**Whole School Development Plan Mathematics**

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**Mathematics**

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| **Introductory Statement and Rationale****Introductory Statement**This document is a statement of the aims and objectives, principles and strategies for implementing the mathematics programme at Scoil Ghormáin Naofa.It was formulated by the school staff and informed by the Curriculum Statements and Curriculum Guidelines (1999), the Literacy and Numeracy for Learning and Life Document (2011), Circular 0056/2011, the needs of the children in Scoil Ghormáin Naofa and the expertise and experience of the staff of Scoil Ghormáin Naofa. **Rationale**We recognise the importance of developing a positive mathematics culture in Scoil Ghormáin Naofa. We realise the importance of children’s development of skills that can transfer across the curriculum, and support life-long learning and success. We wish to:* Maintain and develop high numeracy standards in Scoil Ghormáin Naofa.
* Provide a coherent, consistent whole school plan which will inform teachers’ yearly planning.
* Increase the profile of numeracy in school.
* Enhance children’s problem-solving strategies.
* Provide a structure for regular analysis of numeracy standards leading to more focused teaching and learning.
* Enhance children’s acquisition and use of mathematical language.
 |
| **Vision and Aims****Vision:**In keeping with the ethos and philosophy of the school, where each child is valued in the diversity of their needs, this Maths plan is intended to aid each pupil in maximising his/her individual level of potential. **Aims:*** To develop a positive attitude towards mathematics and an appreciation of both its practical and its aesthetic aspects.
* To develop problem-solving abilities and a facility for the application of mathematics to everyday life.
* To enable the child to use mathematical language effectively and accurately.
* To enable the child to acquire an understanding of mathematical concepts and processes to his/her appropriate level of development and ability.
* To enable the child to acquire proficiency in fundamental mathematical skills and in recalling basic number facts.
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| **Content of Plan****Curriculum:*****Strands and Strand Units:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Strands****Classes** | **Junior and Senior Infants** | **1st and 2nd Class** | **3rd and 4th Class** | **5th and 6th Class** |
| **Early Mathematical Activities** | Classifying. Matching. Comparing. Ordering. |  |  |  |
| **Number** | Counting. Comparing and Ordering. Analysis of number. | Counting and numeration. Comparing and ordering. Place value. Operations. Fractions. | Place value. Operations. Fractions. Decimals. | Place value. Operations. Fractions. Decimals and percentages. Number theory. |
| **Algebra** | Extending patterns. | Exploring and using patterns | Number patterns and sequences. Number sentences. | Directed numbers. Rules and properties. Variables. Equations. |
| **Shape and Space** | Spatial awareness3-D shapes. 2-D shapes. | Spatial awareness. 2-D shapes.3-D shapes. Symmetry. Angles. | 2-D shapes. 3-D shapes. Symmetry. Lines and angles. | 2-D shapes. 3-D shapes. Symmetry. Lines and angles. |
| **Measures** | Length. Weight. Capacity. Time. Money. | Length. Area. Weight. Capacity. Time. Money. | Length. Area. Weight. Capacity. Time. Money. | Length. Area. Weight. Capacity. Time. Money. |
| **Data** | Recognising and interpreting data. | Recognising and interpreting data. | Recognising and interpreting data. Chance | Recognising and interpreting data. Chance |

**Number:** The following table may be used as a guide for class groups, with differentiation where appropriate.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Class | J. Infants | S. Infants | 1st Class | 2nd Class | 3rd Class | 4th Class | 5th Class | 6th Class |
| Numerals | 0 – 5  | 6 – 10  | To 99  | To 199  | To 999 | To 9999  |  |  |

***2. Key Approaches and Methodologies:*** *In the mathematics curriculum the strands and strand units are viewed through the lens of the approaches and methodologies. (Teacher Guidelines: Mathematics pp. 30 – 67)***2.1 General*** All children should be provided with the opportunity to access the full range (all strands) of the mathematics curriculum. *It  is important that teachers’ individual planning reflect the objectives as outlined in the curriculum and not follow a text and that there be consultation between class teachers and  Special Education teachers for those pupils who attend Support.*
* We strive to ensure that there is less emphasis and reliance on textbooks and workbooks and more on active learning strategies.
* We ensure that the textbooks in use are in line with content objectives for the class level.
* Appropriate use of concrete materials is encouraged in all classes. *(Teachers in the middle and senior classes are reminded of the importance of same.)*
* Opportunities are provided for all children from fourth to sixth class to use calculators *e.g. to check answers, to explore the number system, to remove computational barriers for weaker children or to focus on problem solving.*
* We ensure that the number limits are being adhered to, particularly at first and second classes where the emphasis is on the development of the concept of place value, *e.g. more work within the hundred square without going past 100 ( Teacher Guidelines: Mathematics, p. 70)*
* We are in agreement that formulae are being ‘discovered’ by children rather than being taught by rote, *e.g. length by breadth (but we also see the need for learning rules by rote after discovery.)*
* There is an emphasis on simple fraction families in the senior classes.
* Pupils will be collecting real data in other areas of the curriculum and using it to represent their findings i.e. using data from other subjects such as geography, history or science to find the answer to a question, gathering data to answer their own questions such as ‘Do more/less children walk to school this year than five years ago?’ ‘What are the three favourite vegetables eaten by children in our class?’
* Estimation skills will be developed and refined with the emphasis on using estimation in all areas of mathematics.
* Profile of mathematics as a subject to be enjoyed by all children is encouraged in Scoil Ghormáin Naofa *e.g. mathematics fun days, display of mathematics work in school, Maths Week, Maths for Fun, etc.* A Maths wall will be maintained in the corridor to foster a whole school approach to strands at a given time.

**2.2 Talk and Discussion**Talk and discussion in mathematics is taken seriously and seen as an integral part of the learning process, *e.g. teacher/pupil, pupil/pupil, pupil/teacher.*Opportunities are provided for pupils to collaborate, explain how they got the answer to a problem, discuss alternative ways of approaching a problem or give oral descriptions of group solutions. Modelling of new and previously learned mathematical language.**2. 3 Scaffolding**The teacher modifies the amount of support according to the needs of the child, modelling language and possible methods for approaching a problem, making the task manageable for the individual child.**2.4 Integration**Areas in other subjects will be identified where mathematical processes are appropriate and useful, *e.g. gathering data in history and geography, measuring temperatures in science.*Opportunities where a thematic approach could be used across a number of subjects are identified   *(Teacher Guidelines: Mathematics pp. 53 and 57 for examples)***2.5 Linkage**Opportunities where a thematic approach might be used for linkage are identified, *e.g. when dealing with decimals are we also aware of their use in data – pie charts; measures – all areas but particularly money for introducing decimals (See Teacher Guidelines: Mathematics pp. 52 & 56)***2.6 Mathematical Language in Context** There is a conscious effort made to use the children’s own ideas and environment as a basis for reinforcing mathematical language, *e.g. you are taller than he is, teacher’s table is longer/wider than yours*Teachers will identify common approaches to the language used in:* Addition – total, sum of, add, and …
* Subtraction – minus, subtraction, take-away, difference, less than …
* Multiplication – times, product of, multiply, groups of …
* Division – divide, share, split, groups of …
* Equals – same as, is, will be, answer is, means …

See Appendix 1: Mathematical Language Guide for Each Topic. *Note : This resource should be used for guidance purposes only. It is important that students are exposed to different terms and a variety of mathematical language (content and symbols) to support understanding and differentiation.***2.7 Number Facts*** There is a common approach to the teaching of number facts (tables), *e.g. for the 3x tables we count the groups of 3.*
* Children are made aware of the commutative properties of multiplication tables and of their relationship with division
* We teach subtraction and division tables separately to addition and multiplication but we then lead the children to make the connection between them.

**2.8 Active learning and Guided Discovery*** Children are povided with opportunities to use hands on materials, including the school environment to support learning and development of mathematical skills and knowledge.
* The children are encouraged to develop personal benchmarks, particularly in the measures strand, *e.g. noting their height in relation to a metre, the width of their finger as close to a centimetre.*
* Mathematical games are in use at each level, *e.g. dice, cards, dominoes, spinner games, games devised by the children themselves. Maths for Fun in Senior Infants nad 2nd class.*
* Where possible, children are provided with structured opportunities to engage in exploratiry activities, enabling them to develop mathematical strategies for solving problems and to develop self-motivation in mathematical activities. *E.g. maths trails, PDST task cards, Nrich problem solving activities*
* Guided discovery will support the learning of strategies and methods of calculating.

There are agreed strategies for teaching:* Addition – top to bottom
* Subtraction – use of materials and decomposition
* **Vertical:** start from the top using the words ‘take away’ =16 take away four equals 12.
* **Horizontal:** Read from left to right using the words ‘take away’ 5 take away 1 equals 4.
* Multiplication – vertical/horizontal presentation, skip counting, using mental strategies such as identifying doubles, near doubles, multiplying by 5 and 10, using games to reinforce facts, developing and honing estimation skills.
* Division – concept of sharing, understanding division as repeated subtraction, developing and honing estimation skills

**2.9 Collaborative and Co-operative Learning**We take steps to ensure that children learn the skills needed to work *as* a group rather than just *in* a group, *e.g. listening to others, turn-taking, appreciating that others’ opinions are important.*. These provide opportunities for children to learn from their peers,*e.g. buddy systems, older children ‘teaching’ younger ones.* Each class uses a variety of organisational styles, *e.g. pair work, group work and whole class work***2.10 Problem-solving*** Children are encouraged to use their own ideas as a context for problem-solving, *e.g. my mammy bought a 2 litre bottle of orange for the party yesterday – was it cheaper than two 1 litre bottles?*
* There is agreement on using strategies such as RAVECCC\*, ROSE\* and RUDE\* to support children’s problem-solving strategies. It is not essential to choose only one but it is useful if teachers are aware of those in use, particularly those working with children with special needs.

\*RAVECCC – Read, Attend to key words, Visualise, Estimate, Choose numbers, Calculate, Check\*ROSE**–**Read, Organise, Solve, Evaluate\*RUDE – Read, Underline, Draw, Estimate*(All of these are just variations and teachers can easily construct their own to suit their circumstances.)** Children are encouraged to explore and illulstrate problems in different ways *e.g. solving a problem through drawing, symbols, numbers(operations), talk & discussion etc.*
* In making problem-solving more accessible and realistic for children  teachers use checkable answers or use a calculator for larger numbers as part of their programme.
* We are providing opportunities for all children, Infants to Sixth class and including those with special needs, to have the opportunity to experience problem-solving activities, *e.g. by giving oral problems, by having them use objects to solve the problem; by using smaller numbers; by using items in the environment, e.g. how many beads can I hold in one hand – a little, a lot, more than teacher?*

**2.11 Use of ICT**Scoil Ghormáin Naofa is gradually increasing the numbers and types of ICT equipment available for student use. Teachers are encouraged to use ICT where it supports the learning and reinforcement of skills and understanding. Children may use calculators to confirm their answers. Occasions such as Maths Week provide opportunities for children to engage in fun Maths challenges through ICT. iPads and Chrome books are available for Station Teaching ro allow pupils access to Maths games. Support for teachers and planning may be sought from <https://www.pdsttechnologyineducation.ie/en/Planning/>**2.12 Use of the Environment*** We are using the school environment to provide opportunities for mathematical problem-solving *e.g. numbers on doors; using large dice in PE to pick teams; set number of laps to run; using hula hoops for sorting children in PE etc.*
* Mathematical trails are being developed within or outside of the school building.
* We give children opportunities to present/display their mathematical work in the class/corridor/school *e.g. creating posters for show learning and posting these/ completed work on the school Maths Wall.*
* Maths competitions are run frequently through the year at whole school level to encourage a love of Maths outside the Maths lesson.

**2.13 Skills Through Content**Teachers are making sure that skills are being actively developed through the content *(Teacher Guidelines: Mathematics pp. 68-69)* There is evidence that transfer of those skills is taking place in other areas.* **Applying and problem solving,** *e.g. selecting appropriate materials and processes in science*
* **Communicating and expressing,** *e.g. discussing and explaining the processes used to map an area in geography*
* **Integrating and connecting,** *e.g. recognising mathematics in the environment*
* **Reasoning,***e.g. exploring and investigating patterns and relationships in music*
* **Implementing,** *e.g. using mathematics as an everyday life skill*
* **Understanding and recalling,** *e.g. understanding and recalling terminology, facts, definitions, and formulae*
* All classes encourage the use of mental mathematics.

**2.14 Presentation of work**We provide a variety of options for recording work, *e.g. drawing a picture to show the result; using ICT; using concrete materials to demonstrate how the result was obtained; using a diagram; telling/explaining****3. Assessment and Record Keeping:***Assessment is used by teachers to inform their planning, selection and management oflearning activities so that they can best meet the varied mathematical needs of the children. The following are other assessment tools that may used by teachers:* Teacher observation
* Worksheets and work in copies and workbooks
* Assessment games
* Extension and enrichment activities based on the strand unit being taught. Samples can be seen in the Teacher’s Manual
* Ongoing teacher-designed tests.
* Oral tests (tables, continuation of number patterns, …)
* Problem solving exercises that use a variety of mathematical skills
* Use of ICT in assessment
* The Drumcondra standardised test is administered every year at the end of May from 1st - 6th class while teacher designed tests are used throughout the year. The results of each child’s tests will be kept in their school file. Results of the standardised test are communicated to parents in school end of year reports In accordance, with the numeracy and literacy strategy 0007/2012, standardised test results at the end of 2nd, 4th and 6th are made available to the Board of Management and the DES at the end of each school year.

Following assessment teachers may do the following:* Give extra help to individuals who need it.
* Decide to increase time spent using concrete materials.
* Discuss the situation with forwarding teacher at the end of the school year and beginning of new school year.
* Discuss concerns with parents and encourage parents to help the child in an informal way.
* Consult and collaborate with the Special Education Teacher to implement a plan of support for the child(ren) in question.

***4. Children with Different Needs:*****4.1 Children with Learning Difficulties**The strategies used by teachers to ensure the participation of children with special needs in relation to mathematics are as follows:* Children with special needs are provided with access to all strands of the mathematics curriculum insofar as that is possible.
* In-class support will be modelled to provide an inclusive means of teaching the different levels of need and ability in the room. This may take the form of station teaching / group teaching etc.
* Teachers in mainstream classes provide a differentiated programme to cater for children with learning difficulties.
* Supplementary teaching is available for children with learning difficulties in mathematics under the General Allocation Model.
* There are regular meetings to ensure a collaborative approach between the Class Teacher and the Special Education Teacher.
* ICT may be used to support teaching and learning for children with special needs

**4.2 Children with Exceptional Ability**The strategies used in the school/class to provide challenges for children of exceptional ability are as follows:* A differentiated programme *e.g. higher order questioning to challenge understanding*
* Independent research projects.
* Use of ICT to support their work.
* Where possible, use of Special Education Teachers to stimulate these students with extra material

***5. Equality of Participation and Access:*** * Equal opportunities are afforded to boys and girls in the presentation of and participation in the mathematics curriculum in Scoil Ghormáin Naofa.
* Children with disabilities (learning or physical) are catered for in the course of the class teacher’s planning, with supplementary teaching available where necessary.
* All children have equal access to ICT resources.

***6. Organisation:*****6.1 Timetable:**In accordance with the Literacy and Numeracy Strategy (2011), classroom time allocation is now increased to 4 hours and 10 minutes (3 hours 25 minutes infant classes) for mathematics. Maths may be integrated into other subjects and additional discretionary time may be allocated to maths teaching by individual teachers. Where a pupil is accessing School Support, every effort is made to ensure that this withdrawal does not clash with maths time.**6.2 Homework:**Homework is given in line with general homework policy. Homework is differentiated to take into account the varying levels of abilities in each class. Every effort is made to coordinate homework between the Class Teacher and the Special Education Teacher.**6.3 Resources and ICT: *( Teacher Guidelines: Mathematics p. 18, pp.72-73)**** Mathematics resources/materials are stored centrally in the Maths Press.
* Some resources are stored in classrooms that they are most relevent to.
* An inventory is kept with the AP2 post holder and has been attached to this policy.
* Materials, equipment, games, textbooks, supplementary books are selected when funds are available and if teachers identify a need for a particular resource.
* The internet is widely used to support the teaching of Maths.
* Teachers share expertise at staff meetings.
* Teachers are encouraged to inform the Principal and/or AP post holder where there is a deficit in the supply /availability of concrete materials.
* We adhere to our Acceptable Use Policy when using the internet in maths lessons.

***7. Individual Teachers’ Planning and Reporting:***Individual teachers will design a mathematics education plan specifically for their own class while at the same time ensuring that their class plans coordinate with and feed into the overall school plan, set out in the policy. This should ensure clear progression as children move from class to class. Strands covered in Mathematics education each month are recorded on the Cúntas Míosúil.The Cúntas Míosúil will be very relevant in recording what has been covered and in reviewing and developing the school plan for the following years. ***8. Staff Development:***The school will access the PDST Mathematics Cuiditheoir through the Regional Curriculum Support Service to support the staff in certain strands if necessary. Teachers will be notified of courses relating to Mathematics Education available in the area. Skills and expertise within the school are shared and developed through inputs at staff meetings and collegiate networking among teachers. Personal CPD is encouraged by management through the allocation of Croke Pakr Hours for CPD – certs are stored in school***9. Parental Involvement - Home School Links:***Parents have a responsibility to support the school’s policy for the teaching of mathematics. Information will be shared with parents around new approaches to the teaching of mathematics so that they can be facilitated in supporting their children’s development in mathematics. * The importance of trial and error, estimation, the use of concrete materials and the role of calculators
* The school’s approach to e.g. subtraction, division, calculations using fractions.
* The fact that Maths homework may be used on practical activities
* The use of the Homework Journals/Class Dojo app as a vehicle for two-way communication between teacher and parent on progress in Mathematics

Teachers and parents are afforded the chance to discuss each child’s progress in Maths at P/T Meetings. They can discuss 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. Feedback (annotations/verbal,written) will be shared with parents following periodic assessments. ***Maths for Fun***has been introduced to create a positive Maths link between home and school. This initiative encourages parents to get involved in the Maths curriculum through fun activities that will support their children’s learning. The aim of this initiative is to develop a love of, and appreciation for, Maths.***10. Community Links:***We are very much aware of the school’s role in the community and we are also conscious of the fact that the expertise of people in the community is an invaluable resource to any school. Guest speakers or evening events around the teaching of mathematics may be held from time to time. Guest speakers may be recruited from the wider public during events such as Maths Week and Engineers’ Week. |
| **Success Criteria**We will know this plan has been implemented when: * Teachers’ preparation is based on this plan
* Procedures in this plan are consistently referred to and followed

This policy will have achieved its aims when * There is positive feedback from teachers/parents/children
* Children have a positive attitude to and appreciation of the value of mathematics
* Children have an interest in the mathematical aspects of everyday life
* Children have an ability to engage appropriately in problem-solving activities
* Children have confidence and competence in mathematics
 |
| **Implementation and Review**1. **Roles and Responsibilities:**

Each teacher and the staff as a group will evaluate the progress in Mathematics by referring back to our set of stated objectives as outlined in this plan. A short session at staff meeting will be allocated to this work.1. **Timeframe:**

The content of this policy will be reviewed at the end of the school year 2023 and every two years thereafter.\*With the expectation of a new Mathematics Curriculum being published, this policy may need to be reviewed earlier. |
| **Ratification and Communication**The Mathematics policy was drawn up by the teaching staff of Scoil Ghormáin Naofa in the 2019/2020 academic year and was reviewed in 2023. It was ratified by the Board of Management on \_\_\_\_\_\_\_\_\_\_\_\_\_\_. Parents can inspect the policy via the school website or the school office. Signed: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Signed:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chairperson BOM PrincipalDate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

**Maths Equipment**

**Early Mathematical Activities**

|  |  |  |
| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Cubes | Infant roomsMaths press |  |
| Foam dice | Infant rooms | 16x Junior Infants6x Senior Infants |
| Connecting camels | Junior Infants |  |
| Packs for sorting | Junior Infants |  |
| C clips- large | Maths press |  |
| C clips- small | Maths press |  |
| Grouping circles | Senior Infants | 10 |

**Number**

|  |  |  |
| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Number fans | Maths press | >20 |
| Matchsticks | Maths press |  |
| Lollipop sticks | Maths pressJunior Infants |  |
| Mini lollipop sticks (for tens and units) | Maths press | 6 boxes |
| 100 squares | Maths press | 15 |
| Tens & units boards | Maths press | 16 |
| Counters | Maths press |  |
| Place Value Bingo | Maths press | 1 |
| Addition 0-12 Flashcards | Maths press | 1 |
| Subtraction Bingo | Maths press | 1 |
| Subtraction 0-12 Flashcards | Maths press | 1 |
| Times Tables Flash cards | Maths press | 1 |
| Multiplication and division activity cards | Maths press | 1 |
| Fraction circles | Maths press | 1 |
| Fractions, decimals, percentages flips | Maths press | 1 |

**Algebra**

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| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
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**Shape and Space**

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| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Shapes Bingo | Maths press | 1 |
| 3D shapes set | Maths press | 1 |
| Blackboard set- compass, protractor, set squares, ruler | 5th & 6th Class | 1 |
|  |  |  |

**Measures**

|  |  |  |
| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Meter sticks | 3rd/4th Class5th/6th Class | 11 |
| Measuring tapes | Maths press | 10 |
| Rulers | Maths press | >10 |
| Paper measuring tapes | Maths press | 24 |
| Trundle wheel | Maths press | 1 |
| Balancing scales | Maths press | 1 |
| Weighing scales | Maths press | 4 |
| Digital weighing scales | Maths press | 10 |
| Large analogue clock  | Maths press | 1 |
| Magnetic time set  | Maths press | 1 |
| Small analogues clocks | Maths press | >10 |
| Telling Time Bingo | Maths press | 1 |
| Elapsed Time Clock | Maths press | 1 |
| Money | Maths press | Variety of real/fake coins and fake notes |

**Data**

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| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Foam dice | Infant rooms |  |
| Regular dice | Ms. Whittle |  |
|  |  |  |

**Games**

|  |  |  |
| --- | --- | --- |
| **Resource** | **Location** | **Quantity** |
| Place Value Bingo | Maths press | 1 |
| Subtraction Bingo | Maths press | 1 |
| Shapes Bingo | Maths press | 1 |
| Telling time Bingo | Maths press | 1 |
| Monkey game-addition | Senior Infants | 1 |
| Dominoes | Maths press |  |
| Large dominoes | Junior Infants |  |
| Brainsnack problem solving box | Maths press |  |
| Maths Activity box | Maths press  | 1 |
| Snakes and Ladders/Ludo(1x board, 1x dice, 4x red, 4x yellow, 4x green & 4x black pieces) | Ms. Whittle | 2 |
| Connect 4(21x red and 21x yellow pieces) | Ms. Whittle | 2 |

**Mathematical Language Guide for Each Topic**

Early mathematical Activities : Colours, size (big, bigger, biggest, small, smaller, smallest), shape, texture (rough, smooth), like, don’t like, more than, less than, enough, as many as, different, same as, same amount as, goes with, together *(see weight and length below)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Strand/ Strand unit  | Junior Infants | Senior Infants*As before +* | First Class*As before +* | Second Class*As before +* | Third Class*As before +* | Fourth Class*As before +* | Fifth Class*As before +* | Sixth Class*As before +* |
| Number/Operations  | A set of \_\_,More than / less thanSame amount, first/ last, how many ?, altogether, divide, separate, zero, none left ‘and’, ‘make’‘Heavier’ | 1st– 3rd/ last,Count forwards/ backwards, how many more do you need ? before/ after, whats the missing number ? ‘add’, ‘makes’ | Plus, equals, sign, sum, jump, total, split, doubles, near doubles, renaming, take away, count back, minus, from, subtract, break up, estimate, left over, number sentence, brackets, 100 square | Amount, separate, reduce, increase, friendly numbers, strategy, nearest 10, difference,Greater than (>), less than (<), rounding  | Multiplcaition, multiply, multiple, groups of, times, share, divide, equal, repreated addition/ subtraction, split, remainder, left over, L bracket, decimals, decimal point | Product, operation, long multiplication | Multiples, divisor, dividend, quotient factors,  | Greatest profit, combined profit, \_\_ decimal places |
| Place value  |  |  | Tens, units, place value, 100 square, digit, groups | Swap, left over, multipack, rounding  | Hundreds, tenths, value, decimals | Hundreths, ordinal number, numeral | Ten thousands, thousanths, extended form  | Hundred thousand, million  |
| Fractions Fractions cont. |  |  | Half, equal parts, double, whole | Quarter, halve, split into, unit | Eighth, tenth, unit  | Third, fifth, sixth, ninth, twelfth, numerator, denominator | Equivalent, mixed number, proper/ improper fraction, simplify, seventh, eleventh, twentieth | Simplest form |
| Decimals / Percentages  |  |  |  |  | Tenths, decimal point | Hundreths, necessary, unnecessary  | Thousandths, equivalent, convert, per cent  | Decimal fraction, cancel, cross multiply, opposite, invert |
| Number Theory  |  |  |  |  |  |  | Factor,prime/ composite/ square/ rectangluar numbers, divisible, divisor | Square root, exponential form, exponents, indices, cubed, highest common factor, lowest common multiple |
| Algebra | Pattern, next, copy, finish (continue), after, colour, shape, size  | Comes next, complete/ continue/ extend the pattern | Odd-one-out, odd, even, count in \_\_, answer box  | Solve, blanks, count on | Sequence, repeating pattern  | Multiple, maximum, minimum  | Negative, positive, order, brackets, equation | Altitude, square (a number) (orders), variables |
| Spatial Awareness  | Over, under, up, down, on, beside,  | Above, below, in front of, behind, between, near, close, on the right/ left, nearest/ farthest away | Underneath, on top of, around, through, right, left, where, inside, outside, opposite,  | Direction, quarter, nect to, higher, lower, straight, edge, forwards, backwards |  |  |  |  |
| 3-D Shapes | Shape, do/ do not roll, do/do not fit together | Cube, cuboid, sphere, cylinder, sides, face, corners, straight, long, short, curved | Edges, characteristics/ properties, length, equal, net | Cone, point, sides, faces, corners (vertices), solid, slide | Triangular prism, pyramid, dimensions, vertex, vertices  | Pentagonal prism, hexagonal prism  | Tetrahedron, vertex, vertices, \_\_ based / \_\_al pyramid,\_\_\_al prism, polyhedron, hemisphere | Octahedron, perspective  |
| 2-D Shapes | Shape, triangle, rectangle, circle, square, straight line, curved line, point, corner | Sides, long, short, angle | Semi-circle, half, equal, inside, beside  | Oval, corners,Construct, sides | Regular, irregular, hexagon, angles, parallel, non-parellel, tessellate, 2-dimensional | Equilateral/ isosceles/ scalene triangle, parallelogram, octagon, rhombus, pentagon  | Quadrilateral, polygon, trapezium, congruent, compass, arc, diameter, radius, radii, chord, sector, circumference, tangent, quadrant | Closed shapes, extend, decagon, heptagon, nonagon protractor, circumscribe, inscribe, co-ordinates, encode, decode, cryptography |
| Symmetry |  |  |  | Lines of symmetry, fold, mirror, reflection, match | Identical, horizontal, vertical, diagonal, symmetrical |  |  |  |
| Lines and Angles  |  |  |  | Angle, full, half and quarter turns, right angles (square corners) | Parallel, vertical, horizontal, clock wise, anti-clockwise, diagonal  | Oblique, perpendicular Straight/ acute/ obtuse angle, rotate | Reflex angles, degrees, full rotation  | Inside scale, outisde scale, centre point, constructing angles  |
| Length  | Long / short Longer / shorter thanTall/ taller thanWide/ wider than, narrow  | Longest, shortest, widest, narrowest, same length/ width/height | Length, measure, nearly, a metre (m), a bit more/less than a metre, metre stick | Centimeter (cm),Half and quater metre, ruler,  | Convert, trundle wheel | Kilometre (km) | Millimetre (mm), unit of measurement, instrument of measurement | Km gauge, scale drawing, aerial photograph, distance |
| Area & Perimeter  |  |  |  | Area, cover, surface, square units | Length, width  | Perimeter, formula, breadth  | Height, cm^2, m^2,  | Acres, hectares |
| Weight | Balance, weigh, heavy, light, lighter, up, down | Big, small, heaviest, lightest | Kilogram, weighs more/less than 1 kg | Weighing scales, dial,Half/ quarter kg, grams (g) |  |  | Weighbridge, spring balance | Load-bearing limit |
| Capacity | Empty, full, to the top, fill, holds more/ less than, level, soaks, overflows,  | Holds the same amount/ the most/least, up to the top, enough | Capacity, containers, liquid, solid, estimate, litre (L), suitable, approx. | Half and quarter litre | Millilitre (ml) |  | Graduated jug/ cylinder, vessel, intervals, levels | Volume  |
| Time | Day, night, bright, dark, morning, evening, bedtime, lunch-time, early, late, weekend, next, first, last, days of the week | Today is \_, tomorrow will be \_, yesterday was \_, before, after, sooner, later, o’clock, long/ short hand, afternoon, seasons, weekdays, months | Calendar, ealier, fortnight, dawn, half past \_\_, not yet | Digital clock, analogue clock, just before/after,, minutes, quarter to/ past, long hand, short hand  | Second, minutes past/ to, hour, am, pm, convert | Arrival time, departure time, outward, homeward  | 24-hour clock | International time, local time, elapse |
| Money | Cent, how much ?, buy, sell, spend, coins, the same amount | Money, more, less, most, least, bigger, smaller, shinier | Value, euro, cost, change, combinations/ ways to make, currency, tags | Cheaper, total, value, worth |  | Deposit, balance (link with decimals) | Value for money, unitary method | Price difference, V.A.T (value added tax), budget, exchange rate |
| Data | Belong, do/does not belong, set, goes with | How many ?How many more/less ?, pictogram, block graph, most, least | Row, column, represent, graph, across, down, horizontal, vertical | Record, tally, sort, vote , represent, title, most/ least popular / common | Bar chart, survey  | Pie chart, scale | x-axis, y-axis, horizontal/ vertical axis, average, multiple bar chart, key, interval | Trend graph, bar-line graph, forecasting, trends, variables, trend analysis |
| Chance  |  |  |  |  | Possible, impossible, might, certain, not sure, likely, unlikely, chance  | Predict, random, definitely  | Probability scale, probably, improbable, frequency  |  |