St Anne's Catholic Voluntary Academy

Mathematics Policy

This policy will be reviewed on an annual basis.
This policy was reviewed and updated in ***September 2020***
Next review date: ***September 2021***

THE NATURE OF MATHEMATICS

"Mathematics is a creative and highly inter-connected 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 to 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 for Mathematics 2014)

At St. Anne's Catholic Voluntary Academy, we believe that Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real life problems. It also provides the materials and means for creating new imaginative worlds to explore.

This policy sets out how we teach mathematics at St Anne's Catholic Voluntary Academy. Our aim is to make sure that all pupils leave our school 'secondary ready' in Mathematics. By this we mean that all pupils (irrespective of their starting point) are equipped with a 'toolkit' of mental, supported and written methods that they understand and can use correctly. When faced with a calculation, in a problem or unfamiliar context, pupils will be able to decide which method is most appropriate and apply this accurately. They will have strategies and the inclination to check its accuracy and interpret the solution in the context of the problem.

Context of the Mathematics policy

The National Curriculum in England Mathematics Programmes of Study: Key Stages 1 and 2 defines the statutory entitlement of all pupils. This forms the basis of this policy.

This Mathematics policy should also be used in conjunction with the school's Teaching and Learning Policy, which sets out the expectations for all lessons and includes specific guidelines for assessment, planning, marking and feedback and data management.

Key principals of the Mathematics policy

This Mathematics policy aims to both reflect current practice and to present our aspirational ideas for the future of teaching in the subject that we are working towards.

1. Consistency

In line with evidence based research, we believe that pupils at our school will achieve well and make good progress in Mathematics because we have a consistent approach to teaching the subject.

2. Teaching for Mastery

Since 2017-18, the school has begun to embed a Teaching for Mastery approach to Mathematics. With this, we believe that **all** pupils can achieve the expected standards in Mathematics for their year group. In order to achieve this, we are developing our use of a range of elements of classroom practice and school organisation that combine to give pupils the best chances of mastering mathematics.

As the NCETM [2016] states: "*Mastering maths means acquiring a deep, long-term, secure and adaptable understanding of the subject. At any one point in a pupil's journey through school, achieving mastery is taken to mean acquiring a solid enough understanding of the maths that's been taught to enable him/her move on to more advanced material.*"

A detailed breakdown of what we understand by high quality teaching in mathematics is contained in Appendix C.

3. Progression

There is no fixed scheme of work for Mathematics as we recognise the need for teachers to exercise their professional judgement in relation to how long children need to secure particular aspects of the curriculum.

However, Appendix A sets out the suggested order that different content should be taught through the year. Wherever possible, teachers use areas -

such as measurement and statistics - as contexts through which children apply practising number skills.

Appendix A also suggests the approximate proportion of teaching time that will be spent on each aspect of Mathematics, in order to secure an appropriately balanced coverage.

4. Provision for pupils working outside their year group expectations

Whilst we strive for all pupils to achieve the expected standards for their age group, we recognise that a small minority of pupils achieve above or below these standards for different reasons.

For those pupils whose mathematical skills and understanding are **significantly below** those of their year group, the school aims to…

- provide appropriate support (resources, adults etc.) within daily Mathematics sessions so that they can access the learning objective at their age appropriate level
- support these pupils in 'keeping up' (rather than catching up) through a range of interventions. These are likely to include additional support (outside regular mathematics lessons) either on a 1:1 or small group basis
- inform, and request support outside school, from parents / carers at the earliest possible opportunity

For those pupils whose mathematical skills and understanding are **secure**, the school aims to…

- Skilfully nurture and develop these abilities, principally by designing more challenging activities that deepen and broaden pupils understanding of concepts ***within*** their year group programmes of study.

We refer to these pupils as those working towards mastery with greater depth.

5. Early Years Foundation Stage [EYFS]

Practical, hands-on maths activities and the use of correct mathematical language during EYFS are essential components for pupils' later success with Mathematics.

We aim to make sure all children leave Reception having secured the Early Learning Goals and gone beyond these so that they are ready to begin the Year 1 curriculum in September. The principals for doing this are set out in Appendix B.

6. Mental v. written methods

There is a rich evidence base that suggests a pupil's ability to calculate mentally lies at the heart of successful mathematicians and this is something we support. Throughout the school, pupils are encouraged to develop these mental calculation skills through direct instruction, regular practice, application and homework. Pupils are encouraged to think: 'Can I do this in my head?' as

the first approach to problem solving. This approach is honed and developed (often supported with informal jottings) as pupils move through Key Stage 2.

More formal, written methods of calculation are introduced when pupils have an established understanding of the number system and a sound knowledge of some key facts they can recall and mental strategies they can use reliably. The agreed formal written methods of calculation are outlined in Appendix E.

7. In addition to the daily maths lessons, teachers provide children with regular opportunities to engage with times table and number bonds work to help develop fluency and accuracy. Children will also complete a 20 minute 'Basic Skills' session each day to support the development of their arithmetic skills (Magic Maths). We also give our children regular exposure to problem solving and reasoning tasks.

8. Parents and carers

We recognise the vital role parents and carers play in supporting their child's learning and we hope that this policy allows them to have a shared language with the school, supporting and re-enforcing their child's maths skills.

Pupils are given weekly Mathematics homework that gives them the opportunity to learn key facts 'off by heart'. This is intended to improve their fluency, which in turn aids their problem solving by reducing cognitive overload.

The teaching of times tables are fundamental. We use 'Times tables Rockstars' to support Key Stage 2 children at home in this area and 'Hit the button' for children in Key Stage 1.

Parents and carers are kept informed of their child's progress and attainment regularly with parent teacher meetings (where they are given specific areas for their child to focus on learning) and end of year reports (outlining the core maths content each child is now secure in). Additional meetings may be arranged throughout the year if required, in order to discuss how particular pupils may be supported.

Stephanie Clarke
Mathematics Subject Leader
September 2020

Appendix A:

Progression and coverage

Year 1			weeks
	Number – number and place value	27%	10
	Number – addition and subtraction	45%	17
	Number – multiplication and division	10%	4
	Number – fractions	5%	2
	Measurement	8%	3
	Geometry	5%	2

term 1+2 (14 weeks)	term 3+4 (12 weeks)	term 5+6 (12 weeks)
Measurement (time) number and place value (within 20) addition and subtraction (within 20) measurement	number and place value (within 50) addition and subtraction (to 20) multiplication and division (counting)	number and place value (within 100) addition and subtraction (to 20) fractions geometry

Year 2			Weeks
	Number – number and place value	25%	9
	Number – addition and subtraction	35%	13
	Number – multiplication and division	20%	7
	Number – fractions	5%	2
	Measurement	8%	3
	Geometry	5%	2
	Statistics	2%	1

term 1+2 (14W)	term 3+4 (12W)	term 5+6 (12W)
measurement (time) number and place value addition and subtraction Measurement	addition and subtraction multiplication and division	Fractions geometry statistics consolidation

Year 3			Weeks
	Number – number and place value	25%	9
	Number – addition and subtraction	30%	12
	Number – multiplication and division	25%	9
	Number – fractions	5%	2
	Measurement	8%	3
	Geometry	5%	2
	Statistics	2%	1

term 1+2	term 3+4	term 5+6
measurement (time) number and place value addition and subtraction	multiplication and division measurement	fractions statistics Geometry

Year 4			Weeks
	Number – number and place value	25%	9
	Number – addition and subtraction	30%	12
	Number – multiplication and division	25%	9
	Number – fractions	5%	2
	Measurement	8%	3
	Geometry	5%	2
	Statistics	2%	1

term 1+2	term 3+4	term 5+6
measurement (time) number and place value addition and subtraction	multiplication and division measurement	Fractions Geometry statistics

Year 5			Weeks
	Number – number and place value	15%	6
	Number – addition and subtraction	20%	7
	Number – multiplication and division	30%	12
	Number – fractions	25%	9
	Measurement	3%	1
	Geometry	5%	2
	Statistics	2%	1

term 1+2	term 3+4	term 5+6
Measurement (time recap) number and place value addition and subtraction	multiplication and division measurement	fractions statistics Geometry

Year 6			weeks
	Number – number and place value	15%	6
	Number – addition and subtraction	20%	7
	Number – multiplication and division	25%	10
	Number – fractions	25%	9
	Measurement	3%	1
	Geometry	7%	3
	Statistics	2%	1
	Algebra	3%	1

term 1+2	term 3+4	term 5+6
Measurement (time recap) number and place value addition and subtraction measurement	multiplication and division fractions	Algebra Geometry statistics consolidation

Appendix B:

Mathematics in the Early Years Foundation Stage

Within this appendix are the school's agreed principals and philosophy behind the teaching of mathematics in the EYFS.

They are intended to provide all children with a secure understanding of all the ELGs and go beyond these in order to bridge the gap with the expectations of the Year1 curriculum.

Teaching Mathematics in Reception

At St. Anne's Catholic Voluntary Academy, we believe that the teaching of early mathematics should be given the same priority as other areas of learning, such as phonics.

As well as making sure all children leave Reception having secured the early goals for mathematics, we aim to increase the expectations so that they are prepared for their learning in Year1 and beyond.

Below is an outline of how we achieve this:

- There is daily, direct teaching input with the whole-class in mathematics. This usually consists of a starter (e.g. counting, a song etc.) followed by a main focus.

- Throughout the week, there are adult-led mathematics focus groups which are designed to build-on or re-enforce the main lesson content.

- In addition to the above, carefully designed continuous provision is planned for within all areas of the learning environment. This is skilfully designed to link with the current or previous maths focus in order to either:

    - consolidate this in different contexts
    - assess (gather evidence of) children's understanding
    - question children's depth of understanding
    - develop children's mathematical language
    - provide opportunities to extend children's learning into greater depth

- Based on on-going assessment, interventions take place when appropriate in order to make sure all children secure the identified key understandings for Reception [see 'Key understandings from Reception to Year 6'] so they are Year 1 ready.

- Every effort is made to help support parents / carers with their child's learning outside school by providing appropriate resources or ideas where necessary.

Appendix C:

High quality teaching and learning in mathematics

Within this appendix are the school's agreed expectations of what we will see in terms of teaching Mathematics within all classrooms.

Although this list of principals can be used for monitoring and professional development purposes, **it is not intended as a checklist of what you would expect to see in every session**.

Indeed, what we would expect is that the majority of these principals would be present over the course of several sessions – evidenced most clearly in pupil's books and teachers on-going planning and assessment records.

What does high quality teaching and learning look like in mathematics?

Key principals	Additional guidance
Planning, assessment, marking and feedback	
1. Teaching sessions are based on the correct year group programmes of study from the National Curriculum	• When planning a series of lessons, teachers will be aware of the prior learning that needs to be secure (from previous year groups) in order for new content to be understood.
2. Sessions are driven by sharp learning objectives which are progressively linked	• When teaching a particular programme of study, teachers use their subject knowledge and understanding to break down the learning into a series of steps that build on one another (learning objectives/ learning challenges). • Teachers plan these series of steps as an **S plan** so they are aware of the end goal and see where sessions fit best together.
3. Continual and effective use of assessment information is used to adapt teaching to meet pupils needs	• At the beginning and end of each major block of work (place value, calculation, fractions), teachers give pupils a self-designed assessment. The end assessment is usually completed at least 6 weeks after the block has been completed to ensure children have retained the acquired knowledge. • Formal, summative tests are taken by pupils three times a year to validate teacher's assessment. • The most useful assessments are those done by teachers day-to-day by observing pupils responses to tasks and questions. • The most crucial aspect of any assessment is that teachers use the information to adapt their teaching so that it builds on pupils existing knowledge, addresses their weaknesses and focuses on the next steps that they need to make progress. • Assessment information is recorded on the agreed school planning format.

4. Feedback and marking is useful for pupils and manageable for teachers	• Guidance on feedback and marking, including minimum expectations is contained within the teaching and learning policy.

Designing lessons

5. Individual (and series) of lessons are carefully designed so that pupils are given the best opportunities to show their understanding	• Teachers should spend the majority of their time either teaching or designing lessons. • Teachers should either design their own tasks or make use of carefully selected published materials to best meet pupils' needs. • From Year 1 onwards, teachers move pupils swiftly from concrete and practical activities onto recording their mathematics and working independently. • Within tasks, teachers need to consciously build in variation so that pupils can apply their learning to different contexts (conceptual variation) and make links (procedural variation). Thus pupils are given the opportunity for intelligent practice of the course of a series of sessions. • Pupils are given sufficient time, over the course of a series of lessons, to master new content – the amount of time will vary and is dependent on the professional judgement of the teacher.
6. Effective use is made of resources which are well-chosen and used flexibly to best support pupils learning	• Teachers need to carefully consider the use of any resources (including adults) within a session in order to maximise their impact on pupils. • Wherever possible (and especially at the start of new content) teachers should use well-chosen concrete manipulatives and pictorial representations to support all pupils understanding.

7. Where appropriate, teachers effectively model, demonstrate or explain the standard and / or process required	• Lessons should provide pupils with clear instructions as to how to carry out mathematical procedures • Teachers need to carefully plan the amount and content of any teacher talk (which will vary within and between sessions) to maximise pupil's learning time.

Developing independence, motivation and problem solving

8. All staff model positive attitudes towards maths and a belief that all pupils can succeed	• Adults believe that all pupils in their class are capable mathematicians. • Adults help to motivate pupils to believe they can do maths if they are prepared to work hard (growth mindset) and are prepared to challenge pupils / parents when this is undermined. • Adults encourage, and as pupils get older, expect pupils to take responsibility for, and play an active role in, their own learning.
9. Pupils are comfortable in making mistakes and see them as a vital part of the learning process	• Adults need to encourage pupils to 'have a go' and recognise that making mistakes is a chance to learn. • Working out should be valued as much as 'the answer'. • Understanding is seen as the most crucial part of learning mathematics.

10. Teachers plan for and spend lesson time explicitly teaching different problem solving strategies

- Teachers explicitly teach, model and share examples of good problem solving strategies.
- Developing these skills requires initial scaffolding and fluency with key facts (see advice).
- Pupils are given sufficient time over a series of lessons to apply new strategies in different contexts.
- Teachers should consider presenting problem solving tasks where the methods are not immediately obvious, providing the opportunity for pupils to use and compare different approaches.
- Teachers should teach pupils how to use their existing knowledge and use visual representations to help solve problems.

Building pupils mathematical knowledge

11. All adults model the correct use of mathematical language and insist pupils do the same

- The correct use of mathematical language is vital to ensure clarity of meaning and consistency across the school.
- Teachers should regularly provide stem sentences to support pupils in their correct use of mathematical language in their written and verbal responses.

12. Pupils are taught to develop their fluency in basic number facts

- Teachers should ensure that pupils develop fluent recall of number facts (see further advice).
- By developing pupils fluency, they are more likely to be successful using basic facts when carrying out more complex procedures and solving problems.

Supporting and challenging all pupils

13. Support interventions should happen quickly and be planned to have the maximum impact on pupil progress

- Although the need for catch-up intervention will decrease over time, some high-quality, structured interventions may still be required for some pupils to keep up with the whole class.
- Any intervention should be based on sound assessment so that it is focused on achieving a particular end.
- Interventions should be prioritised for pupils when they are as young as possible to remove the need for them later in their schooling.
- Support that is identified as the result of assessment within a lesson should happen as soon as possible (i.e. within the lesson or shortly afterwards) so that these pupils can re-join the main lesson the following day.
- Teachers need to consider who, when and how these interventions should take place so that pupils involved avoid missing important curriculum content. NB These will not normally take place during the core lesson.

14. Pupils who grasp concepts quickly are challenged with carefully designed activities to show mastery with greater depth

- Once teachers are convinced a pupil has mastered new content, they need to provide them with tasks / activities that are at a greater depth but within their year group's expectations.
- Such activities could be well-chosen published ones or self-designed.
- Mastery with greater depth can be characterised by pupils who are confidently and imaginatively able to deal with increases in demands on their reasoning (justifying and proving); deduction; complexity of problems to be solved (open and closed).

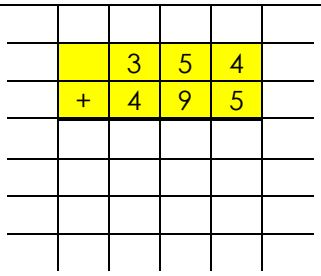
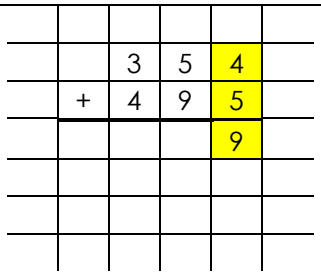
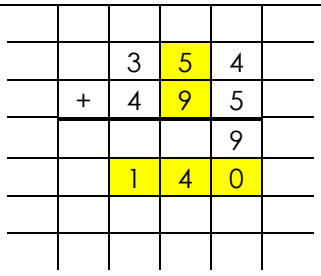
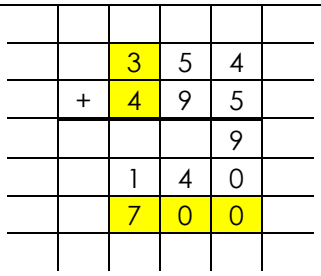
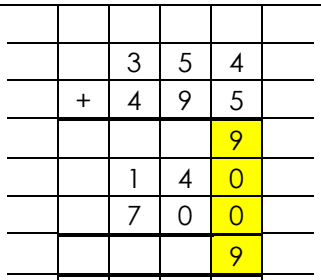
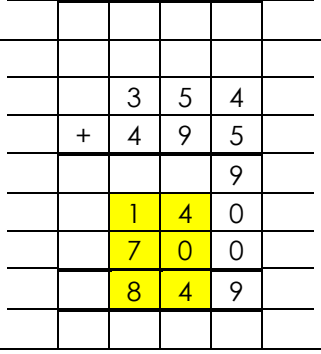
Appendix D:

Written methods of calculation for Key Stage 2

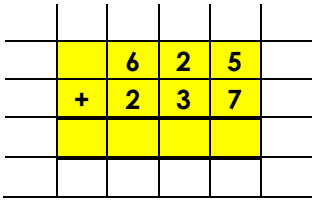
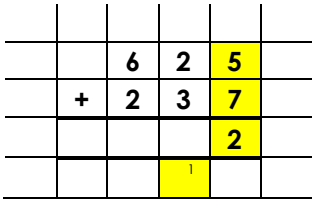
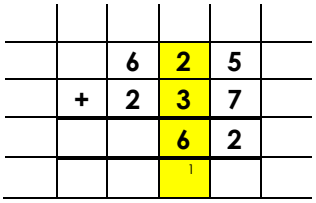
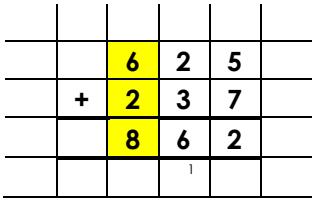
Within this appendix are the school's agreed methods for teaching written calculation in Key Stage 2.

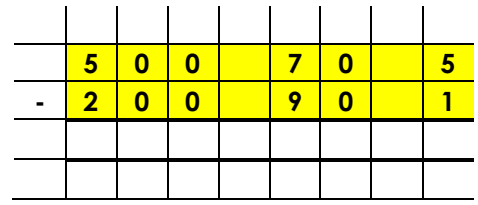
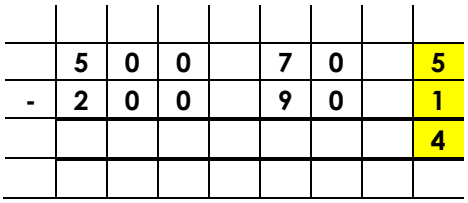
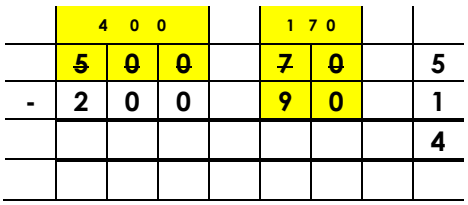
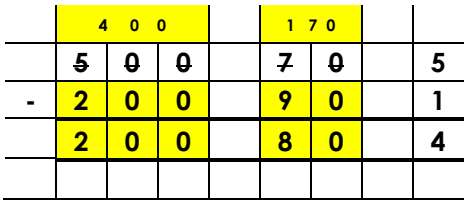
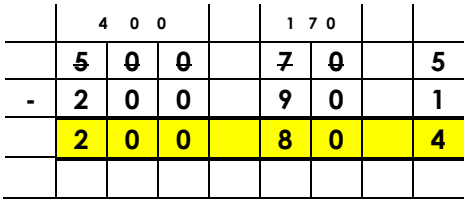
Whilst pupils are encouraged to complete calculations mentally (or with jottings) as a priority, when the complexity of the numbers involved increases written methods are used as they become more efficient.

These written methods are broken down into a series of steps (or success criteria) that pupils need to follow in order to complete the calculation accurately.

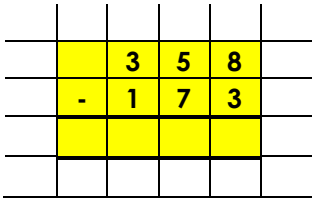
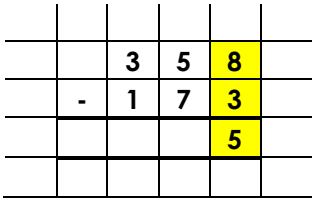
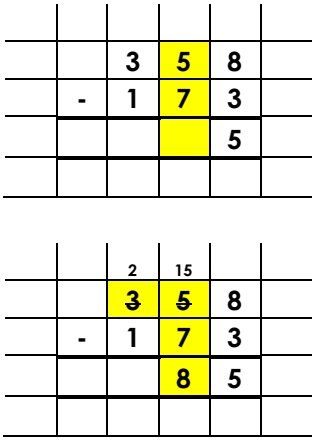
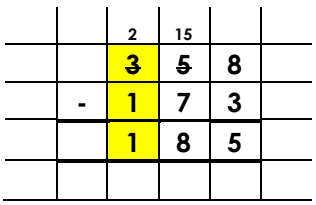
YEAR 3	Addition [expanded] - 3 digit numbers
	1. Write down the numbers to be added underneath each other and draw a line under them (for the answer). **Make sure the numbers are lined up under the correct place value headings.**
	2. Begin by adding the smallest value numbers. These will be in the column furthest to the right. **Record the total for each column below the line, remembering the correct place value headings.**
	3. Continue by adding the column of next highest numbers.
	4. Repeat this process until you have added all the columns.
	5. Now, we add each of the columns below the line, again starting with the smallest value numbers on the right hand side. **Record the total for each column below a new set of lines, remembering the correct place value headings.**
	6. Repeat this until all columns are added.

NB This method should be introduced first so that pupils can 'see' the value of the numbers they are adding and reinforce understanding of place value. Once this is mastered, pupils should quickly move to the more efficient compact method.

YEAR 3	Addition [compact] - 3 digit numbers
	1. Write down the numbers to be added underneath each other and draw two lines under them (for the answer). **Make sure the numbers are lined up under the correct place value headings.**
	2. Begin by adding the smallest value numbers. These will be in the column furthest to the right. **Record the total for each column below the line, remembering the correct place value headings.** **If the total for a column is greater than 9, you will have to record the extra in the next column along.**
	3. Continue by adding the column of next highest numbers and recording the answer. **Remember to include any extra numbers from the previous column that are below the line.**
	4. Repeat this process until you have added all the columns.
625 ≈ 630 **237 ≈ 240** **630 + 240 = 870 ≈ 862**	7. Check your answer is reasonable by estimating.

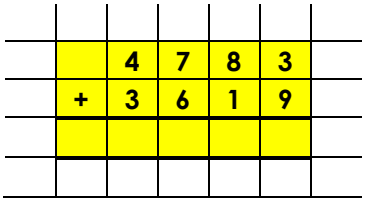
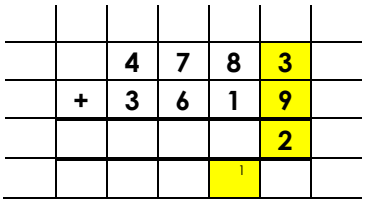
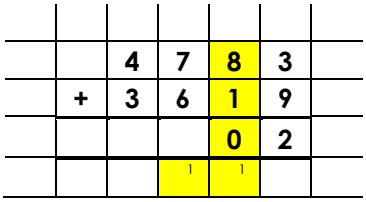
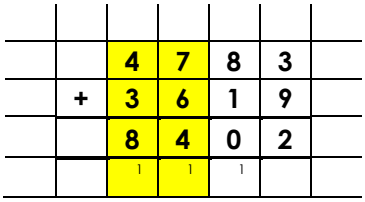
YEAR 3	Subtraction [expanded] - 3 digit numbers
575 - 291	
 5 0 0 7 0 5 - 2 0 0 9 0 1	1. Partition each number into separate hundreds, tens and units. **Make sure the largest number is on the top.** **Make sure the hundreds, tens and unit numbers are lined up directly underneath each other.**
 5 0 0 7 0 5 - 2 0 0 9 0 1 4	2. Begin by subtracting the smallest value numbers. These will be in the column furthest to the right. **Record the difference below the line, directly underneath the numbers above.**
 400 170 ~~5~~ ~~0~~ ~~0~~ ~~7~~ ~~0~~ 5 - 2 0 0 9 0 1 4  400 170 ~~5~~ ~~0~~ ~~0~~ ~~7~~ ~~0~~ 5 - 2 0 0 9 0 1 2 0 0 8 0 4	3. Continue by subtracting the numbers in the column of next highest numbers and recording the answer. **If the number on top is smaller than the one below, you need to exchange (or 'borrow') one of the next highest multiples of 10.** **Remember to record this adjustment in both columns that are affected and then continue subtracting as before.**
 400 170 ~~5~~ ~~0~~ ~~0~~ ~~7~~ ~~0~~ 5 - 2 0 0 9 0 1 2 0 0 8 0 4 575 – 291 = 284	4. Once all the parts have been subtracted, recombine the separate parts to complete the answer.

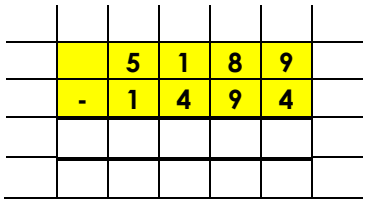
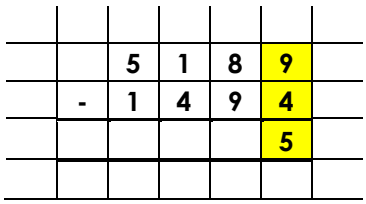
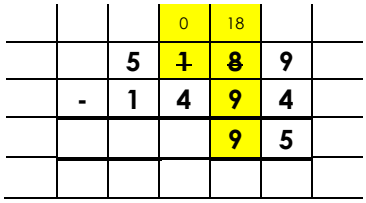
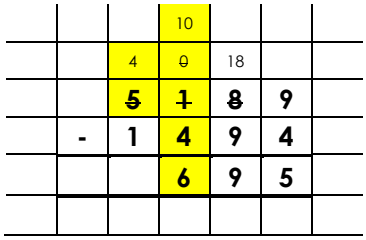
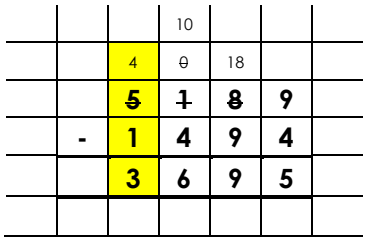
NB This method should be introduced first so that pupils can 'see' the value of the numbers they are subtracting and reinforce understanding of place value. Once this is mastered, pupils should quickly move to the more efficient compact method.

YEAR 3	Subtraction [compact] - 3 digit numbers
	1. Write down the numbers to be subtracted underneath each other and draw two lines under them (for the answer). **Make sure the largest number is on the top.** **Make sure the numbers are lined up under the correct place value headings.**
	2. Begin by subtracting the smallest value numbers. These will be in the column furthest to the right. **Record the difference for each column below the line, remembering the correct place value headings.**
	3. Continue by subtracting the numbers in the column of next highest numbers and recording the answer below. **If the number on top is smaller than below, you need to exchange (or 'borrow') one of the next highest multiples of 10.** **Remember to record this adjustment in both columns that are affected and then continue subtracting as before.**
	4. Repeat this process until you have subtracted all the columns.

answer		**1**	**8**	**5**	
lowest	**+**	**1**	**7**	**3**	
highest		**3**	**5**	**8**	
		1			

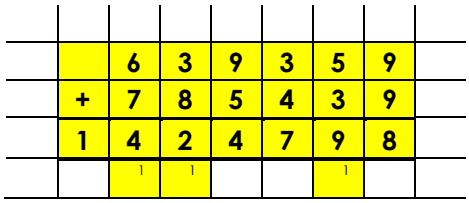
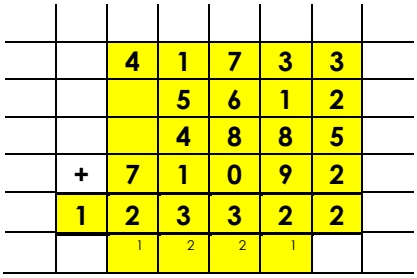
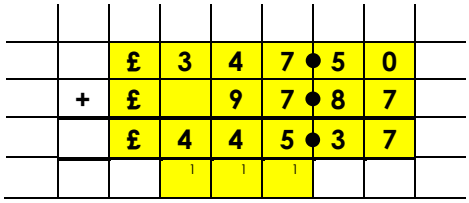
You can check your answer is accurate by completing the inverse: add together your answer and the lowest number from the calculation (on the bottom). The answer should equal the higher number (on the top) from the original calculation.

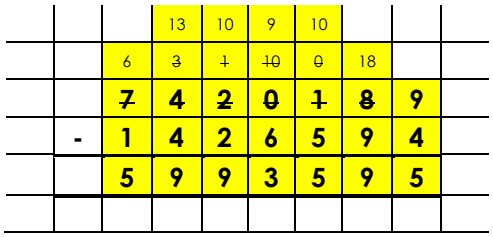
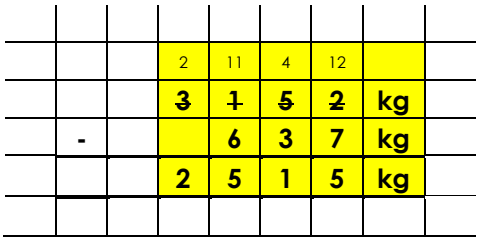
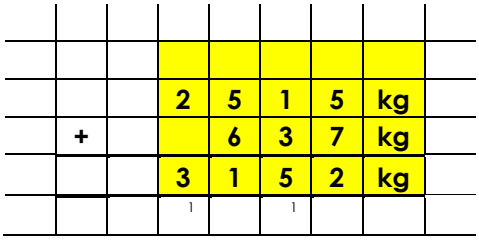
YEAR 4	Addition - 4 digit numbers
	1. Write down the numbers to be added underneath each other and draw two lines under them (for the answer). **Make sure the numbers are lined up under the correct place value headings.**
	2. Begin by adding the smallest value numbers. These will be in the column furthest to the right. **Record the total for each column below the line, remembering the correct place value headings.** **If the total for a column is greater than 9, you will have to record the extra in the next column along.**
	3. Continue by adding the column of next highest numbers and recording the answer below. **Remember to include any extra numbers from the previous column that are below the line.**
	4. Repeat this process until you have added all the columns. **If the total of the largest digits (thousands) is greater than 9, record the extra digit in the next column to the left (tens of thousands).**
4783 ≈ 4800 **3619 ≈ 3600** **4800 + 3600 = 8400 ≈ 8402**	You can check your answer is reasonable by estimating.

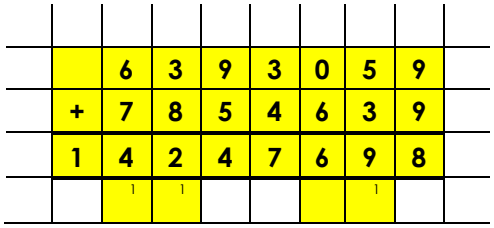
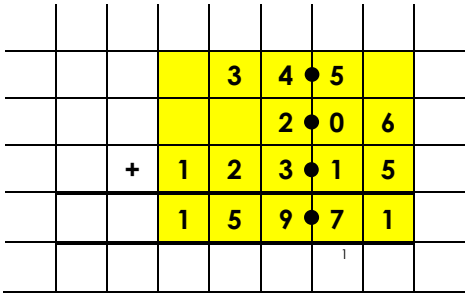
YEAR 4	Subtraction - 4 digit numbers
	1. Write down the numbers to be subtracted underneath each other and draw two lines under them (for the answer). **Make sure the largest number is on the top. Make sure the numbers are lined up under the correct place value headings.**
	2. Begin by subtracting the smallest value numbers. These will be in the column furthest to the right. **Record the difference for each column below the line, remembering the correct place value headings.**
 	3. Continue by subtracting the numbers in the column of next highest numbers and recording the answer below. **If the number on top is smaller than below, you need to exchange (or 'borrow') one of the next highest multiples of 10.** **Remember to record this adjustment in both columns that are affected and then continue subtracting as before.**
	4. Repeat this process until you have subtracted all the columns.

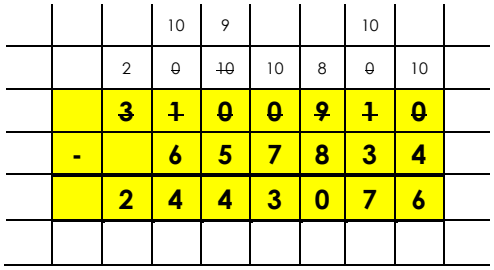
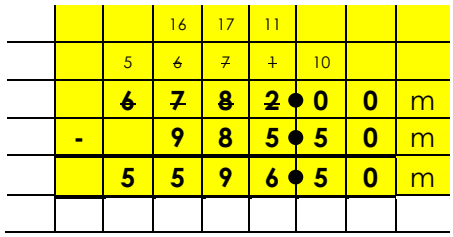
answer		**3**	**6**	**9**	**5**	
lowest	**+**	**1**	**4**	**9**	**4**	
highest		**5**	**1**	**8**	**9**	
		1	1			

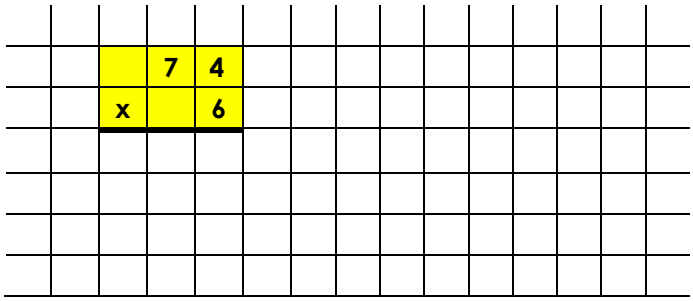
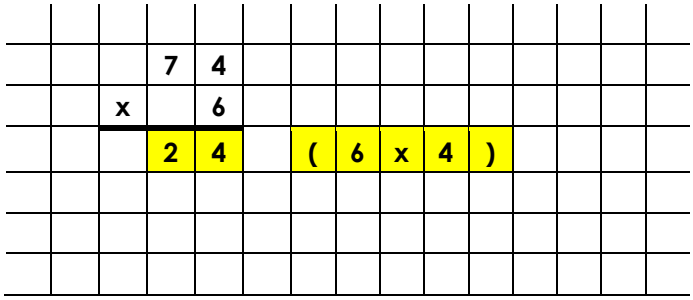
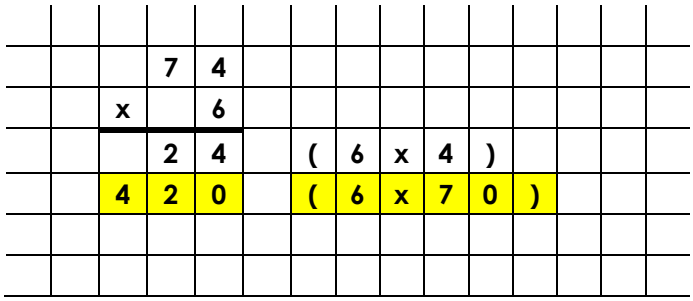
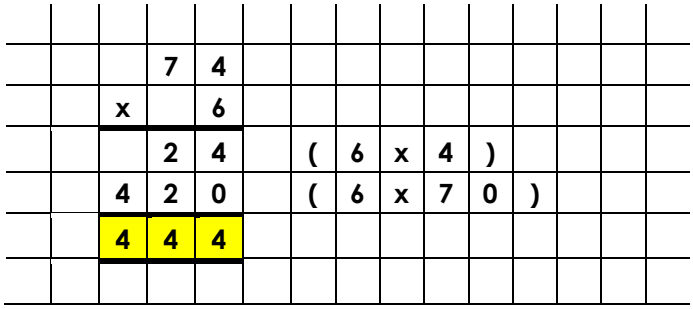
You can check your answer is accurate by completing the inverse: add together your answer and the lowest number from the calculation (on the bottom). The answer should equal the higher number (on the top) from the original calculation.

YEAR 5	Addition - more than 4 digit numbers
   	Extend the method mastered in Year 4, using numbers up to one million and addition of more than two numbers at a time.
64,000 + 79,000 = 143,000 40,000 + 10,000 + 0 + 70,000 = 120,000 £350.00 + £100.00 = £450.00	Answers can be checked for accuracy by using rounding to different values.

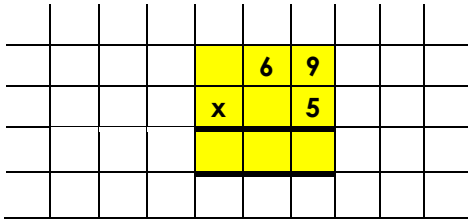
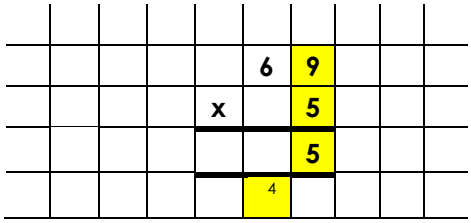
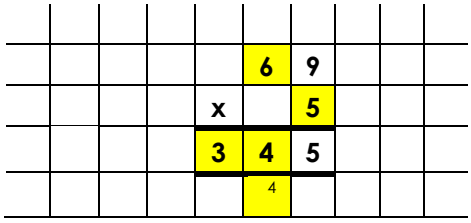
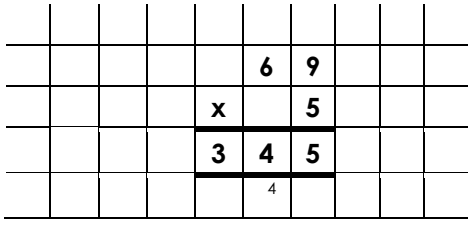
YEAR 5	Subtraction – more than 4 digit numbers
 3,152kg – 637kg 	Extend the method mastered in Year 4, using numbers up to one million and numbers with different amounts of digits.
740,000 – 140,000 = 600,000 	Answers can be checked for accuracy by using rounding to different values and / or completing the inverse operation.

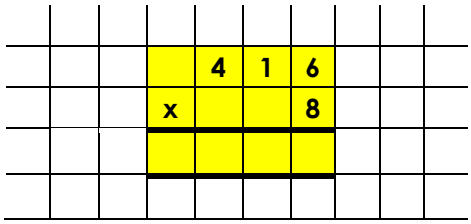
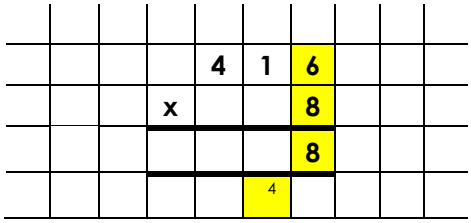
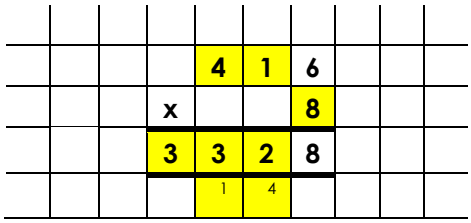
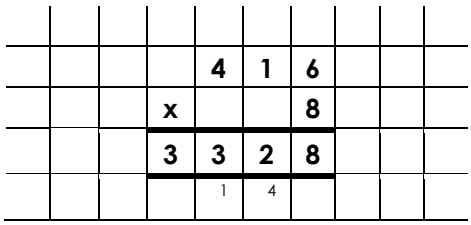
YEAR 6	Addition - more than 4 digit numbers
 34.5 + 2.06 + 123.15  	Extend the method mastered in Year 5, using numbers up to ten million and addition of more than two numbers at a time.
6,000,000 + 8,000,000 = 14,000,000 35 + 2 + 123 = 160	Answers can be checked for accuracy by using rounding to different values.

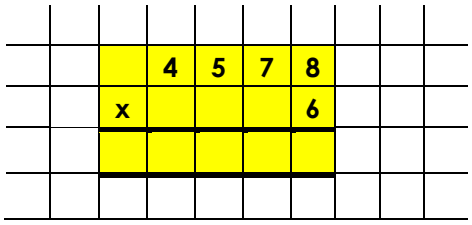
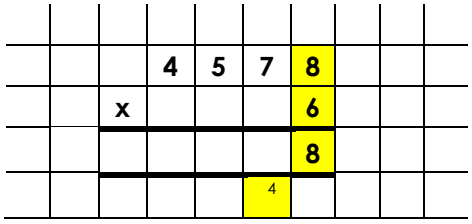
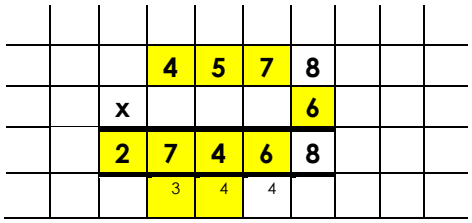
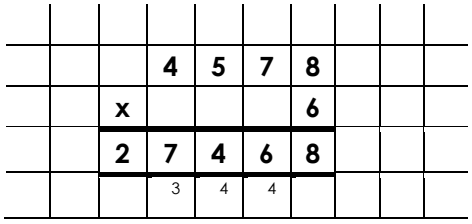
YEAR 6	Subtraction - more than 4 digit numbers
 6,782m – 985.5m  	Extend the method mastered in Year 5, using numbers up to ten million.
64,000 + 79,000 = 143,000 40,000 + 10,000 + 0 + 70,000 = 12,000 £350.00 + £100.00 = £450.00	Answers can be checked for accuracy by using rounding to different values.

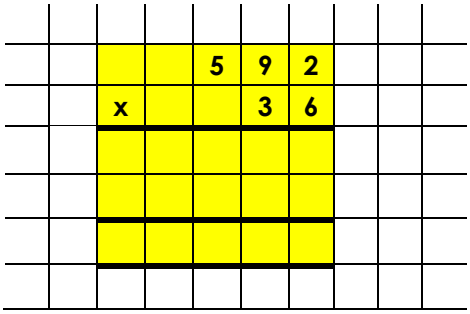
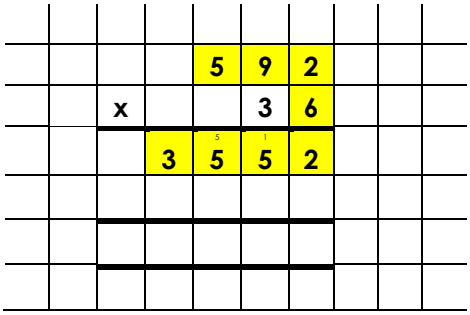
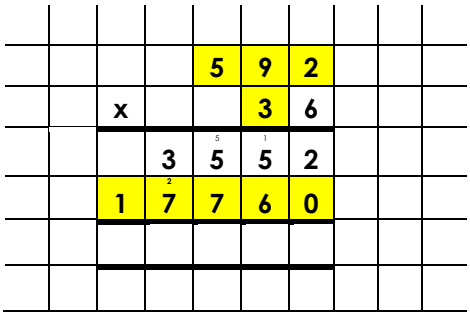
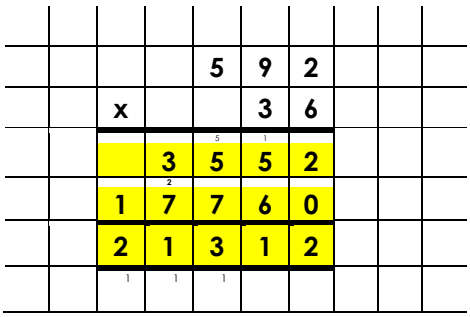
YEAR 3	Multiplication [expanded] – 2-digit by 1-digit numbers
	1. Set out the calculation as shown with the largest value number on the top. Draw a horizontal line underneath to separate the question from the answer. **Remember to line up numbers carefully using place value headings.**
	2. Start to multiply each number from the top (beginning with the lowest value first) by the number underneath. **Record each calculation in brackets alongside each answer.**
	3. Repeat until each number on the top has been multiplied by the number underneath.
	4. Once all separate multiplications are complete, add them to find the total. **Remember to start by adding the numbers in the column with the lowest value (right hand side).** **Record answer.**

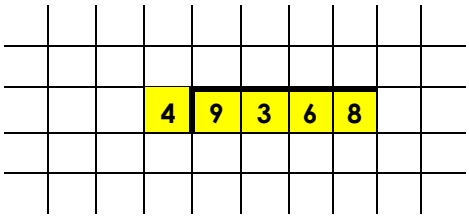
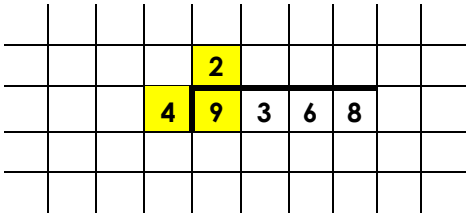
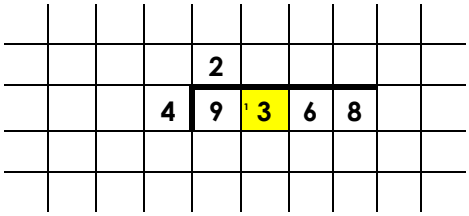
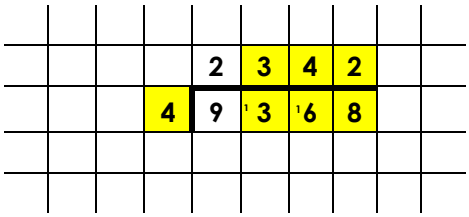
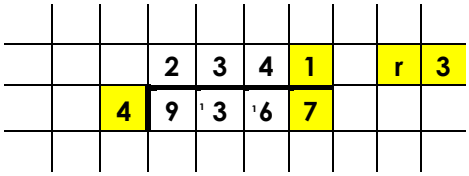
NB This method should be introduced first so that pupils can 'see' the value of the numbers they are multiplying and reinforce understanding of place value. Once this is astered, pupils should quickly move to the more efficient compact method.

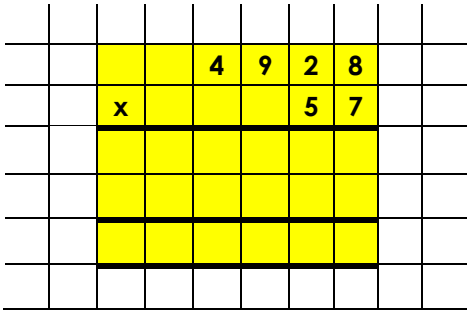
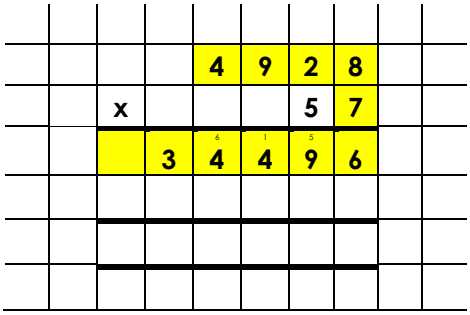
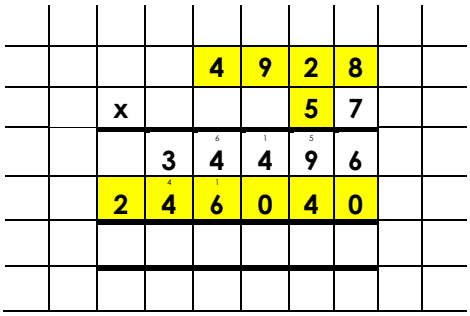
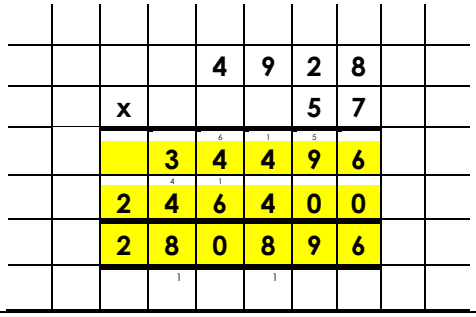
YEAR 3	Multiplication [compact] – 2-digit by 1-digit numbers
	1. Set out the calculation as shown with the largest number on the top. **Remember to line up numbers carefully using place value headings.**
	2. Multiply each number from the top by the number underneath, remembering to start with the lowest value number (right hand side). **If the multiple created contains two digits, record the smallest value between the lines and the largest underneath the next largest place value column to the left.**
	3. Repeat until each number on the top has been multiplied by the number underneath. **Remember to add on any extra numbers created from the previous calculation (recorded under the line).**
	4. Once all separate multiplications are complete, the calculation will be complete.

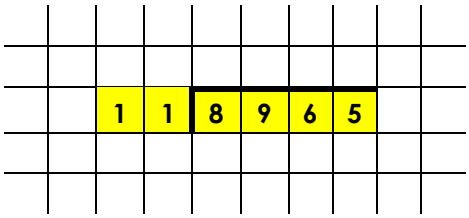
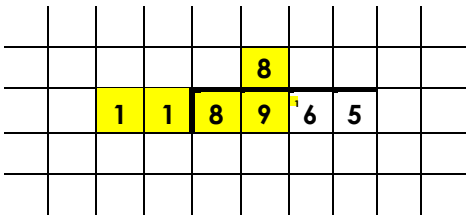
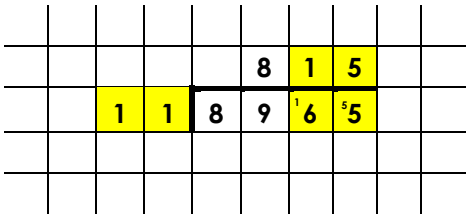
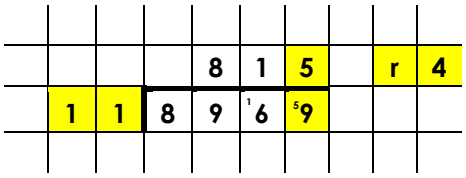
YEAR 4	Multiplication [compact] – 3-digit by 1-digit numbers
	1. Set out the calculation as shown with the largest number on the top. **Remember to line up numbers carefully using place value headings.**
	2. Multiply each number from the top by the number underneath, remembering to start with the lowest value number (right hand side). **If the multiple created contains two digits, record the smallest value between the lines and the largest underneath the next largest place value column to the left.**
	3. Repeat until each number on the top has been multiplied by the number underneath. **Remember to add on any extra numbers created from the previous calculation (recorded under the line).**
	4. Once all separate multiplications are complete, the calculation will be complete.

YEAR 5	Multiplication – up to 4-digits by 1-digit numbers
	1. Set out the calculation as shown with the largest number on the top. **Remember to line up numbers carefully using place value headings.**
	2. Multiply each number from the top by the number underneath, remembering to start with the lowest value number (right hand side). **If the multiple created contains two digits, record the smallest value between the lines and the largest underneath the next largest place value column to the left.**
	3. Repeat until each number on the top has been multiplied by the number underneath. **Remember to add on any extra numbers created from the previous calculation (recorded under the line).**
	4. Once all separate multiplications are complete, the calculation will be complete.

YEAR 5	Multiplication [long] – up to 4-digits by 2-digit numbers
	1. Set out the calculation as shown with the largest number on the top. **Remember to line up numbers carefully using place value headings.**
	2. Multiply each number from the top by the lowest value number underneath, remembering to start with the lowest value number (right hand side). **If the multiple created contains two digits, record the smallest value between the lines and the largest above the next largest place value column to the left.** **Remember to add on any extra numbers created from the previous calculation as you go along.**
	3. Next, repeat this process multiplying each number from the top by the next highest value number underneath. Record the results on the line below those in step 2.
	4. Once all separate multiplications are complete, add each column to find the total. **Remember to start by adding the numbers in the column with the lowest value (right hand side).**

YEAR 5	Division [short] – up to 4-digits by 1-digit numbers
	1. Set out the calculation as shown with the **divisor** outside the bracket and the **dividend** inside.
	2. Look at the highest value number of the dividend. How many times can the divisor be divided into this number? Record this above the bracket.
	3. Mentally calculate the difference between this multiple and carry this over into the next highest place value column to the right.
	4. Move to the next highest place value column to the right. Again, calculate how many times the divisor will divide into this number, recoding this above the bracket and carrying over the difference to the next column on the right. Repeat this process until you have divided each number by the divisor. If the last number is an exact multiple of the divisor, the calculation is complete and you have the answer above the bracket.
	**If there is a difference, this is recorded as a remainder (r) above the bracket and to the right of the answer.** **See example.**

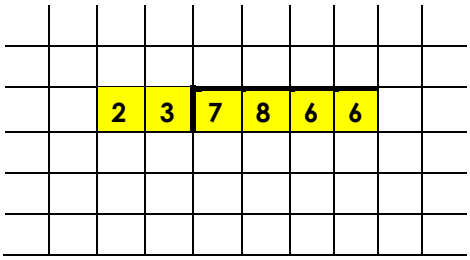
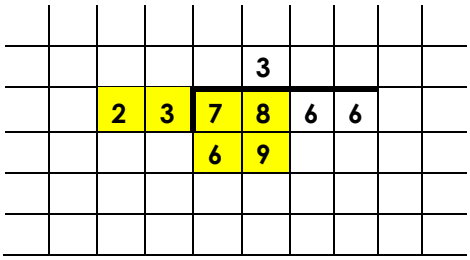
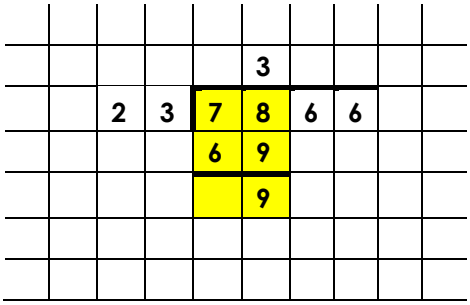
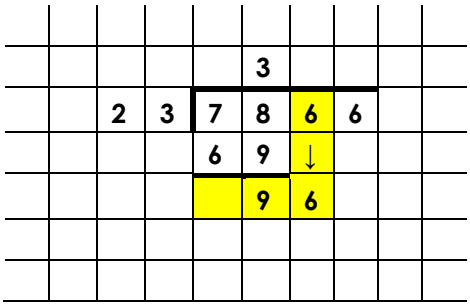
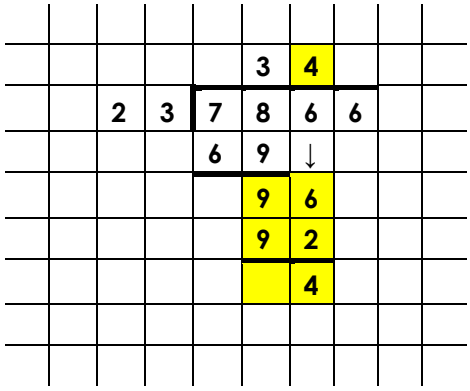
YEAR 6	Multiplication [long] – 4-digit by 2-digit numbers
	1. Set out the calculation as shown with the largest number on the top. **Remember to line up numbers carefully using place value headings.**
	2. Multiply each number from the top by the lowest value number underneath, remembering to start with the lowest value number (right hand side). **If the multiple created contains two digits, record the smallest value between the lines and the largest above the next largest place value column to the left.** **Remember to add on any extra numbers created from the previous calculation as you go along.**
	3. Next, repeat this process multiplying each number from the top by the next highest value number underneath. Record the results on the line below those in step 2.
	4. Once all separate multiplications are complete, add each column to find the total. **Remember to start by adding the numbers in the column with the lowest value (right hand side).**

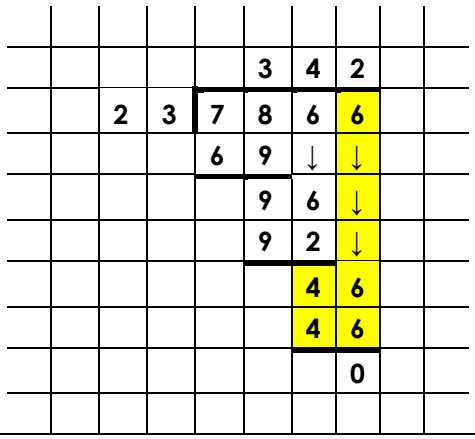
YEAR 6	Division [short] – up to 4-digits by 2-digit numbers
	1. Set out the calculation as shown with the **divisor** outside the bracket and the **dividend** inside.
	2. Look at the **two** highest value numbers of the dividend. How many times can the divisor be divided into this number? Record this above the bracket. Mentally calculate the difference between this multiple and carry this over into the next highest place value column to the right.
	3. Move to the next highest place value column to the right. Again, calculate how many times the divisor will divide into this number, recoding this above the bracket and carrying over the difference to the next column on the right. Repeat this process until you have divided each number by the divisor. If the last number is an exact multiple of the divisor, the calculation is complete and you have the answer above the bracket.
	**If there is a difference, this is recorded as a remainder (r) above the bracket and to the right of the answer.** **See example.**

NB This method of division [short] should be used when the divisor is either:

- **a relatively low 2-digit number or**
- **a 2-digit number that can be multiplied easily, mentally (e.g. 25)**

Otherwise the long method of division should be used. Pupils should be taught to recognise which method is most appropriate and efficient.

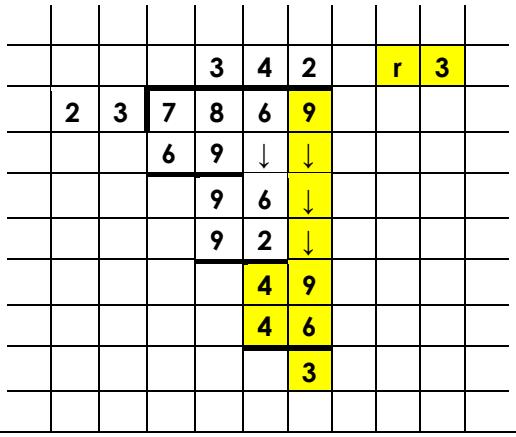
YEAR 6	Division [long] – up to 4-digits by 2-digit numbers
	1. Set out the calculation as shown with the **divisor** outside the bracket and the **dividend** inside.
	2. Look at the **two** highest value numbers of the dividend. How many times can the divisor be divided into this number? Record this above the bracket whilst recording the value of the multiple below.
	3. Calculate the difference between this multiple and the original part of the dividend. Record this underneath.
	4. 'Move down' the next highest place value number to generate a new number to be divided by the divisor.
	5. Using this new number, calculate how many times the divisor can be divided into it. Record this above the bracket. Record the value of the multiple below and calculate the difference as before.



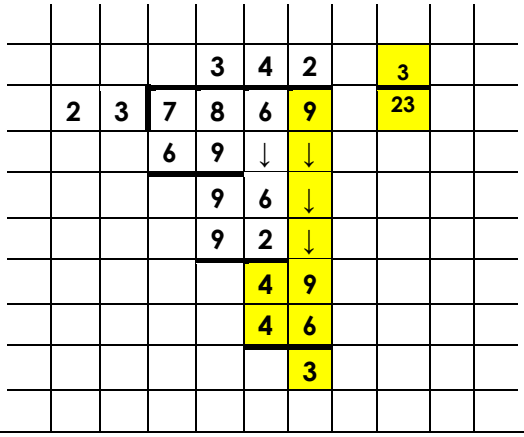
6. 'Move down' the next highest place value number to generate a new number to be divided by the divisor.

Repeat the processes above until all numbers in the dividend have been divided.

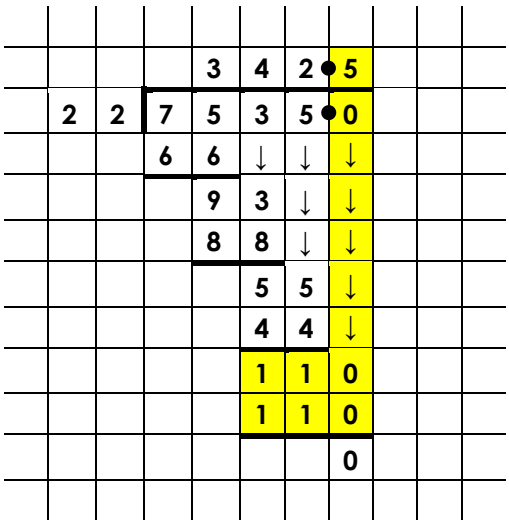
If there is a difference when the lowest value number has been reached (the ones), this can be recorded in three different ways – see examples below.



As a remainder.



As a fraction.



As a decimal, by continuing to divide into the next place value columns after the ones.