Mathematics

1 Aims and objectives

1.1 The aims of mathematics are:

- To become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- To reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- To solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

2 Teaching and learning style

2.1 We use a variety of teaching and learning styles in daily mathematics lessons including: whole-class and direct-group teaching, individual practice, paired investigation work, games playing and problem solving activities. Our principle aims are; to develop children's confidence, knowledge, skills, understanding and enjoyment in mathematics. During lessons we encourage children to describe and explain their thinking using an increasingly complex range of mathematical vocabulary. A wide range of resources to support work and understanding are available for all lessons - Numicon number and calculation materials (OUP), diennes place value apparatus, place value cards, number lines, multiplication grids, digit cards, measuring equipment, models of shapes and small apparatus. Children use ICT in the form of apps on ipads for tables practice, websites such as nrich to explore examples of problems and investigations and calculators to explore number and place value. Teachers use ICT in the form of the IWB to model knowledge and skills.

2.2 In classes there are children of differing year groups, attainment and confidence levels. In order to ensure that all children achieve their full capabilities we are currently exploring how to teach using the Mastery approach. This method aims to develop learning with a focus on a deeper understanding of concepts using small steps of learning shared by everyone. These can then be applied to an increasingly complex range of contexts to develop reasoning and problem solving skills. To build on this, we are developing the use of the Bar method to represent and visualize a problem in order to answer it efficiently using a chosen calculation method.

2.3 Each class has a very experienced full-time Teaching Assistant to support with general lesson work. There are also currently two extra part-time teachers, and four part- or full-time Teaching Assistants to provide support for individual needs as reviewed and required. There is a voluntary mathematics counsellor in Key Stage 2 to support individual children with review and extension work.

3 Mathematics curriculum planning

3.1 Mathematics is a core subject in the National Curriculum. Our school has developed its own long, medium and short-term planning by linking the national framework to our chosen published schemes - Cambridge Mathematics Direct (CUP), Numicon (OUP) and Hamilton.

3.2 We have implemented long term plans for each year group which outline the balance and progression of all the National Curriculum programmes of study and relate them to the relevant strands of the published schemes, as well as supplimentary materials.

3.3 Our medium-term plans give a summary for each term of the daily lesson titles from the published schemes and therefore define what areas we teach on a weekly basis. They ensure an appropriate balance and distribution of all aspects of maths from place value and calculation to measures, data, shape and space across each term.

3.4 The class teacher also devises their weekly plans using the published schemes. These list the specific learning objectives for each lesson and give details of how the lessons are to be taught including teaching and pupil activities, materials to be used and adult support.

4 The Foundation Stage

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

5 Contribution of mathematics to teaching in other curriculum areas

5.1 English
Mathematics contributes significantly to the teaching of English by actively promoting the skills of reading as children read and interpret problems in order to identify the mathematics involved, and analyse graphs and tables in non-fiction texts. Speaking and listening are used to describe and explain thinking and methods of working. Younger children use rhyme and stories to develop mathematical understanding and skills. In all aspects of teaching and learning the correct use of mathematical vocabulary is expected.

5.2 Science
Science investigations involve a considerable amount of measuring and recording of data, as well as interpreting results to allow conclusions to be drawn.

5.3 DT
Designing and constructing models requires an understanding of 2D and 3D shape, as well as accurate measuring.

5.4 PSHE
Problem solving and investigation work encourages children to work together and respect other's views. Work given to be completed outside lessons encourages independent study and a sense of responsibility for their own learning. Units of work on spending money allow them to relate their work to real-life situations.

5.5 Art
Exploring patterns, shapes and positions is an essential part of all art work, and studying styles of work that have a mathematical composition adds an extra dimension to understanding the relationship between maths and art.

5.6 Geography
The skills and understanding involved in measurement of distance, direction and movement are explored through map use. Data collection and analysis are used to answer geographical enquiries.

5.7 History
Units of time and the measurement of time passing are explored through the identification of historical periods using timelines. Studies of ancient civilizations allow the children to explore other number systems and relate them to our own and its origins.

6 Teaching mathematics to children with special needs

6.1 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 individual needs.

6.2 When progress falls significantly outside the expected range, the child may have special needs. Our assessment process looks at a range of factors – classroom organization, teaching materials, teaching style, 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.

6.3 Intervention will lead to the creation of an Individual Pupil Profile for children with special educational needs. The IPP may include, as appropriate, specific targets relating to mathematics.

6.4 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 the activity is safe and appropriate for all children.

7 Teaching More able pupils

7.1 More able children are taught with their own year group and stretched through differentiated work and extra challenges to deepen the application of their understanding.

8 Equality

8.1 All children have an entitlement to the fullest possible experiences, regardless of race, gender, faith and particular learning requirements.

9 Spiritual, Moral, Social and Cultural development

9.1 Developing deep thinking and questioning about the way the world works promotes spiritual growth. The study of mathematics was created to make more sense of the world around us and children are able to experience the awe and wonder of it through connections to science, the arts and nature.

9.2 Problem solving and reasoning involve creative thinking, discussion, explanation and the presentation of ideas. Self- and peer reviewing, which enables pupils to have an accurate grasp of where they are and how they need to improve, involves valuing others opinions and ideas.

10 Assessment and recording

10.1 We assess children's work in mathematics from three perspectives - long-term, medium-term and short-term. We make long-term assessments towards the end of the year using a combination of; formative assessments (Headstart materials), summative assessments (Puma materials) for Years 1, 3, 4 and 5 and statutory assessments for Years 2 and 6. We also use this data to make a summary of each child's progress against emerging, developing, expected or greater depth levels of attainment before reporting this to parents as part of our annual reports.

10.2 Medium-term assessments are made three times a year, again using a combination of; formative (Headstart), and summative (Puma) assessments for Years 1 to 6. The assessment results are recorded on the school's Research Machine Integris system, School KPI (Key Performance Indicator). The subject leader scrutinizes these results with all staff each term, to identify; future targets for individual children as well as support for those who fall

outside of the expected levels for their age-group. An analysis of these results is also presented to the Teaching and Learning governor subcommittee on a termly basis.

10.3 Teachers make short term assessments on a daily and weekly basis using individual achievement of lesson objectives and pupil/peer assessment to inform future plans and next steps.

10.4 The mathematics subject leader scrutinises books from each year group to moderate attainment and progress and keeps examples at the end of the year from Years 1 to 6 from the following groups; attainment, SEN, Pupil Premium, English as an additional language.

10.5 Staff are widening the regular use of problem solving activities in all classes to monitor progress in pupils using and applying skills, reasoning and developing the use of mathematical dialogue.

10.6 Pupils have End of Year Expectation targets to monitor progress in skills and understanding. These are updated termly after each assessment week by class teachers.

11 Resources

11.1 There are a range of resources to support the teaching of mathematics across the school. All classrooms have appropriate small apparatus for teaching place value, number and calculation and an Interactive Whiteboard. There is a central store of other larger equipment for teaching measures, shape and space. RM Easimaths is used across the school to provide extra support for identified individual needs. Mangahigh Maths for individual support and practice is being trialed from September 17 in Years 5 and 6. The subject leader has an annual budget which is used to provide new resources as identified from the annual audit.

12 Monitoring and review

12.1 Monitoring of the standards of children's work and the quality of teaching in mathematics is the responsibility of the subject leader. The head teacher allocates management time to the subject leader so that he/she can; scrutinize planning and pupils' books, moderate attainment using work samples, undertake pupil interviews and lesson observations in order to make informed judgements on standards and monitor pupil progress. These findings, along with termly assessment analysis, are reported regularly to the head teacher and governors.

12.2 The work of the subject leader also involves supporting colleagues in the teaching of mathematics by; providing a strategic lead and direction for the subject in the school, identifying and promoting relevant training, informing them of current developments in the subject, being part of the local Abingdon Maths partnership group to share best practice and moderation outcomes.