



**St. Wilfrid's
Church of England
Primary Academy**

Executive Headteacher: Mr S. Colothan



Mathematics Policy

Updated January 2022

'I can do all things through Christ who strengthens me.'

Phillippians 4:13

Our Christian Vision

'I can do all things through Christ who strengthens me.' **Philippians 4:13**

1. Our **children** will be rooted in strong faith and academic foundations to thrive and succeed, knowing that Jesus is with them, every step of their journey.
2. Our **staff** will have the highest expectations and aspirations for our children, knowing that together, we can achieve anything through Christ.
3. Our **school** will be a place where children can grow in strength, to be unique and flourish in the presence of God.



Our Mission Statement



at St Wilfrid's we can

We will ensure that our children **achieve** exceptionally well.

We will nurture our children to **believe** in themselves and each other.

We will create a culture of love, **care** and respect for one another.

At St. Wilfrid's, we can do all things through Christ who gives us strength.

Our Aims

1. To provide a distinctly Christian ethos, underpinned by our Christian Values and Scripture, where children can grow spiritually and become reflective decision-makers.
2. To provide a 'literacy-rich' curriculum of the highest quality, that engages and challenges all children in our school community.
3. To provide an environment that excites and stimulates learning, fosters personal growth and responds to the individual needs of all children.
4. To provide a rich and broad education, with enrichment and extra-curricular opportunities, and unique experiences, that prepare our children socially and mentally for their future.

Our Christian Values

Our Christian Values, which are rooted in scripture, are threaded through our school, our decision making and everything that we do.

Love is at the heart of our Christian Values and all members of our school community aim to 'live out' our Christian Values in our actions and choices.



Intent

Mathematics at St. Wilfrid's Church of England Primary Academy is a creative and highly inter-connected subject, underpinned by the three statutory aims of the National Curriculum: **fluency, reasoning and problem solving**.

Our intent is for all children to become fluent mathematicians, who are able to confidently recall and apply mathematical knowledge and demonstrate conceptual understanding. We aim for all of our children to be proficient users of mathematical language, which will support them in their mathematical reasoning in different contexts. Our ambition is for children to become competent problem solvers, through applying their mathematical knowledge to wide range of problems, in maths lessons, other subjects and in 'real life'.

Our Christian Values and Distinctiveness, alongside our School Mission Statement of 'Achieve, Believe and Care', are at the heart of our curriculum and all that we do at St. Wilfrid's.

Implementation

In Mathematics, we implement an inclusive curriculum that meets the statutory requirements of the National Curriculum. We use 'Focus Education' as a spine in KS1 and KS2, to support our planning and teaching of Maths and in Early Years we are guided by 'Development Matters.' We supplement this with a wide range of other high-quality teaching and learning resources, which include: White Rose Maths Hub, NCTEM, Nrich, Master the Curriculum, Classroom Secrets and Headstart.

At the beginning of each Maths lesson, children complete a 'Review and Do' related to previous learning, to strengthen children's retention of knowledge. A series of stimulating lessons are planned, with clear learning objectives, to develop fluency, reasoning and problem solving and the use of subject-specific vocabulary.

Our Maths curriculum is delivered through highly effective 'quality first teaching'. All children, when introduced to a key new concept, have the opportunity to build competency in this topic. Children are encouraged to physically represent mathematical concepts using concrete resources, pictorial (models and images) to demonstrate and visualise abstract ideas, alongside numbers and symbols.

Concrete - Examples include structural apparatus such as cubes, counters, 3D shapes or weighing scales as well as contextual objects such as teddies or coins for counting or sorting.

Pictorial - Examples include children's own mark making and simple drawings, sketches, number lines and diagrams.

Abstract - Examples include young children's emergent graphics, early number formation, number sentences and written expanded methods.

Fluency is a fundamental of mathematics, ensuring that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately.

Children become confident in the two types of fluency:

Conceptual fluency, e.g. exploring the five strands of place value, (counting, recognition of cardinal numbers, knowing what each digit in a number represents, understanding our base-10 structure and exchanging), what an equivalent fraction is and identifying key features of different representations of data.

Procedural fluency, e.g. $+$ $-$ \times \div calculation methods linked to whole numbers, fractions and decimals and exploring step by step mental and written methods.

Children are given regular opportunities to recall known facts, develop number sense, know why they are doing what they are doing and know when it is appropriate and efficient to choose different methods and will apply skills to multiple contexts e.g. multiplying and dividing by 10 to convert units of measurements.

Reasoning and problem solving is planned and interwoven into the mathematics curriculum.

Reasoning questions are explicitly taught and modelled through the use of discussion, maths partner talk, manipulatives, written words using 'stem sentences. Reasoning activities could include 'spot the mistake', 'alike and different', 'odd one out', 'always, sometimes and never' and 'true and false'.

The five types of **problem solving** are 'two step word problems', 'finding all possibilities', 'finding rules and describing patterns', 'diagram problems and visual puzzles' and 'logic problems.' The type of problem-solving activity is carefully selected to match the objectives being taught.

Structure of Maths lesson

1. **'Review and Do'** activity.
2. **Teach, Model & Scaffold-** Explicit teaching and modelling (Examples: Use of interactive whiteboard, concrete resources, pictorial representations and abstract as appropriate)
3. **Practise** - this could be independent on whiteboards or jotters, partner talk, and may include using resources.
4. **Apply-** Independent activity including fluency, reasoning and problem solving.
5. **Consolidate-** Reasoning or problem-solving question to end every maths lesson (whole class).

Impact

Our well-planned Maths curriculum ensures that children are fluent and confident mathematicians, who exude an enjoyment and curiosity about the subject. Our children are enthusiastic and competent mathematical problem solvers, within maths lessons and across the curriculum. Children perform consistently well in Mathematics and are very well prepared for the next stage in their education.

Rationale

Mathematics helps children to make sense of the world around them by developing their ability to calculate, reason and solve problems. It enables children to understand and appreciate relationships and patterns in number, geometry, measurement and statistics in their everyday lives. It can be used to analyse and communicate ideas and information effectively, and to tackle a range of practical tasks and real-life problems. Through their growing knowledge and understanding, children learn to appreciate the contribution made by many cultures to the development and application of Mathematics.

"Mathematics 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, and appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject." (National Curriculum, 2014)

Mathematics at St Wilfrid's will:

- present Mathematics as a challenging, exciting and creative subject in order to promote positive and confident attitudes towards learning.
- promote enjoyment and enthusiasm for Mathematics by getting children to use and apply maths in different contexts, providing opportunities for exploration and discussion, and encouraging them to take part in a range of practical activities.
- develop mathematical understanding through the teaching of appropriate learning objectives, including skills, knowledge and a quick recall of basic facts.
- provide opportunities for children to develop the ability to express themselves fluently, using correct mathematical language and vocabulary.
- develop children's ability to be flexible, creative, accurate and to use their initiative and systematic logical thinking.
- encourage the effective use of maths as a tool in a wide range of activities within school and in everyday life.
- involve parents and carers in their child's learning.
- provide mathematical home-learning opportunities via Purple Mash and online subscriptions.

Mathematics Subject Leadership

Subject Leaders are responsible for raising attainment and improving the standards of teaching and learning in their subject. They ensure that a carefully planned, broad and balanced curriculum is implemented for Mathematics, champion the subject and demonstrate its importance to pupils and staff.

Subject Leaders demonstrate a good understanding of how Mathematics progresses over time and how it connects with the school's curriculum as a whole. Mathematics Leaders have high levels of subject pedagogical content knowledge for the age range that they are teaching, and an understanding of the critical endpoints that come before and after.

Subject Leaders at St. Wilfrid's Church of England Primary Academy, work alongside other schools within The Learning Together Trust. This provides opportunities to work collaboratively and creatively with colleagues across the key stages, thus moving the Mathematics curriculum forward, and further developing the subject. Subject Leaders lead by example, setting high standards in their own teaching and ensuring that high-quality teaching and learning of Mathematics takes place across the school, with the achievement and engagement of all pupils being their utmost priority.

Mathematics Subject Leaders will:

- raise the profile of Mathematics at St. Wilfrid's Primary Academy
- lead and manage the Mathematics effectively and have an 'expert' knowledge of the Mathematics curriculum overview, including all unit/topics across the whole school
- confidently articulate the Mathematics curriculum design and have a clear and ambitious vision for Mathematics (Intent, Implementation and Impact)
- monitor, evaluate and enhance the quality of teaching, learning and assessment in Mathematics
- ensure that there is clear progression in knowledge, skills and vocabulary in Mathematics, across school
- support, guide and motivate colleagues in their CPD, as well as build capacity across the school
- identify the subject's needs in the context of whole school priorities and produce a Mathematics School Development Plan annually, reviewing this termly
- audit Mathematics resources and identify resource needs and costings in Mathematics School Development Plans, managing allocated budgets effectively.

- provide strategic direction and development of Mathematics across the school.
- develop their own expertise through training and evidence-based research and investigate how implementations are embedding
- effectively communicate with the Mathematics link Governor, sharing and celebrating Mathematics
- review and update the Mathematics Policy, as necessary

Mathematics Curriculum

Mathematics is a core subject in the National Curriculum and we use this as the basis for implementing the statutory requirements of the programme of study for Mathematics.

Mathematics is divided into the following strands of learning:

- Number- number and place value
- Number- addition and subtraction
- Number- multiplication and division
- Number- fractions (including decimals and percentages)
- Measurement
- Geometry- properties of shape
- Geometry- position and direction
- Statistics

Early Years and Foundation Stage

Learning undertaken within the Foundation Stage is guided by the requirements and recommendations set out in the Early Learning Goals from the Early Years Foundation Stage document and 'Development Matters'. We give all children ample opportunity to develop their understanding of Mathematics and we aim to do this through varied activities that allow them to use, enjoy, explore, practise and talk confidently about different aspects of Mathematics.

Mathematics across the Curriculum

Mathematics is integral to many areas within the curriculum and links are made explicit by teachers. Mathematics is fundamental within science, design technology, computing and geography. It contributes to the development of art, history, physical education and music. Within these disciplines, children have the opportunity to understand how mathematics is linked and to apply mathematical skills and thinking.

Inclusion

At St. Wilfrid's Church of England Primary Academy, we teach Mathematics to all children, whatever their ability and individual needs. Mathematics forms part of our school curriculum policy, to provide a broad and balanced education to all children. We are very mindful of the learning needs of all of our children and those with Special Educational Needs are supported via effective planning, quality first teaching and assessment, differentiated activities as necessary, high expectations, suitable resources and recording formats. We consider the targets set for individual children in their Individual Education Plans (IEPs) and Education Health and Care plans (EHCPs).

Through our Mathematics teaching, we provide learning opportunities that enable all pupils to make good progress within each lesson.

We strive to meet the needs of pupils with special educational needs, those with disabilities, those with special gifts and talents, and those learning English as an additional language, and we take all reasonable steps to achieve this.

We believe that the curriculum should be accessible to all children. This is made possible through scaffolded support, small group work, use of Knowledge Organisers and word banks, or extra time to complete learning tasks.

Advice is sought from outside agencies as appropriate, to ensure an inclusive approach. If teaching staff require additional support to meet the needs of any child, they consult our SENDCo.

Equal Opportunities and Diversity

All children at St. Wilfrid's Church of England Primary Academy, are offered a broad and balanced curriculum, differentiated to meet their needs as necessary. There is equality of access to the whole curriculum. No child is denied access to any part of the curriculum unless specific physical needs or religious/cultural considerations make it inappropriate.

At St. Wilfrid's, we are committed to providing all children with a curriculum that provides equality of opportunity and freedom from discrimination. Staff ensure that all children are treated fairly, equally and with respect. We do not discriminate against any child. All staff challenge any incidents of prejudice or racism. We record any serious incidents on + CPOMS and draw them to the attention of the Executive Headteacher.

We plan Mathematics lessons and activities to challenge and involve all pupils appropriately, according to age and capability, ethnic diversity, gender, culture, race, special educational needs or disability, and language background. Teachers use a range of strategies to ensure inclusion, and to maintain a positive ethos where children demonstrate positive and respectful attitudes towards others. Care is taken when selecting resources to ensure that a range of perspectives and viewpoints are represented, including those of men and women from different racial, national and religious groups. Careful consideration is taken to avoid stereo-typing, and bias, towards race, gender, role or disability. Through the teaching of Mathematics, we aim to develop awareness of ethnic, cultural and economic diversity of human society and to foster positive attitudes to all people.

We deal with any issues clearly and sensitively, if they arise.

Resources

Concrete resources to support number: dienes apparatus, Numicon, tens frames, place value counters, fraction walls, dice, fraction builders, cubes, flip stands, fraction cubes, number strings, abacuses, number fans and decimal number fans. Concrete resources to support shape, space and measure: 2D shapes, 3D shapes, nets and translucent shapes.

In Early Years, we have continuous provision resources for number and stories, outdoor and active maths resources, resources to support early number, patterning and sequencing, online subscriptions, hundred squares, multiplication squares, place value charts and arrow cards.

Assessment and Recording

Assessment takes place at three connected levels: short term, medium term and long term. These assessments are used to inform teaching in a continuous cycle of planning, teaching and assessment.

Assessment is carried out:

- Orally through questioning (open and closed)
- By observation of children at work
- Marking of children's work
- Weekly arithmetic or skills check- scores to be recorded on marksheets
- Half termly, planned assessments during Assessment Week

Informal assessment takes place continuously and teachers record on 'Age Related Descriptors' at the back of the children's books. Half termly data is inputted into Target Tacker to record the achievement of each individual child. Small steps tracker is used for some SEN pupils.

Assessments include:

- Maths assessment tests (Assertive Mentoring and NFER) are used throughout the Academy to assist with teacher assessment. Sandwell and TESS assessment are used to support assessment of learners who make small steps in learning.
- Reception baseline and CEM are used within Early Years for assessment.
- Moderation takes place to ensure consistency of teacher assessments.
- Teachers use 'Age Related Descriptors' and test data to make and record a termly and end-of-year assessment of each child's 'best fit' against the national curriculum statements. This is shared with senior management through termly Pupil Progress Meetings and Head of School Improvement to monitor progress and attainment.

Monitoring and Evaluation

Monitoring and evaluation will be carried out by the:

- Senior Leadership Team
- Head of School Improvement
- Mathematics Subject Leaders
- Mathematics Governor
- Class teachers

All teachers are responsible for monitoring standards in their class. Mathematics Subject Leaders, under the direction of the Senior Leadership Team, take the lead in this. Monitoring will take place according to current school cycle. Using whole school priorities, identified by the Senior Leadership Team, subject leaders are responsible for producing a School Development Plan for Mathematics, to allow for progression and development of the subject.

Mathematics Subject Leaders will also monitor children's work books and long term and medium-term plans, to ensure that the Programmes of Study are being effectively taught and match the needs and abilities of the pupils. Subject leaders have curriculum release time and directed time, in which to fulfil their role.

Mathematics subject leaders are responsible for:

- monitoring the standard of work and the quality of teaching and learning in Mathematics and pupils' progress and standards
- supporting colleagues in the planning, teaching and assessment of Mathematics (through the use of 'book looks', pupil voice, lesson observations, discussion with teachers, subject audit, data analysis, and other monitoring activities that may be required), providing a strategic lead and direction for the subject in school
- monitoring and reviewing the implementation of policy and units of work
- ensuring there are rigorous assessment systems in place to enable teachers and pupils to monitor progress and attainment in Mathematics
- monitoring and analysing assessments, holding teachers to account
- liaising with the Executive Headteacher and Governors to feedback on the monitoring and impact of Mathematics across the school

Staff Support and Training

St. Wilfrid's Church of England Primary Academy believes that all staff should be involved in a continuing process of improvement. Our school is committed to fostering a positive ethos of continuous learning. Continuing Professional Development (CPD) is the means by which a school is able to motivate and develop its staff community. CPD is intended to support teachers and to equip them with the skills and knowledge required to keep pace with the rapidly changing educational and professional environment.

This development takes place at a number of levels: individual, team, whole school and through wider networks. CPD supports and reflects the ethos, Christian Values and vision of the school.

The Mathematics subject leader's role is to provide professional leadership and management for the subject to secure high-quality teaching, effective use of resources and improved standards of learning and achievement for all pupils.

Subject Leaders: Miss. L. Clayton, Miss. A. Blackledge, Miss. D. Cowburn, Mrs. G. Kohler, Miss. R. Bullen and Mrs. K. Newman

Executive Headteacher: Mr. S. Colothan

Date: January 2022

Appendix 1
Calculation policy document

Early Years

When counting children can use the following in addition to lose parts and play equipment

Fingers, natural objects, numbered objects, numicon (staircase patterns), playground markings, 100 square, number tracks, number lines, dice

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |



When adding or subtracting numbers to 10, children can use the following resources and images in addition to play equipment

Tens frame, part part whole model, cubes, bar model, straws, bead strings, real objects, numicon, counters, number tracks, number lines,

$4 + 3 = 7$

$6 + 4 = 10$
 $4 + 6 = 10$
 $10 - 4 = 6$
 $10 - 6 = 4$

10
6 4

$6 + 4 = 10$
 $4 + 6 = 10$
 $10 - 4 = 6$
 $10 - 6 = 4$

$7 = 4 + 3$
 $7 = 3 + 4$
 $7 - 3 = 4$

$7 = 4 + 3$
 $7 = 3 + 4$

$6 + 4$ $7 + 3$ $8 + 2$ $9 + 1$

1 2 3 4 5

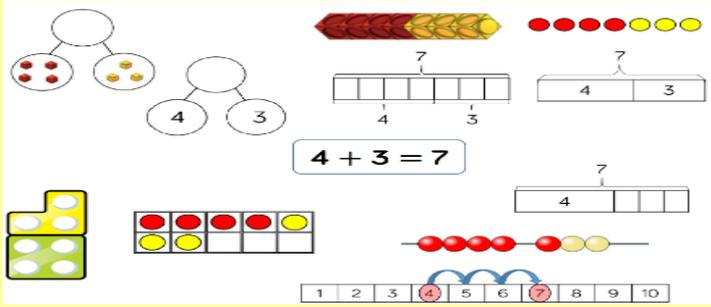
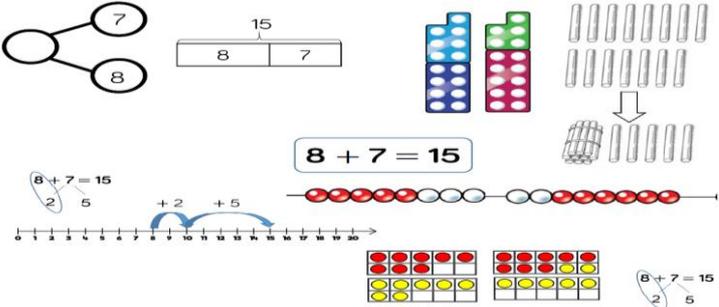
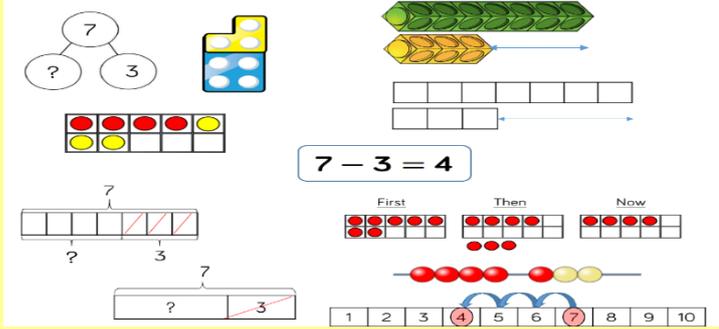
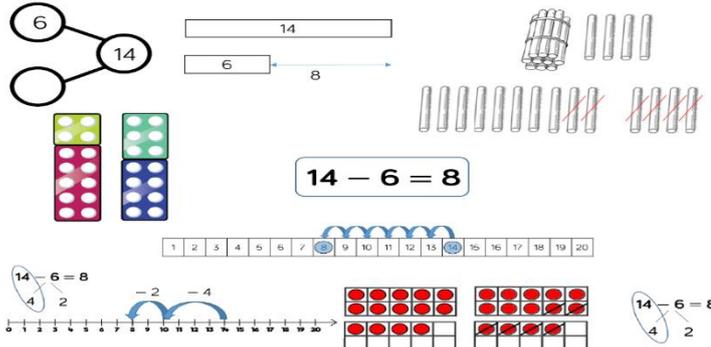
To subitise children can use the following in addition to real objects in the form of the dice pattern.

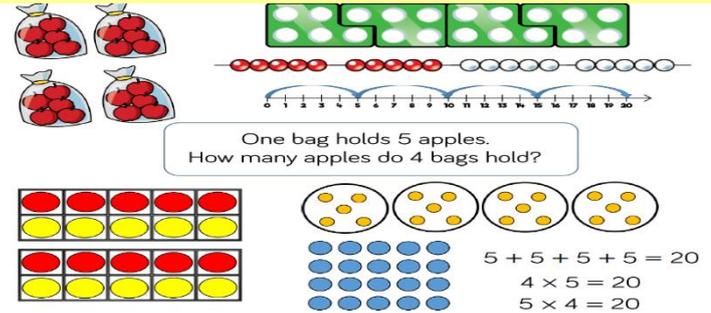
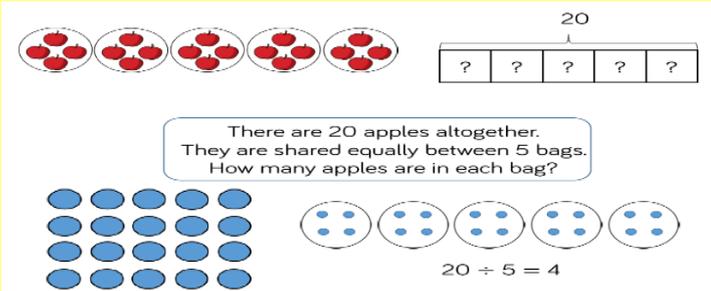
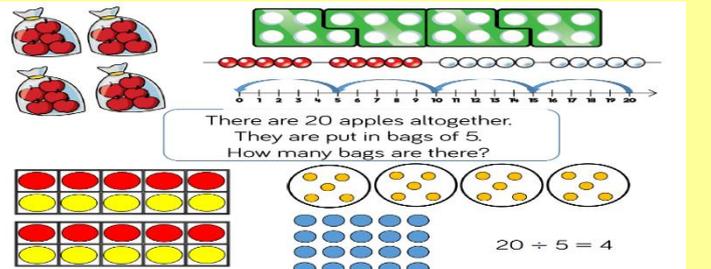
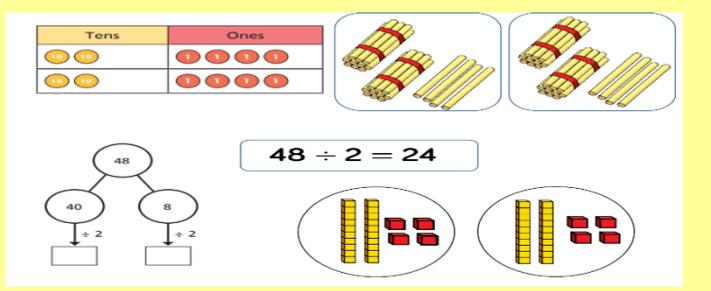
Dominoes, dice, numicon, natural objects in the pattern of dice



Key Stage 1

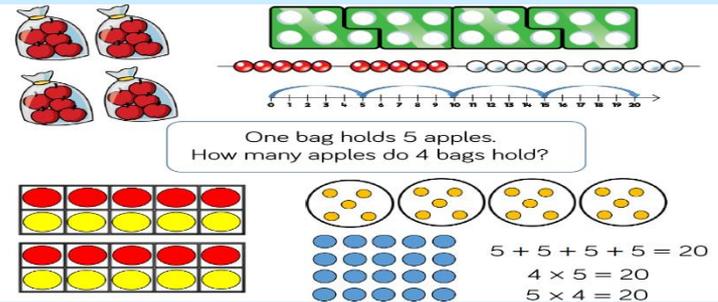
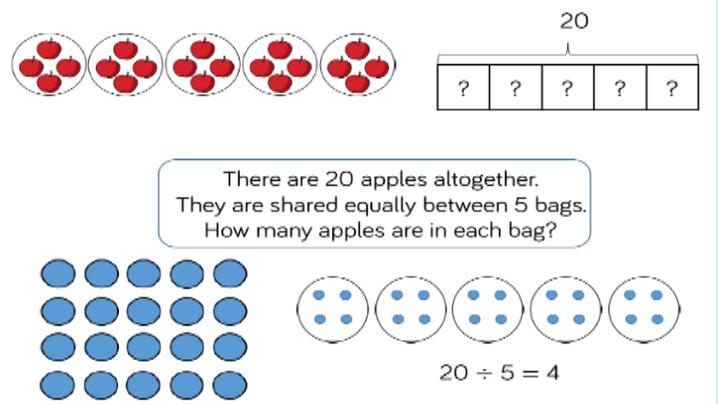
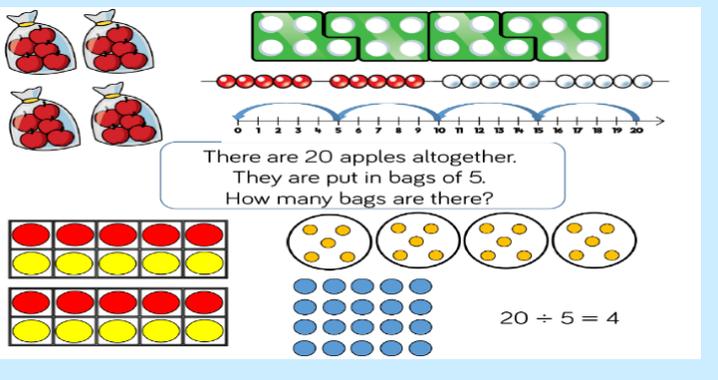
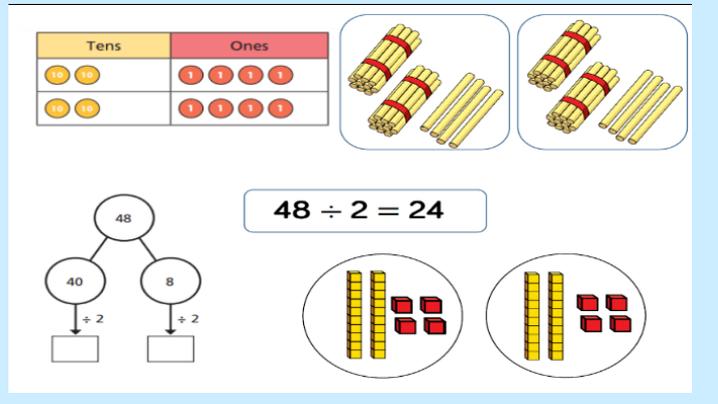
| Year | Mental or written calculation | Default for ALL children |
|---|-------------------------------|--|
| <p style="writing-mode: vertical-rl; transform: rotate(180deg);">Overview of KS1</p> | | <p>Children in KS1 will be given a solid foundation in the building blocks of mental and written arithmetic. A knowledge of place value will enable children develop an understanding of how numbers work, so that they are confident in 2-digit numbers. They will be able to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts. Children will leave KS1 with a good knowledge of numbers to at least 10. They will also have experienced and been taught bonds to 20 and beyond. Their knowledge of number facts enables them to add several single-digit numbers and to add/subtract a single digit number to and from a 2-digit number. Children will learn to partition numbers into tens and ones, leading to partitioning numbers into hundreds, tens and ones. Children will be taught to count in 2s, 3s, 5s and 10s. They will have met and begun to learn the associated 2x, 3x, 5x and 10x tables, engaging in practical ways with the concept of repeated addition and the use of arrays which enables children to develop a preliminary understanding of multiplication and division. They will also be taught to double and halve numbers. Fractions are also introduced as parts of a whole finding fractions of amounts and shapes.</p> |

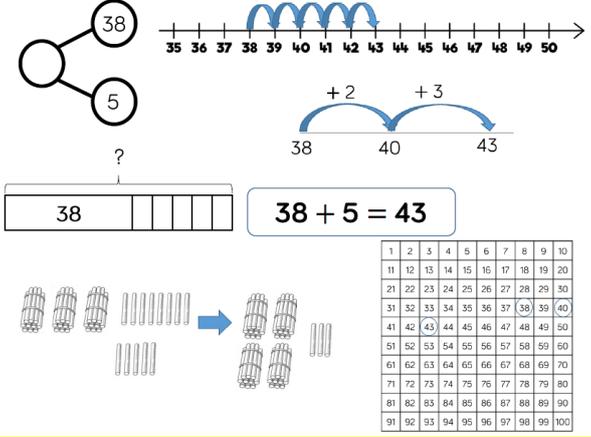
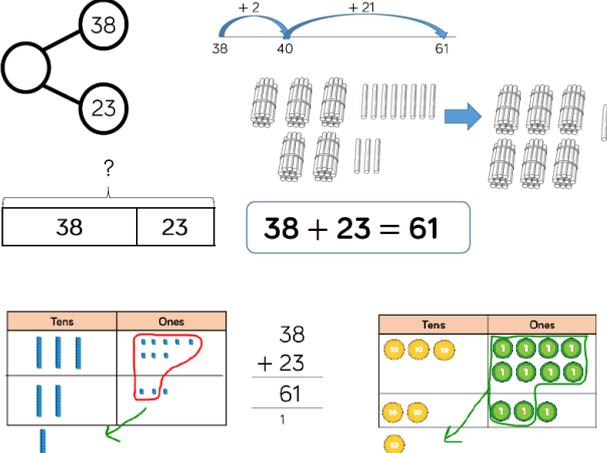
| Year | | Mental or written calculation | Default for ALL children |
|--------|-------------|---------------------------------------|--|
| Year 1 | Addition | Add 1-digit numbers within 10 |  <p>4 + 3 = 7</p> |
| | | Add 1 and 2 -digit numbers to 20 |  <p>8 + 7 = 15</p> |
| Year 1 | Subtraction | Subtract 1-digit numbers within 10 |  <p>7 - 3 = 4</p> |
| | | Subtract 1- and 2-digit numbers to 20 |  <p>14 - 6 = 8</p> |

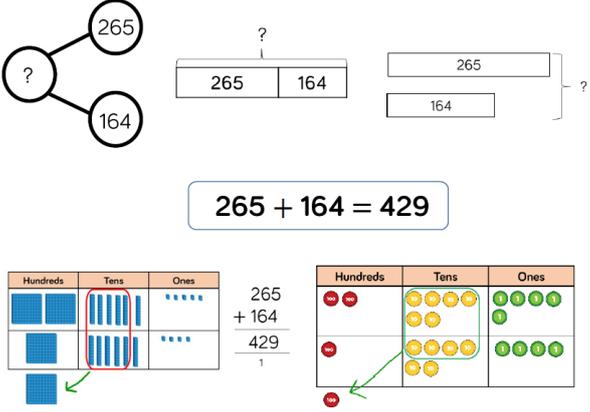
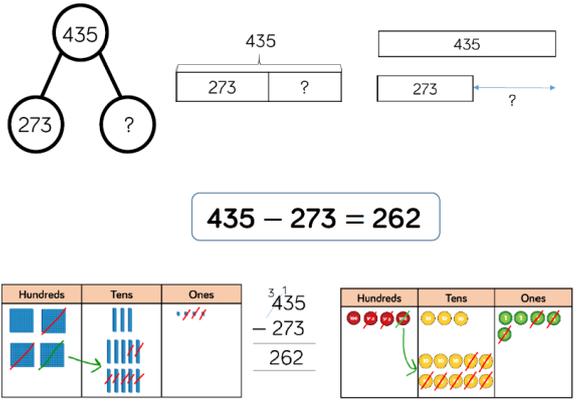
| Year | | Mental or written calculation | Default for ALL children |
|--------|----------------|---|--|
| Year 1 | Multiplication | Solve 1 step problems using multiplication |  <p>One bag holds 5 apples. How many apples do 4 bags hold?</p> <p>$5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$ $5 \times 4 = 20$</p> |
| | | Solve 1 step problems using multiplication (sharing) |  <p>There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?</p> <p>$20 \div 5 = 4$</p> |
| Year 2 | Division | Solve 1 step problems using division (grouping) |  <p>There are 20 apples altogether. They are put in bags of 5. How many bags are there?</p> <p>$20 \div 5 = 4$</p> |
| | | Divide 2-digits by 1-digit (sharing with no exchange) |  <p>$48 \div 2 = 24$</p> |

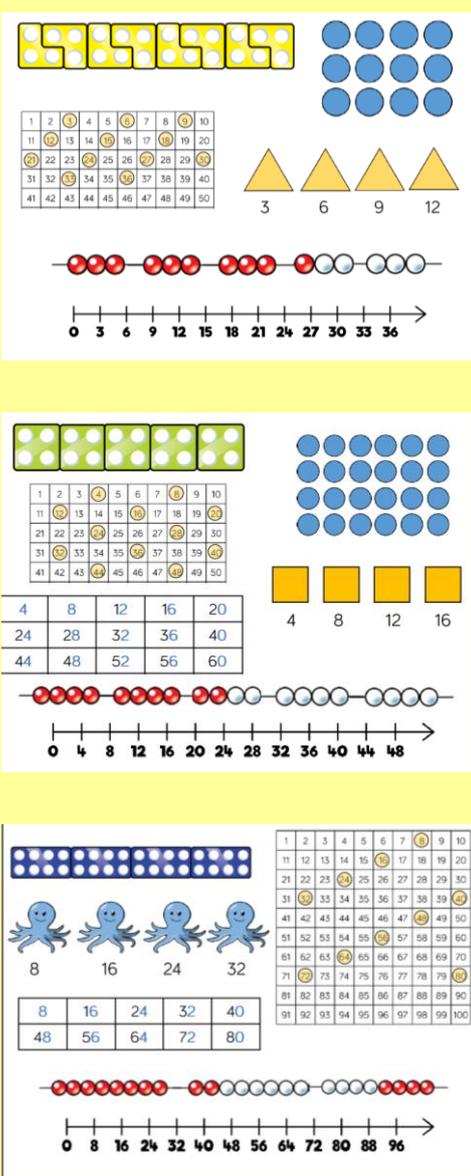
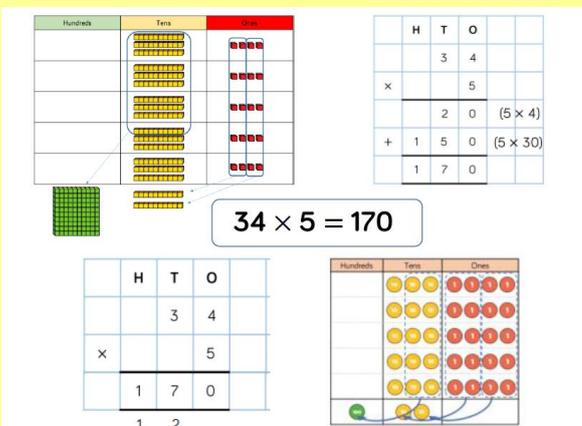
| Year | | Mental or written calculation | Default for ALL children |
|--------|-------------|---------------------------------------|--------------------------|
| Year 2 | Addition | Add 1 and 2 -digit numbers to 20 | <p>8 + 7 = 15</p> |
| | | Add 3, 1-digit numbers | <p>7 + 6 + 3 = 16</p> |
| | | Add 1 and 2-digit numbers to 100. | <p>38 + 5 = 43</p> |
| | Subtraction | Subtract 1- and 2-digit numbers to 20 | <p>14 - 6 = 8</p> |

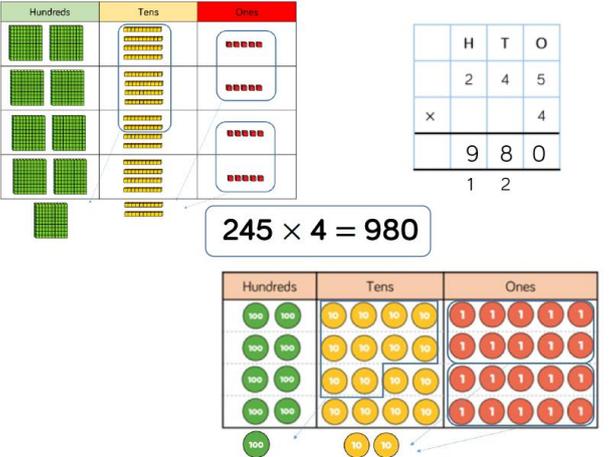
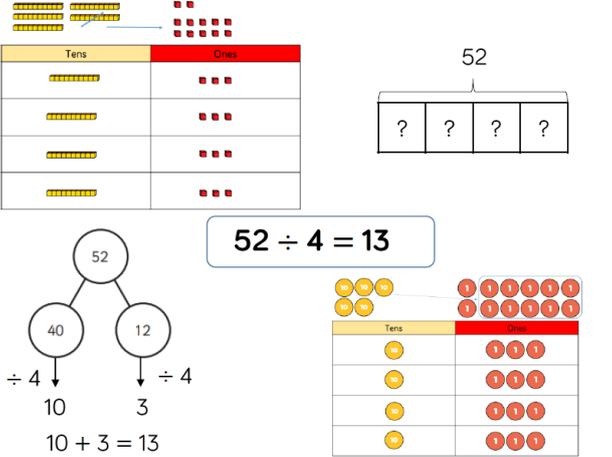
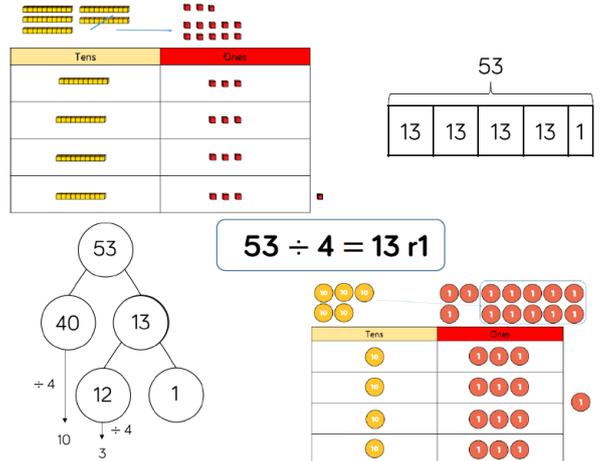
| Year | | Default for ALL children |
|----------------|--|--|
| | Mental or written calculation Subtract 2-digit numbers to 100 | <p>65 28 65</p> <p>28 30 60 65</p> <p>+2 +30 +5</p> <p>65 - 28 = 37</p> <p>Tens Ones</p> <p>5 1 65 - 28 37</p> |
| Multiplication | 2 times tables | <p>0 2 4 6 8 10 12 14 16 18 20 22 24</p> |
| | 5 times tables | <p>0 5 10 15 20 25 30 35 40 45 50 55 60</p> |
| | 10 times tables | <p>0 10 20 30 40 50 60 70 80 90 100</p> |

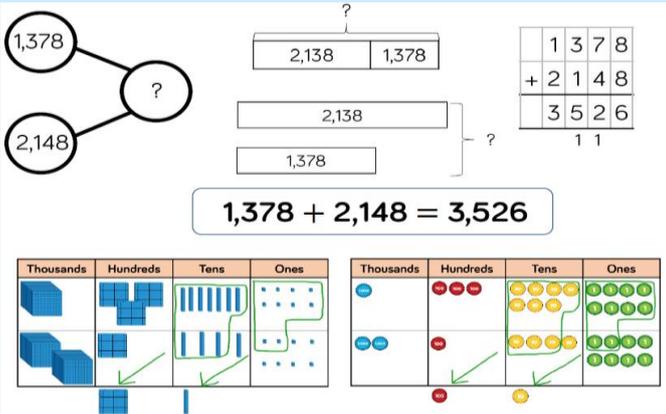
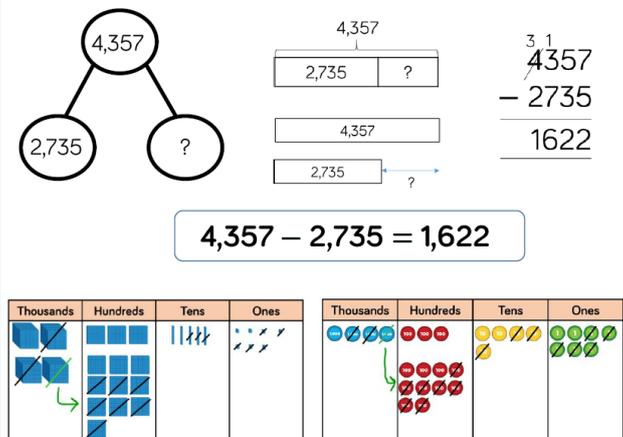
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| Division | | Solve 1 step problems using multiplication (sharing) |  <p>There are 20 apples altogether. They are shared equally between 5 bags. How many apples are in each bag?</p> $20 \div 5 = 4$ |
| | | Solve 1 step problems using division (grouping) |  <p>There are 20 apples altogether. They are put in bags of 5. How many bags are there?</p> $20 \div 5 = 4$ |
| | | Divide 2-digits by 1-digit (sharing with no exchange) |  <p>$48 \div 2 = 24$</p> |

| Year | Mental or written calculation | Default for ALL children |
|--------------------------|--|---|
| Lower Key stage 2 | Overview of LKS2 | <p>In Years 3 and 4, children build on the concrete and conceptual understandings they have gained in KS1 to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced. In Lower KS2 all of the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with larger e.g. when dividing by 5 or multiplying by 20. Children will develop their understanding of fractions, finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.</p> |
| Year 3 | Addition | <p>Add 1 and 2-digit numbers to 100.</p>  |
| | <p>Add two 2-digit numbers to 100.</p> |  |

| Year | Mental or written calculation | Default for ALL children |
|--------------------|----------------------------------|---|
| | Add numbers with up to 3-digits. |  <p> $265 + 164 = 429$ </p> |
| Subtraction | Subtract numbers up to 3-digits. |  <p> $435 - 273 = 262$ </p> |

| Year | | Mental or written calculation | Default for ALL children |
|--|---|--|---------------------------------|
| Multiplication (Including times tables) | | <p>3, 4 and 8 times tables.</p>  | <p>Default for ALL children</p> |
| | <p>Multiply a 2-digit number by a 1-digit number.</p> |  <p>$34 \times 5 = 170$</p> | |

| Year | | Mental or written calculation | Default for ALL children |
|-----------------|--|---|--|
| | | Multiply a 3-digit number by a 1-digit number. |  <p>Resources for $245 \times 4 = 980$ include: a place value chart showing 245 (2 hundreds, 4 tens, 5 ones) multiplied by 4; a grid of 100s, 10s, and 1s blocks representing the product 980; a written multiplication problem with a partial product table; and a base ten block model showing 245 tens blocks multiplied by 4 to result in 980 ones blocks.</p> |
| Division | | Divide a 2-digit by a 1-digit (sharing with exchange) |  <p>Resources for $52 \div 4 = 13$ include: a place value chart showing 52 (5 tens, 2 ones) divided by 4; a partial quotient diagram showing $52 \div 4 = 10 + 3 = 13$; a written division problem with a quotient box; and a base ten block model showing 52 tens blocks divided into 4 groups of 13.</p> |
| | | Divide a 2-digit by a 1-digit (sharing with remainders) |  <p>Resources for $53 \div 4 = 13 \text{ r}1$ include: a place value chart showing 53 (5 tens, 3 ones) divided by 4; a partial quotient diagram showing $53 \div 4 = 12 + 1 = 13 \text{ r}1$; a written division problem with a quotient box and remainder; and a base ten block model showing 53 tens blocks divided into 4 groups of 13, with 1 one block left over.</p> |

| Year | Mental or written calculation | Default for ALL children |
|--------|--|--|
| Year 4 | Addition Add numbers with up to 4-digits. |  <p>The diagram illustrates the addition of 1,378 and 2,148. It shows a number bond with 1,378 and 2,148 pointing to a question mark. A bar model shows 2,138 and 1,378 with a question mark above. A vertical addition problem shows 1,378 + 2,148 = 3,526 with a carry of 1. Below are two place value charts: one with blue blocks representing the numbers and another with colored dots representing the same numbers.</p> |
| | Subtraction Subtract numbers with up to 4-digits. |  <p>The diagram illustrates the subtraction of 2,735 from 4,357. It shows a number bond with 4,357 and 2,735 pointing to a question mark. A bar model shows 4,357 and 2,735 with a question mark above. A vertical subtraction problem shows 4,357 - 2,735 = 1,622 with a borrow of 3 from the thousands place. Below are two place value charts: one with blue blocks representing the numbers and another with colored dots representing the same numbers, showing the borrowing process.</p> |

Multiplication (Including times tables)

6, 7, 9, 11 and 12.

6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90

| | | | | |
|----|----|----|----|----|
| 6 | 12 | 18 | 24 | 30 |
| 36 | 42 | 48 | 54 | 60 |
| 66 | 72 | 78 | 84 | 90 |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84

| | | | | |
|----|----|----|----|----|
| 7 | 14 | 21 | 28 | 35 |
| 42 | 49 | 56 | 63 | 70 |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

9, 18, 27, 36, 45, 54, 63, 72, 81, 90, 99, 108

| | | | | |
|----|----|----|----|----|
| 9 | 18 | 27 | 36 | 45 |
| 54 | 63 | 72 | 81 | 90 |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

11, 22, 33, 44, 55, 66, 77, 88, 99, 110, 121, 132

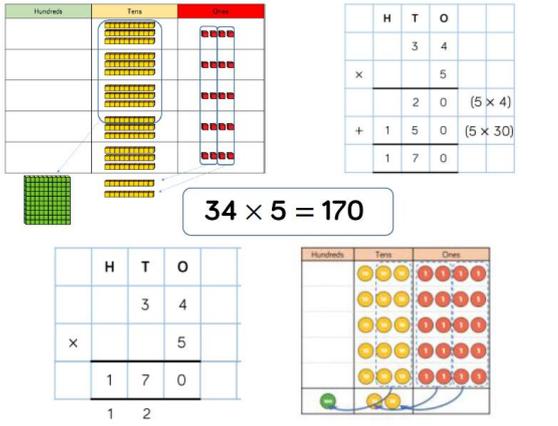
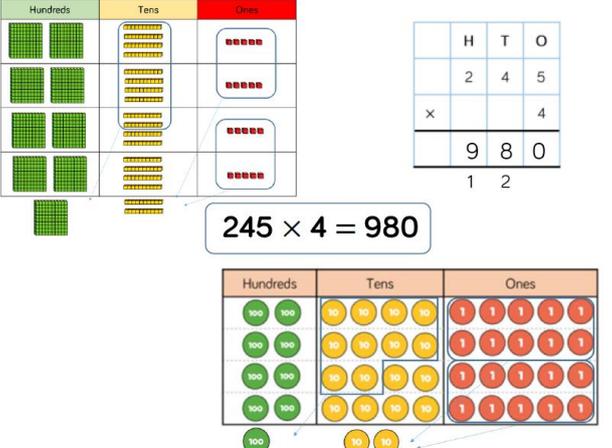
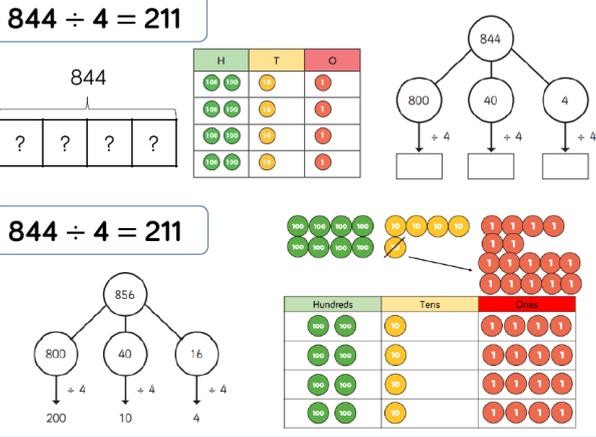
| | | | | | |
|----|----|----|-----|-----|-----|
| 11 | 22 | 33 | 44 | 55 | 66 |
| 77 | 88 | 99 | 110 | 121 | 132 |

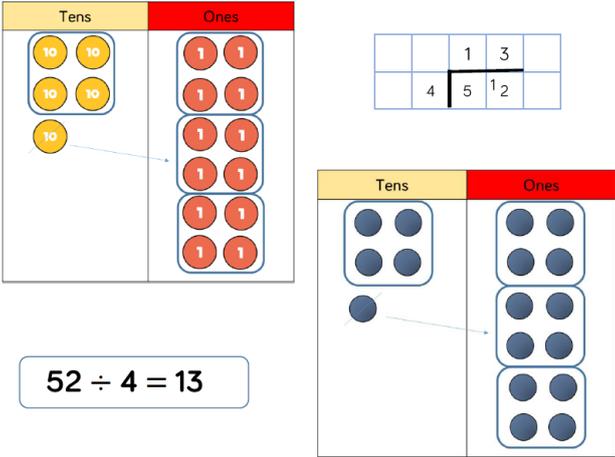
| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

12, 24, 36, 48, 60, 72, 84, 96, 108, 120, 144

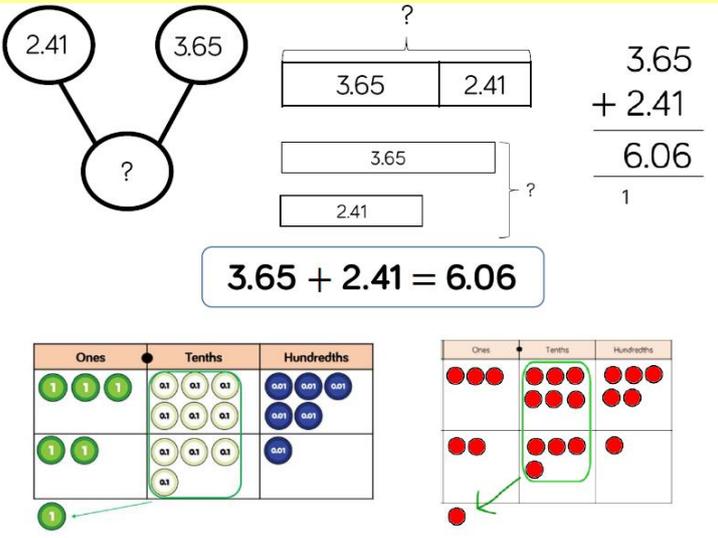
| | | | | |
|-----|-----|----|-----|-----|
| 12 | 24 | 36 | 48 | 60 |
| 72 | 84 | 96 | 108 | 120 |
| 132 | 144 | | | |

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 |
| 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 |
| 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 |
| 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |

| Year | | Mental or written calculation | Default for ALL children |
|-----------------------|--|---|--|
| Multiplication | | Multiply a 2-digit number by a 1-digit number. |  |
| | Multiply a 3-digit number by a 1-digit number. |  | |
| Division | | Divide 3-digits by 1-digit (sharing) |  |

| Year | Mental or written calculation | Default for ALL children |
|------|---------------------------------------|--|
| | Divide 2-digits by 1-digit (grouping) |  |

Upper Key stage 2

| | | |
|--------|-------------------------|--|
| | Overview of UKS2 | <p>Children will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to two decimal places. Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts. Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as $40,000 \times 6$ or $40,000 \div 8$. In addition, it is in Y5 and Y6 that children extend their knowledge and confidence in using written algorithms for multiplication and division. Fractions and decimals are also added, subtracted, divided and multiplied and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.</p> |
| Year 5 | Addition |  |

Add numbers with more than 4-digits.

Tree diagram: $?$ branches into $104,328$ and $61,731$.

Number line: $104,328$ and $61,731$ are shown, with a bracket indicating their sum is $?$.

Equation: $104,328 + 61,731 = 166,059$

| HTh | TTh | Th | H | T | O |
|-------|-------------------|----------------|-------------|----------|-------|
| 10000 | | 1000 1000 1000 | 100 100 100 | 10 10 | 1 1 1 |
| | 10000 10000 10000 | 1000 | 100 100 100 | 10 10 10 | 1 1 1 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | 0 | 4 | 3 | 2 | 8 |
| + | 6 | 1 | 7 | 3 | 1 |
| 1 | 6 | 6 | 0 | 5 | 9 |
| | | | | | 1 |

Subtract with up to 3 decimal points.

Tree diagram: 2.7 and $?$ branch into 5.43 .

Number line: 2.7 and $?$ are shown, with a bracket indicating their difference is 5.43 .

Equation: $5.43 - 2.7 = 2.73$

| Ones | Tenths | Hundredths |
|---------|-----------------|----------------|
| 1 1 1 1 | 0.1 0.1 0.1 0.1 | 0.01 0.01 0.01 |
| 1 | 0.1 0.1 0.1 0.1 | 0.01 0.01 0.01 |

| Ones | Tenths | Hundredths |
|---------|---------|------------|
| 1 1 1 1 | 1 1 1 1 | 1 1 1 |
| 1 1 1 1 | 1 1 1 1 | 1 1 1 |

| | | |
|---|---|---|
| 5 | 4 | 3 |
| - | 2 | 7 |
| 2 | 7 | 3 |

Subtraction

Subtract numbers with more than 4-digits.

Tree diagram: $294,382$ and $?$ branch into $182,501$.

Number line: $182,501$ and $?$ are shown, with a bracket indicating their difference is $294,382$.

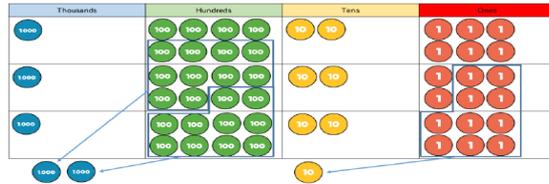
Equation: $294,382 - 182,501 = 111,881$

| HTh | TTh | Th | H | T | O |
|-------|-------------------|----------------|-------------|----------|---|
| 10000 | | 1000 1000 1000 | 100 100 100 | 10 10 10 | 1 |
| | 10000 10000 10000 | 1000 | 100 100 100 | 10 10 10 | 1 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 9 | 4 | 3 | 8 | 2 |
| - | 1 | 8 | 2 | 5 | 0 |
| 1 | 1 | 1 | 8 | 8 | 1 |

Multiplication

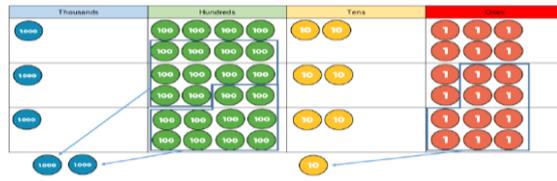
Multiply 4-digit numbers by a 1-digit number.



$$1,826 \times 3 = 5,478$$

| | Th | H | T | O |
|---|----|---|---|---|
| | 1 | 8 | 2 | 6 |
| × | | | | 3 |
| | 5 | 4 | 7 | 8 |
| | | 2 | | 1 |

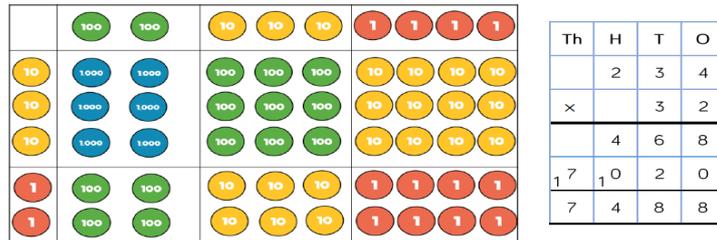
Multiply 2-digit numbers by 2-digit numbers.



$$1,826 \times 3 = 5,478$$

| | Th | H | T | O |
|---|----|---|---|---|
| | 1 | 8 | 2 | 6 |
| × | | | | 3 |
| | 5 | 4 | 7 | 8 |
| | | 2 | | 1 |

Multiply 3-digit numbers by 2-digit numbers.



| | Th | H | T | O |
|---|----|---|---|---|
| | | 2 | 3 | 4 |
| × | | | 3 | 2 |
| | | 4 | 6 | 8 |
| 1 | 7 | 0 | 2 | 0 |
| 7 | 4 | 8 | 8 | |

$$234 \times 32 = 7,488$$

| | | | |
|----|-------|-----|-----|
| × | 200 | 30 | 4 |
| 30 | 6,000 | 900 | 120 |
| 2 | 400 | 60 | 8 |

Multiply 4-digit numbers by 2-digit numbers.

| | TTh | Th | H | T | O |
|---|-----|----|---|---|---|
| | | 2 | 7 | 3 | 9 |
| × | | | | 2 | 8 |
| | | 2 | 1 | 9 | 1 |
| 2 | 5 | 3 | 7 | 1 | 2 |
| 1 | 5 | 4 | 7 | 8 | 0 |
| | 7 | 6 | 6 | 9 | 2 |
| | | | | | 1 |

$$2,739 \times 28 = 76,692$$

Division

Divide 2-digits by 1-digit (grouping).

$52 \div 4 = 13$

Divide 3-digits by 1-digit (grouping).

$856 \div 4 = 214$

Divide 4-digits by 1-digit (grouping).

$8,532 \div 2 = 4,266$

Addition

Add numbers with more than 4-digits.

$104,328 + 61,731 = 166,059$

| HTh | TTh | Th | H | T | O |
|---------|----------------------|-------------------|-------------|----------|-------|
| 100,000 | | 1,000 1,000 1,000 | 100 100 100 | 10 10 | 1 1 1 |
| | 10,000 10,000 10,000 | 1,000 | 100 100 100 | 10 10 10 | 1 1 1 |
| | | | 100 100 100 | 10 10 10 | 1 |

| | | | | | |
|-------|---|---|---|---|---|
| 1 | 0 | 4 | 3 | 2 | 8 |
| + | 6 | 1 | 7 | 3 | 1 |
| <hr/> | | | | | |
| 1 | 6 | 6 | 0 | 5 | 9 |
| <hr/> | | | | | |
| | | | | 1 | |

Subtraction

Subtract numbers with more than 4-digits.

$294,382 - 182,501 = 111,881$

| HTh | TTh | Th | H | T | O |
|--------------------|---|--|--|---|--------------|
| 100,000 | 10,000 10,000 10,000 | 1,000 1,000 1,000 | 100 100 100 | 10 10 10 | 1 |
| | 10,000 10,000 10,000 | 1,000 | 100 100 100 | 10 10 10 | 1 |
| | | | 100 100 100 | 10 10 10 | |

| | | | | | |
|-------|---|---|---|---|---|
| 2 | 9 | 3 | 8 | 2 | |
| - | 1 | 8 | 2 | 0 | 1 |
| <hr/> | | | | | |
| 1 | 1 | 1 | 8 | 8 | 1 |

Multiplication

Multiply 4-digit numbers by 2-digit numbers.

| TTh | Th | H | T | O |
|-------|----|---|---|---|
| | 2 | 7 | 3 | 9 |
| × | | | 2 | 8 |
| <hr/> | | | | |
| 2 | 1 | 9 | 1 | 2 |
| 2 | 5 | 3 | 7 | |
| <hr/> | | | | |
| 5 | 4 | 7 | 8 | 0 |
| 1 | | 1 | | |
| <hr/> | | | | |
| 7 | 6 | 6 | 9 | 2 |
| <hr/> | | | | |
| | | | | 1 |

$2,739 \times 28 = 76,692$

Divide multi digit by 2-digit numbers (short division)

| | | | | |
|--|----|---|---|----------------|
| | | 0 | 3 | 6 |
| | 12 | 4 | 3 | 7 ₂ |

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

| | | | | | |
|--|----|---|----------------|-----------------|-----------------|
| | | 0 | 4 | 8 | 9 |
| | 15 | 7 | 7 ₃ | 13 ₃ | 13 ₅ |

| | | | | | | | | | |
|----|----|----|----|----|----|-----|-----|-----|-----|
| 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |
|----|----|----|----|----|----|-----|-----|-----|-----|

Divide multi-digits by 2-digits (long division)

| | | | | |
|---|---|---|---|---|
| | | 0 | 3 | 6 |
| 1 | 2 | 4 | 3 | 2 |
| | | - | 3 | 6 |
| | | | | 0 |
| | | | | 7 |
| | | | | 2 |
| | | | | - |
| | | | | 7 |
| | | | | 2 |
| | | | | 0 |

- (x30)
 - 12 x 1 = 12
 - 12 x 2 = 24
 - 12 x 3 = 36
 - 12 x 4 = 48
 - 12 x 5 = 60
 - 12 x 6 = 72
 - 12 x 7 = 84
 - 12 x 8 = 96
 - 12 x 9 = 108
 - 12 x 10 = 120
- (x6)
 - 12 x 1 = 12
 - 12 x 2 = 24
 - 12 x 3 = 36
 - 12 x 4 = 48
 - 12 x 5 = 60
 - 12 x 6 = 72
 - 12 x 7 = 84
 - 12 x 8 = 96
 - 12 x 9 = 108
 - 12 x 10 = 120

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

| | | | | | |
|--|----|---|---|---|---|
| | | 0 | 4 | 8 | 9 |
| | 15 | 7 | 3 | 3 | 5 |
| | | - | 6 | 0 | 0 |
| | | | | 1 | 3 |
| | | | | - | 1 |
| | | | | | 2 |
| | | | | | 0 |
| | | | | | 0 |

- (x400)
 - 1 x 15 = 15
 - 2 x 15 = 30
 - 3 x 15 = 45
 - 4 x 15 = 60
 - 5 x 15 = 75
 - 10 x 15 = 150
- (x80)
 - 1 x 15 = 15
 - 2 x 15 = 30
 - 3 x 15 = 45
 - 4 x 15 = 60
 - 5 x 15 = 75
 - 10 x 15 = 150
- (x9)
 - 1 x 15 = 15
 - 2 x 15 = 30
 - 3 x 15 = 45
 - 4 x 15 = 60
 - 5 x 15 = 75
 - 10 x 15 = 150

Divide multi by 2-digits (long division).

$$372 \div 15 = 24 \text{ r}12$$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2 | 4 | r | 1 | 2 |
| 1 | 5 | 3 | 7 | 2 | | | |
| | | - | 3 | 0 | 0 | | |
| | | | | 7 | 2 | | |
| | | | | - | 6 | 0 | |
| | | | | | 1 | 2 | |

- 1 x 15 = 15
- 2 x 15 = 30
- 3 x 15 = 45
- 4 x 15 = 60
- 5 x 15 = 75
- 10 x 15 = 150

| | | | | | |
|---|---|---|---|---|---------------|
| | | | 2 | 4 | $\frac{4}{5}$ |
| 1 | 5 | 3 | 7 | 2 | |
| | | - | 3 | 0 | 0 |
| | | | | 7 | 2 |
| | | | | - | 6 |
| | | | | | 1 |
| | | | | | 2 |

$$372 \div 15 = 24 \frac{4}{5}$$