

GUARDIAN ANGELS' RCPS MATHEMATICS POLICY

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Mission Statement

We follow in the footsteps of Jesus to love, learn and grow.

Our Own Grown Curriculum

Our own grown curriculum provides every child with a Catholic education based on the life and teachings of Jesus Christ in which our schools Mission Statement and the Gospel Values underpin all aspects of school life.

We recognise and celebrate that every child is made in the image and likeness of God. Our curriculum is inclusive and meets the needs of every child in our school.

We have grown a curriculum that is progressive and sequential, creative, challenging, fun and enriching. The curriculum provides every child with the knowledge, skills and experiences to become excellent lifelong learners and equip them to embrace the diverse and ever-changing world that we live in.

Purpose of this policy

This policy reflects the aims and values of Guardian Angels' RCPS. It ensures all stakeholders, including staff, governors, parents and children, are working towards the same goals.

The purpose of this policy is to:

- Set out a framework for all teaching and non-teaching staff, giving guidance on planning, teaching and assessment
- Demonstrate adherence to the National Curriculum objectives and guidelines
- Provide clear information to parents and carers about what their children will be taught
- Allow the governing board to monitor the curriculum

Our Vision

At Guardian Angels' RCPS, we believe that Mathematics helps to give meaning to our world, furnishing us with a method of communication which uses numbers, shapes and symbols. It is a universal means of communication used to explain, predict and tackle problems in everyday life.

Our intent is to promote Mathematics as a lively, interesting and attractive subject and to provide a richness of experience and challenge in order for our children to develop a range of knowledge, skills and understanding of concepts. Our aim is for the children to gain the ability to work methodically and systematically, with persistence and perseverance, as this will ensure that the children are independent and resilient learners. All children will be

provided with the appropriate opportunities and provision to access the curriculum so that their individual needs are catered for and so that they are challenged at their own individual level.

At Guardian Angels' RCPS, our intent is to develop the children's ability to think logically and to approach problems with strategies and methods that are appropriate and efficient. We strive to ensure the children explore mathematics with confidence and in an inquisitive manner, discussing concepts and mathematical structures and then making decisions based on their understanding. The children will gain confidence in their mathematical ability, expressing ideas, reasoning fluently, talking about the subject with confidence and using the correct mathematical terminology.

Mathematics is used in the world around us and our curriculum is designed to ensure that children have the opportunities to apply their mathematical understanding in a world beyond the classroom as well as a tool in a wide range of activities. The children will gain a broad range of number facts and calculation strategies that they can work with fluently, gaining an appreciation of pattern and the ability to identify relationships, making links between different areas of the curriculum. This includes ensuring a deep understanding of number, geometry, measures and statistics.

Aims and outcomes

By the end of Year 6, children should:

The principal focus of mathematics teaching is to ensure that by the end of year 6, pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio.

At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them.

By the end of year 6, pupils should be fluent in written methods for all 4 operations, including long multiplication and division, and in working with fractions, decimals and percentages.

Pupils should read, spell and pronounce mathematical vocabulary correctly.

Teaching and learning of Mathematics

The approach to teaching applied is based on six key principles:

- dedicated Mathematics lessons every day
- teaching fluency of calculation and number fact
- an emphasis on exploring different calculation strategies
- all pupils exploring the same small steps in learning in depth
- the application of knowledge and skills in order to solve a range of problems independently
- the use of concrete and pictorial resources to support the understanding of abstract principles

The mathematics curriculum at Guardian Angels' RCPS is taught using long-term plans for each year group which are informed by the outlines provided by the White Rose Maths Hub. To ensure that there is adequate time allocated to developing mathematical skills, each class teacher is expected to provide a daily lesson for Mathematics which should last about 45-50 minutes in KS1 and 60 minutes in KS2. In addition to this, there is an extra half-hour fluency session taught in Years 2-6. The purpose of these sessions is to practise counting and calculation strategies, improve number fact knowledge and to develop fluency of calculation.

White Rose Maths Hub is used as a starting point for planning lessons in blocks of work. Teachers follow the units of work and small steps, supplementing WRN with activities from a variety of sources.

The Early Years

The Foundation Stage aims to prepare children for learning in Key Stage 1. The enjoyment of mathematical experiences is the key aim of the Foundation Stage, achieved through practical experiences underpinned by oral development. The understanding of Number, Pattern, Measurement, Shape and Space is developed through stories, rhymes, songs, games and imaginative play.

We want our children to be able to represent number facts within 10 using written representation with or without representation using objects and explain their understanding using some mathematical terms. We want our children to be able to recognise and create patterns and use mathematical terms and comparative language to describe shapes and measures. Recording at this stage is informal, and likely to include the use of objects, pictures, symbols and ICT.

The level of development children should be expected to have attained by the end of the EYFS is defined by the early learning goals. The ELGs support teachers to make a holistic, best-fit judgement about a child's development, provides parents and carers with a well-rounded picture of a child's knowledge, understanding and abilities and their readiness for Year 1.

Objectives in the Teaching of Mathematics

The overall objective is the delivery of the mathematics curriculum, achieving continuity of methodology and content. The development of content is covered in detail in the long-term plans for each year group.

Our objectives can be broken down into four sections:

- Knowledge of facts - number bonds, mathematical vocabulary, use of symbols, knowledge of procedures etc.
- Understanding of conceptual structures – relationships, patterns, estimation, interpretation
- Attainment of skills – performing basic operations, using equipment appropriately, practical skills of measurement
- Development of personal qualities – positive attitude, ability to reason, resilience, problem solving methods and an acceptance that we learn through our mistakes.

Mathematical Language and Terminology

When teaching mathematics, it is imperative that teachers consistently use the correct terminology. For example, when teaching addition, the numbers being added together are called addends, and when subtracting, the subtrahend is subtracted from the minuend. By using the correct terminology, pupils will be given the tools to make accurate generalisations and, therefore, be able to understand patterns and relationships in number.

Teaching Mental Calculation

There are two main aspects to mental calculation:

- to demonstrate instant or rapid recall of number facts
- to work out calculations using mental strategies

What should be stressed is the efficiency of a method, by which is meant the ease and speed by which it leads to a correct answer. Some strategies might be more efficient than others and the aim is for the children to choose a sensible strategy for calculation. Children need to be given sufficient time to master each strategy so that they not only use it but can also explain why it is useful.

Teaching Written Calculation

Although great emphasis is placed on the development of mental strategies, written methods are still important as they are viewed as complementary to mental methods, not separate from them. Written recordings help children to clarify their thinking.

Teachers need to support and guide children through the following stages:

- developing the use of pictures and a mixture of words and symbols to represent numerical activities
- use of standard symbols and conventions such as the numerals 0-9, the = sign and the operation signs to record mental calculations
- use of jottings to aid mental calculations
- use of compact forms of recording

The school approach to all calculation is supported through the use of the Visual Calculation Policy.

Problem Solving and Reasoning

Using and applying mathematics is embedded at the heart of teaching for mastery and is given great emphasis. Solving problems is a key part of each yearly teaching programme in our curriculum. It encompasses

- making decisions; deciding which operation and method to use (mental, mental with jottings, pencil and paper or calculator)
- reasoning about numbers or shapes and making general statements about them
- solving problems involving numbers in context; 'real life', money or measures
- collecting, organising, presenting and interpreting data

Children must be able to apply what they learn to a wide range of contexts, in and out of school, and in all aspects of their lives. We must provide opportunities for solving a variety of problems, not only within the daily mathematics lesson but also in other subjects and events in and around school. These might be

- short problems requiring perhaps only a few seconds of consideration
- extended investigations which might last over several lessons

Children need to be given the opportunity to discuss how to proceed with the problem either with a partner, group or whole class, thus allowing them to share ideas, deal with difficulties and sustain their interest.

Skills for using and applying mathematics need to be taught. They are not acquired accidentally! These skills include

- breaking a problem down into a series of steps and recognising the mathematics that can be used to solve it
- applying mathematical skills when planning their approach
- monitoring progress towards their goal
- checking and deciding whether the answer makes sense

Successful problem solvers process these skills and use them intensely in problem solving situations.

Mathematics Curriculum overview

	Learning Journey 1	Learning Journey 2	Learning Journey 3
Nursery	Colours and Matching	Number 4 Composition	More Than/ Fewer
	Sorting	Number 5	2D Shapes
	Number 1	Number 5 Composition	3D Shapes
	Number 2	Number 6	More or Less

	Subitising Number 2 Pattern 1 Pattern 2 Subitising Number 3	Height and Length Mass Capacity Sequencing Positional Language	Number Composition What Comes After What Comes Before Numbers to 5 Number 7 Number 8 Number 9 Number 10
Reception	Match, sort and compare Talk about measure and patterns It's me 1, 2, 3 Circles and triangles 1, 2, 3, 4, 5 Shapes with 4 sides	Alive in 5 Mass and capacity Growing 6, 7, 8 Length, height and time Building 9 and 10 Explore 3-D shapes	To 20 and beyond How many now? Manipulate, compose and decompose Sharing and grouping Visualise, build and map Make connections
Year 1	Number - Place Value (within 10) Number - Addition and subtraction (within 10) Geometry – Shape	Number – Place Value (within 20) Number – Addition and subtraction (within 20) Number – Place Value (within 50) Measurement – Length and height Measurement – Mass and volume	Number – Multiplication and division Number – Fractions Geometry – Position and direction Number – Place value (within 100) Measurement – Money Measurement – Time
Year 2	Number - Place Value Number - Addition and subtraction Geometry - Shape	Measurement - Money Number – Multiplication and division Measurement – Length and height Measurement – Mass, capacity and temperature	Number – Fractions Measurement – Time Statistics Geometry – Position and direction

	Learning Journey 1	Learning Journey 2	Learning Journey 3
Year 3	Number - Place Value Number - Addition and subtraction Number – Multiplication and division A	Number – Multiplication and division B Measurement – Length and perimeter Number – Fractions A Measurement – Mass and capacity	Number – Fractions B Measurement – Money Measurement - Time Geometry – Shape Statistics
Year 4	Number - Place Value Number - Addition and subtraction Measurement – Area Number – Multiplication and division A	Number – Multiplication and division B Measurement – Length and perimeter Number – Fractions Number – Decimals A	Number – Decimals B Measurement – Money Measurement - Time Geometry – Shape Statistics Position and direction
Year 5	Number - Place Value Number - Addition and subtraction Number – Multiplication and division A Number – Fractions A	Number – Multiplication and division B Number – Fractions B Number – Decimals and percentages Measurement – Perimeter and area Statistics	Geometry Geometry – Position and direction Number - Decimals Number – Negative numbers Measurement – Converting units Measurement - Volume
Year 6	Number - Place Value Number – Addition, subtraction multiplication and division Number – Fractions A Number – Fractions B Measurement – Converting units	Number – Ratio Number – Algebra Number – Decimals Number – Fractions, decimals and percentages Measurement – Area, perimeter and volume Statistics	Geometry - Shape Geometry – Position and direction Themed projects, consolidation and problem solving

Cross-curricular links - Mathematics Across the Curriculum

Mathematics is a server subject and teaches children fundamental skills that allow them to access many other areas of the curriculum. Below are some examples of the links between Maths and other subject areas. These also demonstrate how making links between Maths and different subject areas can deepen mathematical knowledge, understanding and skill to develop true mastery.

Science and Maths

Maths and science are tightly linked together. Almost every scientific investigation is likely to require one or more of the mathematical skills of classifying, counting, measuring, calculating, estimating, and recording in tables or graphs. Statistics are used extensively in science. Most charts and graphs used in science are initially taught in maths lessons.

Geography and Maths

- Collecting and representing data from field work.
- Grid references and coordinates.
- Using scales on Ordnance Survey maps to establish the correct distance between two points.

Physical Education and Maths

- Time, distance and speed of races can be incorporated into Mathematic sessions to enable children to work out averages and convert between different measures.
- Data can be collected and analysed to assess performances.
- As in Geography, maths skills are needed when orienteering: using grid references, angles and direction.
- Averages (Mean, Mode and Median) can be used to assess an athlete's performance.
- Creating sequences for gymnastics.
- Discussing symmetry on the football pitch or netball court.

Design Technology and Maths

- Reading Scales.
- Measuring ingredients and working out proportions.
- Using ratios in recipes.
- Being able to measure things accurately is an important skill in DT when making products.
- Estimation is also important when working out quantities of raw materials.

Computing and Maths

- Angles and direction which can be drawn and measured using floor robots and apps.
- Information can be represented through Excel documents.
- Logic is used in programming as is problem solving.
- Logical Reasoning during programming.
- Scratch Maths allows children to use their mathematical skills to program computers.

Art & Design and Maths

- Symmetrical art can be analysed and the number of lines of symmetry can be found. Also, the order of rotational symmetry can be studied.
- Ratio is used to mix paints. For example, to make purple, you mix 3 parts red to 7 parts blue.
- Many artists and architects have proportioned their works to approximate the Golden Ratio, believing this proportion to be aesthetically pleasing.
- Perspective can be used to show enlargement of shapes on square paper
- Tessellations in different pieces of artwork.
- Works of art from the Cubism era of the 20th century link to nets and 3D shapes.

History and Maths

- Historical (scaled) timelines can be used as a basis for finding the difference in dates and giving an understanding of lengths of time over periods in History.
- Historical dates can also be utilised for sequencing events.
- Charts and graphs can provide extremely useful historical information, which children can analyse.

Assessment

Formative assessment

Formative mathematics assessment is ongoing and will be used to inform teachers in relation to their planning, lesson activities and adaptations.

Summative assessment

Summative assessment is completed at the end of blocks, half termly and termly. The results and judgments are stored centrally.

- White Rose Maths Hub block assessments from Y1 through to Y6
- White Rose Maths Hub end-of-term assessments from Y1 through to Y6
- Termly / Half termly times tables assessments
- Reception baseline
- Year 4 multiplication tables check
- Statutory SATs at the end of KS2

At the end of each school year, children will be assessed within one of the following bands:

- Pre-Key Stage (PKS)
- Working Towards the curriculum (WT)
- Working at Expected (EXP)
- Working at Greater depth (GDS)

Marking

Children receive regular feedback and marking follows the school's marking policy.

Recording of children's learning

In Mathematics, pupils will record their learning in the following ways:

- Mathematics books

- Early Morning Mathematics books
- Photographs on the class page
- Videos on the class page
- I-pads/Laptops
- Reception-Individual Learning Journey (this may take the form of photographs, pictures, notes or written work, and may be worksheet-based or fully independent. Use of Seesaw / website)

Roles and responsibilities

Headteacher

The Headteacher will:

- Support the subject leader but also hold them to account for the effectiveness of the subject
- Support staff through the provision of training and resources
- Monitor the planning and delivery of the subject
- Ensure the requirements of the National Curriculum are met
- Ensure this policy is reviewed according to the timescales set out

Subject leader

The subject leaders will:

- Prepare and review subject policy and curriculum plans
- Promote the study of the subject throughout the school
- Monitor the teaching and assessment of the subject
- Attend appropriate CPD
- Stay informed regarding developments in the study and teaching of the subject
- Evaluate resources
- Provide training and CPD to staff on the subject curriculum and its delivery, and keep them informed about subject developments nationally
- Assess the impact of the subject curriculum on pupils' learning and development
- Make presentations to governors on the subject and how it is being taught

Teachers

Class teachers will:

- Teach and assess the subject according to the principles laid out in this policy
- Report to the subject leader
- Maintain subject knowledge and appropriate CP

Inclusion

Teachers set high expectations for all children in Mathematics. They will use appropriate assessment to set ambitious targets and plan challenging work for all groups, including:

- More able children
- Children with low prior attainment
- Children from disadvantaged backgrounds
- Children with special educational needs (SEN)
- Children with English as an additional language (EAL)

Teachers will plan lessons so children with SEN and/or disabilities can study PSHE, wherever possible, and ensure that there are no barriers to every pupil achieving. Teachers will adapt and modify their planning and resources to meet the needs of each child.

Teachers will also take account of the needs of children whose first language is not English. Lessons will be planned so that teaching opportunities help children to develop their English, and to support them to take part in PSHE.

Links to other policies

This subject policy links to the following policies and procedures:

- Curriculum policy
- Assessment policy
- Marking and Feedback policy
- Learning and Living Differences (SEND) policy
- Teaching and Learning policy
- Well-Being and Readiness to Learn Policy
- SEND Policy
- Equality Policy
- Dyslexia Policy
- Home-School Agreement

Monitoring and review

This policy will be reviewed by staff and governors every two years.