CASTILION PRIMARY SCHOOL

Engage, Enthuse, Empower

Amadeus Primary Academies Trust

Limitless Learning Together

Reviewed	Agreed by Staff	Review Date	Committee responsible for review
September 2020	September 2020	When necessary	Learning and Achievement

MATHEMATICS POLICY

'Mathematics is a creative and highly interconnected 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 for 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 National Curriculum 2014

At Castilion Primary School we want to encourage everyone to grow in confidence within mathematics to achieve their full potential. We wish to give our children fluency in skills to be able to apply these to any problem so that they are ready to tackle any situation which they may face.

Mathematics teaches children how to make sense of the world around them through developing their ability to use number, calculate, reason and solve problems. It helps children to understand relationships and patterns in both number and space in their everyday lives. The Mathematics curriculum should be bold, provide breadth and balance and be relevant and differentiated to suit the needs of all children in the modern world. It should be flexible, motivating all pupils, thus encouraging success at all levels.

At Castilion Primary School, we aim to ensure that all pupils:

- 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

- **reason mathematically** by following a line of enquiry, recognising relationships, making generalisations and developing an argument, justification or proof using mathematical language

- can **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

We aim to place problem solving and investigative skills at the heart of our mathematics teaching. We recognise that collaboration and communication are crucial life skills and should be developed in our mathematics teaching.

Purpose of mathematics in our school is to develop

- ❖ a positive attitude towards mathematics and an awareness of the relevance of mathematics in the real world.

- ❖ competence and confidence in mathematical knowledge, concepts and skills.

- an appreciation of mathematical pattern and the ability to identify relationships.
- an ability to solve problems, to reason, to think clearly and logically with confidence and to work systematically and accurately.
- initiative and an ability to work both independently and in cooperation with others.
- an ability to communicate mathematics verbally and in written form.
- an ability to use and apply mathematics across the curriculum and in real life.
- an understanding of mathematics through a process of enquiry and experiment.

Our pupils should:

- have a well-developed sense of the size of a number and where it fits into the number system
- know by heart number facts such as number bonds, multiplication tables, doubles and halves
- calculate accurately and efficiently, both mentally and in writing and paper, drawing on a range of calculation 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 in oral and written form
- 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 spatial awareness and an understanding of the properties of 2d and 3d shapes

Implementation of Maths Policy

Foundation Stage

Our Foundation Stage teachers use the Early Years Curriculum to support their teaching of Mathematics. The children have the opportunity to talk and communicate in a widening range of situations and to practise and extend their range of vocabulary and mathematical skills. The children explore, enjoy, learn about and use Mathematics in a range of personalised situations. Mathematics is planned on a weekly basis and assessed using the criteria from Development Matters. Mathematics is taught both as a discrete subject and within the whole Early Years Curriculum as part of continuous provision to give children opportunities to use their mathematical skills in real life situations. Daily counting, songs and rhymes form part of our daily routines. There is a number focus session, differentiated four ways taught weekly, alongside differentiated maths adult led activities and continuous provision. There is also a weekly SSM input with follow up activities. Within our daily continuous provision there are lots of opportunities for children to explore, develop and consolidate their mathematical understanding. This is based around topics, often based on books, or to support the development of particular areas identified. Tapestry holds information from nursery to reception. Evidence of children's progress is gathered through photographs, pictures and recordings of their mathematical play, as well as formal examples of adult led maths tasks.

The National Curriculum for Mathematics (Programmes of Study)

Teachers plan according to the New National Curriculum Programme of study and the Primary Mathematics Framework. Teachers use this guidance for their year group to produce planned units of work outlining objectives to be covered and expected outcomes for each lesson.

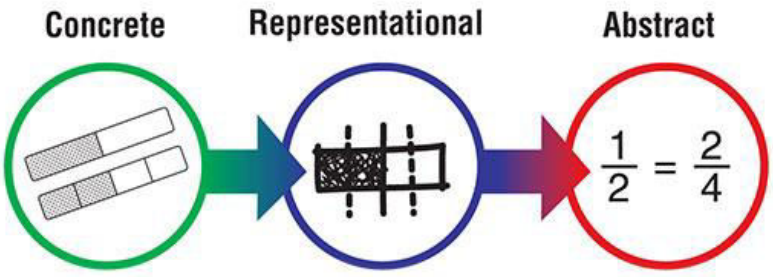
The National Curriculum sets out the statutory entitlement to learning for all pupils in each Key Stage. The programmes of study set out what children should be taught.

KS1	▪ Number (Place Value, Calculations and Fractions) ▪ Measurements ▪ Geometry (Properties of Shapes and Position and Direction) ▪ Statistics (Year 2)
Lower KS2	▪ Number (Place Value, Calculations and Fractions) ▪ Measurements ▪ Geometry (Properties of Shapes and Position and Direction) ▪ Statistics
Upper KS2	▪ Number (Place Value, Calculations and Fractions) ▪ Measurements ▪ Geometry (Properties of Shapes and Position and Direction) ▪ Statistics ▪ Ratio and Proportions ▪ Algebra

There is a balance of ***fluency, reasoning*** and ***problem solving*** within math lessons based on the principles of mastery. The short term planning is done weekly, listing the specific learning objectives that are to be covered in each year group class for each lesson that week. From Spring 2017, children are taught in their classes, with children being taught against the age appropriate Stage, unless the children are identified as SEN. Teaching and learning is differentiated to best match the needs of the class and the individuals within it using concrete, pictorial and abstract representations.

Concrete – Pictoral – Abstract (CPA)

When new concepts are to be introduced, all three approaches to learning should be used. Jerome Bruner reminds us that these three representations are needed for pupils to learn and he notes how these are not age-dependent.



All three concepts do not need to be evident in all lessons; however, when new concepts are introduced, the children need an opportunity to explore this using concrete manipulatives first, then use pictorial representations before exploring this as the abstract, no matter what year group they are in. This then builds solid foundations for them to work from.

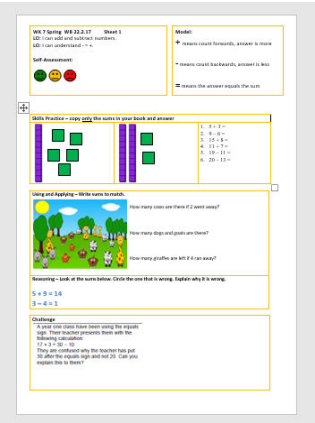
Maths is taught daily in KS1 and KS2. Within each half term there is a balance of number and 'topic' focus to cover the objectives from Measures, Geometry and Statistics.

Teaching Approaches

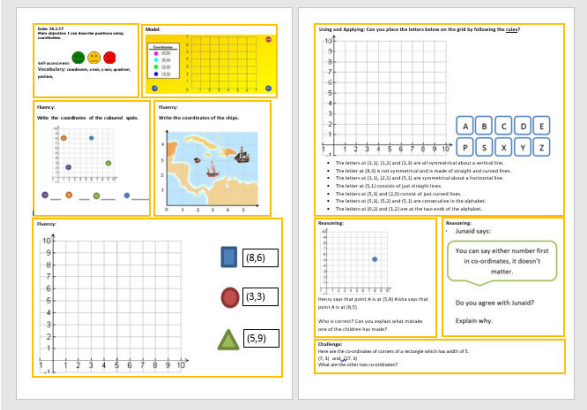
Teachers use a range of teaching strategies to engage the children in maths and ensure progress is made by all children within a class; no set formula is used. A week's maths lessons would include:

- Regular counting both within and outside a maths lesson.
- Learn its (based on Big Maths structure) and fact families
- Mental/oral starter
- New Learning - Both teaching input and pupil activities
- A balance between whole class, guided grouped and independent work, (groups, pairs and individual work
- Modelling with an adult
- Effectively differentiated activities/objectives and appropriate challenge.
- Embedded reasoning and problem solving using a range of resources such as STOPS, enrich, White Rose Hub, NCETM resources.
- Plenary and self-assessment
- Maths facts (following a set structure) sent home for children to learn and tested weekly. Children move onto the next set of facts within the structure once they have mastered them for 2-3 weeks.
- Early morning work (EMW) set twice weekly to support pre- and post-assessments of identified areas.

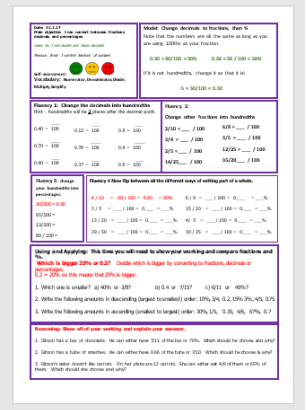
In KS1 and KS2, maths teaching sequence worksheets are being used. These are differentiated as appropriate and where possible children self-select their own level. There is a balance of fluency, problem solving and reasoning and will often include a challenge. These worksheets are trimmed and stuck in the children's maths books on the left hand side, with the children working on the right hand side. Teaching is not 'worksheet' led – the worksheet outlines the task: the use of the brain and practical activity are key! Children should indicate what section of the page they are working on by writing a title or code (e.g. F for fluency). Each of these sheets may take a day or up to 3 days depending on where in the teaching cycle the class is. Sometimes the focus for the session is new learning, at other times pupils may be practising, to master the application of a concept they have learned earlier. The focus of the session may vary for different children depending on their learning needs.



Year 1



Year 4



Year 6

The focus on the development of pupil's spoken language is a crucial element in every mathematics lesson. In order to become able mathematicians, children need to develop the ability to discuss and justify mathematical strategies and concepts in both verbal and written form. Children need to be able to communicate and explain their reasoning as well as use the correct mathematical vocabulary appropriately. Teachers summarise and define key mathematical vocabulary to be used within the lesson to promote mathematical development. Teachers are expected to model and promote the use of mathematical vocabulary, thus allowing pupils to develop their own mathematical vocabulary and reasoning skills. Pupils should be able to read and spell mathematical vocabulary, at a level consistent with their word reading and spelling knowledge.

'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 misconception.' **The National Curriculum 2014.**

Calculation Policy

Please refer to our Calculation Policy.

Target Setting

Teachers set targets for each class based on 'must', 'should', 'could' basis for a block of maths objectives, which allow children to focus on a key concept identified. These targets are on display on the maths working walls within each class. In EYFS these targets are presented as whole class targets, differentiated for the needs of individual groups of children.

Assessment

Formative Assessment

Teachers integrate the use of formative assessment strategies such as effective questioning, clear learning objectives, the use of success criteria and effective feedback and response in their teaching. Within each lesson

Summative Assessment

Using half termly tests, pupils are assessed against the relevant NC objectives every half term. The school's progress tracking system (Classroom Monitor) is updated regularly. Progress meetings are held on a half term basis – refer to the Assessment Policy.
End of year tests are used at the end of KS1 and 2; teachers use past and sample papers to inform their assessments as they prepare pupils for these assessments.

All assessments and teaching informs teachers understanding of a child's ability in maths and this is recorded on Classroom Monitor.

Marking

Please refer to our school' Effective Feedback and Marking Policy.

Next Step Learning - NSLs are used as appropriate to develop children's understanding and consolidate their learning.

The school's Assessment and Marking Policies inform high quality feedback and pupils' response to it in Mathematics.

Cross curricular

Opportunities are used to draw mathematical experiences out of a range of activities in other subjects, such as in PE, Science and Geography, to enable children to apply and use Mathematics in both real life and academic contexts and make links.

Homework

- Mathematics homework is set for children in Years R-6 each fortnight.
- Homework provides opportunities for children to: practise and consolidate their skills and knowledge; develop and extend their techniques and strategies; and prepare for their future learning.
- Homework should include fluency, problem solving and reasoning elements to reflect the class practice.

- Homework must have examples of methods and working to support children and parents at home.
- Homework activities are varied, interesting and fun so that the children are motivated; the tasks compliment the area of Mathematics being taught that week.

Inclusion

All children receive quality first literacy teaching on a daily basis and activities are differentiated accordingly. Where identified, some pupils are considered to require targeted support to enable them to work to age appropriate objectives through Narrow the Gap (NtG) time. This should be clearly identified in the children's book. Intervention strategies are mentioned on Personal Learning Plan's and discussed with parents. Able pupils are planned for in line with our policy for teaching more able pupils. The needs of children with English as an additional language will be met through planning and support. This is supported by our EAL Policy.

Signed: Head Teacher Date:

Signed: Chair of Governors Date:

Appendix

In school resources – Each class has a stock of maths resources, additional centrally held resources can be found in the staff room cupboard and in the Year 3 area.
Useful resources for problem solving and reasoning are:

- Convince Me cards
- Scholastic problem solving resources
- Keen Kite – Everyday Problem solving
- Maths comprehension cards
- Maths challenge cards
- Problem solving boxes

Useful Websites

- STOPS problem solving
- Maths Map
- Nrich
- Ncetm
- White Rose Hub
- Maths Passport
- Mathematics Shed