Carden Primary School

Policy for Mathematics

May 2016

Introduction

At Carden we value every pupil and the contribution they have to make. As a result we aim to ensure that every child achieves success and that all are enabled to develop their knowledge and skills in accordance with their level of ability.

Rationale

Mathematics equips pupils with a uniquely powerful set of tools to understand and change the world. These include: logical reasoning, problem solving skills and the ability to think in abstract ways. Mathematics is a creative and highly interconnected discipline which is essential to everyday life. With this in mind we endeavour to ensure that children develop a positive and enthusiastic attitude towards mathematics that will remain the case into adulthood.

The National Curriculum for mathematics (2014) describes in detail what pupils must learn in each year group. Combined with our Calculations Policy, this ensures continuity, progression and high expectations for attainment in mathematics.

It is vital that a positive attitude towards mathematics is encouraged amongst all of our pupils in order to foster confidence and achievement in an essential skill. At Carden we use the National Curriculum for Mathematics (2014) as the basis of our mathematics programme. We are committed to ensuring that all pupils achieve mastery in the key concepts of mathematics, appropriate for their age group, in order that they make genuine progress and avoid gaps in in their understanding that provide barriers to learning as they move through their education. Assessment for Learning, an emphasis on investigation, problem solving, the development of mathematical thinking and development of teacher subject knowledge are therefore essential components of the Carden approach to this subject.

Aims

- To foster a positive attitude to mathematics as an interesting and attractive part of the curriculum
- To develop the ability to think clearly and logically, with confidence, flexibility and independence of thought
- To develop a deeper understanding of mathematics through a process of enquiry and investigation
- To develop an understanding of the connectivity of patterns and relationship within mathematics
- To develop the ability to apply knowledge, skills and ideas in real life contexts outside the classroom and become aware of the uses of mathematics in the wider world
- To develop the ability to use mathematics as a means of communicating ideas

- To develop an ability and inclination to work both alone and co-operatively to solve mathematical problems
- To develop personal qualities such as perseverance, independent thinking, co-operation and self-confidence through a sense of achievement and success
- To develop an appreciation of the creative aspects of mathematics and an awareness of its aesthetic appeal

The expectation is that the majority of the pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage. Pupils who grasp concepts readily should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.

Principles of Teaching and Learning

The school uses a variety of teaching and learning styles during each mathematics lesson.

Our teachers strive to:

- Build children's confidence and self-esteem
- Develop children's independence
- Allow all children to experience regular success
- Contextualise mathematics
- Use practical approaches to mathematics (concrete and pictorial)
- Encourage children to select independently resources to help them
- Challenge children of all abilities
- Encourage children to enjoy mathematics
- Develop a child's understanding of mathematical language
- Allow children to ask questions as well as answer them

Our learners should:

- Have a well-developed sense of the size of a number and where it fits into the number system (place value)
- Know by heart number facts such as number bonds, multiplication tables, doubles and halves
- Use what they know by heart to figure our numbers mentally
- Calculate accurately and efficiently, both mentally and in writing
- Draw on a range of calculations strategies
- Recognise when it is appropriate to use a calculator and be able to do so effectively

- Make sense of number problems, including non-routine 'real' problems and identify the operations needed to solve them
- Explain their methods and reasoning, using correct mathematical terms
- Judge whether their answers are reasonable and have strategies for checking them where necessary
- Suggest suitable units for measuring and make sensible estimates of measurements
- Explain and make predictions from the numbers in graphs, diagrams, charts and tables
- Develop special awareness and an understanding of the properties of 2D and 3D shapes

Planning

Planning begins from a thorough understanding of children's needs gleaned through effective and rigorous assessment and tracking, combined with high expectations and ambition for all children to achieve. Medium term planning will outline the areas of mathematics that will be taught during the term to ensure coverage of the National Curriculum.

Within short term planning, clear success criteria for each learning objective should be created – demonstrating the progression needed to reach and exceed the objective. This will enable the class teacher to follow a clear and systematic teaching sequence, where input and activities are differentiated by considering which parts of the success criteria individual children are ready for.

Occasionally, where children are working **significantly** below or above the objective the majority of the class need to work towards, and where extending this by expanding the success criteria seems inappropriate, objectives from higher or lower age-group may be planned and taught.

Planning where possible, should involve real-life contexts for mathematics, where children are problem solving with a purpose in mind. There should be a whole class investigation at least once per planning block to practice different elements of problem solving, including: finding all the possibilities, logic problems, finding rules and describing patterns, diagrams/visual problems and exploring different aspects of number. These investigations should hone in on specific problem solving skills that are transferable to other contexts.

Class teachers should regularly plan for opportunities for children to apply their maths skills to different problems within maths lessons and across the curriculum. This will also allow learners to revisit, practice and consolidate different areas of mathematics and apply them within different contexts.

When planning across the curriculum, questions should be used within titles of units of work and lessons, to initiate an 'enquiry' approach. Skills of problem solving can then be taught with consistency.

Teaching

In the Early Years Foundation Stage, children are frequently given the opportunity to develop their understanding of number, measurements, pattern, shape and space through a combination of short, formal teaching as well as a range of planned structured play situations where there is plenty of scope for exploration. Children will become very competent 'counters' so that their fluency with the number system provides a foundation for mathematical understanding. Counting forwards and backwards in many different sized steps as well as from different starting and ending points is essential.

Mathematical learning builds from a concrete understanding of concepts where children are manipulating objects. When learners are able to see concepts this way, they then need to understand the same concepts represented pictorially. Children are then ready for abstract representation before being able to apply their knowledge to different situations. Children should be encouraged at all times to communicate their understanding of mathematics so that it clarifies their thoughts.

Learners' mental mathematics is of great importance, with number bonds, multiplication tables facts and various strategies for calculation taught and practiced at school with support sought from parents through homework activities. A progression towards efficient written calculations should be developed and applied consistently in each year group. The school Calculations Policy should be followed.

Though the nature of lessons will be very different depending on the needs of the class, children should be: active, practising skills they haven't yet mastered, learning something new or learning to apply their knowledge to a different context. They should be: 'doing' very quickly, working at a good pace and being productive, sharing their thoughts and methods and being successful.

When teaching problem solving skills across the curriculum, time (and sometimes whole lessons) should be given to each aspect of problem solving ensuring that children get thorough practice at: preparing for problem solving, thinking through problems to establish what they know and don't know so far, actually doing the problem solving effectively AND communicating the answer effectively. They should evaluate the process too. Over time, children will improve at each aspect.

Questioning is the key to success in all mathematics sessions. Regular CPD sessions and discussion are held to discuss effective questioning. Teachers and Teaching Assistants are expected to continuously adapt questions based on assessment for learning.

Use of teaching assistant support is planned for in every part of the mathematics lesson to ensure that they are used effectively in supporting, developing and assessing learners' progress throughout. At Carden, we value the impact that TA support has on all our children's learning and our TAs are involved in planning through regular meetings with the teachers. Regular training sessions are given to keep them fully updated and develop their skills further. They are encouraged to share assessment observations made in mini-plenaries, final plenaries and through discussions with teaching staff to have a shared impact on children's progression.

Assessment

Assessment for learning should occur throughout the entire mathematics lesson, enabling teachers/teaching assistants to adapt their teaching/input to meet the learners' needs. This feedback should be incisive and regular. On a daily basis children should self-assess against the learning objective and success criteria, giving them a sense of success. Children should know when they are meeting their targets and be self-assessing against those as well.

Pupils' work should be marked in line with the Marking Policy and should model how corrections should be made, giving children a chance to learn from their misconceptions or incorrect methods. Future lesson design should depend on class, group and individual success evaluated through marking and observations made during the lesson.

Assessment of pupil work and progress is ongoing by the class teacher and informs future planning. Teachers mark work in mathematics in line with the school marking policy. Teachers use the school electronic tracking system to monitor children's progress in mathematics, gathering evidence over the course of the year. They use this information to inform planning for groups and individual pupils. Teachers also make summative assessments at least once per half term in order to provide further understanding of where the child is working at and to inform a more rounded judgement of their abilities. Tracking is also used to ensure that learners who are not making sufficient progress over time are targeted for additional support. This may entail additional support within whole class teaching or further intervention.

Display and Resources

Each classroom must have a working wall dedicated to mathematics. There is also an expectation that at least one year group display per term is dedicated to mathematics. There should also be, either on display or easily accessible to children, level appropriate resources, particularly concrete and pictorial to support children to grasp concepts. Mathematical vocabulary should also be displayed so that children are able to use this in communication of their understanding. Displaying mathematics prominently also helps

encourage a positive attitude and enthusiasm towards mathematics for all groups of children.

Information and Communication Technology

Calculators should not be used as a substitute for good written and mental arithmetic. They should therefore only be introduced near the end of Key Stage 2 to support learners' conceptual understanding and exploration of more complex number problems, if written and mental arithmetic are secure. Teachers should use their judgements about when ICT tools should be used.

Spoken Language

The National Curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils' build secure foundations by using discussion to probe and remedy their misconceptions.

Intervention

At Carden we provide children who are not making good progress with extra support through intervention. Interventions in mathematics are based on developing key number skills that are appropriate for the children involved. These may involve participation in a structured programme such as Numbers' Count, First Class at Number or Success at Arithmetic or less formal sessions with a teacher or teaching assistant – pre-teaching a new concept for example.

Interventions are tightly planned, with success criteria set and frequent assessments to ensure progress is being made. Whilst interventions could be carried out by teaching assistants, what is being taught and how it is delivered remains the class teacher's responsibility and communication is essential. We identify from tracking any gender issues that exist and plan initiatives that address these as part of pupil progress review meetings. During these meetings we also examine the progress of ability groups, those with English as an additional language, vulnerable learners and those with a Special Educational Need.

Monitoring

Children's progress is monitored during four weekly Achievement Team and termly Pupil Progress meetings. Additionally, the subject leader and SLT evaluate further evidence each term to ensure children are making progress. This monitoring occurs through

examination of work in books, learner voice interviews, analysis of assessment information and via other means depending on what information needs to be gleaned.

Following monitoring activities, feedback is given to staff about strengthening practice and CPD (professional development) opportunities. Where specific initiatives have been put in place through action planning for school development, these are monitored by the subject leader in order to evaluate their impact. Findings are reported to the head teacher and governors through the Subject Leaders' Report and Action Plan.

Parental Engagement and Homework

We recognised that parents make a significant difference to children's progress and actively seek to encourage this partnership working with the school. All children are set homework for mathematics, the main purpose of which is to develop speaking and listening at home, give additional time for practice and consolidation and allow children to discuss mathematical concepts with their families and friends in a familiar context.

Monitoring and Reviewing

The monitoring of the standards of learners' work and the quality of learning and teaching in mathematics is the shared responsibility of the Extended Leadership Team, Senior Leadership Team and 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. A named member of the school governing body is briefed to overview the teaching of mathematics in the school.

Other documents to be read in conjunction with this mathematics policy:

Marking and Assessment Policy

National Curriculum 2014

Calculations Policy

SEND Policy and Single Equality Scheme

Teaching and Learning Policy