The St Mary's Primary Maths Curriculum

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Author:	Pauline Orchard	Approver:	Name
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The St Mary's Primary Mathematics Curriculum

INTENT

WHY do we teach Mathematics at St Mary's?

"Pure Mathematics is, in its way, the poetry of logical ideas." – Albert Einstein

Believe + Enjoy + Achieve = Everything Is Possible

Mathematics is an important creative discipline that helps us to understand and change the world. We want all pupils at St Mary's Broughton Gifford to experience the beauty, power and enjoyment of mathematics and develop a sense of curiosity about the subject.

At St Mary's, we foster positive 'can do' attitudes, actively believe *all* children can achieve in mathematics, and teach for secure and deep understanding of mathematical concepts. We use mistakes and misconceptions as an essential part of learning and provide challenge through rich and sophisticated problems before acceleration through new content.

It is our intent that by the time a child leaves St Mary's they will have…

- Become **fluent in the fundamentals of mathematics** (see Breadth of Study progression) so that they develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Solve problems** by applying their mathematics to a variety of problems with increasing sophistication, including in unfamiliar contexts and to model real-life scenarios
- **Reason mathematically** by following a line of enquiry and develop and present a justification, argument or proof using mathematical language.
- Have an **appreciation of number and number operations**, which enables mental calculations and written procedures to be performed efficiently, fluently and accurately to be successful in mathematics.
- **Secure and deep understanding** of Mathematical concepts

The essential idea behind teaching of Maths at St Mary's Broughton Gifford is that all children need a secure and deep understanding of the mathematical concepts they are learning so that:

• Future mathematical learning is **built on solid foundations**, which do not need to be re-taught;

• There is **no need for separate catch-up programmes** due to some children falling behind;

• Children who, under other teaching approaches, can often fall a long way behind, are better able to keep up with their peers, so that **gaps in attainment are narrowed while the attainment of all is raised.**

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At St Mary's Broughton Gifford, we view this as a set of core principles and beliefs. This includes a belief that all pupils are capable of understanding and doing mathematics, given sufficient time. Pupils are neither 'born with the maths gene' nor 'just no good at maths'. With good teaching, appropriate resources, effort and a 'can do' attitude all children can achieve in and enjoy mathematics. Integral to **mastery** of the curriculum is the development of deep rather than superficial conceptual understanding. The research for the review of the National Curriculum showed that it should focus on "fewer things in greater depth", in secure learning which persists, rather than relentless, over-rapid progression.

We feel **secure and deep understanding of the mathematics curriculum** requires that all pupils:

- *Use mathematical concepts, facts and procedures appropriately, flexibly and fluently;*
- *Recall key number facts with speed and accuracy and use them to calculate and work out unknown facts;*
- *Have sufficient depth of knowledge and understanding to reason and explain mathematical concepts and procedures and use them to solve a variety of problems.*

To support this, we believe **that if a pupil has mastered a mathematical concept,** idea or technique he or she can:

- *Describe it in his or her own words;*
- *Represent it in a variety of ways (e.g. using concrete materials, pictures and symbols)*
- *Explain it to someone else;*
- *Make up his or her own examples (and no examples) of it;*
- *See connections between it and other facts or ideas;*
- *Recognise it in new situations and contexts;*
- *Make use of it in various ways, including in new situations.*

Implementation

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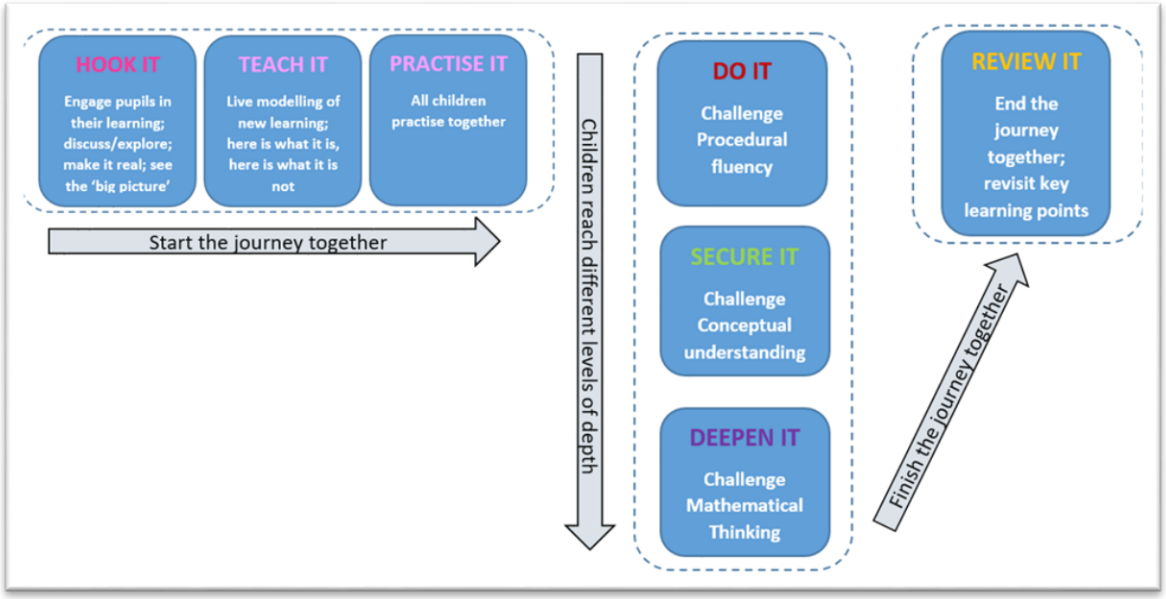
HOW do we teach Mathematics at St Mary's?

1) Mathematics Lesson: Intelligent Practice

Each day, classes take part in **Maths Lessons** (40-45mins) which focus on one manageable step, taken from a thorough and well-considered long and medium term planning document, which ensures sufficient, progressive and deep coverage of all curriculum objectives. Unit planning is based on the National Curriculum Statements ('Themes') dividing materials into manageable steps lesson by lesson.

Typical Maths Lesson Design:



Whilst this is the 'typical' lesson design, we also recognise the need for flexibility in planning to allow teachers to approach different concepts in different ways according to the complexity of the subject and age of the children. Here are some examples of how it may be adapted:

- Rather than a lesson including a Do It, Twist It, Solve It section, these may be tackled over several lessons to allow for more time to be given to each section. For example, a class might have a Do It Day, a Twist It Day and a Solve It Day

- Whilst transitioning from Foundation Stage to Year 1 in the Autumn terms, teaching of Mathematics takes on a less formal lesson design, focusing on using manipulatives, learning through exploration and play and discussion-based learning, with evidence coming as part of teachers' observations, photo evidence and other recordings, transitioning towards more formal recordings in books in the Spring term. However, the language of Do It, Twist It and Solve It will be introduced and used from the beginning of Year 1 alongside this approach.

2) Maths Meetings: Deliberate Practice

At St Mary's Broughton Gifford, we make time every day for children to take part in Maths Meetings (20 minutes). This is specifically timetabled beyond the Maths Lessons to support deliberate practice, consolidation, pre-teach and/or provide immediate intervention. This time to revisit previously learned concepts, knowledge and procedures ensures that, once learned, mathematical knowledge becomes deeply embedded in pupils' memories.

Example Weekly Overview:

- *Monday: Arithmetic Practice (past and present skills)*
- *Tuesday: Arithmetic Practice (past and present skills)*
- *Wednesday: Deliberate Practice and/or Same Day/Week 'Preventing the Gap' Intervention*
- *Thursday: Deliberate Practice and/or Same Day/Week 'Preventing the Gap' Intervention*
- *Friday: Fact Friday (Y1 Bonds; Y2 Muplication and Division Facts 2, 5, 10; KS2 Multiplication and Division Facts)*

However, teachers are encouraged to routinely adapt these sessions based on the arising needs of the children in their class, using both their formative and summative assessments to help inform this. For example, there may have been gaps in children's learning from previous weeks we need further practise as gleaned from an end of term assessment, or a teacher may have identified a gap in children's understanding at the beginning of the week which needs to be addressed immediately. As with the Maths Lessons, there is flexibility for teachers to adapt the order and timetabling of Maths Meetings to suit the arising needs, age of the children and other timetabling adaptationso: sme classes may have their Maths Meetings prior to a Maths Lesson, some may have them immediately after lunch and some may have them at the beginning of the school day.

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Higher Attaining Pupils

At St Mary's Broughton Gifford, developing secure and deep understanding of all mathematical concepts is used to acknowledge that all pupils require depth in their learning, but some pupils will go deeper still in their learning and understanding. However, our 'can do' approach to teaching Maths means that we do not label pupils as lower/higher ability, as the use of this language puts an automatic ceiling on what children can or cannot achieve as predetermined by their teachers, parents or themselves. In fact, research shows that when teachers teach with the belief that a pupil is capable of achieving well, those children go on to make more rapid progress than their peers (*Pygmalion in the Classroom*, Rosenthal and Jacobsen, 1968). As such, we use the language of 'prior lower/higher attaining' pupils and ensure that all children access all parts of Maths Lessons. Although we encourage challenge for all through all stages of teaching and learning, we ensure that children who attain well and grasp concepts quickly are given the opportunity to deepen their learning even further in every lesson.

It is inevitable that some pupils will grasp concepts more rapidly than others and will need to be stimulated and challenged to ensure continued progression. However, research indicates that these pupils benefit more from enrichment and deepening of content, rather than acceleration into new content. Acceleration is likely to promote superficial understanding, rather than the true depth and rigour of knowledge that is a foundation for higher mathematics.

Challenge for all is provided by *going deeper* rather than accelerating too early into new mathematical content; it is a fundamental element of our approach to Maths teaching, being woven throughout every part of a lesson for all children. During the Teach It/Practise It parts of lessons, teachers challenge all children to develop their procedural, conceptual and depth of understanding through questioning, using precise mathematical vocabulary and generalisations, and expecting all children to reason about their understanding using the same vocabulary/generalisations.

We believe if a child is developing **mastery with greater depth** the child can:

• *Solve problems of greater complexity (i.e. where the approach is not immediately obvious), demonstrating creativity and imagination;*

• *Independently explore and investigate mathematical contexts and structures, communicate results clearly and systematically explain and generalise the mathematics.*

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Children with Special Educational Needs (SEN):

Typically, all children are taught maths as part of whole classes of children, as we believe that children benefit from exposure to mathematical discussion, demonstration and explanation of methods. Children with SEN are encouraged and supported to participate in daily maths lessons where appropriate. Where applicable, children will have individual targets which are recorded in their SEN provision maps. These targets are based on the child's level of development and are matched appropriately to the National Curriculum Programme of Study for Mathematics.

Children with SEN who are finding it difficult to access the content of main maths lessons may be supported by additional support staff who work in collaboration with the class teachers. Children with severe and complex learning needs may be supported through an individualised programme of support in the main part of a lesson, so that the content of lessons is matched to their level of ability. This may mean that these children are being taught knowledge, skills and understanding in ways that suit their individual needs. This could be presented as teaching them knowledge, skills and understanding from previous Year Groups or Key Stages so that they can make progress and achieve at a pace which is appropriate for them.

Early Years Foundation Stage (EYFS):

Teachers and practitioners support children in developing their understanding of mathematics in a broad range of contexts in which they can explore, enjoy, learn, practise and talk about their developing understanding. This area of development includes seeking patterns, making connections, recognising relationships, working with numbers, shapes and measures, and counting, sorting and matching. Children use their knowledge and skills in these areas to solve problems, generate new questions and make connections across other areas of learning and development.

Children in the EYFS learn by playing and exploring, being active, and through creative and critical thinking which takes place both indoors and outside. We recognise that children learn through routine, continuous provision and incidental learning opportunities, as well as planned sessions and activities. Mathematical understanding can be developed through stories, songs, games, routine, questioning, imaginative play, child initiated learning and structured teaching.

In Foundation Stage 1, group activities are timetabled and planned. In Foundation Stage 2, daily time is dedicated to mathematics. Overall these lessons include a good balance between whole-class work, group teaching and individual practice. In the Autumn term, these

sessions are similar to those in Foundation Stage 1. However, throughout the year there is a gradual shift where adult-directed sessions are extended in preparation for Year 1.

Overall, in Mathematics at St Mary's, we will be doing more of this:

☑ Teaching all pupils in class, together, most of the time

☑ Verbal feedback during lessons and more ticking of correct concepts

☑ Spending longer on one idea

☑ Giving pupils who need it additional support over shorter more intense timescales – ideally same/next day - to prevent gaps in learning occurring

☑ Regular assessments which cover what's been taught to inform teaching

And less of this:

☒ Formal marking with lots of feedback and 'next steps'

☒ Covering lots of ideas in one week

☒ Formal, long term interventions to boost pupils out of class

☒ Separating in to ability groups

☒ Formal testing of pupils termly to obtain a grade/level

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Mixed-Age Classes

As a school with mixed-age classes, we recognise a need to balance full and deep coverage of the curriculum alongside the logistical and workload challenges of teaching two year group's curricula concurrently. As a result, there are the approaches staff will adopt in order to strike the most efficient balance for their cohorts of children when planning for mixed-aged classes:

- ***Teaching separate sessions for each year group***
  - Teaching smaller, separate sessions to each year group. For example, teach one year for 30mins, then swap with the other
  - Focusing on one year group for a whole session while the other does Extra Problem Solving, practise of prior learning etc, supervised by a TA
- ***Joining up similar concepts by rearranging the order and/or covering both objectives in one session***
  - Some objectives overlap and can be covered at the same time, developing depth of understanding for each year group through targeted questioning
  - Some objectives are the same for both year groups and can be taught concurrently
- ***Being flexible with the length of time spent on concepts***
  - Through assessment information, teachers may use their professional judgement to decide that there are some concepts which your class have already mastered. As a result, they may not need as many sessions as the planning suggests and, therefore, can spend less time on that concept and more on another
  - The planning template allows flexibility for 'Extra Problem Solving' sessions, which can be used to focus on year group specific content while another focused on additional problem solving
  - Some concepts may only need light-touch coverage and could be built upon in the Maths Meetings
  - Some concepts can be drip-fed (e.g. days of the week, months, time, roman numerals etc) and may not need specific Maths Lesson time to
  - Some concepts can be covered in a cross-curricular way (e.g. statistics, averages, measures through Science)

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WHAT do we teach in Mathematics at St Mary's?

The CanDoMaths approach is used to underpin teacher's teaching, planning and assessment of Mathematcs. Can Do is underpinned by the National Curriculum and Non-Statutory Guidance and, as a result, CanDoMaths progression and sequencing of lessons can be monitored in-line with national expectations. EYFS use the Maths Project, developed by Sue Rayner, as their framework for teaching ***(The CanDoMaths Manageable Steps for each year group and Maths Project overview can be found on the school website alongside this policy).***

The Can DoMaths and Sue Rayner progressions are used as a **framework** from which teachers plan their sequence of lessons. However, teacher judgement will ultimately be used as the basis for deciding the sequence of lessons and amount of time spent on each concept depending on the arising needs of the children in each cohort.

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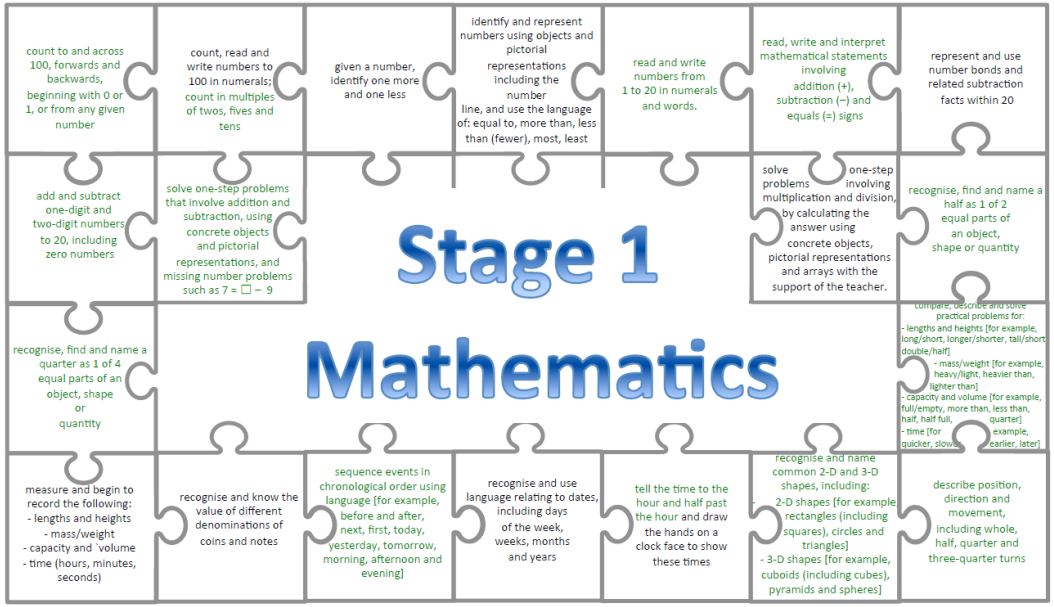
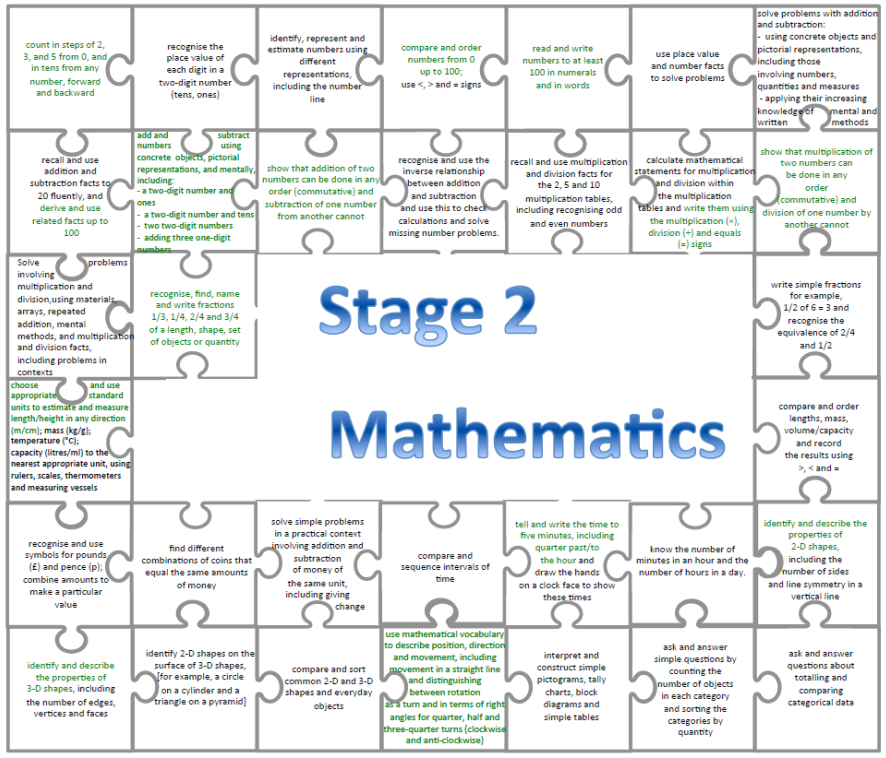
Core Skills Progression

Breadth of Study





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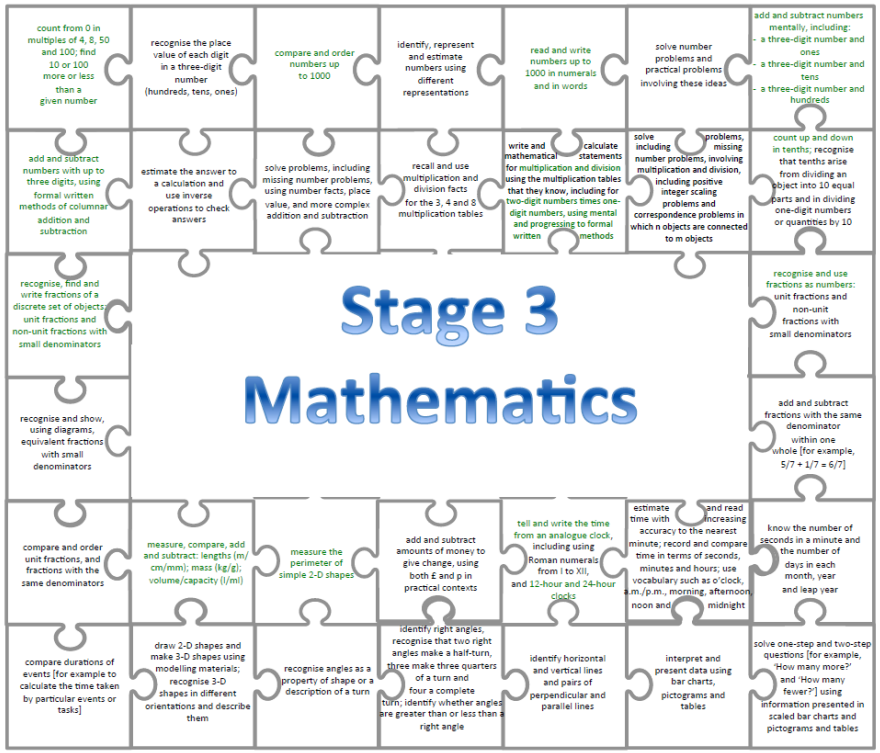

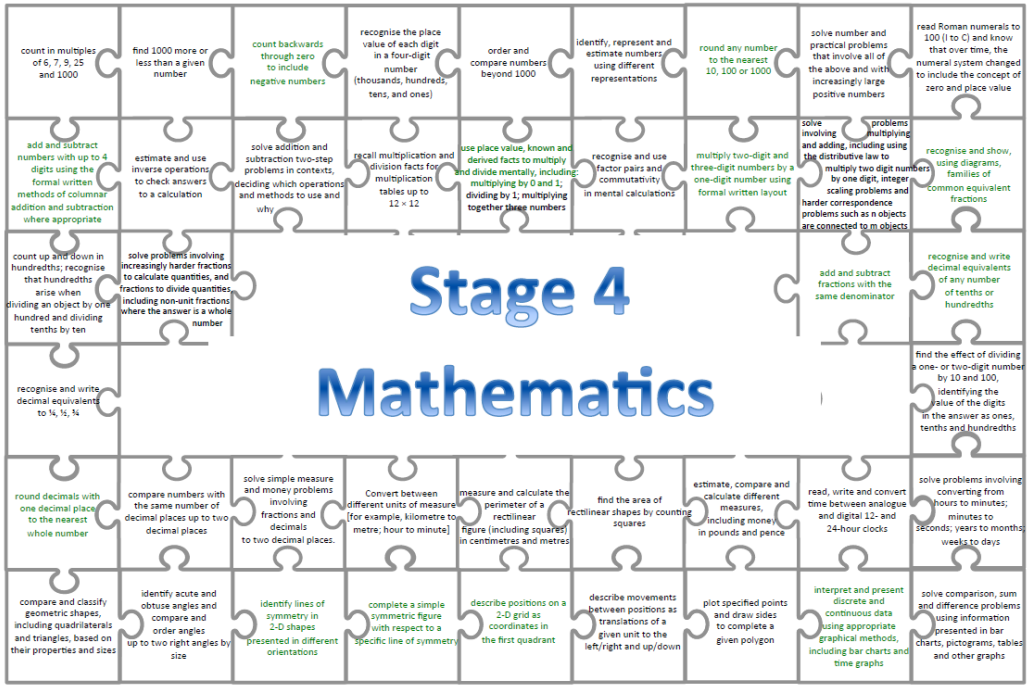

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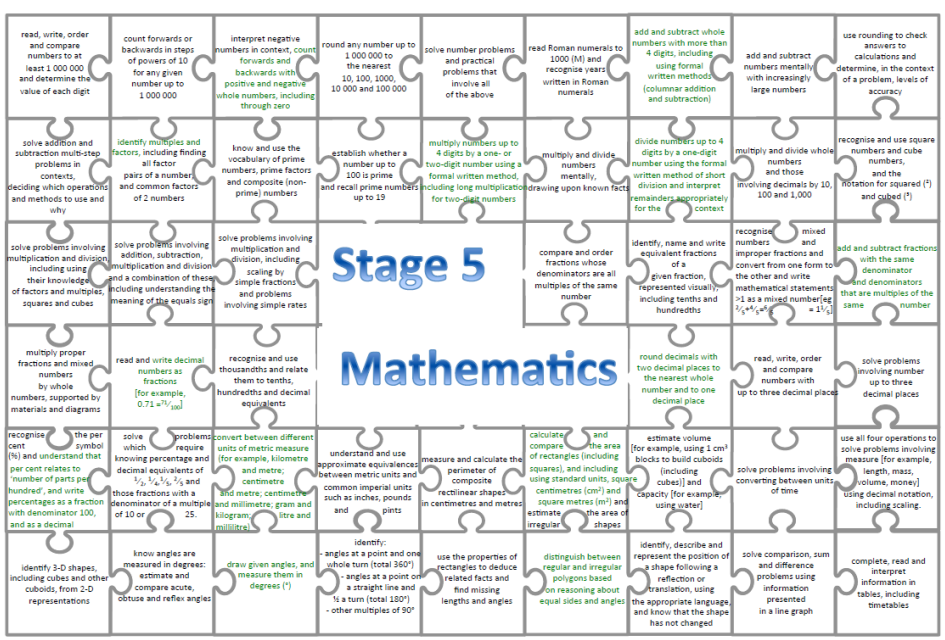

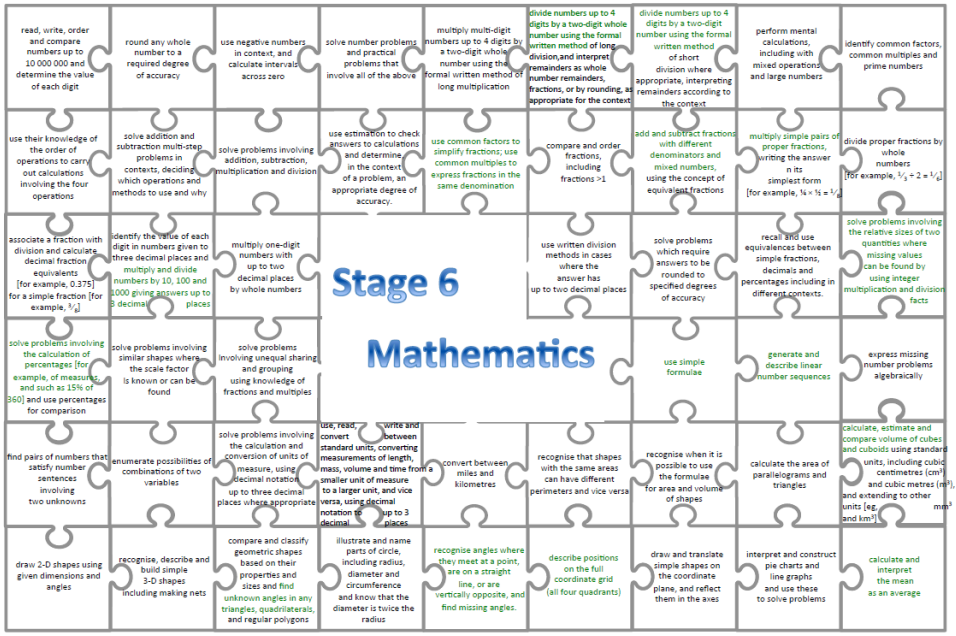

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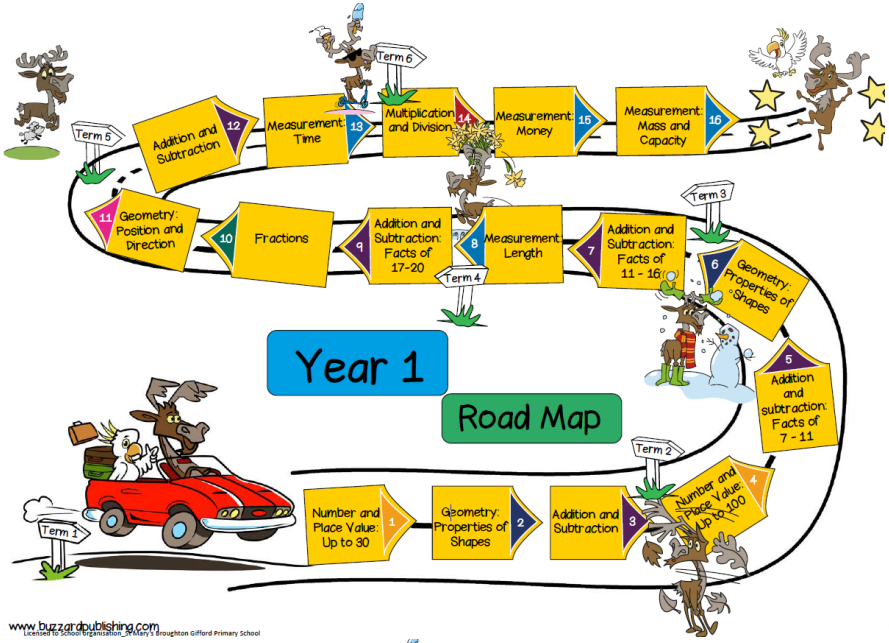
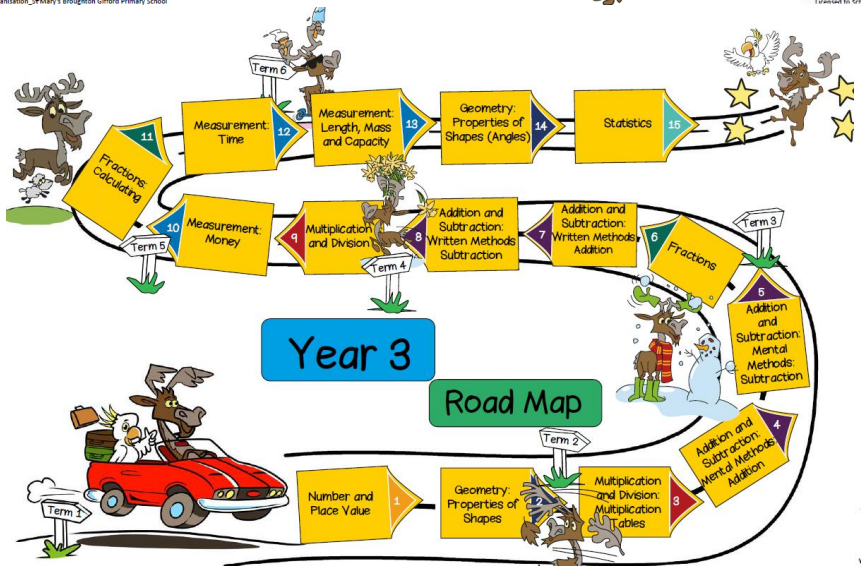
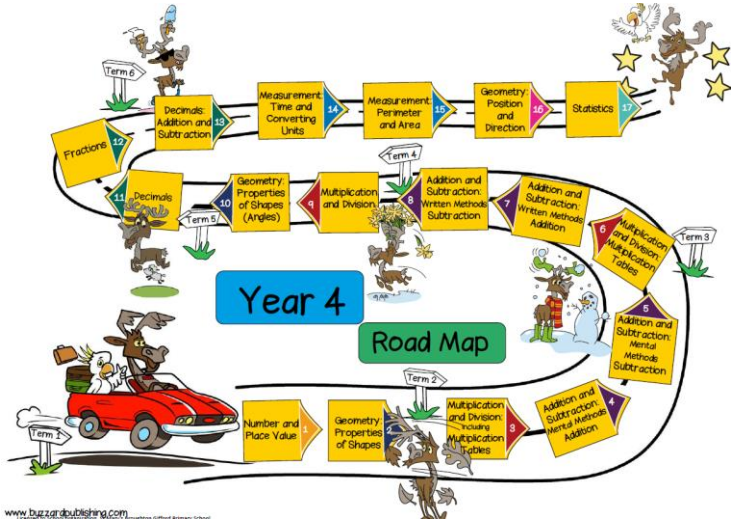
Learning Pathway







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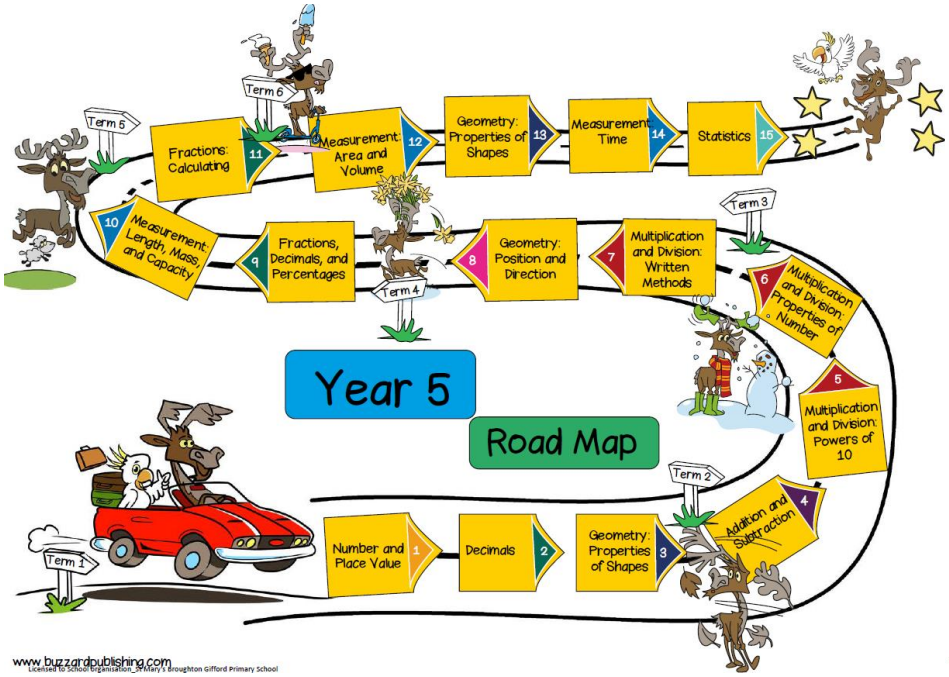

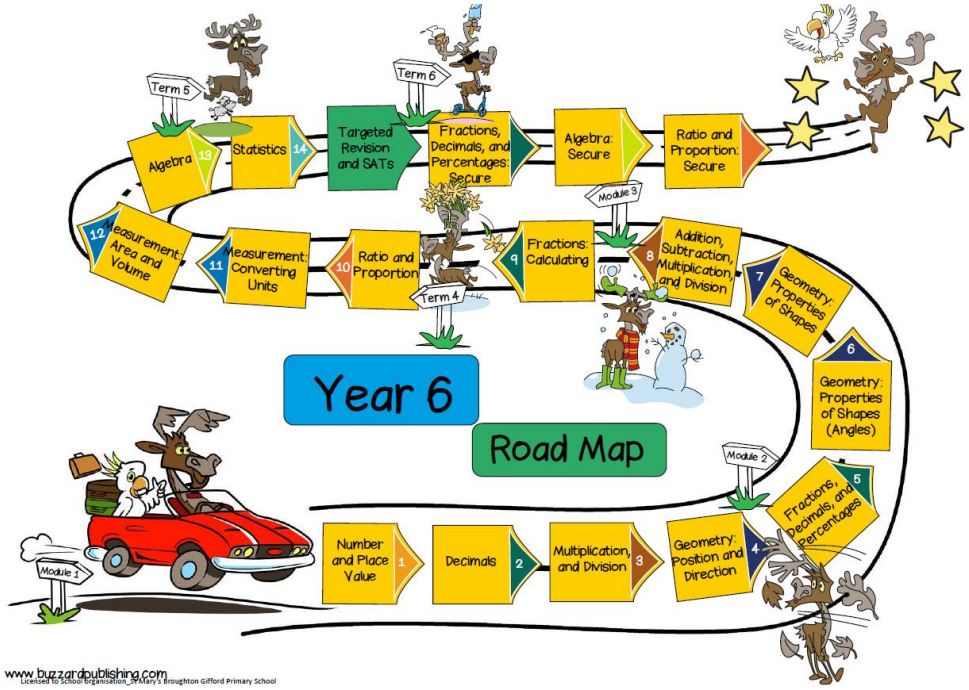

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