

# St. Andrew's N.S.



## ***A Whole School Plan for Mathematics***

This policy should be read in conjunction with all other school policies.

Policy Ratified

July 2010  
February 2012  
January 2017

## Table of Contents

<b>Introductory Statement .....</b>	<b>3</b>
<b>Rationale .....</b>	<b>3</b>
<b>Vision.....</b>	<b>3</b>
<b>Aims .....</b>	<b>3</b>
<b>Curriculum Planning.....</b>	<b>3</b>
<b>Strands and Strand Units.....</b>	<b>3</b>
<b>Approaches and Methodologies .....</b>	<b>3</b>
<b>Assessment and Record Keeping.....</b>	<b>7</b>
<b>Pupils with Different Needs.....</b>	<b>9</b>
<b>Equality of Participation and Access .....</b>	<b>9</b>
<b>Organisational Planning.....</b>	<b>9</b>
<b>Resources and Information Communication Technology (ICT).....</b>	<b>10</b>
<b>Individual Teachers' Planning and Reporting.....</b>	<b>11</b>
<b>Staff Development/ Sharing Professional Expertise.....</b>	<b>11</b>
<b>Parental Involvement.....</b>	<b>12</b>
<b>Success Criteria.....</b>	<b>12</b>
<b>Implementation .....</b>	<b>12</b>
<b>Review.....</b>	<b>12</b>
<b>APPENDIX 1: PLANNING FOR TEACHERS BY STRAND.....</b>	<b>14</b>
<b>APPENDIX 2 : Mathematical Resources / equipment.....</b>	<b>25</b>
<b>APPENDIX 3 : Mathematical Trails (examples).....</b>	<b>28</b>
<b>APPENDIX 4: Mathematical Software on CD.....</b>	<b>33</b>
<b>APPENDIX 5: Useful Mathematical Websites .....</b>	<b>34</b>
<b>Glossary .....</b>	<b>35</b>

## **Introductory Statement**

Following both pre-service and in-service training and professional collaboration at staff meetings, the following plan was agreed in July 2010 and subsequently updated in 2012 following further collaboration with parents and colleagues.

## **Rationale**

This plan is a record of whole school decisions in line with the Primary Curriculum, (1999). It is intended to guide teachers in their individual planning and to inform parents as to the school's approach to teaching and learning for this curricular area.

## **Vision**

This plan focuses on meeting the needs of our pupils in the area of Mathematics. We aim to equip pupils with the necessary knowledge and skills that they will use and apply to a broad range of mathematical concepts, with a view to them achieving their full potential. Parental involvement is actively encouraged to support pupils' learning in this area. This plan also informs teachers of School Policy and planning in the area of Mathematics.

## **Aims**

We endorse the aims and objectives of the Primary Curriculum in Mathematics as set out on page 12 of the Mathematics Curriculum documents. These aims and objectives:

- Develop a positive attitude towards mathematics and an appreciation of its practical and aesthetic aspects in making mathematics challenging, exciting, creative and relevant.
- Develop problem solving abilities.
- Enable the pupil to use mathematical language effectively and accurately.
- Enable the pupil to acquire an understanding of mathematical concepts and processes relevant to their ability and development.
- Enable the pupil to acquire proficiency in fundamental mathematical skills and in recalling number facts.

## **Curriculum Planning**

### **Strands and Strand Units**

The curriculum objectives used for each class are those as laid out in the Mathematics Curriculum documents. These strands are:

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

***For fully comprehensive details of these strands and their strand units, the curriculum document is available on [www.ncca.ie](http://www.ncca.ie).***

*See also Appendix 1 of this policy: Planning for Teachers by Strand.*

### **Approaches and Methodologies**

The following approaches and methodologies will be used throughout the year:

### **The Use of Manipulatives**

All pupils will have access to and use a broad range of mathematical equipment during lessons. Some resources are available in each classroom and more are available in the Mathematics resource cupboard.

See Appendix 2. A List of Mathematical resources/equipment.

### **Talk and Discussion**

Recognising the importance of the development of mathematical language, teachers support the pupils in this regard by giving instructions clearly, explaining ideas carefully, posing questions skilfully as well as providing and repeating key vocabulary. This is supported through displaying mathematical terms, symbols and diagrams/charts clearly in the classroom as appropriate. By engaging the pupils in discussion we develop their ability to express and clarify thinking. We also support those with language difficulties and pupils where English is an additional language. Mathematical problems, processes and activities are discussed with the teacher, groups and other individual pupils.

### **Active Learning /Guided Discovery**

Concrete materials are used at all levels in all strands and strand units of the curriculum - from Junior Infants to Sixth Class. Practical work is accompanied by careful dialogue to guide the pupils in:

1. making connections between the practical and the abstract
2. encouraging the acquisition of concepts
3. developing mathematical strategies for solving problems
4. developing self-motivation in mathematical activities

### **Using the Local Environment**

Pupils are learning all the time from their peers, adults and their everyday environment. In our teaching we look, for example, to the

1. classroom
2. corridors
3. playground
4. school hall
5. locality of the school
6. pupils' homes
7. wider world

These environments provide a rich source for engaging in problem solving, measurement, shape and space. They also afford us more opportunities to make Mathematics more relevant, interesting and fun. Mathematical trails both within the school grounds and the local environment may also be used for this purpose.

### **Data**

Pupils are encouraged to collect real data i.e. Infant Classes collect personal information and represent it on a pictogram. Older pupils create and interpret bar charts and pie charts. Pupils may conduct surveys on topics of their choice and represent their findings on graphs (appropriate to their class level).

### **Language and Agreed Methods**

There is a strong link between language and concept acquisition. It is important to have a common approach to the terms used and the correct use of symbol names. Our school has agreed the following vocabulary for Mathematics:

## Addition and Equivalence

Class	Symbol	Terms used
Junior Infants	+	and make more altogether
	=	same as is
Senior Infants	+	add plus
	-	take away left less than
First Class	+	addition total more than sum of
	=	equals answer is
	-	subtract
		place value – the word units will be used instead of ‘ones’
		Swap/regroup will be used when regrouping
Second Class	-	subtraction from less than difference minus

## Multiplication and Division

Class	Symbol	Terms used
Third Class	×	multiplication times multiply
	÷	divide division split group share divided by shared between how many
Fourth Class		increase decrease product of
Fifth & Sixth Classes		Quotient square power of represents means

### Place Value

In place value the word units will be used instead of ones. The words swap and regrouping will be used when regrouping.

### Methods

#### Decimal Point

The number is the only component which moves. The decimal point should not have a box to itself in copybooks as it does not of itself have place value.

### Written Methods

To ensure a common approach to the teaching of addition/subtraction with regrouping, addition/subtraction of fractions, long multiplication/division, we have agreed the following:

- *Addition*: top to bottom. Write the carried over numbers above the bottom line.
- *Subtraction*: Vertical - use of transition boards and Dienes blocks. Start at the top using the words take away/subtract/minus Horizontal - read from left to right using the words take away/subtract/minus.
- *Long Multiplication*: when multiplying by the tens the small carried number will be written above the top row of numbers with the circle around them and then added in.
- *Fractions*: in addition and subtraction of fractions the fraction part is changed into equivalent fractions (by finding the common denominator). Add/subtract the equivalent fractions and then the whole number.
- *Long Division*: in long division the steps of round, estimate, multiply, subtract and bring down will be followed where appropriate.

Pupils are provided with opportunities to verbalise and use manipulatives to represent each of these activities before using written symbols.

## Tables

- Number facts up to twelve will be memorised.
- Addition and subtraction facts will be covered by the end of Term 2 in Second Class.
- Multiplication and division facts will be covered by the end of Third Class.
- 

Both will be revised up to the end of Sixth Class. Subtraction and division tables will be learned as the inverse of addition and multiplication.

## Memory techniques

Addition- + 0, + 1, + 2, doubles, near doubles and ten facts.

Multiplication- x 5, x 10, x 2, doubles, use of fingers for x 9 and counting in 2s, 3s, and 4s. Different methods will be used in different classes including drill, reciting tables, clock, interactive whiteboard etc.

## Skills

The following skills will be acquired by the pupils through the study of the various strands in the curriculum:

- Applying and Problem Solving
- Communicating and Expressing
- Integrating and Connecting
- Reasoning
- Implementing
- Understanding and Recalling (number facts and formulae)
- Estimation

Every strand must provide opportunities for acquiring these skills. Opportunities are also given for the transfer of these skills to other curricular areas e.g. Geography, Music, Physical Education and Science.

## Problem-Solving

In recognising that Mathematics is most useful when it can be applied to particular situations and put to a meaningful use, problem solving skills are developed from Infants to Sixth Class and incorporated in all strands of the Mathematics programme. Pupils are encouraged to use their own ideas as a context for problem solving. Where possible we will use the local environment to develop these skills, e.g. Mathematics trails, Siopa Gaeilge. (See Appendix 3).

### *Problem-solving Strategies*

With regard to problem solving pupils may use the following strategies:

- Look for a pattern
- Guess and check
- Write a number sentence
- Break the problem down and solve each part
- Draw a picture
- Make a chart or table of the information
- Use concrete materials

- Use easier numbers
- Work backwards
- Use a calculator
- Work with a partner/small group

### *Answering the problem*

- Use all the important information
- Check your work
- Decide if the answer makes sense
- Write the answer
- Key Strategies
- Estimate
- Discuss or consider
- Measure or do
- Record or report

### **Estimation**

Estimation will form part of most Mathematics lessons.

### **Strategies**

Pupils will be encouraged to use each of the following strategies selecting the most appropriate for the task in hand.

- Front-ended strategy – used best in addition. The left-most digits are the most significant in forming an initial estimate and can be used on their own to establish a rough estimate.
- Clustering strategy - best suited to groups of numbers that ‘cluster’ around a common value, (e.g. 425, 506, 498, 468, 600 – 500).
- Rounding strategy - round up/down. Used with the four operations but best in division
- Special numbers strategy - looks for numbers that make patterns,  $3 + 5 + 7 + 4 + 6$   
 $3$  and  $7 = 10$ ,  $6 + 4 = 10$  that is  $20 + 5 = 25$

Please see pages 32 – 34 of the Teacher Guidelines for Mathematics.

Staff members are also committed to the ongoing use of peer tutoring/cooperative learning as well as team/station teaching in both mathematics and other curricular areas.

### **Assessment and Record Keeping**

Assessment is used by teachers to inform their planning, selection and management of learning activities so that they can make the best possible provision for meeting the varied mathematical needs of our pupils. Teachers use various methods of assessment from the following approaches:

- Teacher observation of knowledge, skills development, and participation in activities to include completion of standardised tests.
- Standardised tests e.g. Sigma T Mathematics test.
- Teacher designed tests and tasks.
- Work samples.
- Self-assessment by pupils.

## **Teacher Observation**

Teacher observation can be used as a means of building a broad understanding of a pupil's strengths and difficulties. Teachers will note anything important in relation to the pupil's progress or learning needs in Mathematics.

Observations may include the following:

- The level and manner of engagement in or attention to activities including standardised tests.
- Strengths and concerns in relation to written work.
- Involvement in discussion.
- Response to and initiation of questioning during class/group work.

In St. Andrew's N.S. it is school policy that when standardised tests are being conducted, the support teachers and class teachers monitor and record pupils' approaches and responses in completing these. Tests are also corrected in a collaborative manner as a means of verifying and validating test results.

## **Teacher designed tasks and tests**

The following are used throughout the school to help inform the class teacher of each pupil's progress in Mathematics:

- Oral tests to include tables, continuation of number patterns.
- Written tests of numerical competence.
- Problem solving exercises using a variety of mathematical skills.
- Compilation of data or drawing a diagram.

## **Standardised Testing**

We in St Andrew's N.S. recognise the wealth and quality of information which can be provided by the pupil's completion of these tests and also the teacher observation of these tasks. Also, each individual test is analysed and recorded using the school's Aladdin system. These tests may be used to inform class teachers of learning needs within each class and in the identification of pupils for learning support.

The following procedure is used for norm-referenced tests (tests where the pupil's performance in these is measured in comparison to children of a similar age throughout the country):

- Pupils from 1<sup>st</sup> to 6<sup>th</sup> are formally assessed by means of the *Sigma T Standardised Mathematics Tests* in the final term of each academic year.
- The results of each pupil's tests will be kept in their file and stored in the school office.

Test results are communicated to parents at parent-teacher meetings and on the pupil's annual school report. Results are communicated to parents in June using STen scores. A copy of class test results must be given to both the Principal and the Special Needs (S.E.N.) Coordinator and passed on to the next teacher at the end of the year. These results are highly confidential and should be treated as such under the Data Protection Act.

Standardised tests can be shown to parents but cannot be given to parents or other non-professionals. This is a condition of their distribution and use by schools. They remain the property of the school.

- In line with the school's policy on record keeping, school files are maintained until the pupil reaches the age of 21.
- To ensure objectivity and consistency in administration and marking class teachers and support teachers mark tests in a collaborative manner. Teachers **must not** "teach to the test" as this invalidates test results.

### **Diagnostic Tests**

Parental permission in written form must be obtained before these tests are administered. Tests are administered by the support teacher.

Sample list of possible tests or parts thereof which may be used:

- France Test
- Mathematics Quest
- Basic Number Diagnostic test
- Early Mathematical Skills checklists (NCCA, NCSE)
- Gillham Mathematics Screening
- Westwood (2009) Checklists

Sigma T is also used as a diagnostic test on an individual basis in First to Fifth Classes to ascertain the areas of specific difficulty.

### **Pupils with Different Needs**

The mathematics programme aims to meet the needs of all the pupils in the school. This will be achieved by teachers differentiating their teaching approaches/methodologies for example through varying the:

1. pace
2. content
3. teaching strategies

to ensure that all pupils benefit to the maximum degree from the lesson content.

Pupils who attain scores at or below 12<sup>th</sup> Percentile on standardised tests will have priority in attending learning support for supplementary help in Mathematics. Availability of supplementary teaching will depend on the caseload of the support teacher (selection criteria, as determined by DES are applied). Pupils with additional needs will be taken into consideration when planning lessons and field trips. The school may also purchase extra resources where possible.

Pupils who score in the well above average range on standardised tests are accommodated under the differentiated model of teaching within the classroom. They are also afforded opportunities to engage with more challenging materials within the team teaching model as resources permit. Parents are consulted regarding opportunities for their children, i.e. Centre for Talented Youth in D.C.U.

### **Equality of Participation and Access**

All Pupils are provided with equal access to all aspects of the Mathematics Curriculum in accordance with their needs.

### **Organisational Planning**

#### **Timetable**

The following time is allocated for Mathematics in the school:

- Infants: 3 hours 25 minutes per week
- First – Sixth Class: 4 hours and 10 minutes per week.

Timetables are based on the time allocation for this and other curricular areas. There is a discretionary time available each week which teachers use to support numeracy. Here all teachers include numeracy components in other areas of the curriculum e.g. S.E.S.E: Science, History and Geography.

### **Homework**

The recommended timing for homework is set out in the School Booklet.

In this school we strive to ensure that:

- Homework is in line with the approaches set out in the Mathematics Curriculum.
- Homework should take account of the differing levels of ability in the class and should be a positive experience for all.
- Homework involves a mixture of number work, the current concept being taught and mental Mathematics.

Tables may also be given for homework, but pupils should be given an opportunity to begin learning these in class.

Practical activities should be given from time to time, e.g. measuring - bearing in mind the age and independence level of the pupils.

Time is allocated as part of the Mathematics lesson for correction of Mathematics homework and the review of any problems arising as this provides unique opportunities for pupil/teacher engagement as well as pupil learning and assessment.

### **Resources and Information Communication Technology (ICT)**

#### **Manipulatives**

We acknowledge the importance of concrete materials in the development of mathematical concepts for pupils in all classes. Each class is provided with adequate equipment for the strands. (See Appendix 2A).

Equipment is stored in Mathematics resource cupboards and in classrooms where appropriate.

Following the audit of mathematics equipment throughout the school as part of the School Self Evaluation (S.S.E.) and subsequent School Improvement Plan (S.I.P.) the P.T.A. agreed to provide €2K for extra mathematics equipment in the school.

Arising from the Curriculum Evaluation by the D.E.S. inspectors conducted in December 2016, we plan to provide basic numeracy equipment for each of the classes in the junior part of the school (Infants to Second Class) rather than store items in a central location.

#### **Calculators**

Pupils are permitted to use calculators from Fourth Class upwards for certain strands. They are useful in:

- handling larger numbers
- checking answers
- exploring the number system
- removing computational barriers for weaker pupils thus enabling them to focus on the structure of problem solving questions at hand

It is important that the skill of estimation is developed along with the use of the calculator so that an incorrect calculation may be identified.

Calculators should meet the following requirements:

- The recommended calculator used in our school is Sharpe or similar. If children prefer to use an alternative calculator it is important that the calculator uses Algebraic Logic as opposed to Arithmetic Logic. Algebraic Logic uses priorities in sequences of operation which we call B.O.M.D.A.S. (brackets, of, multiplication, division, addition and subtraction).
- Keys should be of a reasonable size and have a positive click action.
- They must have a display of at least 8 digits and be large enough for two or three children to see if one per child is not available.
- They should have a memory function.
- Calculators are stored in the Mathematics storage cupboard.

### **I.C.T.**

In terms of hardware, interactive whiteboards, laptops, iPads, visualisers, digital cameras and other electronic devices are used. The software used may include a variety of activities to develop pupils' conceptual knowledge and problem solving skills as well as drill and practice activities. We also make extensive use of relevant online mathematical media and mathematical based websites.

In line with our policy on the use of I.C.T. staff will use the interactive whiteboards which have been made available in all teaching areas of the school, both the classrooms and support teaching areas. These as well as our iPads will be used to enhance both learning and teaching throughout the school. The use of iPads is timetabled to ensure equality of access by all classes. I.C.T. will also be used as an assistive technology with individual pupils where available and appropriate. Staff are also looking into the extension of our iPad use to include the promotion of higher order thinking such as computer coding.

Please see Appendix 4 and Appendix 5.

### **Textbooks / Workbooks**

Textbooks are selected to reflect the objectives of the curriculum and are used as a teaching resource. They are supplemented through use of I.C.T. and other relevant resources. Extension material is used also. A table book is used throughout the school. Supplementary materials will be purchased when a teacher deems necessary.

### **Individual Teachers' Planning and Reporting**

Teachers should base their long term (yearly/termly) and short term (monthly, fortnightly/weekly) plans on the approaches as set out in the whole school plan for Mathematics. Work covered each month will be outlined in the Cuntas Míósúil which will be inserted in the appropriate file in the Principal's office on a monthly basis. Yearly or termly schemes are placed in the appropriate file in the Principal's office at the beginning of each year.

### **Staff Development/ Sharing Professional Expertise**

Teachers are made aware of any opportunities for further professional development through participation in courses available in Education Centres or other venues. Expertise within the school is shared and developed through input by colleagues at staff meetings. Since 2003 St. Andrew's N.S. has been actively involved in the mentoring of newly qualified teachers in a structured and formal manner. Since the 2013-2014 school year this has been further developed in St. Andrew's N.S. under the Droichead Pilot Project to support the induction of newly qualified teachers in the school into the teaching profession. A key element of this involves staff members observing each other's practice and engaging in professional conversations on an individual and whole staff basis.

## **Parental Involvement**

Communication between teachers and parents as partners in the child's learning in Mathematics is crucial. For example:

- Through helping their children informally by encouraging the correct use of mathematical language and use of number, estimation and mental strategies in everyday life.
- Through engaging in play for young children and exploration with, for example sand, water, bricks or blocks can be highlighted.
- Through providing useful information for the teacher about the child's early number or mathematical experience.
- Facilitating the teacher's understanding of the child's attitudes to mathematics and his/her use of mathematics in daily life. This can be achieved through school surveys or during individual parent teacher or whole class meetings.

## **Success Criteria**

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

- Curriculum and policy implementation will be evident in both teacher planning and class work.
- Continuity of content and methodology will be evident in teachers' preparation and monthly reports.
- On-going assessment, formal and informal, will show that pupils are acquiring an understanding of mathematical concepts and proficiency in mathematics skills appropriate to their age and ability.
- Feedback from both pupils and parents as to the children's learning and overall attitude to mathematics teaching.

## **Implementation**

### **Roles and Responsibilities:**

The class teacher is responsible for the implementation of the mathematics programme for their own class and ensuring that the Primary School Curriculum 1999 has been implemented in full. The In-School Management (I.S.M.) post holder for Mathematics is responsible for disseminating information, policy review/update and purchase of mathematics' resources.

## **Review**

This plan will be reviewed in 2020 or as deemed necessary.

Post holder /Principal/Deputy Principal will initiate and coordinate this review.

This policy was discussed, evaluated and approved by the School's Board of Management (B.O.M.) on Monday 23<sup>rd</sup> January 2017

Signed \_\_\_\_\_  
Chairperson

Date \_\_\_\_\_

## **APPENDICES 1 – 4**

**APPENDIX 1: PLANNING FOR TEACHERS BY STRAND**

**APPENDIX 2: Mathematical Resources / equipment**

**APPENDIX 3: Mathematical Trails (examples)**

**APPENDIX 4: Mathematical Software on CD**

**APPENDIX 5: Useful Mathematical Websites**

## **APPENDIX 1: PLANNING FOR TEACHERS BY STRAND**

### **Junior Infants:**

#### ***Early mathematical activities***

Classifying objects on the basis of 1 attribute,  
Matching equivalent & non-equivalent sets,  
Comparing objects according to length, width, height, weight, quantity, thickness or size  
Ordering objects according to length or height.

#### ***Number***

Classifying, Matching, Comparing, Ordering  
Counting objects 1-10  
Compare equivalent and non-equivalent sets 1-5 by matching  
Order sets of objects by number 1-5  
Ordinal number; first and last  
Read and write numerals 1-5  
Combine sets – totals to 5  
Estimate no. of objects 1-5  
Solve oral problems 0-5

#### ***Algebra***

Identify, copy & extend patterns in colour, shape & size

#### ***Space and Shape***

*Patterns:* copy and extend patterns

*Spatial awareness:* over, under, up, down, on, beside, in,

*2D shapes:* square, circle, triangle, and rectangle- 2 shapes to make a square. Construct using *3D shapes* - roll, do not roll, fit together, don't fit

#### ***Measures***

Developing an understanding of the concept of length/weight through exploration, discussion and use of appropriate vocabulary.

Compare and order objects according to length/height/weight.

Estimate and measure weight and length in non-standard units, e.g. "how many matchsticks fit along the table?"

*Length:* long, short, wide, narrow, longer, shorter, tall, wider than

*Weight:* heavy, light, - full, empty, nearly, holds more, holds less,

*Time:* morning, evening, night, day, lunchtime, bedtime, early, late, weekends etc.

*Money:* recognise and use coins up to 5cent, buy sell, coins, how much?

#### ***Data***

*Data:* Match sets, equal, unequal, sort & classify sets of objects, interpret and represent data- more, enough, less as many as.

### **Senior Infants:**

#### ***Number***

Counting objects 0 – 20

Compare equivalent and non-equivalent sets 0-10 by matching

Order sets of objects by number 0-10

Ordinal number: first, second, third, last

Explore components of number 1-10

Combine sets totals –10, use + and =  
Read and write numerals 1-10  
Estimate no. of objects 2-10  
Solve oral problems 0-10

### **Algebra**

Patterns: making and recognising patterns of 10  
Predict subsequent numbers  
Find missing numbers,  
Identify copy and extend patterns in colour, shape, size and number (3-4 elements)  
Discover different arrays of the same number

### **Shape and Space**

*Position:* above, below, near, far, right, left,  
*3D shapes:* cube, cuboid, sphere, cylinder, edge, corner, face, straight, curved, round, flat, corner, combine 3D shapes to make other shapes, solve tasks and problems involving other shapes  
*2D shapes:* square, circle, triangle, rectangle, straight, curved, flat, corner, side, combine and divide 2D shapes to make larger and smaller shapes, solve problems involving shape and space, give simple moving and turning directions.

### **Measures**

Developing an understanding of the concept of length/weight through exploration, discussion and use of appropriate vocabulary.  
Compare and order objects according to length/height/weight.  
Estimate and measure weight and length in non-standard units, e.g. “how many matchsticks fit along the table?”  
*Length:* as long as, wide as, longest, and shortest. Estimate Weight- weigh in non-standard units using balance  
*Capacity:* guess/estimate  
*Time:* yesterday, today, tomorrow, seasons, soon, not yet. Read time in 1-hour intervals.  
*Money:* recognise coins to 20 cents and use coins to 10 cents.

### **Data**

Data: represent and interpret data in 2 rows or columns using real objects, models & pictures  
Sort and classify sets of objects by one and two criteria

### **First Class:**

#### **Number**

Count the number of objects in a set  
Estimate number of objects in a set 0-20  
Read, write, order numerals 0-99  
Ordinal numbers first to tenth  
Compare equivalent and non-equivalent sets 0-20  
Record place value 0-99  
*Addition:* Develop and apply commutative, associative, zero properties of addition  
Develop/Recall mental strategies for addition facts within 20  
Construct number sentences/number stories- addition problems within 20  
Add numbers with/without renaming -99  
Counting in twos, fives, tens  
*Subtraction:* deducting, complementing, difference  
Develop mental strategies for subtraction 0-20

Number stories/sentences sub. 0-20  
Subtract numbers within 99 without renaming  
Symbols +, -, =  
Solve 1 step problems using addition/subtraction  
*Fractions*: identify/establish  $\frac{1}{2}$  of sets to 20

### **Algebra**

*Pattern*: odd and even numbers and use of number frame  
*Spatial awareness*: vocabulary- between, on top of, around, through, left, right. Follow simple directions within classroom  
Explore and use pattern in addition facts

### **Shape and Space**

*2D shapes*: square, rectangle, triangle, circle, semicircle, sides size, corners, number and length of sides. Use of 2D shapes in classroom  
*3D shapes*: cube, cuboid, cylinder, sphere  
Explore relationship between 2D and 3D shapes  
Between, underneath, on top of, around, through, left and right

### **Measures**

*Length*: estimate, compare and measure, record length using non-standard units and standard unit- metre. Suggest ways of comparing objects. Solve and complete practical tasks and problems involving length  
Vocab: length, width, height, measure, metre, nearly a metre, a bit less than a metre,  
*Weight*: estimate; compare, measure and record.  
Vocab: heavy, heavier, heaviest, light, lighter and lightest, balance  
Use kilogram – measure and record weights record weight using non-standard measures. Largest/ smallest packet that weighs 1kg. Solve simple problems.  
*Capacity*: estimate, compare, measure, record using non-standard units- pour, fill, empty, holds more, less, or the same amount as  
Use litre and solve simple problems  
*Time*: vocabulary- days of week, months of year.  
Read time in hours and half hours on 12-hour clock. Read day and month using calendar.  
*Money*: Recognise exchange and use coins to the value of 50 cent. Exchange a coin for others of equal value. How many items can be bought with a given sum.

### **Data**

Data: represent concretely and pictorially, interpret data in 2/3/4 rows or columns using real objects, models and pictures.

## **Second Class:**

### **Number**

Count the number of objects in a set- estimate first. Estimate number of objects in a set 0-20  
Read, write, order numerals 0-199  
Ordinal numbers using the calendar  
Compare equivalent and non-equivalent sets using < > =  
Use language of ordinal number e.g. using the calendar  
Place value 0-199  
*Addition*: Develop, apply and explore commutative, associative zero properties of addition  
Develop/Recall mental strategies for addition facts within 20  
Construct number sentences/number stories- addition problems within 99

Add numbers with/without renaming –estimate simple sums < 99. Use multiples of 10 (36 + 10) (45+20) Repeated addition and group counting  
*Subtraction*: deducting, complementing, difference. Develop and recall mental strategies for subtraction 0-20  
Subtract numbers within 99 with / without renaming Symbols +, -, =, < >  
Solve 1/2 step problems using add/subtraction  
Construct number sentences involving subtraction of whole numbers  
*Fractions*: identify/establish  $\frac{1}{2}$  /  $\frac{1}{4}$  of sets to 20

### **Algebra**

Pattern: odd and even numbers on 100 square and use of number frame  
Explore and use patterns in addition facts  
Recognise pattern and predict subsequent numbers

### **Shape and Space**

*Spatial awareness*; give and follow simple directions within classroom  
Explore, discuss, develop and use vocabulary of spatial relations.  
*2D shapes*: square, rectangle, triangle, circle, oval  
semi-circle. Compare/Contrast Construct/ Use of 2D shapes in classroom, combine and partition 2 D shapes  
Identify and discuss the use of 2D shapes in the environment  
Describe, compare and name 3D shapes including cube, cuboid, cylinder, sphere, cone.  
Draw 3D shapes  
Explore relationship between 2D and 3D shapes  
Discuss the use of 3D shapes in the environment  
Solve and complete practical tasks and problems involving 2D and 3D shapes.  
*Symmetry*: identify line symmetry in shapes and in the environment  
*Angles*: Explore and recognise angles in the environment- things that turn, wheels, half and quarter turns in hall or yard

### **Measures**

*Length*: estimate, measure, record length using non-standard units and standard units- metre/centimetre. Explore relationship between metre and cm. Suggest ways of comparing objects. Height of each Pupil shortest/tallest  
Solve practical tasks and problems involving length.  
*Area*: estimate and measure using non-standard measures. Discuss and record.  
*Weight*: estimate; compare measure, record weight using non-standard measures.  
Kg and  $\frac{1}{2}$  kg and  $\frac{1}{4}$  kg. Graph weights of fictional children. (sacks, suitcases) Avoid weighing pupils in class.  
Use pan balance, kitchen scales, bathroom scales  
*Capacity*: litre,  $\frac{1}{2}$  litre and  $\frac{1}{4}$  litre containers  
*Time*: read time in hours and half-hours on the digital clock. Read time in hours, half hours and quarter hours on the 12-hour analogue clock  
Read day and month using calendar and identify season.  
*Money*: Recognise exchange and use coins to the value of 2 euro. Exchange a coin for others of equal value. How many items can be bought with a given sum? Record money amounts as cents and later euro.

### **Data**

Data: represent, read, and interpret simple tables and charts and block graphs. Progress to drawing on squared paper.  
Sort and classify objects by 2/3 criteria.

## **Third Class:**

### **Number**

*Place value:* explore and identify place value 0-999. Significance of 0. Read, write, and order 3 digit numbers and solve simple problem. Round whole numbers to nearest ten /hundred. Explore and identify place value in decimal numbers to one decimal place.

*Operations:* Add/subtract with/without renaming within 999. Estimate sums and differences (rounding where necessary). Know and recall addition/subtraction facts. Solve word problems.

Multiplication as repeated addition etc. Understand and apply the zero commutative/distributive properties of multiplication. Develop and recall multiplication facts within 100. Multiply 1 or 2 digit number by 0-10. Round and estimate products. Represent in horizontal/vertical form. Multiply by 1 and 10.

Practical tasks and problems.

*Division:* Division as sharing /repeated subtraction with/without remainders. Divide 1/ 2-digit number by 1 digit. Record using the division algorithm. Estimate quotients and check answers. Rounding up or down -44 divided by 12 -about 40 divided by 10. Develop and recall division facts within 100. Solve practical tasks and problems.

*Fractions:* Identify fractions and equivalent fractions –denominators 2, 4, 8 and 10. Understand relationship between fractions and division. Calculate unit fraction of number and calculate a number.

Compare and order fractions with appropriate denominators and position on the numberline.

Calculate a fraction of a set using concrete materials. Develop an understanding of the relationship between fractions and division.

Solve and complete practical tasks and problems involving fractions.

*Decimals:* identify tenths, express in decimal form  $\frac{1}{10}$  as 0.1 order decimals on the number line. Identify the number with greatest value within a given set. Solve problems involving decimals.

### **Algebra**

Number patterns and sequences: explore, recognise, and record patterns in numbers 0-999.

Use pattern as an aid in memorisation of number facts. Make patterns on 100 sq.

Explain rule for sequences.

Number sentences: translate addition/subtraction number sentence with a frame into word problem. Solve 1-step number sentences.

### **Shape and Space**

*2D shapes:* square, rectangle, triangle, hexagon, circle, semicircle, oval, irregular shapes. Combine, tessellate and make patterns with 2D shapes. Solve and complete practical tasks and problems involving 2D shapes. Explore, describe and compare properties of 2D shapes.

*Vocab:* sides, angles, parallel and non-parallel lines.

Construct and draw 2d shapes. Make patterns. Identify these shapes in environment.

*3D shapes:* Cube, cuboid, cylinder, cone, sphere, triangular prism, and pyramid. Faces, edges, corners etc. Construct 3 D shape. Identify 3D shapes in the environment.

Explore and describe the relationship/ properties of 3D shapes with constituent 2D shapes. Solve and complete practical tasks and problems involving 2D and 3D shapes.

*Symmetry:* line symmetry in 2 dimensional shapes. Identify lines of symmetry in the environment in 2 D shapes.

Lines and angles: horizontal, vertical and parallel lines. Angles as greater than/ less than or equal to a right angle. Use right angle measure to identify right angles. Solve problems involving lines and angles.

Recognise an angle in terms of a rotation.

### **Measures**

*Length:* estimate, compare, measure, record lengths in m. and cm. Rename cm. in m. and cm.

Add/subtract metres and centimetres.

Solve and complete practical tasks and problems involving the addition and subtraction of units of length

*Area:* estimate, compare, measure regular and irregular shapes.

*Weight:* estimate, compare, measure, and record weight using kg. and g. Compare objects as an aid to estimation. Add/subtract using kg and g. Solve and complete practical tasks and problems involving weight.

*Capacity:* estimate, compare, measure, and record using l and ml. 1 litre, 250 ml and 500 ml.

Add/subtract l and ml. Solve and complete practical tasks and problems involving this.

*Time:* count in fives on number line and 100 sq. read time in 5 minute intervals on analogue and digital clock (12 hour) read and interpret simple timetables/calendars. Record time in analogue and digital forms. Refine and develop vocabulary of time.

Rename mins. as hours and hrs as mins. 70 mins = 1 hr 10 mins. Read dates from calendars. Express weeks as days. Consolidate and develop further sense of time passing.

Solve and complete practical tasks and problems involving this.

*Money:* rename amounts of euro or cents. Record using symbol and decimal point. Add/subtract euro and cents. Solve and complete practical tasks and problems involving this.

### **Data**

*Data:* read and interpret tables, pictograms, block graphs and bar charts in intervals 1,2,5,10. Solve simple problems using collected data from own environment. Collect, organise and represent data using pictograms, block graphs and bar charts.

*Chance:* vocabulary- possible, impossible, might, certain, not sure. Identify and record outcomes of simple random processes.

## **Fourth Class:**

### **Number**

*Place value:* explore and identify place value 0-9999. Significance of 0. Read, write, order 4 digit numbers and solve simple problems. Round whole numbers to the nearest thousand. Identify place value in decimal numbers to two decimal places.

*Operations:* Add/subtract with/without renaming within 9999. Estimate sums and differences (rounding where necessary) check estimates with/without calculator. Know and recall addition/subtraction facts. Solve word problems-use calculator to develop problem-solving strategies and verify estimations.

*Multiplication:* Develop an understanding of multiplication as repeated addition and vice versa. Understand and apply the zero commutative/distributive/associative properties of multiplication. Develop and recall multiplication facts within 100. Multiply 2 /3digit

Number by 1 or 2 digit number. Use calculator to check estimates. Practical tasks and problems.

*Division:* Division as sharing /repeated subtraction with/without remainders. Divide 3-digit number by 1 digit. Use calculator to check estimates. Develop and recall division facts within 100. Solve practical tasks and problems.

*Fractions:* Identify fractions and equivalent fractions –denominators 2, 3, 4, 5,6,8, 9,10 and 12.

Compare and order fractions with appropriate denominators and position on the numberline.

Understand relationship between fractions and division. Calculate a fraction of a set using concrete material.

Calculate a number given a multiple fraction of the number. Express one number as a fraction of another number. Solve problems involving fractions.

*Decimals:* express tenths and hundredths as fractions and decimals. Identify place value of whole numbers and decimals to 2 decimal places. Order decimals on number line.

Add/subtract whole numbers and decimals. Multiply/divide decimal number to 2 places by single digit whole number. Solve problems involving decimals.

### **Algebra**

*Number patterns and sequences:* explore, recognise, extend, describe and record patterns in numbers 0-9999. Use pattern as an aid in memorisation of number facts. Make patterns on 100 sq. Explain rule for sequences.

*Number sentences:* translate add/subtraction/multiplication/division number sentence with a frame into word problem. Solve 1-step number sentences. Translate 1 step word problem into a number sentence.

### **Shape and Space**

*2D shapes:* equilateral, isosceles, scalene triangle, parallelogram, rhombus, pentagon and octagon. Make patterns. Use ruler and set square to construct/draw 2D shapes.

Combine, tessellate and make patterns with 2D shapes

*3D shapes:* Cube, cuboid, cylinder, cone, sphere, triangular prism, and pyramid. Construct 3 D shapes.

Identify 3D shapes in the environment. Establish and appreciate that when prisms are sliced through in the same direction each face is equal in shape and size.

Explore and describe the relationship of 3D shapes with constituent 2D shapes. Solve and complete practical tasks and problems involving 2D and 3D shapes.

*Symmetry:* lines of symmetry as horizontal, vertical or diagonal. Use of line symmetry to complete missing half of a shape, picture or pattern.

*Lines and angles:* Identify, describe and classify oblique and perpendicular lines. Acute, obtuse and right angles. Solve problems involving lines and angles. Draw, discuss and describe intersecting lines and their angles. Classify angles as greater than, less than or equal to a right angle. Solve problems involving these.

### **Measures**

*Length:* estimate, compare, measure, record lengths in appropriate metric units. Rename unit of length using decimal or fraction forms. Understand estimate and measure the perimeter of regular 2D shapes. Solve problems involving the addition, subtraction, multiplication and simple division of units of length (m, cm, km.)

*Area:* estimate, compare, measure regular and irregular shapes. Use standard square unit's sq cm, sq m.

*Weight:* estimate, compare, measure, record weight using kg. and g. become familiar with 100g markings,  $\frac{1}{2}$  kg,  $\frac{1}{4}$  kg. Rename in kg and g and use decimal or fraction form (2 decimal places). Add/Subtract/Multiply/Divide kg and g. Selecting suitable instruments of measurement.

Solve problems involving this.

*Capacity:* estimate, compare, measure, record using l and ml. 100 ml,  $\frac{1}{2}$  l,  $\frac{1}{4}$  l. Select suitable instruments of measurement. Rename units of capacity using decimals and fractions. Add/subtract/multiply/divide l and ml.

Solve problems involving this.

*Time*: read time in 1-minute intervals on analogue and digital clock (12 hour). Express digital time as analogue and vice versa. Consolidate and develop further a sense of time passing.

Read and interpret simple timetables/calendars. Rename mins. as hours and hrs as mins. Add/subtract hours and mins.

Solve problems involving this.

*Money*: rename amounts of money as euro or cents using euro sign and decimal point. Add/subtract/multiply/divide euro and cents.

Solve problems involving this.

### **Data**

*Data*: collect, organise, represent data using pictograms, block graphs, bar charts, and bar line graphs using scales- 1:2, 1:5, 1:10, and 1:100.

Read/interpret bar line graphs and simple pie charts using  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ .

Solve problems involving this.

*Chance*: vocabulary- chance, likely, unlikely, never, definitely. Identify and record outcomes of simple random processes.

Order events in terms of likelihood of occurrence

## **Fifth Class:**

### **Number**

*Place value*: read, write, order whole numbers and decimals. Identify place value in whole numbers and decimals. Round whole numbers to nearest 10,100, 1000 and round decimals to nearest whole number.

*Operations*: estimate sums, differences, products and quotients of whole numbers. Front-end estimation, rounding, clustering, special numbers.

Estimate calculations and check with calculator. Add/subtract whole numbers and decimals to 3 decimal places with/without calculator. Multiply a decimal- to 3 places by a whole number with/without calculator. Divide 3-digit number by 2-digit number with/without calculator. Divide decimal number by whole number with /without calculator.

*Fractions*: Compare, identify and order fractions with denominators 2-12. Express improper fractions as mixed numbers and vice versa and position on number line. Add/subtract simple fractions and simple mixed numbers. Use equivalent fractions to simplify calculations.

Multiply a fraction by a whole number. Express tenths, hundredths, and thousandths in both fractional and decimal form. Express improper fractions as mixed numbers and vice versa and position them on the numberline.

*Decimals and percentages*: understand simple percentages and relate them to fractions and decimals. Calculate simple percentages e.g. 50%, 25% 10%. Compare and order fractions and decimals. Solve problems using whole numbers, fractions, decimals and simple percentages.

*Number theory*: identify simple and composite numbers. Identify square and rectangular numbers. Identify factors and multiples.

### **Algebra**

*Directed numbers*: identify positive and negative numbers in context.

*Rules and properties*: explore and discuss properties and rules about brackets and priority of operation. Compute expressions with brackets in a variety of positions. Significance of position of brackets. Identify relationships and record verbal and simple symbolic rules for number patterns. (B.O.M.D.A.S.)

*Equations*: translate number sentences with a frame into word problems and vice versa. Solve 1 step number sentences and equations.

## **Shape and Space**

*2D shapes:* make informal deductions about 2D shapes and their properties. Size and number of angles, type and number of sides e.g. trapezium, scalene triangle, regular hexagon. Identify properties of the circle. Construct a circle of given radius or diameter using a compass. Tessellate combinations of 2D shapes. Explore, compare, record lines of symmetry in 2D shapes. Make a specified shape with tangram shapes. Solve problems involving this.

*3D shapes:* Identify and examine 3D shapes and explore relationships including tetrahedron (faces, edges and vertices.)

Explore, compare and record number of faces of 3D shapes. Draw nets of simple 3D shapes. Construct 3D shapes from nets.

*Lines and angles:* Recognise, classify and describe angles and relate them to shape and the environment.

Measure and record angles as acute, obtuse, reflex, or right angles. Determine the number of such angles in relation to common regular shapes. Recognise angles in terms of rotation. Estimate, measure and construct angles in degrees. Explore sum of angles in a triangle. Measure using a protractor.

## **Measures**

*Length:* Select and use appropriate instruments of length.

Use ruler for short objects, metre stick for longer distances/objects, trundle wheel for distances. Estimate and measure length using appropriate metric units. Use mm, cm, m, km. Estimate and measure perimeter of regular/irregular shapes.

Discover area of rectangle is length by breadth. Measure area of regular/irregular shapes using square centimetres and square metres. Compare sq metres and sq centimetres.

*Weight:* Select and use appropriate instruments of measurement.

Use balance, kitchen scales, bathroom scales, spring balance. Estimate and measure weight using appropriate metric measures- grams and kilograms.

*Capacity:* Select and use appropriate instruments of measurement.

Use graduated jugs, litre containers. Millilitres- cups, litres- watering can. Estimate and measure.

*Time:* read and interpret timetables and the 24-hour clock-digital and analogue. Interpret and convert between times in 12 hour and 24 hour format.

*Money:* Compare value for money using unitary method.

## **Data**

*Data:* use pictograms, single and multiple bar charts and simple pie charts. Compile and use simple data sets. Explore and calculate averages of simple data sets. Use data sets to solve problems.

*Chance:* list all possible outcomes of simple random processes. Estimate the likelihood of occurrence of events. Construct and use frequency charts and tables.

## **Sixth Class:**

### **Number**

*Place value:* read, write, order whole numbers and decimals. Identify place value in whole numbers and decimals. Round decimals to 1/2/3 decimal places.

*Operations:* estimate sums, differences, product, quotients of decimals. Use strategies for estimation. Add/Subtract whole numbers and decimals to 3 decimal places with/without calculator. Multiply decimal-by-decimal with/without calculator. Divide 4-digit number by 2-digit number with/without calculator. Divide decimal number by decimal with/without calculator. Division does not always make smaller.

*Fractions:* compare and order fractions, identify equivalent forms of fractions. Express improper fractions as mixed numbers and vice versa and position on number line.

Add/Subtract simple fractions and simple mixed numbers. Common denominator should be found by listing multiples. Multiply fraction by fraction. Express tenths, hundredths, and thousandths in both fractional and decimal form.

Divide a whole number by a unit fraction. Understand and use simple ratios.

*Decimals and percentages:* use percentages and relate them to fractions and decimals. Express quantities as percentages. Compare and order percentages of numbers. Solve problems relating to profit and loss, discount, VAT, interest, increases, decreases.

*Number theory:* identify simple prime and composite numbers. Identify and explore square numbers. Explore and identify simple square roots. Identify common factors and multiples. Write whole numbers in exponential form.

### **Algebra**

*Directed numbers:* identify positive and negative numbers on the number line. Add simple positive and negative numbers on the number line.

Rules and properties: Know simple properties and rules about brackets and priority of operation. (B.O.M.D.A.S.) Use calculator in exercises to find missing numerals. Identify relationships and record symbolic rules for number patterns.

*Variables:* Explore the concept of a variable in the context of simple patterns, tables, simple formulae, and substitute values for variables.

Equations: translate word problems with a variable into number sentences. Solve 1 step number sentences and equations.

### **Shape and Space**

*2D shapes:* make informal deductions about 2D shapes and their properties. Use angle and line properties to classify and describe triangles and quadrilaterals. Construct triangles from given sides or angles. Identify properties of the circle. Construct circle of given radius or diameter. Tessellate combinations of 2D shapes. Use geoboards and squared paper. Plot simple coordinates and apply where appropriate.

Classify 2D shapes according to their lines of symmetry.

Solve problems using this.

*3D shapes:* identify, examine 3D shapes, including octahedron, explore relationships, including faces, edges, and vertices. Draw the nets of simple 3D shapes and construct the shapes.

*Lines and angles:* Recognise, classify and describe angles and relate angles to shapes.

Identify types of angles in the environment. Recognise angles in terms of a rotation. Estimate, measure, construct angles in degrees. Explore sum of angles in a quadrilateral.

### **Measures**

*Length:* select and use appropriate instruments of measurement. Rename measures of length. Express results as fractions and decimal fractions.

Recognise /Estimate/Measure perimeter of regular and irregular shapes.

*Area:* recognise that the length of the perimeter of a rectangular shape does not determine the area of the shape.

Use and interpret scales on maps and plans. Calculate area of regular/irregular shapes.

Measure surface of specified 3D shapes. Use acres and hectares for fields, playgrounds, car parks. Find area of a room from a scale plan.

*Weight:* Select and use appropriate instruments of measurement. Rename measures of weight as fractions or decimals of appropriate metric units.

*Capacity:* Select and use appropriate instruments of measurement. Rename measures of capacity as fractions or decimals of appropriate metric unit. Find volume of cuboid experimentally.

*Time:* explore international time zones. Explore relationship between time, distance and average speed.

*Money:* Explore value for money. Calculate sale prices. VAT. Convert other currencies to euro and vice versa.

**Data**

*Data:* Read and interpret trend graphs and pie charts. Compile and use simple data sets. Collect organise and represent data using Pie Charts and Trend graphs.

Explore and calculate averages of simple data sets. Use data sets to solve problems.

*Chance:* Identify and list all possible outcomes of simple random processes. Estimate the likelihood of occurrence of events; order on a scale from 0 to 100%, 0 to 1. Construct and use frequency charts and tables.

The following numbers are recommended. However, this will be differentiated according to the needs of the pupils within each class. In our experience some pupils in St. Andrew's N.S. exceed the minimum curriculum requirements particularly at Junior level.

Class	Numerals
Junior Infants	0 - 5
Senior Infants	6 - 10
1 <sup>st</sup> Class	to 99
2 <sup>nd</sup> Class	to 199
3 <sup>rd</sup> Class	to 999
4 <sup>th</sup> Class	to 9999
5 <sup>th</sup> Class	99,999
6 <sup>th</sup> Class	million

## **APPENDIX 2: Mathematical Resources / equipment**

### **Strand - Number**

DICE - 2 Large Dice / 8 Dice Bags / 9 Ten sided dice / 13 x Six sided dice / 6 x 10 sided dice

UNIFIX - Box Unifix Cubes / 1 Set Unifix Cubes & tens / 1 Box Unifix Cubes (200+) / 6 Boxes Unifix Insert Pattern Boards (1-10) / 5 Unifix Value Boards / 6 Unifix Notation & Counting Boards (1-20) / 16 Unifix Tens & Units Trays / 16 Unifix Hundreds, Ten & Units Trays

COUNTERS - 3 Boxes counters (circa 400) / 1 Small Box counters / 4 Boxes counting bears / 1 Box counting camels / 1 Small Box Flat counting camels / 1 Tub of Counters / 1 Bag of coloured plastic bears / 1 Bag counters (400) / 1 small box wiggly worm counters / 1 small bag bear counters / 1 Box Cubes / 200 counters / 1 Box weighted numbers / 13 Counting / Sorting Trays / 10 Lots of threading beads for 10 children / 1 Box of links / 4 Boxes plastic dots / 1 Box Foam dots / 1 Box plastic animals / 1 Small tub of matchsticks (coloured) / 1 tray Wooden Beads / 1 Small Box of Links (150 pieces) / 1 Box of Links / 1 Beaded Rope 1-100 representation

DOMINOES - 1 Box Dominoes / 1 Box Dominoes (heavy card) / 1 Box sea creature dominoes / 1 Box farmyard dominoes (heavy card) / 2 Boxes Dominoes / 2 x Boxes Dominoes /

GAMES - 1 Mathematics Puzzle Game (4-8) / 1 Game Puzzle Sums / Mathematics Board Games / 1 Box Mental Arithmetic Peg Board Game / 1 game Chess / 1 Multiplication Bingo Game / 7 PDST Folders Mathematics Games for seniors 5<sup>th</sup> & 6<sup>th</sup> / 12 Mathematics Games for 2 players (2<sup>nd</sup> Class) / 1 x Addition Bingo / 1 Subtraction Bingo / 1 x Times Tables Lotto / 1 x Fraction Action Lotto / 1x Know Your Times Tables / 1 Number Shark DVD

NUMICON - Numicon for groups of 12-15 / 1 Bag of Numicon / 3 Boxes Numicon / 1 Numicon Set

FANS - 30 Number fans / 30 Small Number Fans / 2 Large Number fans / 16 mini number fans

FLASHCARDS - 1 x Division Flashcards (0-12) / 54 Addition Flashcards (0-12) / 21 Number Flashcards (0-25)

CALCULATORS - 2 x Calculators (small) / 12 Calculators / 40 Calculators

100 SQUARES - 28 Laminated 100 squares / 1 Box Peg and 100 Square Boards / 11 Plastic 100 squares / 1 Playboard Set (5 plastic 100 squares) / 9 x 100 squares / 30 x 100 Squares / 1 Wooden Hundred Square / 2 One Hundred Wooden Squares & Pegs

DIENES BLOCKS - 1 Set of Dienes Blocks for a whole class / 1 individual Set of Dienes Blocks / Dienes Blocks 13 x hundreds / 7 x tens

CARDS - 5 Decks of Cards / 1 Pack Giant Number Cards / 7 x Decks of cards / 2 x decks of cards /

NUMBER LINES - 18 Wooden Peg Holder Number Lines (1-20) / 3 Number lines (1-20) / 1 Box Wooden Number Representation Lines / 2 Number lines (wooden 1-20) / MATHEMATICS TRAIL'S - 1 Mathematics Trail Folder Operation 3<sup>rd</sup> & 4<sup>th</sup> Class / 1 Mathematics Trail Folder 'Laminated 2-D Shapes for Infants' / 1 Mathematics Trail Folder 1<sup>st</sup> / 2<sup>nd</sup> Class / 1 Mathematics Trail Folder Angles 5<sup>th</sup> / 6<sup>th</sup>

CUISENAIRE RODS – 1 box

FRACTIONS / PERCENTAGES - 1 Wooden Percentage Board / 1 Wooden Fraction Board / 5 Plastic Fraction Boards (fraction pieces missing) / 4 Bags Fraction / Percentage Pie Boards / 1 Box Fraction Dominoes / 1 Box Plastic Pie Chart Fraction  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$  / 1 Box Plastic Percentage Tower Blocks / 1 Bag Fraction / Decimal wooden blocks / 1 pack Fraction Stamps / 3 x Fraction Cards / 2 Packs Fraction Snap Card Game

LAMINATES - 60 x Laminated A3 Hundreds/Tens/Units Hand On Sheet / 40 Laminated Addition / Subtraction sheets (2 digit) / 11 Laminated Sheets for making sets

ACTION MATHEMATICS - 1 Box Action Mathematics Word Cards / 1 Box Action Mathematics Cards

NUMBER RODS - 2 Number Rod Trays / 3 Bags Number Rod Tracks

MISCELLANEOUS - 5 x Time Table Sets Key rings / 1 Times Tables Flashcards / 1 Box rubber bands / 40 Reading Windows / 6 Inflatable Mathematics Sum Balls / 7 Abacus / 1 Numbershark / 6 Story of numbers trays

### **Strand - Shape & Space**

1 Box 3-D Shapes  
2 Boxes Knex  
1 Box Straws (connectors and hoops)  
3 Boxes wooden shapes  
1 Box Quercetti- Gears (construction)  
1 Box Klikko Construction  
3 Wooden shaped games  
2 Boxes Construction Straws  
7 Geometry Sets  
1 Set Square  
13 Compasses  
1 Small Box of wooden 3-D Shapes  
1 Folder Pattern Blocks  
1 Box of plastic mirrors  
3 Boxes 3D Plastic shapes  
3 Boxes Wooden 3-D Shapes  
3 Boxes Shape Stamps  
1 Box Knex  
1 Class Pack Polydron Shape Construction  
1 Box (84 piece) Connection Shape Construction  
8 Geoboards  
1 Large Geometry Set (Teacher)  
1 Box (30) Small Set Squares  
1 Box (10) Medium Sized Set Squares

### **Strand - Algebra**

Pegs / Boards (1 Box / 10 Boards)

2 peg Boards

2 x 100 Square Pegboard

12 peg boards and pegs

### **Strand - Measures**

#### **Strand Unit - Weight**

3 Plastic Bucket Balance Scales (Junior Classes)

1 Baking Scales

1 Metal Scales (defective)

1 Balance Scales

1 Box plastic weights (5g – 20g)

1 Primary Bucket Balance

#### **Strand Unit - Area**

1 Box Area Dominoes

2 Area measure Grids 25cm X 25cm

#### **Strand Unit - Capacity**

2 Boxes of empty containers of differing capacity

2 Boxes of containers to measure capacity (featuring standard units)

#### **Strand Unit - Money**

1 Tin of Euro Notes coins (facsimiles)

#### **Strand Unit - Time**

2 Large Plastic Clocks (Teacher)

43 Small Plastic Clocks (pupils)

1 Large Wood/Plastic Clock

30 Laminated Paper Clocks with hands

2 Box Digital Clock Dominoes

1 Box Minutes 'To' Dominoes

1 Box Minutes 'Past' Dominoes

1 Box Money Go Around Euro Resource

1 Visual Timer

2 Small Plastic Clocks

1 Around The Clock Puzzle

1 Mathematics Game Telling Time Bingo

#### **Strand Unit - Length**

3 x 50m measuring tapes

1 Giraffe Height Chart

4 Trundle Wheels

30 Plastic black and white Counting Sticks / Metre Sticks

#### **Strand – Data**

**Blocks / counters / beads (already recorded in the Number strand above)**

#### **Colour Coded Legend Of Mathematics Resources And Whereabouts**

5<sup>th</sup> class / Junior Infants / 4<sup>th</sup> class / Mathematics Resource Cupboards / 3<sup>rd</sup> Class / 1<sup>st</sup> Class

2<sup>nd</sup> Class / Resource Rooms / Senior Infants / 6<sup>th</sup> Class

### **APPENDIX 3: Mathematical Trails (examples)**

#### **Junior/Senior Infants (classroom based)**

**NAME:** \_\_\_\_\_

**DATE:** \_\_\_\_\_

1) How many groups in your class?

---

2) How many children in your group?

---

3) How many boys and girls in your group?

---

4) How many children are absent today?

---

5) How many legs on your table?

---

6) How many legs on your chair?

---

7) How many fingers have you on each hand?

---

8) How many fingers have you altogether?

---

9) How many circular shapes can you see?

---

10) How many square shapes can you see?

---

11) How many rectangular shapes can you see?

---

12) How many triangular shapes can you see?

---

13) How many legs altogether have the girls in your group?

---

14) How many legs altogether have the boys in your group?

---

15) How many more boys than girls in your group?

---

16) How many less in your group than in the group beside you?

---

17) Name the boys/girls in your group that are taller/smaller than you?

---

18) What shape is the clock? (circle/square/triangle/rectangle)

---

19) How many children in your group have black hair?

---

20) How many children in your group have brown hair?

---

21) How many children in your group have fair hair?

---

22) How many windows in your classroom?

---

23) What shape are the windows in your classroom?

---

24) Did you come to school in the morning, the evening or the night?

---

25) Name something in your class, which is shorter than your pencil?

---

26) Name something in your class, which is longer than your pencil?

---

## First/Second Class (classroom based)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

- 1) How many boys and girls in your class?  
\_\_\_\_\_
- 2) How many children altogether in your class?  
\_\_\_\_\_
- 3) How many children altogether in First/Second class in the school?  
\_\_\_\_\_
- 4) How many children altogether in First and Second class?  
\_\_\_\_\_
- 5) How many circular shapes in your class?  
\_\_\_\_\_
- 6) How many square shapes in your class?  
\_\_\_\_\_
- 7) How many rectangular shapes in your class?  
\_\_\_\_\_
- 8) How many triangular shapes in your class?  
\_\_\_\_\_
- 9) What shapes are on the floor?  
\_\_\_\_\_
- 10) What time did school start today?  
\_\_\_\_\_
- 11) What time will school end today?  
\_\_\_\_\_
- 12) How many children altogether in the school?  
\_\_\_\_\_
- 13) How many children are absent today in your class?  
\_\_\_\_\_
- 14) How many children are in school today in your class?  
\_\_\_\_\_
- 15) What is the length of your table in hands?  
\_\_\_\_\_
- 16) What is the width of your table in hands?  
\_\_\_\_\_
- 17) Find the length/width of your classroom in strides/feet?  
\_\_\_\_\_
- 18) Estimate how many metres long your classroom is.  
\_\_\_\_\_
- 19) Estimate how many metres wide your classroom is.  
\_\_\_\_\_
- 20) How many centimetres long is your pencil?  
\_\_\_\_\_
- 21) How many centimetres long is your Mathematics book?  
\_\_\_\_\_
- 22) How many centimetres wide is your Mathematics book?  
\_\_\_\_\_
- 23) Does your schoolbag weigh more than/less than a bag of sugar (1 kg.)?  
\_\_\_\_\_
- 24) What coins would you use to pay for something costing 24c? Name 3 different ways of doing this.  
\_\_\_\_\_
- 25) What coins would you use to give the exact amount for something costing €1.70?  
\_\_\_\_\_

### Third/Fourth Class Mathematics Trail

Name: \_\_\_\_\_ Date: \_\_\_\_\_

- 1) How many children in your class?  
\_\_\_\_\_
- 2) How many children in the whole school?  
\_\_\_\_\_
- 3) What time did you leave for school this morning?  
\_\_\_\_\_
- 4) At what time did school begin this morning?  
\_\_\_\_\_
- 5) How many minutes from when you left home until class began?  
\_\_\_\_\_
- 6) At what time is small break?  
\_\_\_\_\_
- 7) What time is it 15 minutes after small break ends?  
\_\_\_\_\_
- 8) What time is it 15 minutes before small break ends?  
\_\_\_\_\_
- 9) At what time does big break (lunch) end?  
\_\_\_\_\_
- 10) What time is it 20 minutes before school ends?  
\_\_\_\_\_
- 11) How much did your pencil/rubber cost?  
\_\_\_\_\_
- 12) If you bought 4 pencils, how much would they cost?  
\_\_\_\_\_
- 13) What is the cost of a litre of 7-up in your local shop?  
\_\_\_\_\_
- 14) How many biscuits in a packet of Digestive biscuits?  
\_\_\_\_\_
- 15) Name 4 things in the class, which are longer than a metre?  
\_\_\_\_\_
- 16) Name 4 things in the classroom, which are shorter than half a metre?  
\_\_\_\_\_
- 17) What is your own height in metres and centimetres?  
\_\_\_\_\_
- 18) What is your teacher's height in metres and centimetres?  
\_\_\_\_\_
- 19) How much smaller/taller are you than your teacher?  
\_\_\_\_\_
- 20) Estimate how many litres of water your classroom sink holds.  
\_\_\_\_\_
- 21) How many metres long is the school yard?  
\_\_\_\_\_
- 22) How many metres wide is the school yard?  
\_\_\_\_\_
- 23) Estimate the area of the classroom in square metres.  
\_\_\_\_\_
- 24) How many children in your class have brown hair?  
\_\_\_\_\_
- 25) How many children in your class have black hair?  
\_\_\_\_\_
- 26) How many children in your class have fair hair?  
\_\_\_\_\_
- 27) If you throw a dice what is the likelihood of getting a 5?  
\_\_\_\_\_

28) What is the likelihood of you watching T.V. tonight, likely, unlikely, definitely or never?

---

29) Have you anything in your bag that is the shape if a hexagon?

---

30) Name 4 items at home that are the shape of a cylinder?

---

31) What 3-D shape do we associate with Egypt?

---

32) Look at the clock, what time is it now?

---

33) What sort of angle do the two hands of the clock make? (acute, obtuse, right-angle)

---

34) Find a sphere in the halla?

---

35) Name a chocolate bar that is in the shape of a triangular prism.

---

36) Name 6 sets of parallel lines you can see in the classroom/school yards?

### **Fifth/Sixth Class Mathematics Trail**

**Name:** \_\_\_\_\_ **Date:** \_\_\_\_\_

1) What numeral is over the door in the post-office?

---

2) Is it a special number? (square, rectangular or triangular)

---

3) Write down 3 rectangular numbers on your road/street?

---

4) Write down 3 triangular numbers on your road/street?

---

5) How would you find out many cars the supermarket car-park can hold?

---

6) How many Fords/Toyotas/Opals are parked in the school car-park?

---

7) Which is more likely to pass by your school gate at 11.00a.m.? – An articulated lorry or a tractor?

---

8) Find the cost of a kg of sausages in the supermarket.

---

9) What would the cost of 19kg of sausages be?

---

10) Find the cost of a kg of fillet steak.

---

11) What would the cost of  $\frac{1}{4}$  kg of steak be?

---

12) What would be the cost of 9kg of fillet steak?

---

13) What shape are the tiles of the local supermarket's floor?

---

14) What number is on your classroom door?

---

15) What is the length of your classroom in metres?

---

16) What is the width of your classroom in metres?

---

- 17) What is the area of your classroom in square metres?
- 
- 18) Is 1 square metre of tiles cost €24, how much would it cost to tile your classroom floor?
- 
- 19) What is the cost of a litre of unleaded petrol in the local garage?
- 
- 20) If a car holds 48 litres of petrol, what would it cost to fill the car with petrol?
- 
- 21) What change would you get from €100 if you filled the car with petrol?
- 
- 22) What is the cost of a litre of diesel?
- 
- 23) What would it cost a lorry driver to fill his lorry with 94 litres of diesel?
- 
- 24) If the lorry driver got a 10% discount, what did he actually pay for the diesel?
- 
- 25) What time did you leave home for school this morning?
- 
- 26) How long did your journey to school take you?
- 
- 27) What time did school start today?
- 
- 28) What time will school finish today?
- 
- 29) How long are you in school altogether each day?
- 
- 30) Excluding breaks, how long are you in school altogether?
- 
- 31) What is your favourite movie? How long does it last in hrs and mins (approx.)?
- 
- 32) Where is the closest cinema to Roscommon? How far away is it in kms?
- 
- 33) What is the cost of an adult and what is the cost of a child's ticket in this cinema?
- 
- 34) What would be the cost for a family of two adults and four children to go to this cinema?
- 
- 35) Where is your nearest fast food restaurant?
- 
- 36) How much does your favourite meal cost in this fast food restaurant?
- 
- 37) How much would it cost for you and your friend to eat the same meal?
- 
- 38) How much change would you get if you paid for the 2 meals with €20.00?
- 
- 39) If the restaurant offered a 5% discount to students, how much would your meal cost after the discount?

## **APPENDIX 4: Mathematical Software on CD**

Number Shark  
Mouse Island  
Mathematics Numeracy Series 1  
Aspex Shape & Space  
Badger Trails  
SumThing  
Clicker 4  
Clicker 5  
Science Explorer  
Tizzy's Toybox  
Mathematics Workshop  
Noddy & Pingu Mathematics  
Blue Peter  
Mathematics Attacker  
Mathematics Blaster (4-6)  
Mathematics Blaster (6-9)  
Mathematics Blaster (9-12)  
Mathematics 1 Grid Club  
Mathematics Worksheet Wizard 1  
What's the time Mr. Wolf  
3D World Atlas  
Big Mathematics Adventure  
Science Simulation 1  
Science Simulation 2  
Science Simulation 3  
Play & Learn Science Experiments  
Max & the Secret Formula

## **APPENDIX 5: Useful Mathematical Websites**

Useful Mathematics websites

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

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

[www.mathematicsisfun.net](http://www.mathematicsisfun.net)

[www.seomraranga.com](http://www.seomraranga.com)

[www.aaamath.com](http://www.aaamath.com)

[www.puzzlemaker.com](http://www.puzzlemaker.com)

[www.funbrain.com](http://www.funbrain.com)

[www.adrianbruce.com](http://www.adrianbruce.com)

[www.schoolhub.com](http://www.schoolhub.com)

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

[www.schooldiscovery.com](http://www.schooldiscovery.com)

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

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

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

[www.counton.org](http://www.counton.org)

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

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

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

[www.coolmathematics4kids.com](http://www.coolmathematics4kids.com)

[www.primarygames.com](http://www.primarygames.com)

[www.multiplication.com](http://www.multiplication.com)

[www.barryispuzzled.com](http://www.barryispuzzled.com)

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

[www.boxofideas.org](http://www.boxofideas.org)

[www.apple.com](http://www.apple.com)

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

[www.educate.org.uk](http://www.educate.org.uk)

[www.senteacher.org](http://www.senteacher.org)

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

[http://www.foresteducation.org/resources/woodland\\_m\\_1122560070.pdf](http://www.foresteducation.org/resources/woodland_m_1122560070.pdf)

## **Glossary**

These descriptions are intended to be a help to primary teachers and are not necessarily the full mathematical definitions of the term.

algorithm	a logical, arithmetical or computational procedure that, if correctly applied, ensures the solution of a problem
analogue clock	a clock on which hours, minutes and sometimes seconds are indicated by hands on a dial
are	a unit of area equal to 100 square metres
associative	an operation such as multiplication or addition is associative if the same answer is produced regardless of the order in which the elements are grouped, e.g. $(2 + 3) + 5 = 10$ , $2 + (3 + 5) = 10$
cardinal number	a number denoting quantity but not order in a set
commutative	giving the same result irrespective of the order of the elements in addition and multiplication $6 + 2 = 8$ $2 + 6 = 8$ , $5 \times 7 = 35$ $7 \times 5 = 35$
composite number	a number with more than two factors that is not a prime number, e.g. 6, 10
denominator	the divisor in a fraction
diameter	a straight line connecting the centre of a circle with two points on the perimeter
distributive	the same result is produced when multiplication is performed on a set of numbers as when performed on the members of the set individually, e.g. $5 \times 4 = (3 + 2) \times 4 = (3 \times 4) + (2 \times 4)$
dividend	a number or quantity to be divided by another number or quantity
divisor	a number or quantity to be divided into another number or quantity
equation	a mathematical sentence with an equals sign
hectare	a unit of area equal to 100 ares
line symmetry	a shape has line symmetry if one half of the shape can be folded exactly onto the other half
number sentence	an equation or statement of inequality e.g. $4 + x = 11$ , $4 \times 2 < 12$ or $2 + 5 = 7$
numerator	the number above the line in a fraction

ordinal number	a number denoting relative position in a sequence, e.g. first, second, third
perimeter	the sum of the length of the sides of a figure or shape
prime factor	a factor that is a prime number
prime number	a whole number that has only two factors, itself and 1, e.g. 2, 3, 7
radius	a straight line from the centre of a circle to a point on the circumference; a radius is half the diameter
ratio	the relationship between two numbers of the same kind; e.g. the ratio of 2 kg to 6 kg is 2:6
subitise	tell at a glance, without counting, the number of items in a set
subtrahend	the number to be subtracted from another number, e.g. 10 - 4 (4 is the subtrahend)
tessellation	shapes tessellate if they fit together exactly, form a repeating pattern, and make an angle of 360 degree at the points of contact
variable	a letter or symbol that stands for a number, e.g. $y + 7 = 12$

B.O.M.D.A.S.	Brackets Order Multiplication Division Addition Subtraction
D.C.U.	Dublin City University
D.E.S.	Department of Education & Science
E.F.L.	English as a foreign language
I.C.T.	Information & Communication Technology
N.C.C.A.	National Council for Curriculum & Assessment
N.C.S.E.	National Council for Special Education
P.T.A.	Parent Teacher Association
S.E.N.	Special Educational Needs
S.E.T.	Special Education Teacher
S.N.A.	Special Needs Assistant
STen	Standard ten score
V.A.T.	Value Added Tax