appreciation of both its practical and its aesthetic aspects, enabling the child and parents to see that mathematics is fun and can be enjoyed.
- To enable each child to use mathematical language effectively and accurately.
- To enable each child to acquire an understanding of mathematical concepts and processes to his/her appropriate level of development and ability.
- To enable each child to acquire proficiency in fundamental mathematical skills and in recalling basic number facts.
- To allow all children the opportunity to succeed according to their individual ability.
- To create a culture of reflection and collaboration that supports the continual development of mathematics learning in the school.
- To integrate mathematics into other curriculum areas.
- To ensure there is much emphasis on active learning strategies, including extensive use of concrete materials in all classes, along with using the school building and wider environment.
- To inform mathematics teaching by on-going Assessment for Learning.

3: Content:

3.1: Mathematics Curriculum Content:

Our teachers at Broombridge Educate Together implement the full Primary Curriculum (1999) and accordingly the Mathematics curriculum is taught at each class level. Each class teacher familiarises themselves with the curriculum objectives of their own class level from the Teaching guidelines.

Year bands	Junior and Senior Infants	1 st and 2 nd class	3 rd and 4 th class	5 th and 6 th class
Early Mathematical Activities	<ul style="list-style-type: none"> Classifying Matching Comparing Ordering 			
Number	<ul style="list-style-type: none"> Counting Comparing and Ordering Analysis of Number <i>Combining</i> <i>Partitioning</i> <i>Numeration</i> 	<ul style="list-style-type: none"> Counting and Numeration Comparing and Ordering Place Value Operations <i>Addition</i> <i>Subtraction</i> Fractions 	<ul style="list-style-type: none"> Place value Operations <i>Addition</i> <i>Subtraction</i> <i>Multiplication</i> <i>Division</i> Fractions Decimals 	<ul style="list-style-type: none"> Place value Operations Fractions Decimals Percentages Number Theory
Algebra	<ul style="list-style-type: none"> Extending patterns 	<ul style="list-style-type: none"> Extending and using patterns 	<ul style="list-style-type: none"> Number patterns and sequences Number sentences 	<ul style="list-style-type: none"> Directed Numbers Rules & Properties Variables Equations
Shape and Space	<ul style="list-style-type: none"> 3-D Shape 2-D Shape Spatial Awareness 	<ul style="list-style-type: none"> 2-D Shape 3-D Shape Spatial Awareness Symmetry Angles 	<ul style="list-style-type: none"> 2-D Shape 3-D Shape Symmetry Lines and Angles 	<ul style="list-style-type: none"> 2-D Shape 3-D Shape Symmetry Lines and Angles
Measures	<ul style="list-style-type: none"> Length Weight Capacity Time Money 	<ul style="list-style-type: none"> Length Area Weight Capacity Time Money 	<ul style="list-style-type: none"> Length Area Weight Capacity Time Money 	<ul style="list-style-type: none"> Length Area Weight Capacity Time Money
Data	<ul style="list-style-type: none"> Recognising and interpreting data 	<ul style="list-style-type: none"> Recognising and interpreting data 	<ul style="list-style-type: none"> Recognising and interpreting data Chance 	<ul style="list-style-type: none"> Recognising and interpreting data Chance

3.2. Skills through Content

Teachers include the skills of the mathematics curriculum in all lessons. The skills through content approach is adopted; this means that children will develop their skills while working on a particular content area of the curriculum. For example, children may reason how to categorise shapes while completing activities in the shape and space strand. They may then explain their reasoning to their group, developing their communicating and expressing skills.

Year bands	Junior & Senior Infants	1 st and 2 nd class Infants +	3 rd and 4 th class 1 st and 2 nd class +	5 th & 6 th class 3 rd and 4 th class +
Applying and problem solving	<ul style="list-style-type: none"> Select appropriate materials and processes for mathematical tasks. Select and apply appropriate strategies to complete tasks or solve problems. Recognize solutions to problems 	<ul style="list-style-type: none"> Apply concepts and processes in a variety of contexts 	<ul style="list-style-type: none"> Analyse problems and plan an approach to solving them. Evaluate solutions to problems 	<ul style="list-style-type: none"> Reflect upon & evaluate solutions to problems
Communicating and expressing	<ul style="list-style-type: none"> Discuss and explain mathematical activities. Record the results of mathematical activities using diagrams, pictures & numbers. Discuss problems presented pictorially or oral 	<ul style="list-style-type: none"> Listen to and discuss other children's mathematical descriptions and explanations. Discuss & record using diagrams, pictures & symbols. 	<ul style="list-style-type: none"> Listen to and discuss other children's mathematical descriptions and explanations. Discuss & record using diagrams, pictures & symbols. 	<ul style="list-style-type: none"> Discuss and explain processes and results in an organized way. Discuss problems and carry out analyses.
Integrating & connecting	<ul style="list-style-type: none"> Connect informally acquired mathematical ideas with formal mathematical ideas. Recognise mathematics in the environment. Recognise the relationship between verbal, concrete, pictorial and symbolic modes of representing numbers. 	<ul style="list-style-type: none"> Understand the mathematical ideas behind the procedures he/she uses. 	<ul style="list-style-type: none"> Understand the connection between mathematical procedures and concepts. Represent mathematical ideas and processes in different modes (pictorial, verbal, diagrammatic, symbolic). Recognise and apply mathematical ideas and processes in 	

	<ul style="list-style-type: none"> Carry out mathematical activities that involve other areas of the curriculum 		<p>other areas of the curriculum.</p>	
Reasoning	<ul style="list-style-type: none"> Classify objects into logical categories. Recognise and create sensory patterns. Justify the processes and results of mathematical activities 	<ul style="list-style-type: none"> Make guesses and carry out experiments to test them. Recognise and create mathematical patterns and relationships. 	<ul style="list-style-type: none"> Make hypotheses and carry out experiments to test them. Make informal deductions involving a small number of steps. Explore and investigate mathematical patterns and relationships. Reason systematically in a mathematical context. 	<ul style="list-style-type: none"> Search for and Investigate mathematical patterns and relationships.
Implementing	<ul style="list-style-type: none"> Devise and use mental strategies/procedures for carrying out mathematical tasks. Use appropriate manipulatives to carry out tasks and procedures. Execute standard procedures efficiently with a variety of tools. 	<ul style="list-style-type: none"> Execute standard procedures efficiently. 	<ul style="list-style-type: none"> Execute standard procedures efficiently with a variety of tools. 	
Understanding and Recalling	<ul style="list-style-type: none"> Understand and recall terminology 	<ul style="list-style-type: none"> Understand and recall terminology and facts 	<ul style="list-style-type: none"> Understand and recall terminology, facts and definitions. 	<ul style="list-style-type: none"> Understand and recall terminology, facts, definitions & formulae.

3.3: Approaches and Methodologies:

Active Learning and Discovery

- Children work actively in individual and collaborative settings (pair work, small groups, and individual work).
- The teacher serves to elicit, support, and extend children's prior and new learning.
- There is a hands-on approach to encourage children to explore, manipulate and understand Mathematical concepts, using broad, creative, and varied concrete materials/everyday objects.
- Teachers will endeavour to promote conceptual understanding over rote use of procedures (guided discovery).

Multiple Representations (Concrete/Pictorial/Abstract)

- All concepts, at every class level, where possible will be introduced with the use of concrete materials.
- These will be followed using appropriate pictorial materials.
- Children will use abstract representations following success in their use of concrete/pictorial materials.

Mathematical Language, Talk and Discussion

- Mathematical language will be modelled through explicit teaching and the use of living maths language charts in each classroom.
- Teachers ensure that the relevant mathematical language is implemented appropriately and in context formally through Maths instruction and informally across the curriculum e.g.: Play.
- Due attention will be given to the skill of communicating and expressing.

Skills through Content

- The skills of the curriculum are given due attention in teacher preparation and planning.
- Skills can be explicitly modelled in isolation, but their application will be embedded in teaching.

3.4: Maths-rich Environment

Mathematics and numeracy provide a lens with which to view the world. Accordingly, children need every opportunity to apply their mathematical knowledge to their environment, and to use their environment to further their mathematical knowledge. The following approaches are used in the school to foster this reciprocal link:

- Maths noticeboard on general display (Problem of the Week)
- Maths displays in every classroom.
- Display of children's works.
- Frequent informal maths trails (to find shapes, measure)
- More formal maths trails (E.g., Maths Week)
- Informal and formal reference to the Maths Eyes approach.

3.5: Presentation of Work:

Children can begin using squared maths copies in Junior Infants if the teacher finds it helpful. The frequency with which these copies are used will increase as children progress through class levels. As a rule, work in maths copies should be presented as follows. This presentation will be taught from 2nd class.

- Ruled – 'in two squares and down two squares.
- Dated – the date written at the top of the page.
- Titled and numbered – Exercise should be numbered in the ruled column.
- One numeral/number per square.
- The page may be split down the middle to fit more work on the page.

Other modes of presentation:

Other modes of presentation that are actively encouraged include:

- Charts and posters for project work
- Photographing work using school Tablets/ Cameras.
- Presenting work using technology (e.g., presentations, videos)
- Use of mini whiteboards for skills practice and pair share.
- Oral presentations
- Using playdough, rice, sand, and other concrete materials to form numerals.

Numeral Formation:

Children should be able to recognise numerals presented and written in a variety of forms. However, to achieve consistency within and across the different learning settings, a unified approach to the teaching of numeral formation will be used in the infant classes. The following numeral formation is taught, starting on the highlighted points:



**Please see Appendix for Rhymes to accompany each specific number formation.

3.6: Assessment and Record Keeping:

Assessment will be a continuous and dynamic part of the teaching and learning process and shall be a positive experience for the children. The results of assessment will inform the teaching and learning process at Broombridge Educate Together.

The aims of assessment are:

- To enhance the child's learning by providing accurate feedback for both the child and the teacher.
- To assist the teacher in the planning and in pacing of mathematics lessons and activities.
- To encourage the teacher to examine the suitability of the curriculum content for his/her particular class and also the methodologies and approaches being used.
- To identify children who may have difficulties in specific areas of mathematics.
- To identify the kinds of difficulty experienced by children in developing mathematical concepts and skills.
- To help inform parents of progress.
- Results on both a class and school basis are looked at to see if there are areas of mathematics that can be improved.
- Records are managed and stored in line with the school's policy on record keeping.

The following areas should be assessed (Revised Curriculum, 1999)

- Conceptual knowledge and understanding.
- Problem solving ability.
- Computational proficiency
- Recall skills.
- Mastery of specific content areas
- Ability to communicate and express mathematical ideas and processes.
- Attitude to maths

The following assessment methods will be used at Broombridge ETNS

Teacher Designed Tasks and Tests

A teacher designed test is carried out at each class level termly in Infant classes and monthly from 1st -6th class.

Teachers have discretion in designing these assessments at class level.

Teachers may use their own discretion to assess more regularly, for example at the end of a particular topic. Teachers typically test tables on a weekly basis, though this is not obligatory.

Self-Assessment

Teachers decide these strategies at their own discretion. Some recommended approaches include:

Mathematical scrapbooks & Journals

Thumbs up / Thumbs down.

Two stars and a wish

Traffic Lights

Conferencing

Standardised Tests

Standardised tests are used in every class from 1st class upwards.

The school uses the Drumcondra test developed by St Patrick's College.

The test is administered annually during the month of May.

Results are communicated to parents via the school report in the month of June. When necessary, a face-to-face meeting may be arranged after the report has issued.

Results are also used to inform interventions for maths and planning.

Assessment for Learning/ Formative Assessment

Teachers will use a range of Assessment for Learning and formative assessment techniques to inform the learning in the classroom.

These will include:

Pupil Conferencing

Questioning and Feedback

Peer Assessment

Self-Assessment (As outlined above)

Use of Mini Whiteboards (Pair share and/or Individual Work.)

Record Keeping:

- Information as it relates to specific diagnoses and maths difficulties are noted in children's Individual Pupil Learning Profiles.
- RSGM Assessments should be passed from Junior Infants to Senior Infants, and onwards to First Class.
- Drumcondra results are kept on each child's Aladdin profile; the response booklets are kept in each child's physical file held by their class teacher.
- Teachers keep a record of any teacher designed tests/ incidental notes on a child's progress run during the year in their assessment folder.

4: Children with differing needs

A balanced mathematics programme will cover concepts, skills and problem solving and should consider the child's strengths and weaknesses. The introduction and development of each topic will be structured in a graded and sequential way to allow for the individual child to develop and participate and be involved in a meaningful way. This Mathematics plan aims to meet the needs of all the children in the school.

- Teachers in mainstream classes provide a differentiated programme to cater for children with learning difficulties. This may involve varying pace, teaching style, content and methodologies to ensure learning for all children.
- An emphasis is placed on allowing all children to use a variety of materials to learn and to consolidate concepts, computation, and problem-solving strategies.

Children requiring extra support.

- Where a child demonstrates a particular difficulty, either with a topic, strand or overall, the class teacher will provide extra support and assistance to the child.
- Strategies used by teachers to ensure the participation of children with special educational needs in relation to mathematics include Learning Support/Resource teacher working in-class through co-teaching, consultation with the SEN team, use of concrete materials, calculators etc.
 - Collaborative teaching in the form of team teaching takes place, where resources are available, to allow the children to work in smaller more focussed groups.
 - There are regular meetings to ensure clear communication and collaboration between the class teacher and the learning support/resource teacher.
 - Children who receive scores at or below the 10th percentile on the standardised tests will have priority in attending/accessing the Learning Support teacher for supplementary teaching for Maths. The availability of supplementary teaching for Maths, however, 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.
 - The class teaching in collaboration with our Learning support team will devise an individual Profile and Learning Programmes (IPLPs) for pupils who have been selected for supplementary teaching or IEPs for pupils who require an individual education plan.
 - Children with special needs are provided with access to all strands of the mathematics curriculum insofar as that is possible.
 - Resources are available to assist children with special needs e.g., cubes, Dienes blocks, tactile number lines, Numicon etc.

In-class differentiation

A combination of approaches for differentiation are employed in all classes, based on discussions between the class teacher and Learning support team and based on the needs of learners:

By Process

- Extended use of concrete materials.
- Extended use of pictorial representations.
- Variety of mixed and ability groups.
- One to one or small group support.
- Different mathematical strategies may be emphasised.

By Outcome

- Different amount of work to complete.
- Different mode of presentation (E.g., number sentence v. picture)
- Use of All/ Most/Some approach to differentiate success criteria and outcomes of lessons.

By Support

The class teacher will work closely with Learning support teacher to identify the children who need a more individualised support.

Where necessary children will work in small groups supported by the class teacher and/or the Learning support teacher.

Children with a specific Special Needs diagnosis will receive support of a SNA where possible.

By Content

Mathematical content at a different difficulty level, or different level of complexity, within the same strand unit.

Different skills emphasis (e.g., implementing versus problem solving)

5: Organisational Planning

5.1: Timetable

- As set out by the NCCA and Departmental Circulars we allocate 3 hours 25 mins developing numeracy skills at infant level and 4 hours 10 mins from 1st-6th.
- Maths must be taught on a daily basis and should be indicated clearly in each teacher's timetable.
- Maths time should include at least 10 minutes of Mental Oral Maths at the beginning of the lesson.
- The process of mathematical learning is also developed through integrated activities or thematic/cross curricular approach.
- Class teachers and support teachers work collaboratively throughout the school on timetabling, content, strategies, and techniques.
- A variety of shared and collaborative teaching is in place to provide additional and complimentary support to children who require such support and where school resources are available to meet these needs.

5.2 Homework

Homework in mathematics serves three main purposes at Broombridge Educate Together

1. Consolidate work learned in school.
2. Facilitate learning of mathematical facts.
3. Foster home-school connections and extend maths knowledge beyond the classroom.

Bearing the three purposes above in mind, the type of homework set in maths each year is agreed at a class-level by teachers. Mental or oral maths homework is considered of equal or greater importance than written work. This includes the maths games, maths stories and tables activities. Children are encouraged to explain their maths homework to their parents, to share the mathematical language with which they are familiar.

5.3: Resources and Planning

- Concrete materials will be used at all levels from early Mathematics in Junior Infants to 6th class. Hands on work will be accompanied by careful dialogue to guide the children in making connections between the concrete and the abstract and to encourage the acquisition of concepts.
- Mathematical equipment, games and publications are available for use by all on a borrow scheme. These resources are stored in the Maths Resource Room. New resources will be purchased annually until we reach 6th class and then as needed.
- We will use the school environment to provide opportunities for mathematical problem solving.
- Ready Set Go Math manuals, manipulatives and sets of laminated game sheets are available to Junior & Senior Infants teachers.
- Requests for additional materials should be made to the principal.
- A base class text will be used, and other supplementary texts are made available as well as teacher – developed worksheets. Different textbooks will be trialled in the first few years of the school until a scheme that best suits the school is chosen.
- Where it is possible and or appropriate, IT will be used to provide extension and enrichment activities throughout the school. Links to useful websites are available for teachers via the numeracy folder on our Google Drive. There a code of practice to ensure safe Internet usage (refer to Acceptable Usage Policy.) Teachers are recommended to familiarise themselves with material on websites prior to use by the children.

5.4: Individual teacher's planning and reporting

- All teachers are familiar with the strands/strand units/content objectives and skills for their class level(s). Teachers refer to them regularly when planning for their classes, ensuring all aspects of the curriculum are covered and that there is a balance between the strands throughout the year.
- Teachers will base their termly and short-term plans on the approaches set out in the whole school plan for Mathematics. Work completed will be recorded using the cuntas míosuil.
- Long term plans are created and stored in the staff folder. They are reviewed annually by year band teachers.
- Long term plans will be reviewed by principal to ensure continuity from one year band to next.

- Short term plans (Scéim Coicíse) are created, through collaboration with other year band teachers and stored in the staff folder.
- Learning support teachers will draw up IPLPs/IEPs for the children who have been identified as requiring learning support in collaboration with class teachers.

5.5: Staff development

- Continuing Professional Development courses are encouraged and supported insofar as is possible by the Board of Management and the Principal. Notifications from the Teachers' Centre are emailed to teachers.
- Collaboration and liaison among the staff as a whole is valued and essential to a whole school approach to the teaching of Mathematics.
- Staff are given opportunities at staff meetings to share their knowledge with the whole staff.
- Opportunities for co-teaching will be identified. This will change from term-to-term depending on the needs of the class.
- Staff have access to reference books, materials etc which are stored in the school maths resource area.
- Teachers with similar classes meet regularly to plan and discuss content and progress in the teaching of mathematics.
- Teachers of same year band plan together with the support of the SEN team.

5.6: Parental Involvement

- The staff welcomes parental involvement in the school and in their child's education. An information meeting is held by the class teacher for all parents at the start of the school year.
- Some methodologies and mathematical language may be explained to parents at class meetings which take place in September each year.
- Relevant information/tips/strategies which may help parents at home to assist their children will be communicated as appropriate.
- Individual parent/teacher meetings are held annually in February. Teachers and parents are afforded this chance to discuss each individual child's progress in Maths and other areas, and ways of assisting that progress.

Parents and teachers are welcome to make individual arrangements to discuss matters of relevance at other times throughout the year.

- Parents will be encouraged to support their children each night with homework – homework to be signed each night.
- Parents will be encouraged to promote the use and awareness of maths at home and in the environment, particularly in relation to areas such as 'Time' and 'Money'.
- Parents are further encouraged to expose their children to everyday maths experiences and to use the correct vocabulary in everyday conversation.
- At IEP meetings children's' strengths and needs are discussed and priority learning needs and targets in mathematics where appropriate are agreed.
- Support teachers can meet with parent/s/guardian/s as part of the progress meetings to discuss children's progress, areas of difficulty and plan of work in maths where appropriate.

5.7: Community links

- The school recognises that members of the community could make a particular contribution to the mathematics programme. They are welcomed into the class to provide assistance. Garda vetting procedures must be followed.
- A list of agencies/organisations that could be of assistance to the mathematics programme e.g., shops, credit unions and banks – money, bakery/butchers – weight, train/bus stations/stops – timetables, money will be drawn up to support community links.

6: Success Criteria

We will use the following criteria to evaluate the success of the plan:

How we can determine if the plan has been implemented:

- 1) Approaches in the plan are reflected in teachers planning.
- 2) Content and methodologies are followed and reflected in teacher's day to day practise.

How will we know that the plan has achieved it's aims? What are our indicators?

- 1) Parent/Staff/Student surveys completed at intervals throughout our School Self Evaluation process.
- 2) A marked improvement in target areas we are focusing on each year as part of our School Self Evaluation plan 2021-2024.
- 3) Feedback from Inspectorate.

7: Implementation and Review

The Whole School plan will be implemented beginning in September 2021 supported by the School Self Evaluation process (2021-2024). Each year of the three-year process we will set targets for areas of development as a staff and reflect on these goals continuously as part of the process. The plan can be amended and developed based on the feedback to ensure it is a document that reflect the day-to-day teaching and learning at Broombridge Educate Together.

8: Ratification and Communication

The Plan was ratified by the Board of Management of Broombridge Educate Together on _____. This plan was then shared and communicated to all staff members and parents/guardians in November 2021. A copy of this whole school plan is posted on our school website.

Appendix 1: Maths Language Across Strands and Year Groups

Junior Infants

Early Mathematical Activities	Number	Shape and Space	Measures
Classifying	Counting	Spatial Awareness	Length
Big/Bigger/Biggest Long/Longer/Longest Tall/Taller/Tallest Wide/ wider / widest Heavy / heavier / heaviest Is the same as/ is not the same as Rough Small / smaller/ smallest Short / shorter / shortest Narrow / narrower / narrowest Light /lighter / lightest	Numbers 1-10 Number Count How many? Count up to....	Over, Up, On, In, Under, Down, beside, Outside, Inside, Moving in... Curved lines	Long, Longer than, Tall Taller than, Wide, Wider than, Short Shorter than, Narrow Narrower than
Comparing	Comparing and Ordering	2-D Shape	Weight
...than (i.e: longer than)	More than, Same as, First, Too many, Enough Less than/ fewer than, As many as, Last, Not enough, About the same as	Square, Triangle, Round, Thick, Shape Circle, Rectangle, Not round, Thin, Corner	Heavy, Heavier, Balance, Light, Lighter Weigh
Matching	Analysis of Number	3-D Shape	Capacity
More than Enough As many	Makes, Add, Combine, Join, Sets, Partition, Separate, Total, Altogether	Roll/Does not roll, Corner, can stack, cannot stack, fit together	Full, Empty, holds more/ less than, nearly full, Holds as much as
Ordering		Data	Time
First, next, before, start, last, after, finish.		Sort, Enough, More than, Less than, As many as, Chart, Graph.	Morning, Evening, Night Day, Lunchtime, Dinnertime, Bedtime Early, Late
			Money
			Cent 1c, 2c, 5c Buy, Sell, Spend, Coins How much?

Senior Infants

Number	Shape and Space	Measures
Counting	Spatial Awareness	Length
Numbers 1–20 Count on, number, before, after, estimate, set, number line.	Above, Below, Near, Far, Left, Right.	As long as, As wide as, longest, shortest
Comparing and Ordering	2-D Shape	Weight
First, second, third, last, compare, order, set.	Edge, Corner, Face, Straight, Curved, Round, Flat.	Heavy, Heavier, Heaviest, Light, Lighter, Lightest, Weigh.
Analysis of Number	3-D Shape	Capacity
Combine, Partition, Plus, Equals, Divide, Separate, Altogether, Total.	Cube, Cuboid, Sphere, Cylinder.	Containers, Fill, Compare, liquid, full, nearly full, empty, holds more than, holds less than.
	Data	Time
	Groups With Without Compare	Yesterday, Today, Tomorrow, Days of the Week, Seasons, soon, not yet, birthday, calendar, clock. Morning, evening.
		Money
		Price, Cheap, expensive, Too Much, Too Little, Change, Cent

First Class

Number	Shape and Space	Measures
Counting & Numeration	Spatial Awareness	Length
0-99, Number, Numeral, Set, Count on, Count back, skip, jump, Estimate, compare, more, less, same as.	Between, Underneath, Beside, On top of, around, left, right.	Length, Width, Height, Metre, Nearly, More/Less than, estimate, metre
Operations	2-D Shape	Weight
Addition, Number, Number Sentence, Count on, Count Back, Double, Pair, Equals, altogether, total	Square, rectangle, circle, triangle, semi-circle.	Heavy, Heavier, Heaviest, Light, Lighter, Lightest, Compare, Estimate, Weigh, kilogram
Fractions	3-D Shape	Capacity
Half, Whole, Set, Part	Cube, Cuboid Sphere, Cylinder Edge, Corner	Pour, Fill, Full, Empty, holds more/less than/same as, estimate, measure, litre
Place Value	Data	Time
Tens, Units, Value, Greater, Lower	Graph, Compare, Pictogram, Measure, show.	Days of the week, Months of the year, calendar, time, hour, half hour
Comparing & Ordering	Algebra (Extending and using patterns)	Money
How Many, First – Tenth, Pattern.	Odd, Even, Pattern	Cent, Euro, Value, Equal, Compare.

Second Class

Number	Shape and Space	Measures
Counting & Numeration	Spatial Awareness	Length
0-199, Number, Numeral, Set, Count on, Count back, skip, jump, Estimate, compare, more, less, same as, before, after	Between, Underneath, Beside, On top of, around, left, right.	Length, Width, Height, Metre, Nearly, More/Less than, estimate, metre, centimetre
Operations	2-D Shape	Weight
Addition, Number, Number Sentence, count on, Count Back, Double, Pair, Equals, altogether, total.	Square, rectangle, circle, triangle, semi-circle, oval, corner, side, edge	Heavy, Heavier, Heaviest, Light, Lighter, Lightest, Compare, Estimate, Weigh, kilogram, half kilogram, quarter kilogram.
Fractions	3-D Shape	Capacity
Half, Quarter, Whole, Set, Part	Cube, Cuboid Sphere, Cylinder, Cone, face, corner	Pour, Fill, Full, Empty, holds more/less than/same as, estimate, measure, litre, half litre, quarter litre.
Place Value	Symmetry	Time
Hundreds, Tens, Units, Value, Greater, Lower	Line, Symmetry, Symmetrical, Mirror image.	Days of the week, Months of the year, calendar, time, hour, half hour
Comparing & Ordering	Lines & Angles	Money
How Many, First – Tenth, Pattern, Greater than/	Angles, Corners, Square Corner. Parallel, Non-Parallel	Cent, Euro, Value, Equal, Compare.
Algebra (Extending and using Patterns)	Data	
Odd, Even, Pattern	Graph, Compare, Pictogram, Measure, show, Block graph, table, chart.	

Third Class

Number	Shape and Space	Measures
Place Value	2-D Shape	Length
0-999, Whole Number, Thousand, Numeral, Base ten, digit (one, two, three digit), value, whole numbers, one decimal place, notation board.	Square, rectangle, circle, triangle, semi-circle, oval, corner, side, edge, regular/irregular shapes, tessellate.	Length, Width, Height, Metre, Nearly, More/Less than, estimate, metre, centimetre
Operations	3-D Shape	Weight
Rounding, Repeated Addition, Multiplication, Division, Sharing, Remainder, Tenths, Equal Groups, Repeated Subtraction	Cube, Cuboid Sphere, Cylinder, Cone, triangular prism, square based pyramid, face,	Heavy, Heavier, Heaviest, Light, Lighter, Lightest, Compare, Estimate, Weigh, kilogram, gramme
Fractions	Symmetry	Capacity
Half, Quarter, Whole, Set, equivalent fraction, numerator, denominator.	Line, Symmetry, Symmetrical, Mirror image,	Pour, Fill, Full, Empty, holds more/less than/same as, estimate, measure, litre, millilitre.
Decimals	Lines & Angles	Time
Decimal point, decimal place, tenth, order	Angles, Vertical, Horizontal, right angle, rotate, oblique, parallel, perpendicular, greater than, less than.	Time, hour, half hour, minute, 5 past, quarter past, quarter to, analogue, digital, calendar, days of the week, months, seasons.
Data	Area	Money
Graph, Compare, Pictogram, Interpret, show, Block graph, table, bar chart, collect, table.	Area, regular, irregular, cover, space.	Cent, Euro, Value, Equal, Compare.
Chance	Algebra (Number Pattern & Sequence)	
Roll, toss, spin, chance, random, possible, certain, impossible, certain, not sure.	Odd, Even, Pattern	

Fourth Class

Number	Shape and Space	Measures
Place Value	2-D Shape	Length
0-9,999, Whole Number, Thousand, Numeral, Base ten, digit (one, two, three, four digit), value, whole numbers, one/two decimal place/s, notation board.	parallelogram, rhombus, pentagon, octagon, equilateral, scalene, isosceles corner, side, edge, regular/irregular shapes, tessellate, parallel/non-parallel lines.	Length, Width, Height, Metre, estimate, metre (m), centimetre (cm), kilometre (km), perimeter.
Operations	3-D Shape	Weight
Rounding, Repeated Addition/Subtraction, Multiplication, Division, Sharing, Remainder, Tenths, Equal Groups.	Cube, Cuboid Sphere, Cylinder, Cone, triangular prism, square based pyramid, face, corner, vertices	Compare, Estimate, Weigh, kilogram (kg), gramme (g), scale.
Fractions	Symmetry	Capacity
Half, Quarter, hundredths Whole, equivalent fraction, numerator, denominator.	Line, Symmetry, Symmetrical, Mirror image, horizontal, vertical, diagonal.	Holds more/less than/same as, estimate, measure, litre (l), millilitre (ml).
Decimals	Lines & Angles	Time
Decimal point, decimal place, tenth, order, one place of decimal, two places of decimal.	Angles, Vertical, Horizontal, right angle, rotate, acute, obtuse, right, intersecting.	Time, hour, half hour, minute, 5 past, quarter past, quarter to, analogue, digital, calendar, days of the week, months, seasons.
Data	Area	Money
Compare, Pictogram, Interpret, block graph, table, bar chart, line graph, collect, table.	Area, space, in, square metre, square centimetre.	Cent, Euro, Value, Equal, Compare.
Chance	Algebra (Number Pattern & Sequence)	
Roll, toss, spin, chance, random, possible, certain, impossible, certain,	Pattern, Sequence, rule	

Appendix 2: Numeral Formation



Around and around and around we go, we have to get home to make a zero



Number 1 is big and tall. Stand it up so it won't fall.



Half a heart will never do, add a straight line. Look we've made the number 2!



Around the tree, around the tree, now I've made the number 3



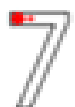
Down and across and down once more, now I've made the number four.



Numbers 5 is a funny chap, down, a tummy, and then give him a hat.

A large outline of the number 6 with a red dot at the top left of the curve, indicating the starting point for writing.

Number 6 looks like a curl in your hair. Twiddle it around to show that it's there.

A large outline of the number 7 with a red dot at the top left of the horizontal bar, indicating the starting point for writing.

Number 7 starts with a hat, then goes down, just like that.

A large outline of the number 8 with a red dot at the top left of the upper loop, indicating the starting point for writing.

Number 8 starts with an s, then goes round to join it up.

A large outline of the number 9 with a red dot at the top left of the circular part, indicating the starting point for writing.

Number 9 is like a ball on a stick. Starts with a c, then goes up and down quick.

Appendix 3: Problem Solving Resources

RUDE

R Read

Read the problem at least 3 times



U Underline

Underline important words and numbers.



D Draw

Draw a picture, diagram or table to represent the problem.



E Estimate

Make an estimation on what the answer should be.















Calculate and Check

Write an equation or sum for the problem and check your work.



Problem Solving Rubric

Math Problem Solving Rubric

	4: I'm an expert!	3: Got it!	2: Close.....	1: Huh????
Problem Solving Steps	 I understand the problem and follow all of the steps. I can show others how to do it.	 I understand the problem and can follow most of the steps.	 I am starting to understand the problem and some steps. I can do it with help.	 I do not understand the problem and can follow few or none of the steps.
Strategy Selection	 I use a strategy to solve the problem correctly and check my work with another strategy	 I use a strategy and get the correct answer.	 I can use a strategy, but need help to get the correct answer.	 I do not use a strategy and cannot solve the problem.
Explanation	 I can explain all of my problem solving steps and justify my answer.	 I can explain most of my problem solving steps.	 I am starting to explain my work can do it with help.	 I do not understand how to explain how I solved the problem.

Appendix 4: Mental Maths Strategies

Mental strategies are an important aspect of mental maths. Children should be able to draw on a range of mental strategies to solve different operations. Being able to use these strategies lessens a reliance on formal computations. Whenever possible, children should be encouraged to share their own mental strategies with other children.

This will allow for a variety of strategies to be shared in the class. See the PDST Mental Maths strategy handbooks for advice and ideas:

<http://www.pdst.ie/sites/default/files/Mental%20Maths%20Workshop%201%20Handbook.pdf>

Stage	Mental Maths Strategy	Year Group
1	<u>Addition and Subtraction</u> Counting forwards and backwards	Junior Infants
2	<u>Addition and Subtraction</u> Counting forwards and backwards Facts of 10 Commutative property	Senior Infants
3.	<u>Addition and Subtraction</u> Counting forwards and backwards Facts of 10 Commutative property Doubles/Near Doubles	1st Class
4.	<u>Addition and Subtraction</u> Counting forwards and backwards Doubles/Near Doubles Bridging through 10 Reordering Think Addition <u>Multiplication and Division</u> Skip Counting	2nd Class

<p>5.</p>	<p><u>Addition and Subtraction</u> Counting forwards and backwards Partitioning Place Value</p> <p><u>Multiplication and Division</u> Skip counting Commutative Property Distributive Property Inverse Relationship Doubles/Near Doubles</p>	<p>3rd Class</p>
<p>6.</p>	<p><u>Addition and Subtraction</u> Counting forwards and backwards Compensating</p> <p><u>Multiplication and Division</u> Associative Property Doubles/Near Doubles Partitioning by Place Value Using Known Facts Partial Products/Quotients</p>	<p>4th Class</p>
<p>7.</p>	<p><u>Addition and Subtraction</u> Counting forwards and backwards Keeping a constant distance</p> <p><u>Multiplication and Division</u> Doubling/Halving Using Known Facts Using Multiples of 10</p>	<p>5th Class</p>
<p>8.</p>	<p><u>Addition and Subtraction</u> Counting forwards and backwards Keeping a constant distance</p> <p><u>Multiplication and Division</u> Factorisation Rounding and Compensation Using Known Facts</p>	<p>6th Class</p>

Appendix 5: Tables and Number Facts

Year Group	Tables and Number Facts
Junior Infants	Number bonds to 5
Senior Infants	Revise Number Bonds to 5 Number bonds to 10
1st Class	Revise Number bonds to 10 Number bonds to 20 Addition tables to 10 Subtraction to 10 Skip Counting (1,2,5,10)
2nd Class	Revision of Number bonds Addition and Subtraction tables to 10 Skip Counting (1,2,3, 5 & 10)
3rd Class	Revise Skip Counting (1,2,3,5 & 10) Skip Counting (4,6,7,8 & 9)
4th Class	All tables (1-10)

Appendix 6: Mathematical Language

	Equals Sign =	Addition +	Subtraction -	Multiplication x	Division
Junior Infants	altogether makes.....	___ and ___ altogether makes Add Combine	Informal use by the teacher (How many are left etc)		
Senior Infants	is the same as Equals	___ add/plus ___ ___ is the same as ___ add/plus ___ ___ equals Count on	___ take away ___ ___ leaves ___ subtract ___ leaves		
1st Class		Addition Plus Add Count on Jump	Subtraction Subtract Minus Less Difference	Double/Doubles Skip Counting 2's, 5's, 10's	
2nd Class		Sum	More than	Skip Counting 2's, 3's, 5's, 10's Repeat Addition	
3rd Class	equivalent	Total increase	Decrease	___ times ___ ___ multiplied by ___ Array/Repeat Addition	___ divided by ___ ___ shared among ___ Divide/Shared /Fair Share/Split Remainder
4th Class	As above	Raise	Reduce	Product	As above
5th & 6th Class	As above	As above	As above	As above	As above