

Ashgate Primary School



Mathematics Policy

Policy expectations in the delivery of mathematics

This Document should be read in conjunction with:

- Teaching and Learning Document
- Calculations Policy
- Special Educational Needs Policy
- Equal Opportunities

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Written by: Amanda Vobes / Peter Seargent

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Philosophy.

“Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.” (The New national curriculum in England framework document, July 2013)

Mathematics is a core subject within the National Curriculum. This policy outlines the purpose, nature and management of the teaching and learning of Mathematics in the school.

We aim for all of our children to be strong mathematicians because they:

- ☐ Have a strong conceptual understanding of Mathematics; its structures and its relationships
- ☐ Can recall and apply their knowledge confidently and efficiently
- ☐ Are secure in using written methods for which they have a clear understanding

We aim to place problem solving and investigative/reasoning skills at the heart of our mathematics teaching so that a ‘deep’ understanding and ‘application’ of mathematics can be effective in everyday life. We recognise that collaboration and communication are crucial life skills and should be developed in our mathematics teaching.

The expectation is that all children welcome challenge and that teachers foster the attitude that we all, even the most able among us, should expect to strive to improve.

Through careful assessment, planning and preparation we aim to ensure that all children progress when they are ready. New knowledge and skills should be secured before new material is introduced. For those who grasp new material quickly, they should apply this to rich problem solving tasks.

Mathematics is essential in everything we construct, everything we calculate and almost every problem which we have to solve in our everyday lives. This is reflected in school where the use of mathematical knowledge, skills and understanding is required in all other areas of the curriculum. Children’s knowledge, skills and understanding in Mathematics develop as they use it in practical activities, to solve relevant and meaningful problems, and to explore the patterns and relationships on which mathematical concepts depend.

At Ashgate School, our chief aim is that all our pupils will develop a positive attitude to Mathematics and learn to use it with confidence, understanding and pleasure.

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At Ashgate School we aim to ensure that every child:

- Knows that Mathematics has a high profile in the school and knows the reason why.
- Is excited and challenged by mathematical activities
- Is competent in mental arithmetic and is equipped with the necessary skills and strategies to aid their mental agility
- Knows which calculations to use for the four operations and is encouraged to show their working out (jottings)
- Has sufficient knowledge of numbers, shape and space, measures and handling data, so that they can be sure of their knowledge and understanding in order to solve real-life problems and practical tasks
- Sees the importance of Mathematics in other curriculum subjects.

Implementation

The implementation of this policy is the responsibility of all teaching staff and Learning Support Assistants and is led by the mathematics Subject Leader.

Curriculum

The school works to the expectations set out in the National Curriculum in England 2014 and the Early Years Foundation Stage 2020.

The school uses the White Rose Maths as a starting point for planning to ensure continuity and coverage in topics covered from EYFS to Year 6 and use consistent representations and resources to match objectives as we work towards maths mastery. Their mantra of 'Everyone can do Maths' fits very closely with our own philosophy. Teachers are encouraged to access a range of other schemes and resources for mathematics to ensure materials chosen are tailored to meet the individual needs of each cohort and to fulfil the NC requirements where it is appropriate. We remember that it is the National Curriculum objectives and the needs of the individuals that is core to our practice, not a scheme or historical practice.

The school uses Times Table Rock Stars to support the learning of multiplication and division facts. This encourages the learning and speedy recall of tables from year 2 through to year 6. Children in EYFS, KS1, and where needed in KS2, are able to use Numbots to help support number recognition and addition and subtraction facts.

The school's curriculum places an emphasis on rich, applied mathematical tasks, which allow the children many opportunities to persevere with problem solving.

While sometimes it may be appropriate to teach some mathematical concepts discretely and by rote learning (including number bonds, multiplication tables and inverse facts), there is an emphasis on giving the Mathematics a context so that there is purpose for learning. Using the school environment and the wider world, the curriculum ensures children explore, make connections, seek patterns, recognise relationships and are creative with mathematics. Each White Rose block includes small steps towards fluency within a particular area and problem solving and reasoning activities to ensure skills are applied and explained.

A good understanding of place value and key number facts is extremely important therefore we encourage use of a wide range of practical equipment and representations, in all year groups, to support this conceptual development including

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- Numicon
- Base Ten
- Tens Frames
- Part Whole Models
- Counting Sticks
- Cuisenaire Rods
- Number lines
- One hundred squares and
- Nrich programmes designed to support the effective teaching of 'reasoning' skills.

Throughout all stages, children play with numbers, measures, shapes and patterns to develop numerical awareness and explore the idea of 'proof.' We promote mathematical games that involve point scoring and personal bests (both electronic, and 'hands on') as we know that if managed properly this is highly motivating.

See also our Curriculum Statement and Calculation Policy

Teaching and Learning

All teaching must be at least good and in many cases outstanding.

Underpinning all good or outstanding teaching in mathematics is the expertise and sound subject knowledge of the staff.

Clear policies and regular professional development from a range of sources will develop the expertise of staff to help in delivering the school's curriculum thoroughly and consistently:

- ☐ In enhancing staff subject knowledge
- ☐ In weaving mathematical ideas into a coherent whole
- ☐ In choosing practical resources, visual images and information and communication technology that promote inclusive teaching and a deeper understanding for all
- ☐ In using good Assessment for Learning techniques to listen to children and to check and probe their understanding throughout.

Planning

Planning follows the small steps within each White Rose Block and the Ashgate Primary School Calculation Policy which gives an overview of the development of addition, subtraction, multiplication and division from Reception to Year 6.

Teachers use this detailed information on progression through each strand and how to use practical resources and models to develop understanding at each stage.

Classes are mixed ability and the groups within classes are fluid. Teachers will use a range of grouping methods when planning. No children miss out on the daily mathematics lesson for the class, as it is crucial they have access to Quality First Teaching.

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Occasionally, we may provide supporting groups across classes if this is judged to best meet the needs of the children; however, cohort streaming is not undertaken.

Lessons include opportunities for:

- ☐ Practical activities and mathematical games
- ☐ Problem solving
- ☐ Individual, small group and whole class discussions
- ☐ Open and closed tasks
- ☐ A range of methods of calculating e.g. mental, paper and pencil and calculator
- ☐ Working with ICT
- ☐ Outdoor learning

Teachers plan for deep coverage and mastery of the school's curriculum through both daily Mathematics lessons and additional opportunities to develop mental Mathematics skills. This can be of a discrete and rote nature if required to underpin basic skills.

Plans for daily Mathematics lesson include teaching, practicing, applying, and reviewing and cater for all learning styles (Visual, Aural and Kinaesthetic).

Children's prior attainment, needs, learning steps and targets are at the forefront of all planning and are clearly linked to and reviewed through regular assessments. (see assessment).

Targets are found in the front of each child's book and are reviewed continuously to ensure pupils have appropriate targets for development. Targets are highlighted in yellow. Once teachers are satisfied that children satisfy the NICE criteria for attainment (See Teaching and Learning Policy), the target is dated, marked green and a new target set. Staff may choose additional targets for pupils where appropriate to the needs of the child.

All plans must be available in the classroom for inspection or use by additional staff.

Where planning is undertaken by an individual as a framework for others to amend, this must be available by the end of day on a Friday prior to its implementation. This is done to ensure that planning can be annotated and adjusted to meet the needs of individual classes. PPA is provided to all staff for this purpose.

Reasoning and problem solving homework is planned to reinforce concepts taught during the previous week and sent out on a Friday. Children can also access their Numbots and Times Table Rock Stars account at home.

See also our Calculation Policy, Teaching and Learning Document and Homework Policy

Resources

Children become fluent in mathematics when they have lots of 'hands on' experiences. Therefore, children and staff draw on a wide range of practical resources in order to develop the conceptual understanding of Mathematics; its structures and its relationships. This then helps children move smoothly to pictorial and then abstract representations and recorded methods.

Good use of resources also helps make the learning more interesting.

Each class has a standard set of resources, provided by the Mathematics Subject Leader. Additional resources are kept in a central location, currently in the tower room. More specialist resources specifically required for groups or individual needs, can be sourced through the Subject Leader.

It may be necessary for some more valuable resources to be shared and timetabled. This should be done through the Subject Leader.

Inclusion

SEND

For every child to be able to participate we must know each of them as individuals. For children with SEND teaching must be closely linked to their PSP targets. What is good provision for a child with SEN is good for all children i.e. an abundance of activities that allow children to learn visually, through speaking and listening and kinaesthetically

The following principles inform and guide our policy and practice:

- ☐ Meeting the diverse and complex needs of each and every individual is embedded in everything that we do as a whole staff
- ☐ It is the responsibility of the school to enable the child to access and make progress through the curriculum
- ☐ Equal opportunities is not the same as equal provision

We respond to children's diverse learning needs by:

- ☐ Creating effective learning environments
- ☐ Securing their motivation and concentration
- ☐ Providing equality of opportunity through a range of teaching approaches and modifying these for individual needs
- ☐ Using appropriate assessments
- ☐ Setting targets for learning

Gifted and Talented

Teaching of more able children is within their own class and by extending their learning through differentiated group work, extra challenges and opportunities for independent learning.

Where appropriate, special arrangements are made for an exceptionally gifted child including: 'deeper learning' opportunities, challenges and signposting opportunities beyond the school.

Above all we celebrate and affirm the diversity in our school, our community, our society, and our world and commit ourselves to enabling all our pupils to participate constructively as they grow.

See also our Inclusion policy.

Contribution of Mathematics to Teaching in Other Curriculum Areas **English**

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. In particular children need quality and variety in language that they hear and speak; these are key factors in developing their mathematical vocabulary and being able to present a mathematical justification, argument or proof. Children are assisted in making their thinking clear to themselves as well as others and teachers ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

ICT

The effective use of ICT can enhance the teaching and learning of mathematics when used appropriately. When considering its use, we take into account the following points:

- ICT should enhance good mathematics teaching. It should be used in lessons only if it supports good practice in teaching mathematics;
- Any decision about using ICT in a particular lesson or sequence of lessons must be directly related to the teaching and learning objectives for those lessons;
- ICT should be used if the teacher and/or the children can achieve something more effectively with it than without it;
- Teachers have access to interactive resources through Education City, Espresso and Active Learn activities to give children opportunities to apply mathematical skills.

Science

Almost every scientific investigation or experiment is likely to require one or more of the mathematical skills of classifying, counting, measuring, calculating, estimating and recording in tables and graphs. In science pupils will for example order numbers, including decimals, calculate simple means and percentages, use negative numbers when taking temperatures, decide whether it is more appropriate to use a line graph or bar chart, and plot, interpret and predict from graphs.

Art, Design and Technology

Measurements are often needed in art and design and technology. Many patterns and constructions are based on spatial ideas and properties of shapes, including symmetry. Designs may need enlarging or reducing, introducing ideas of multiplication and ratio. When food is prepared a great deal of measurement occurs, including working out times and calculating cost; this may not be straightforward if only part of a packet of ingredients has been used.

History, Geography and Religious Education

In history and geography children will collect data by counting and measuring and make use of measurements of many kinds. The study of maps includes the use of co-ordinates and ideas of angle, direction, position, scale and ratio. The pattern of the days of the week, the calendar and recurring annual festivals all have a mathematical basis. For older children historical ideas require understanding of the passage of time, which can be illustrated on a time line, similar to the number line that they already know.

Physical Education and Music

Athletic activities require measurement of height, distance and time, while ideas of counting, time, symmetry, movement, position and direction are used extensively in music, dance, gymnastics and ball games.

Personal, Social and Health Education (PSHE) and Citizenship

Mathematics contributes to the teaching of personal, social and health education, and citizenship. The work that children do outside their normal lessons encourages independent study and helps them to become increasingly responsible for their own learning. The planned activities that children do within the classroom encourage them to work together and respect each other's views.

The role of Learning Support Assistants

Learning Support Assistants are actively involved in teaching small groups within lessons and in providing intervention sessions. They support all groups in the classroom, enabling the teacher to also work with all groups on a weekly basis. They offer sensitive support and are expected to modify tasks, materials and teaching resources as required.

They demonstrate initiative in using practical resources to support learning and help pupils overcome difficulties, for example by using strings of counting beads to aid early multiplication. They are careful not to over-direct pupils' learning.

They spot misconceptions and gaps in learning, and take responsibility for assessing pupils in their groups, and help to identify the next steps and plan subsequent activities with the class teachers. They participate in reviewing pupils' progress and are particularly effective in identifying and supporting personal problems that present barriers to learning.

It is a priority that Learning Support Assistants are included in the planning, assessment and delivery of support for the most vulnerable pupils. This does not, however, mean that they are always the most suitable staff member to support groups. They can, and should, be used to enable the teacher to offer specialized support for those whilst the LSA supports children who are capable of working more independently.

Responses to Children's Work

We recognise the importance of responding to children's work, whether orally or in writing. We seek to encourage children by highlighting positive achievements. This could include praise for use of a viable method even if the end results were incorrect.

Children are given opportunities, and actively encouraged, to explain their work to others and to display their work when it seems appropriate. They are encouraged to value and respect the work of others. Children are also encouraged to respond to any teacher comments made as well as identifying any targets they feel they have achieved.

The school has a detailed Teaching and Learning document which highlights specific response strategies and expectations.

Assessment

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study as stated in the National Curriculum 2014. Teachers will complete ongoing assessments and will be informed by their marking and questioning of the children during lessons and the plenary.

'Assessment Weeks' are planned for on the Annual Planner to allow staff to access summative assessment materials. These are used to 'inform' Teacher Assessment and are completed by the end of each half term. Teacher Assessments must be completed and recorded no later than the first day back of each term. This enables a wider review of whole school and cohort progress, thus informing wider action planning and allowing strategic decision making (including governor reviews). Such reviews are undertaken 3 times a year. However, in maths staff also use the end of block assessments available from WRM to help ensure that pupils have grasped concepts and inform any intervention work that may be needed.

Each week, teachers are asked to plan, using a range of resources available on the school server, a reasoning/problem solving investigation, linked to learning small steps and Age Related Expectations, to help assess if the children can apply recently taught skills. Reasoning tasks and other discrete activities provide useful opportunities to inform Teacher Assessment.

Intervention practices

At Ashgate we have the highest expectations for all children. We act early to secure the essential knowledge and skills of the least able. In conjunction with the leadership team, SENCo, Learning Mentor and Mathematics Subject Leader, staff are encouraged to reflect on why barriers to learning exist in the first place and what can be done to prevent them arising in future.

Children needing extra support to help them work towards age related expectations in Mathematics are identified during pupil progress meetings and where possible intervention

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groups, run outside of Mathematics lessons, are used to help narrow the gap. The intervention used will depend on the nature of the difficulty for the children.

In years 3 and 4, daily practice is undertaken to secure times tables' knowledge.

In KS1 additional small group support sessions are run to secure current teaching.

We are currently developing materials using Precision Teaching method to work with targeted children.

The impact of these is monitored and regularly reviewed.

Leadership

Our Mathematics Subject Leader must always be an outstanding practitioner in their own right in order to lead by example. To tackle barriers and ensure consistency, they are responsible for:

- ☐ Monitoring teaching and learning through lesson observations, work scrutinies and pupil progress reviews
- ☐ Using the information gathered from data analysis to improve teaching and the curriculum
- ☐ Robustly challenging weak teaching and identifying what support or development is needed
- ☐ Mapping interventions and ensuring support staff are deployed effectively
- ☐ Assisting, when required, with individual and group target setting and ensure progress against these targets is effectively shared with parents
- ☐ Preparing and organising INSET as necessary

The Mathematics Subject Leader must also work in partnership with other members of the leadership team particularly the Inclusion Manager and our governors' School Improvement Committee in raising standards in Mathematics across our school and maintaining the high profile of mathematics in the School Improvement Plan.

Monitoring and Review

Monitoring of the standards of children's work and of quality of teaching in mathematics is the responsibility of the Headteacher and Governors supported by the Subject Leader.

The work of the Subject Leader also involves supporting colleagues in the teaching of mathematics, being informed about current developments in the subject, and providing a strategic lead and direction for the subject in the school.

The school's governing body is briefed regularly to overview the teaching of numeracy and are invited into school to see current practice.