

Mathematics Policy



The Valley Community School

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Reviewed by: E. Keating A Cragg A Makkan

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Attached committee: Curriculum

The Valley Community School

Our Vision Statement

“A world class centre of outstanding learning”

To achieve this we:

Are embracing the principles of lifelong learning, best use of new technology and “visible learning”

Are developing an international understanding of our place in the world

Are developing leaders and critical thinkers of tomorrow

Are meeting the requirements of the National Curriculum 2014

School Mission Statement

“Together we’re better”

Our guiding principles are:

- We work closely with our community
- We broaden our pupils’ perspectives
- We teach understanding and respect for others
- We value everyone’s abilities and support each other

Our core values:

Acceptance

Fairness

Trust

Equality

Respect

Meeting requirements:

Since September 2014 the school has been meeting the requirements of the National Curriculum (2014) in core specific year groups. All other years have been meeting the requirements of National Curriculum (2014) since September 2015.

Assessment:

Within Mathematics, assessments will focus on mastery of expectations specific to each year group, as exemplified within the National Curriculum and its subsidiary guidance.

The school feels strongly that there is a need to develop both global citizenship and, where possible, teach the fundamental principles of British Citizenship.

This encompasses;

- a sense of fair play
- tolerance
- duty and remembrance
- respect
- values
- ethics
- belonging
- contributing to and supporting all our local communities
- perseverance.

The Valley Community School

Mathematics Policy Guidelines

Mathematics teaches us how to make sense of the world around us through developing a child's ability to calculate, to reason and to solve problems. It enables children to understand and appreciate relationships and patterns in both number and space in their everyday lives. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of mathematics.

The aims of mathematics are:

- to promote enjoyment and enthusiasm for learning through practical activity, exploration and discussion;
- to promote confidence and competence with numbers and the number system;
- to develop the ability to solve problems through decision-making and reasoning in a range of contexts;
- to develop a practical understanding of the ways in which information is gathered and presented;
- to explore features of shape and space, and develop measuring skills in a range of contexts;
- to understand the importance of mathematics in everyday life.

Curriculum Content

Mathematics is a core subject in the National Curriculum. We plan using the revised National Curriculum (2014) and information from White Rose Maths. At the Valley Community School, no one scheme supports our pupils; we are guided by an overarching map that affiliates with the White Rose Learning but this is a guide and not to be followed rigidly at the expense of individualised cohort needs. We believe this guides professional judgement to adapt schemes of work to an agreed degree, (+/-5%) e.g. where an extra 2 or 3 lessons are needed to really secure a concept; at the end of a teaching sequence intellectual teaching freedoms are in place.

As set out in the National Curriculum (2014) we aim to ensure that all children become fluent in the fundamentals of mathematics, are able to reason mathematically and can solve problems by applying their mathematics. At the Valley Community School, these skills are embedded within maths lessons and developed consistently over time. We have a daily lesson which is a mixture of teacher led and collaborative learning and we are committed to developing children's curiosity about the subject. We encourage children to ask as well as answer mathematical questions and we provide opportunities for children to apply their skills and knowledge in a range of different contexts.

The majority of children progress through the curriculum content at the same pace. All children have the opportunity to use a wide range of resources such as number lines, number squares, digit cards and small apparatus to support their work and to foster deep conceptual and procedural knowledge. Children use ICT in mathematics lessons where it will enhance their learning, for instance when modelling ideas and methods. Differentiation is achieved by emphasising deep knowledge and through individual support and intervention. Teachers use precise questioning in class to test conceptual and procedural knowledge and assess children regularly to identify those requiring intervention, so that all children achieve their full potential. We provide high quality pre, mid and post teaching interventions that support children to bridge learning gaps or make progress at an individual level.

We also have a daily Basic Skills lesson which is split between English and Mathematics depending on the cohorts needs.

These basic skills include place value, counting, number bonds, multiplication tables and related facts and telling the time.

Planning

At the Valley School, we have developed a long term strategy for supporting exceptionally high levels of progress and attainment in mathematics. Our driving principles are that:

- the curriculum must be cyclical to allow children to grasp concepts at different times in the year or school life,
- core skills are tracked, known and understood by all, creating a common language,
- design ensures that children have the best possible opportunities to demonstrate learning,
- applied operations and protocols ensure high levels of continuity and consistency,
- children should be encouraged to apply mathematics to problem solving wherever possible,
- rote learning of the basics, such as number bonds and multiplication tables,
- a strong focus on mathematical language,
- home learning that closely matches learning in class.

We carry out the curriculum planning in mathematics in 3 phases – long term, medium term and short term.

It is the class teacher who completes the weekly plans for the teaching of mathematics. These weekly plans list the specific learning objectives for each lesson and give details of how the lessons are to be taught. The class teacher

keeps these individual plans, and the class teacher and subject leader often discuss them for monitoring purposes.

The short term mathematics planning will be planned and hyperlinked to the long term plan. In all classes there are children of differing mathematical ability. We recognise this fact and provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this through a range of strategies – in some lessons through differentiated group work, and in other lessons by organising the children to work in pairs on problem solving. We ensure that work is matched to the needs of individuals. The plans are to be informed by the assessment process and target setting to ensure that areas for development are addressed. The co-ordinator as part of the monitoring and evaluating process will monitor planning. Evaluation should take the form of brief notes aimed at informing future planning.

We teach mathematics in our reception classes. As the classes are part of the Foundation Stage of the National Curriculum, we relate the mathematical aspects of the children's work to the objectives set out, which underpin the curriculum planning for children aged three to five. We give all the children ample opportunity to develop their understanding of number, measurement, pattern, shape and space through varied activities that allow them to enjoy, explore, practise and talk confidently about mathematics, inside and outside.

English

Mathematics contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening. For example, we encourage children to read and interpret problems in order to identify the mathematics involved. The children explain and present their work to others during plenary sessions. Younger children enjoy stories and rhyme that rely on counting and sequencing. Older children encounter mathematical vocabulary, graphs and charts when using non-fiction texts. This reinforcement of key vocabulary is particularly important for children for whom English is a second language.

Information and Communication Technology

Children use and apply mathematics in a variety of ways when solving problems using ICT. Younger children use ICT to communicate results with appropriate mathematical symbols. Older children use it to produce graphs and tables when explaining their results or when creating repeating patterns, such as tessellations. When working on control, children use standard and non-standard measures for distance and angle. They use simulations to identify patterns and relationships. The Interactive White Board is an invaluable tool for interactive learning and reinforcement.

PSHE

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. We present children with real-life situations in their work on the spending of money and financial capability.

Spiritual, moral, social and cultural development

The teaching of mathematics supports the social development of our children through the way we expect them to work with each other in lessons. We group children so that they work together and we give them the chance to discuss their ideas and results.

Special Educational Needs

At our school we teach mathematics to all children, whatever their ability. Mathematics forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our mathematics teaching we provide learning opportunities that enable all pupils to make progress. We do this by setting suitable learning challenges and responding to each child's different needs. Assessment against the National Curriculum allows us to consider each child's attainment and progress against expected levels.

When progress falls significantly outside the expected range, the child may have special educational needs. Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style and differentiation – so that we can take some additional or different action to enable the child to learn more effectively. This ensures that our teaching is matched to the child's needs.

Intervention through Wave planning and School Action Plus will lead to the creation of an Individual Education Plan (IEP) for children with special educational needs. The IEP may include, as appropriate, specific targets relating to mathematics. Wave planning is also written for groups of children who need boosting in a particular area.

We enable pupils to have access to the full range of activities involved in learning mathematics. Where children are to participate in activities outside the classroom, we carry out a risk assessment prior to the activity to ensure that the activity is safe and appropriate for all pupils. Monitoring also takes place to ensure that GDS pupils are stretched and challenged.

Short Term Assessments

These are an informal part of each lesson. They should be jotted down, where necessary, in lesson evaluations. Individuals or groups who have difficulty with particular concepts or skills should be identified and their needs addressed in the plenary session or in a mathematics clinic or intervention. Teachers may also use mental tests or short written tests to check particular points. These short term assessments are closely matched to the teaching objectives.

Less formal assessments form the basis of our assessments internally, as well as formal assessments three times a year.

Medium Term Assessments

These are to review and check progress against the key objectives, identify weaknesses, check the progress of children with IEPs, check against set targets, to inform longer term planning and provide information for end of year assessments. These are formative in nature. They may take the form of group or individual activities or written tasks. It is not necessary or feasible to check and record each pupil's individual progress against every single teaching objective. The children need to be aware of their next steps and progress set against them. As part of our assessment, pupils also have a weekly lesson called Big Maths, where pupils answer timed questions and then go through common errors as a group, identifying their next steps.

Long Term Assessments

These are based on the statutory tests for pupils in years 2 and 6 and PUMA Rising Star assessments for years 1, 3, 4 and 5. Reception and nursery assess against the baseline assessments, key objectives and early learning goals. These results will be analysed to establish weaknesses/issues to be addressed. The information is passed to the next class teacher so that targets can be set for the next school year.

Reporting

1:1 Assertive Mentoring meetings with parents and their child or parents evenings take place in November and February, where the child and parent meet with the teacher. They discuss progress and attainment plus targets for the future. Any behaviour and organisational issues may also be discussed. Parents are given a brief report highlighting these areas.

Progress should also be reported in the school report and recorded on the summative document. Targets for the next year should be identified, recorded and discussed with children and parents when possible.

Timing

An hour of maths in KS2 should be taught each day, and 50 minutes in KS1. There is no set time for mathematics due to other subjects in the timetable; however, if possible, maths lessons should take place in the morning.

Resources

There is a wide range of resources to support the teaching of mathematics across the school. A range of software is available to support work with the computers, including Mathswizz, Ready To Progress and White Rose. Resources in KS2 are stored in the walk in cupboard in Year 6X in Blue Zone and in classrooms. In KS1 resources are kept in each zone. Textbooks are either stored in classrooms or in the resource areas.

Target Your Maths and Power Maths books have been bought to supplement other resources.

Coordinator's Role

This should include the following:

- Policy and scheme preparation and monitoring.
- Advice to colleagues.
- Help with planning.
- Audit and action plan preparation and implementation.
- Leading INSET.
- Co-ordinating resources.
- Involvement in school monitoring procedures for mathematics.

Recording

Each child will have a maths book. These will progress from plain in the early years, with smaller squares being used as children progress through the school. Work not to be recorded will also be done on whiteboards.

How we make suitable adaptations to support the learning of Disadvantaged and Special Needs Pupils

“At The Valley School we adapt the curriculum to make it accessible to all pupils. This involves adapting the curriculum content, methods by which it is taught, teaching sequence or resources. Our highly trained and dedicated staff know that true inclusion does not just happen in core subjects, but throughout the whole curriculum.

Our Inclusion practices include:

- Schemes of work in the short, mid and long-term, with clearly defined milestones and practical objectives exemplified clearly
- Pre-teaching key concepts and language
- Post-teaching to consolidate
- Supporting accessibility by understanding by focusing on key vocabulary
- Using hands on drama, making and the arts, rather than defaulting to reading/written content only
- Using ICT technology, apps, video and computer based technologies where appropriate
- Waves of intervention that focus on Basic Skills and language proficiency that supports wider curriculum accessibility.”

Intent, Implementation and Impact Statement

Intent

- Become fluent in the fundamentals of mathematics.
- Ensure basic knowledge and understanding are over taught to allow pupils to retrieve information from long term memory quickly.
- Arithmetic and basic skills are practised on a regular basis to ensure key mathematical concepts are embedded and links are made.
- Develop conceptual understanding and the ability to recall and apply knowledge rapidly.
- To reason and problem solve by applying mathematics to a variety of increasingly complex problems.
- To think logically and work systematically and accurately.
- To develop resilience that enables all children to reason and problem solve with increased confidence and high self-esteem.
- All children are encouraged and challenged to excel in mathematics at their individual level.

Implementation

- Ensure clarity in basic skills sessions covering for example: place value, counting, number bonds, multiplication tables and related facts and telling the time, focussing on areas we know pupils have difficulty with.
- Daily Maths lessons to develop fluency, reasoning and problem solving for all children.
- The spiral design of the curriculum allows adequate opportunities for practise through systematic instructional approaches.
- Pre, mid and post teaching interventions ensure children are fully supported to access their learning and reasonable adjustments are made for those working below expectations.
- Quality teaching ensures there is appropriate challenge for all learners.
- Concrete manipulatives and pictorial representations are used to support conceptual understanding and to make links across topics.
- Homework consolidates prior learning and systematically rehearses content.
- Children are assessed regularly and adaptations are made to the curriculum accordingly (see RAPS).
- Teaching incorporates our Theories of Action.

Impact

- Engaged children who are all challenged and meeting their full potential.
- Children are able to independently apply their knowledge to a range of increasingly complex problems.
- Children are reasoning with increased confidence and accuracy and can explain their reasoning using appropriate vocabulary.
- Teaching is embracing the principles of lifelong learning, best use of new technology and visible learning.
- Over time, attainment and progress is consistently above and well above national levels.
- Developing leaders and critical thinkers of tomorrow.

Specific steps in mathematical sequencing analysed alongside the Ofsted Research documentation:

'Mastery' pedagogical approaches that have influenced English mathematics education tend to require pupils to demonstrate high levels of achievement before they are moved on to new content. Some mastery approaches place a greater emphasis on problem-solving and on deepening pupils' understanding

- Classified mathematical curriculum content into declarative, procedural and conditional knowledge.

Declarative:

Declarative knowledge is static in nature and consists of facts, formulae, concepts, principles and rules.

Meaning and process:

Procedural knowledge is recalled as a sequence of steps. The category includes methods, algorithms and procedures: everything from long division, ways of setting out calculations in workbooks to the familiar step-by-step approaches to solving quadratic equations.

Conditional:

Conditional knowledge gives pupils the ability to reason and solve problems. Useful combinations of declarative and procedural knowledge are transformed into strategies when pupils learn to match the problem types that they can be used for.

Sequencing involves linking declarative knowledge with procedural knowledge into a reciprocal relationship.

Examples:

Declarative knowledge of number bonds and procedural knowledge of column addition, which both reinforce each other. In terms of curriculum sequencing, pupils are able to retain knowledge and ability to use core methods when teachers take an iterative approach to teaching and rehearsing concepts and core methods

- familiarity with the facts being used helps with learning and understanding the linked method
- familiarity with the method helps to make associated facts firm and precise in the mind

Principles of sequencing:

- Successful curriculum progression is planned from the beginning of a pupil's education through focusing on core content, to develop pupils' motivation and to allow more breadth and depth later.
- The planned curriculum details the core facts, concepts, methods and strategies that give pupils the best chance of developing proficiency in the subject.
- The teaching of linked facts and methods is sequenced to take advantage of the way that knowing facts helps pupils to learn methods and vice versa.

- Sequences of learning allow pupils to access their familiarity with the facts and methods they need in order to learn strategies for solving problem types

High quality maths education must have:

- Teachers engineer the best possible start for pupils by closing the school-entry gap in knowledge of the early mathematical code: facts, concepts, vocabulary and symbols.
- Pupils are taught core facts, formulae and concepts that are useful now and in the next stage of education.
- Teachers help pupils develop their automatic recall of core declarative knowledge, rather than rely on derivation, guesswork or casting around for clues.

Whilst concrete mathematical activities are useful they should not distract from concrete mathematical models:

- Teachers teach younger pupils non-distracting and accurate mathematical methods that encourage them to use recall over derivation.
- Teachers plan to teach older pupils efficient, systematic and accurate mathematical methods that they can use for more complex calculations and in their next stage of learning.
- Teachers help pupils to use these methods to see new connections of number, geometry and time.
- Teachers encourage pupils to use core mathematical methods rather than resort to guesswork, cast around for clues or use unstructured trial and error.

Methods are well known and clear:

Staff have a shared understanding of clear and consistent methods that build up over time

- Teachers teach useful, topic-specific strategies to pupils, as well as how to match them to types of problem.
- Pupils are confident using linked facts and methods that are the building blocks of strategies, before strategies are taught.
- Teachers encourage pupils to use core, systematic strategies rather than resorting to guesswork or unstructured trial and error

High-quality maths education may have the following features:

- New content draws on and makes links with the content that pupils have previously acquired.
- Curriculum progression is by intelligent design rather than by choice or chance.
- Rehearsal sequences align with curriculum sequences.
- Pupils who are more likely to struggle or who are at risk of falling behind are given more time to complete tasks, rather than different tasks or curriculums, so that they can commit core facts and methods to long-term memory

APPENDIX 1: PEDAGOGICAL APPROACHES

How we teach:

- Systematic instructional approaches to engineer success in learning are incorporated into all stages and phases.
- Teachers aim to impart core content in alignment with the detail and sequence of the planned curriculum.
- Teachers help pupils to avoid relying on guesswork or unstructured trial and error.

Consolidation:

Content category	Type 1 practice	Type 2 practice
Declarative	Fact retrieval (recall)	Explaining relationships between facts (derivation and parsing of number)
Procedural	Method rehearsal (exercises)	Explaining principles, proving conceptual understanding (such as, use of informal methods, creating bar models and interpreting context)
Conditional	Strategies rehearsal (collections of problems with the same deep structure)	Describing relationships between the problem and choices of strategy (proof/reasoning)

Other aspects of classroom practice:

- goes beyond immediately answering questions correctly.
- involve overlearning.
- aligns with the detail and sequence of the curriculum.
- is free from distraction and disruption.
- strikes a balance between type 1 and type 2 practices.
- avoids creating a reliance on outsourced memory aids or physical resources.
- helps pupils to avoid relying on guesswork, casting around for clues or the use of unstructured trial and error.
- Is heavily focussed on language development.
- Shares common systems, coding and assessment protocols

Assessment:

- Pupils are well prepared for assessments through having learned all the facts, methods and strategies that are likely to be tested.
- Teachers plan frequent, low-stakes testing to help pupils to remember content. Such as Big maths, tables tests, entry tests, pre assessment, practical application times
- Lessons incorporate timed testing to help pupils learn maths facts to automaticity.(see above)

PUMA and Big Maths assessment and testing is our preferred choice of a summative tool to inform:

- Quality first teaching
- Whole cohort achievement plans
- Intervention and support systems
- 1:1 support
- Tutoring and additional gaps in learning support