CONTENTS

- Maths Policy

- Medium Term Planning

- Individual Assessment

- Entry level assessment

- Early Years Foundation Stage- Development Matters

1   Introduction

1.1   Maths is a core subject of the National Curriculum in England at Key Stage 1 and we follow a commercial scheme of work which adhere to the programme of study within it.

1.2   Maths experiences at Crosshall Infant School are rigorous and involve the child in practical, mental and recorded activities in numeracy, measurement, geometry and statistics. We use the concrete, pictorial and abstract model of teaching and learning. Development of mathematical language and problem-solving abilities are fostered.

2   Aims

The Maths Curriculum aims to ensure all children:
- become **fluent** and achieve **mastery** the fundamentals of mathematics, including varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

At Crosshall Infant School we will foster these aims along with ensuring all children:
- develop a positive attitude towards maths as an interesting and attractive subject.
- develop an awareness of links between maths and other areas of the curriculum.
- develop an awareness of relevance of maths to everyday life through first-hand experience and problem solving.
- develop an ability to think logically - with independence of thought and flexibility of mind, with confidence in one's own ability.
- develop an understanding of maths through enquiry and a willingness to experiment.
- develop an appreciation of the nature of numbers and space.
- develop mathematical skills and knowledge accompanied by the quick recall of basic facts.
- develop an appreciation of mathematical pattern and the ability to identify relationships.
- maintain and increase confidence in maths by being able to express ideas fluently using appropriate language.

- provide a classroom climate which emphasises the practical acquisition of skills before their formal recording.

All teachers in school will ensure that the requirements of the National Curriculum are met in the policy planning and practice of maths in the school.

3   Teaching and Learning

3.1   As a core subject, Maths is taught by all class teachers to all the children.

3.2   In the Early Years Foundation Stage the maths curriculum is following the 'Mastering Number Programme' supplied by NCETM which meets the criteria in the non-statutory guidance in Development Matters.   The children are taught in small groups of similar ability or in whole class activities. In the Autumn term the emphasis is put on practical maths with some recording on whiteboards. The children begin more formal recorded tasks in the Spring and Summer term.

3.3   In Year 1 and Year 2 the children have a daily maths lesson in ability sets or their own classes. They follow the programme of study in The National Curriculum 2014 through a commercial scheme at their appropriate level. Children in Year 1 and Year 2 have access to Education City and are set homework through this online website. It is a secure site and records children's scores and achievements so teachers can see this. All Key Stage 1 children have an additional 10 minutes per day of maths following the 'Mastering Number Programme'. They also take part in Figure it out Friday where they work collaboratively to solve a reasoning problem in the area they have been learning all week.

3.4   All the children learn through concrete, pictorial and then abstract activities including problem-solving and quick mental recall of number facts and mental calculation methods.

4   Activities and Experiences

4.1   Progression in Number- number and place value, addition and subtraction, multiplication and division and fractions, Measurement, Geometry- properties of shape and position and direction and Statistics are achieved by following the guidelines of the commercial scheme. Children are taught in differentiated groups.

4.2   In EYFS the children will be taught skills under the following headings: Mathematical vocabulary, number and place value, addition and subtraction, measurement, properties of shape, position and direction and statistics.

4.3   There are opportunities to use computing skills within the maths curriculum and corresponding links to other curriculum areas, including the use of interactive screens and individual computer software.

4.4   Use of mental maths in quick recall of facts and calculating mentally are encouraged in the numeracy lessons.

4.5   Areas of teaching and learning are broken down into planning blocks, which provides appropriate levels of study for the different ability groups

5   Resources

5.1   Abacus online teacher resources/workbooks and Mastering Number Programme slides and resources.

5.2   A central storage area in each unit is organised for the practical apparatus for everyday use (e.g. dice, money trays, counters, weights, scales).

5.3   Worksheets are collated in a class file and saved in a subject resource file on the general drive for each ability group.

5.4   Maths trays are used in Key Stage 1 to allow children to independently choose equipment needed to answer questions. In Reception a larger maths tray is introduced to the children and used by the teacher and children during maths sessions.

5.5   Various resources are collated for use in maths cupboards and are available to all teachers to support children's understanding of the concept taught.

6   Equal Opportunities

6.1   All children are entitled to a maths curriculum catering for their individual needs.

6.2   The needs of the most and least able children are met through the Special Educational Needs requirements.

7   Health and Safety

7.1   It is important that pupils are taught to handle equipment safely.

8   Assessment and Recording

8.1   We use the Assertive Mentoring system for assessment. The system reflects the National Curriculum 2014 and is based on a colour coded system. Stage 1 is Year 1 and Stage 2 is Year 2. Each stage is broken down into sub stages. There are four sub stages per stage. Emerging (red), Developing (yellow), Secure (green) and next stage ready (blue). Stage 2 emerging is purple.

The children are formally assessed once every half term. There are six of these at every stage and each question tests a specific criteria. The children's answers are recorded on individual tracking sheets. If the child gets the question correct, a cross is put in the corresponding cell on the tracking grid, a diagonal line for partially correct and a dot for incorrect. The number of crosses are counted and this number then shows where they are within the stage. How much progress is made can be seen simply and clearly on the tracking sheet and the teacher can see what areas need developing and how many more crosses are needed to move the pupil to the next stage.
When we are marking maths work with the children we will ask the children to use a purple pencil to make any amendments so we can see where they have had another go. This will make it really clear where they have gone back and had a second attempt.

8.2   Observational assessments are recorded on a grid sheet after each maths session in Foundation Stage.

8.3   Formal assessment takes place through the Standard Assessment Tasks (S.A.T.S.) at the end of Key Stage 1.

8.4   Judgements against Key Stage descriptors are made at the end of KS 1 and recorded as teacher assessments. The Standards file is used to make judgements.

8.5   A statement about the child's ability will be made annually in the annual report to parents. This will include a suggested target for improvement.

9   Monitoring and evaluation

9.1   The maths curriculum is monitored by the Maths Leader and evaluated on a cyclical programme.

INTRODUCTION

This document outlines the approach to mathematics in Crosshall Infant School. The guidelines reflect the objectives of maths teaching in the school. They take account of the programmes of study in The National Curriculum 2014 and the use of relevant commercial scheme's progressive plans. Maths begins in the Nursery and Reception classes as part of the integrated curriculum following the Early Years Foundation Stage Profile, in specific maths groupings. Organisation of the maths curriculum throughout Year 1 and Year 2 follows a very structured pattern, which nevertheless allows the individual child to develop at his/her own rate of progress.

PLANNING

Maths planning is carried out in several phases. To ensure an achievement of breadth and balance in the maths curriculum the most extensive planning is done on a half-termly basis. Basic blocks of maths work following The National Curriculum 2014 programmes of study and Abacus guidelines are used to provide a linear progression throughout the Key Stage and these are used as the basis for the half-termly course of study for the ability groups. This half-termly planning is recorded in each unit's Medium Term Planning.   In Year 1 and Year 2 each ability group will have a differentiated input/activity although they will be following the same objective.   These plans include the learning objectives and associated activities. In Reception the basic programme of the EYFS (Early Years Foundation Stage) is followed in the first half term until the children are grouped differentially.

A weekly breakdown of this planning ensures that the activities are covered each week according to the children's ability level. Weekly planning is further broken down into specific areas to be taught. These include oral and mental maths "starters" to each maths lesson, the specific area of teaching and learning, including learning objectives and activities and the plenary session. Teachers will use assessments from each session to adjust their plans accordingly.

CURRICULUM CONTENT

The maths curriculum in Reception follows the statutory framework for the EYFS (Early Years Foundation Stage). This is then followed by the National Curriculum 2014 at Key Stage 1. The children are expected to achieve the appropriate attainment targets at their level of study. The National Curriculum emphasises the importance of learning mental strategies and this is given great emphasis in the programmes of study.

The teaching programme includes: Number- number and place value, addition and subtraction, multiplication and division and fractions, Measurement, Geometry properties of shape and position and direction and Statistics (Statistics starts in the programme of study for Year 2).

The principal focus of mathematics teaching in Key Stage 1 is to ensure that pupils develop confidence and mental fluency leading to mastery, with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, including the use of practical resources (e.g. concrete objects and measuring tools).

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of Year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

ORGANISATION

Maths teaching is carried out in various ways throughout the school. In the earliest stage of the Reception year all the children experience learning numbers through rhymes, repetition games and the mastering number programme via the NCETM (National Centre of Excellence in the Teaching of Mathematics). After an entry level assessment the children are grouped according to their ability and taught in these groups within their own class environment. However the planning for these groups is across the year group and there will be parallel groups in each class. The work undertaken and the achievements are moderated across the year group. Daily maths teaching takes place as part of the integrated day where children are engaged in a variety of tasks in Reception.

In Year 1 and Year 2 the children are grouped according to their ability across the year group and may move to a different class for their daily maths lesson. The lesson format consists of a five-minute mental starter, a main teaching input, work in groups on the skill taught and a plenary session to conclude the lesson. Children's progress is monitored very carefully at team meetings.

CROSS-CURRICULAR LINKS

Maths is taught mainly as a separate subject in school but other subjects have maths as an integral part of them.

Science: Statistics and data handling will form a key part in the science curriculum. 'Working Scientifically' will allow the children to use their maths skills in science and a

knowledge of problem-solving is often necessary. Certain scientific instruments need a knowledge of the number system and calculating skills to be used accurately.

Computing: The Interactive Screen is widely used for both presenting lessons and interactive learning. Data handling is another of the main applications of computing to maths. By Year2 the children should be able to enter and retrieve data in simple programs. There are also many maths games available on the internet.

Geography: spatial awareness and application is used in certain mapping exercises.

PE: In the early years directional games in PE provide a source of cross-curricular work.

Other maths work may be incorporated into various topics on an on-going basis. It is important children see that maths is used across the curriculum and they begin to make links and transfer their skills.

ASSESSMENT

Assessment begins with the undertaking of the statutory baseline assessment within the first few weeks of the child entering the Reception class. This comprises of several tasks of basic numeracy and the use and understanding of conceptual language. These are assessed in a 1 to 1 situation and provide a profile of the child's mathematical understanding and a framework for grouping the children according to their ability. Throughout the year the children continue to be assessed using criteria in the Development Matters document.

In both Year 1 and Year 2 assessment takes place on a more formal recorded level. This can be done on a weekly basis through worksheets and teacher led activities or as a half-termly summative assessment. The results of which are used to inform groupings and movement of children between groups.

In Year 1 and Year 2 children are assigned weekly homework based on the main teaching focus for that week. This is set on a Friday, having been taught strategies to help them throughout the week.

At the end of the Key Stage the children are given a teacher assessment, using all the above criteria as evidence. This is followed by the Key Stage 1 Standard Assessment Tasks (S.A.T.S.) when the children are assessed in a formal situation with an externally-set test paper. The children are required to work through the paper within a given time limit. The children then achieve a nationally compatible level of attainment. This is used to inform the teacher assessment.

Approved: January 2025
Next Review Due: January 2026

Appendix 1

Our Calculation Policy

This calculation policy has been created to meet the expectations of the new national curriculum but most importantly the learning needs of our children at the Crosshall Infant School Academy Trust. The methods chosen match the national curriculum but have also been specifically selected after consideration of our children's learning styles.

Age Expectations

The policy has been organised by year group, considering the national curriculum 2014 expectations. The new curriculum focuses on skills and mastery and is not about moving children on to the next method as soon as they can do the one before. Working on more complex and richer problems rather than new methods will support this 'mastering' of maths. However, some children will be working at levels well above their age and will require the introduction of new methods.

Mental Methods

The written methods in this document are important but they by no means replace the superb mental methods we have developed. As children become more mature and confident with their calculation, they need to start following these 3 steps when approaching problems:

1) Can I solve it in my head and use a mental method?

2) Do I need to use some written jottings to help me?

3) Do I need to use a written method to solve this problem?

Addition and Subtraction

Year 1 Programme of Study from the National Curriculum 2014
Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add and subtract one-digit and two-digit numbers to 20, including 0,

solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = ? − 9

Year 2 Programme of Study from the National Curriculum 2014
Pupils should be taught to:

- solve problems with addition and subtraction:
  ⇒ using concrete objects and pictorial representations, including those involving numbers, quantities and measures
  ⇒ applying their increasing knowledge of mental and written methods
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
  ⇒ a two-digit number and 1s
  ⇒ a two-digit number and 10s
  ⇒ 2 two-digit numbers
  ⇒ adding 3 one-digit numbers
- show that addition of 2 numbers can be done in any order (commutative) and subtraction of 1 number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Resources

We have a lot of resources in school for the teaching of addition and subtraction. For example:
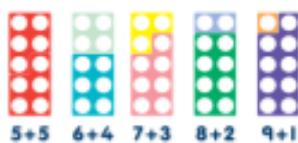
- Numicon
- Compare bears
- Penguins and icebergs
- Unifix cubes
- BINGO!
- Addition/subtraction bones

Addition – Year 1

Adding with numbers up to 20

Children should use number lines (with the numbers on) to add by counting in ones. Starting with the greatest number and counting on the smaller number.

$6 + 3 = 9$
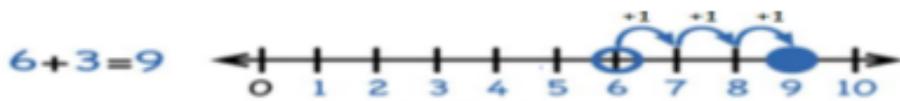
As well as using a number line, children in Year 1 need to:

- Use a variety of equipment to solve addition problems, including counting equipment, everyday objects, number tracks etc.
- Read and write the addition (+) and equals (=) sign and use them in number sentences.
- Solve addition number sentences and missing number problems: $7 + 4 = ?$, $1 + 2 + 1 = ?$, $? + ? = 9$ etc.
- Use bead strings or bead bars to visualise bridging through 10s e.g. $8 + 5 =$ can be solved by counting on 2 then counting on 3.

Key Vocabulary

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line

Key Skills

- Reading and writing numbers to 100 in numerals.
- Writing numbers to 20 in words including correct spelling.
- Counting to and across 100 in ones.
- Counting in multiples of 2, 5 and 10.
- Solving simple one step addition problems: using objects, number lines and images to support.

Addition - Year 2

Adding with 2 digit numbers

Children should explore and understand how to use blank number lines to add using their knowledge of place value and how to partition numbers in different ways. Once confident they should move onto written partitioning methods.

16 + 7

+4   +3

16   20   23

Adding a 2 digit number and units

27 + 30

+10 +10 +10

27   37   47   57
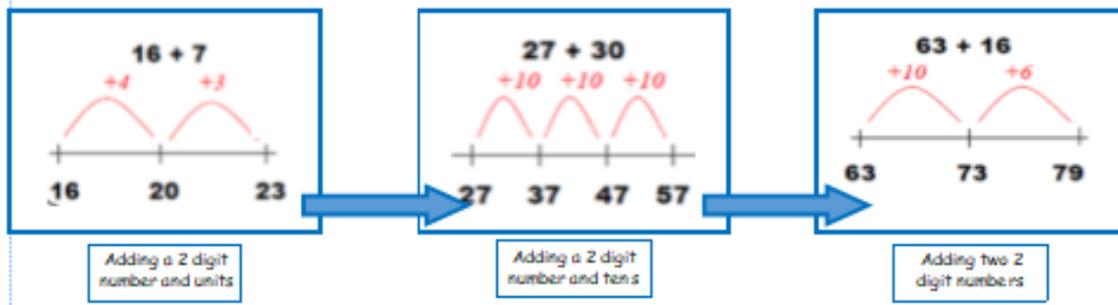
Adding a 2 digit number and tens

63 + 16

+10   +6

63   73   79

Adding two 2 digit numbers

34 + 23 = 57
30 + 20 = 50
4 + 3 = 7

Partitioning should be started with 2 digit numbers that do not bridge the tens or hundreds so children become fully confident with the method itself.

58 + 43 = 101
50 + 40 = 90
8 + 3 = 11

78 + 47 = 125
70 + 40 = 110
8 + 7 = 15

Once children are confident they can start using the partitioning method to add numbers that bridge the tens and hundreds boundaries.

Key Vocabulary

Add, more, plus, and, make, altogether, total, equal to, equals, the same as, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary

Key Skills

- Add a 2 digit number and units and a 2 digit number and 10s.
- Add pairs of 2 digit numbers.
- Add three single digit numbers.
- Know and show that adding can be done in any order (the commutative law).
- Recall bonds to 20 and multiple of 10 bonds to 100.
- Count in steps of 2,3 and 5 and count in 10s from any number.
- Understand the place value of 2 digit numbers (tens and ones).
- Compare and order numbers to 100 using < > and = signs.
- Read and write numbers to at least 100 in numerals and words.
- Solve contextual addition problems.

Progression in Calculations

Objective and Strategies	Concrete	Pictorial	Abstract
Combining two parts to make a whole: part-whole model	Use cubes to add two numbers together as a group or in a bar.	Use pictures to add two numbers together as a group or in a bar.	$4 + 3 = 7$ $10 = 6 + 4$ Use the part-part whole diagram as shown above to move into the abstract.
Starting at the bigger number and counting on	Start with the larger number on the bead string and then count on to the smaller number 1 by 1 to find the answer.	$12 + 5 = 17$ Start at the larger number on the number line and count on in ones or in one jump to find the answer.	$5 + 12 = 17$ Place the larger number in your head and count on the smaller number to find your answer.
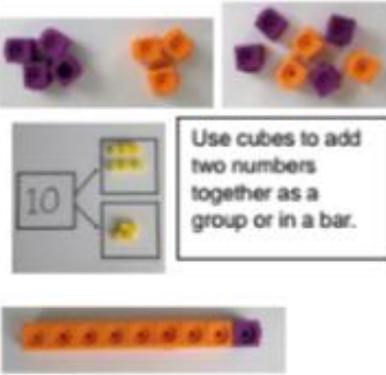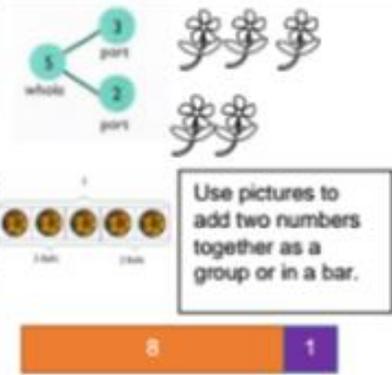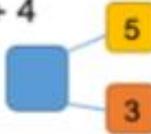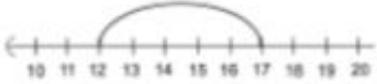
Progression in Calculations

Objective and	Concrete	Pictorial	Abstract
Regrouping to make 10.	$6 + 5 = 11$ Start with the bigger number and use the smaller number to make 10.	Use pictures or a number line. Regroup or partition the smaller number to make 10. $3 + 9 =$ $9 + 5 = \boxed{14}$ $+1$ $+4$	$7 + 4 = 11$ If I am at seven, how many more do I need to make 10. How many more do I add on now?
Adding three single digits	$4 + 7 + 6 = 17$ Put 4 and 6 together to make 10. Add on 7. Following on from making 10, make 10 with 2 of the digits (if possible) then add on the third digit.	Add together three groups of objects. Draw a picture to recombine the groups to make 10.	$4 + 7 + 6 = \boxed{10} + \boxed{7}$ 10 $= \boxed{17}$ Combine the two numbers that make 10 and then add on the remainder.
Column method- no regrouping	$24 + 15 =$ Add together the ones first then add the tens. Use the Base 10 blocks first before moving onto place value counters.	After practically using the base 10 blocks and place value counters, children can draw the counters to help them to solve additions.	Calculations $21 + 42 =$ 21 $+ \underline{42}$
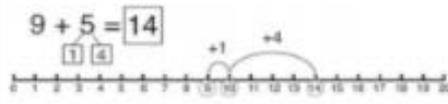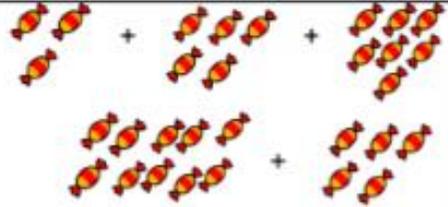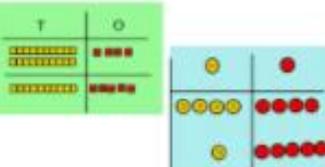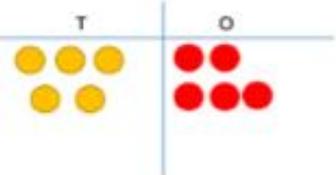
Subtraction - Year 1

Subtracting from numbers up to 20

In Year 1, children will use numberlines, objects and visual methods to understand subtraction as taking away but also as the difference between or distance between two numbers.
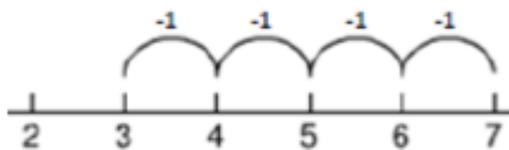
For 7 take away 4, the child would start on the numberline at 7 and count back 4 in ones. This would give them the answer 3.
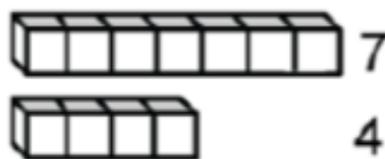
To answer problems such as how many more is 7 than 4 or what is the difference between 7 and 4, cubes should be made into rods so children can see the problem visually. This method can also be used to answer 'find the difference' problems.

Hundred squares, number tracks, counting objects and real life objects should all be used as well to explore subtraction in a variety of practical contexts.

Mental subtraction is equally important in Year 1 and children should practise recalling subtraction facts up to and within 10 and 20. In Year 1 children should also be taught about subtracting zero.
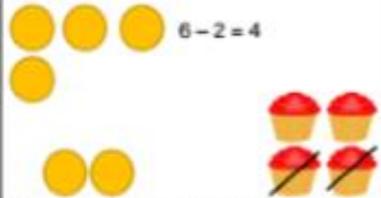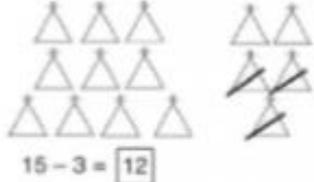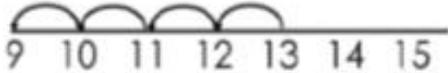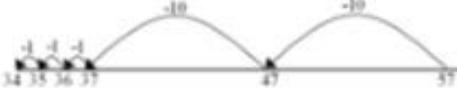
Key Vocabulary

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ___?

Key Skills

- Given a number, say one more or one less.
- Count to and over 100, forward and back from any number in 1s.
- Represent and use subtraction facts to 20 and within 20.
- Subtract with one digit and 2 digit numbers to 20, including zero.
- Solve one step problems that involve subtraction using objects, pictures and numbered lines.
- Read and write numbers to 100 in numerals.
- Write numbers in words to 20, including correct spelling.

Subtraction - Year 2

Subtracting with 2 digit numbers

In Year 2 children will start to use blank numberlines to subtract by counting back which will greatly support the development of mental subtraction skills.

For 47-23=24, children should start by partitioning the tens number and subtracting that first by counting back in tens. They will then subtract the units number and subtract that by counting back in 1s.

Once children develop the confidence of counting back they will be able to select more efficient jumps to solve a problem and will not have to partition the tens and units numbers separately.
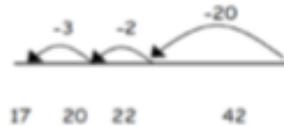
Once confident with efficient jumps, children are ready to subtract by bridging through 10, again partitioning is very important here and the children will need to be very confident with partitioning in different ways.

Counting as a mental method

Counting on is a super mental method! It is especially useful for finding the difference problems and numbers that are close together. It is important that children understand that although they are counting on, they are finding the difference which is subtraction.
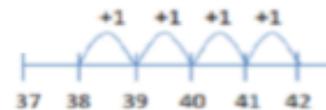
Key Vocabulary

Equal to, take, take away, less, minus, subtract, leaves, distance between, difference between, how many more, how many fewer/less than, most, least, count back, how many left, how much less is ___?, count on, strategy, partition, tens, units
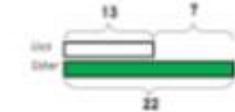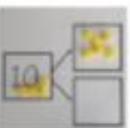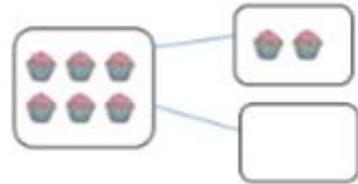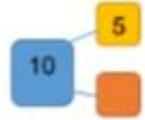
Key Skills

- Recognise the place value of each digit in a 2 digit number.
- Recall and use subtraction facts to 20 fluently, use to derive related facts to 100.
- Subtract using objects, images, 100 squares and mentally including a two digit number and ones, a two digit number and 10s and two 2 digit numbers.
- Understand and show that subtraction calculations cannot be done in any order.
- Use the inverse relationships between + and - to check calculations and solve missing number problems.
- Solve simple subtraction problems in context using written and mental methods.
- Read and write numbers to at least 100 in numerals and words

Progression in Calculations

Objective and Strategies	Concrete	Pictorial	Abstract
Taking away ones	Use physical objects, counters, cubes etc to show how objects can be taken away. $6 - 2 = 4$	Cross out drawn objects to show what has been taken away. $15 - 3 = \boxed{12}$	$18 - 3 = 15$ $8 - 2 = 6$
Counting back	Make the larger number in your subtraction. Move the beads along your bead string as you count backwards in ones. $13 - 4$ Use counters and move them away from the group as you take them away counting backwards as you go.	Count back on a number line or number track 9 10 11 12 13 14 15 Start at the bigger number and count back the smaller number showing the jumps on the number line. This can progress all the way to counting back using two 2 digit numbers.	Put 13 in your head, count back 4. What number are you at? Use your fingers to help.

Progression in Calculations

Objective and strategies	Concrete	Pictorial	Abstract
Find the difference	Compare amounts and objects to find the difference. Use cubes to build towers or make bars to find the difference Use basic bar models with items to find the difference	Count on to find the difference. Draw bars to find the difference between 2 numbers. **Comparison Bar Models** *Lisa is 13 years old. Her sister is 22 years old. Find the difference in age between them.* 13 — 7 22	Hannah has 23 sandwiches, Helen has 15 sandwiches. Find the difference between the number of sandwiches.
Part Part Whole Model	Link to addition- use the part whole model to help explain the inverse between addition and subtraction. If 10 is the whole and 6 is one of the parts. What is the other part? 10 - 6 =	Use a pictorial representation of objects to show the part part whole model.	5 10 Move to using numbers within the part whole model.
Make 10	14 – 9 = Make 14 on the ten frame. Take away the four first to make 10 and then takeaway one more so you have taken away 5. You are left with the answer of 9.	13 – 7 = 6 Start at 13. Take away 3 to reach 10. Then take away the remaining 4 so you have taken away 7 altogether. You have reached your answer.	16 – 8= How many do we take off to reach the next 10? How many do we have left to take off?
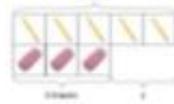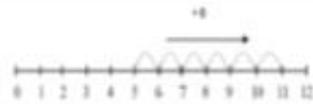
Multiplication - Year 1

Repeated addition with objects, arrays and pictorial representations

In Year 1 children will be exposed to many different multiplication based activities in a variety of contexts. Much of this will be repeated addition activities or be linked to counting in 2s, 5s or 10s.

How many legs will 2 cats have?

4 + 4 = 8
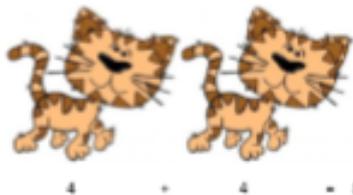
Children use images and pictorial representations to solve simple problems that involve repeated addition. They may wish to use the picture to support or use other equipment. Adult support at this stage is to be expected.

Some children may start to see the link between the problem below and counting in 5s and be able to use mental skills to solve the problem.

There are 5 roses in each garden. How many roses in 3 gardens?

5 + 5 + 5 = 15
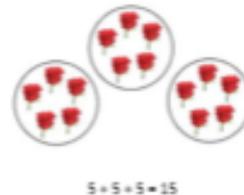
Key Vocabulary

Groups of, lots of, times, array, altogether, multiply, count

Key Skills

- Count in multiples of 2, 5 and 10.
- Solve 1 step problems involving multiplication using objects, arrays or pictures with support.
- Make connections between arrays and counting in 2s, 5s and 10s.
- Begin to understand doubling using objects and pictorial representations.
- Solve practical problem solving activities counting equal sets or groups.
- Have lots of practise counting and bundling groups of objects into 2s, 5s and 10s.

Maths

Multiplication - Year 2

## Multiplying using arrays and repeated addition– 2, 3, 4, 10x table facts

In Year 2 children will be aware of simple arrays and pictorial representations and understand what they mean. In Year 2 children will develop the knowledge of how to make their own array to solve a problem and also how repeated addition on a number line can get them to a solution.

$4 \times 3 = 12$

$3 \times 4 = 12$

$3 \times 4 = 4 + 4 + 4 = 12$
$4 \times 3 = 3 + 3 + 3 + 3 = 12$
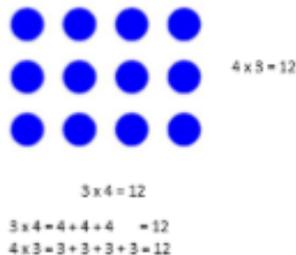
Arrays are super for children to solve the answer to simple problems. They are also great for showing children the commutative law, for example, if you turned this array for 3x4=12 sideways you would see that 4x3 also equals 12.
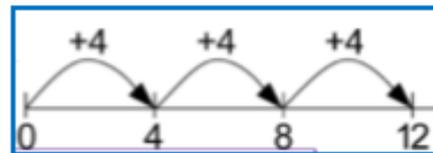
Repeated addition is a good progression from arrays. It encourages the children to use addition on a blank number line and count up to their answer as shown on the example above which models that 3x4=12.
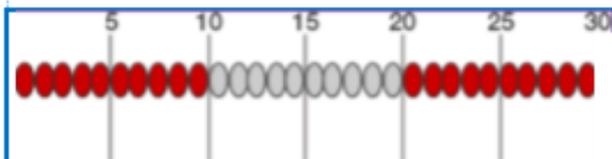
Mental methods and practical apparatus are still very important at this stage. Visual images such as the bead string to the left demonstrates 6x5=30 will support children's visualisation of multiplication and allow them to develop stronger mental skills
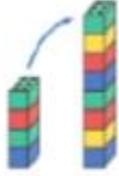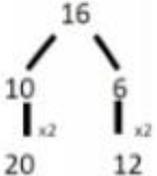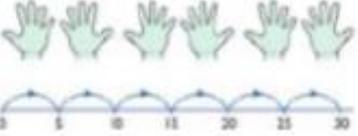
Key Vocabulary

Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, set of, equal groups, times, as big as, once, twice, three times
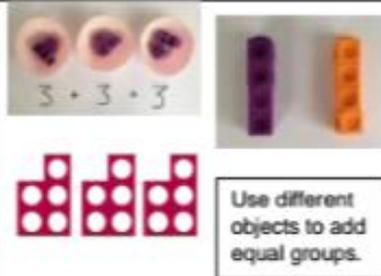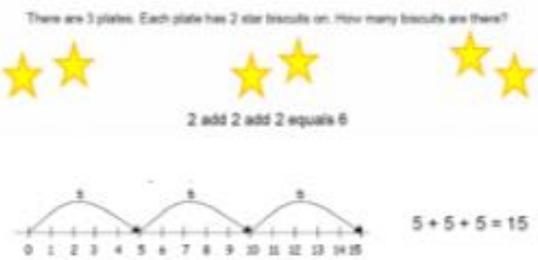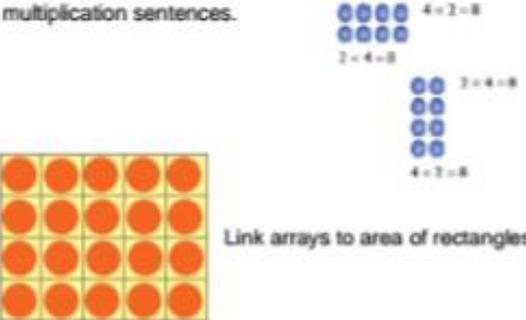
Key Skills

- Count in steps of 2, 3 and 5 from zero and in 10s from any number.
- Recall and use multiplication facts for the 2, 5 and 10 times tables.
- Recognise odd and even numbers.
- Write and calculate number statements using the x and = signs.
- Show that multiplication can be done in any order (the commutative law).
- Solve a range of multiplication problems using objects, arrays, repeated addition, mental methods and multiplication facts.
- Use and become familiar with all of the above multiplication language.

Progression in Calculations

| Objective and Strategies	Concrete	Pictorial	Abstract
Doubling	Use practical activities to show how to double a number. double 4 is 8 4 × 2 = 8	Draw pictures to show how to double a number. Double 4 is 8	16 10 6 x2 x2 20 12 Partition a number and then double each part before recombining it back together.
Counting in multiples	Count in multiples supported by concrete objects in equal groups.	Use a number line or pictures to continue support in counting in multiples.	Count in multiples of a number aloud. Write sequences with multiples of numbers. 2, 4, 6, 8, 10 5, 10, 15, 20, 25 , 30

Progression in Calculations

Objective and strate-	Concrete	Pictorial	Abstract
Repeated addition	3 + 3 + 3 Use different objects to add equal groups.	There are 3 plates. Each plate has 2 star biscuits on. How many biscuits are there? 2 add 2 add 2 equals 6 5 + 5 + 5 = 15	Write addition sentences to describe objects and pictures. 2+2+2+2+2 = 10
Arrays- showing commutative multiplication	Create arrays using counters/ cubes to show multiplication sentences.	Draw arrays in different rotations to find **commutative** multiplication sentences. 4 × 2 = 8 2 × 4 = 8 3 × 4 = 8 4 × 3 = 8 Link arrays to area of rectangles.	Use an array to write multiplication sentences and reinforce repeated addition. 5 + 5 + 5 = 15 3 + 3 + 3 + 3 + 3 = 15 5 x 3 = 15 3 x 5 = 15

Maths

Division - Year 1

Grouping and sharing small quantities without remainders

As an introduction to division, children in Year 1 will solve problems in familiar and relevant contexts where they have to group and share. They will use objects and pictorial representation to solve problems and they will begin to use counting in 2s, 5s and 10s to support their problem solving.

A farmer has 15 roses and shares them between 3 friends. How many roses do they get each?
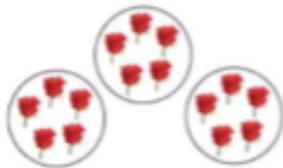
15 roses shared between 3 = 5 roses each

Children need to learn grouping and sharing alongside each other so they understand how they are linked. Grouping will also help children understand how multiplication can be used to solve division problems. Contextual problems will strengthen children's understanding of division.

Bats fly in group of 2. How many groups of 2 will there be if there are 8 bats?

8 bats shared into groups of 2 = 4 groups

Key Vocabulary

Share, share equally, one each, two each..., group groups of, lots of, array

Key Skills

- Solve one step problems involving multiplication and division using concrete objects with support from adults.
- Children use grouping and sharing to understand division and to begin to understand finding simple fractions.
- Children to make connections between arrays and counting in 2s, 5s and 10s.
- Children use halving and understand that this is the same as sharing into 2 equal groups.

Division - Year 2

Grouping and sharing larger quantities using written methods and symbols

Children will continue to use methods of sharing and grouping in division with objects to support their understanding of arrays for sharing and grouping and the division number line for grouping.

To solve problems such as 15 ÷ 3 =, children will share 15 objects into 3 groups like in the first array or make groups of 3 until they get to 15, like in the second image.
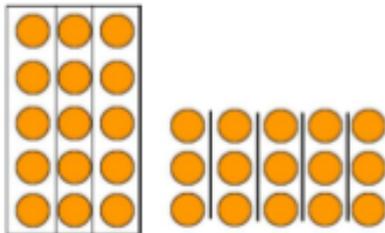
Completing both of these processes will help children see the link between sharing and grouping but also the link between 15 ÷ 3 = 5 and 15 ÷ 5 = 3.

The difference between grouping and sharing should be discussed regularly and visual models and diagrams are very important. Children should solve a variety of contextual problems that will require them to group or share.

Children will start to group on a number line which will help cement their understanding of division as grouping. When grouping on a number line, children will start with a zero at the beginning and will write the dividend at the end of the line, they will jump in steps of the divisor. The example to the right shows a number line for the calculation 12 ÷ 3 = 4 as there were 4 jumps of 3 to get to 12.
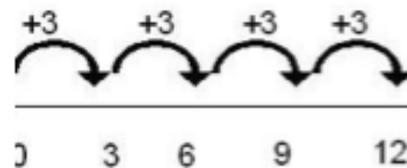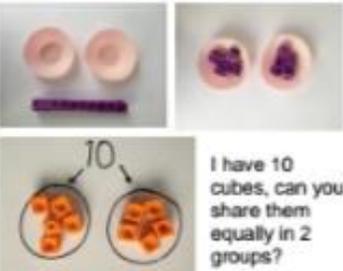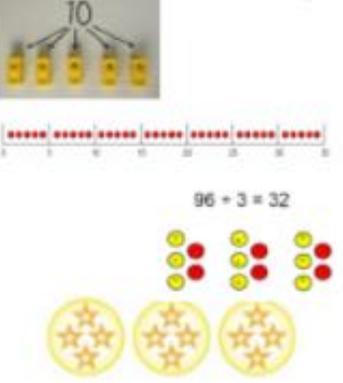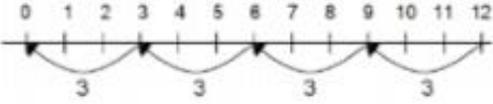

Key Vocabulary

Share, share equally, one each, two each…, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left over
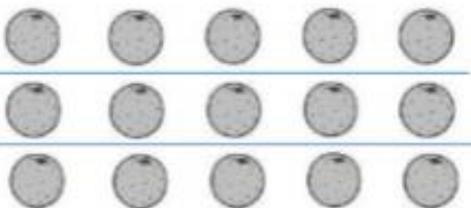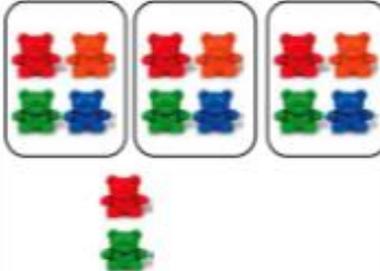
Key Skills

- Count in steps of 2, 3 and 5 from 0.
- Recall and use x and ÷ facts for the 2, 5 and 10 times tables.
- Solve division problems and write division number sentences for problems.
- Understand that division is not commutative unlike multiplication.
- Solve increasingly challenging division problems using concrete objects, arrays and simple written methods such as grouping on a number line.

Progression in Calculations

Objective and Strategies	Concrete	Pictorial	Abstract
Sharing objects into groups	I have 10 cubes, can you share them equally in 2 groups?	Children use pictures or shapes to share quantities. $8 \div 2 = 4$	Share 9 buns between three people. $9 \div 3 = 3$
Division as grouping	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. $96 \div 3 = 32$	Use a number line to show jumps in groups. The number of jumps equals the number of groups. Think of the bar as a whole. Split it into the number of groups you are dividing by and work out how many would be within each group. $20 \div 5 = ?$ $5 \times ? = 20$	$28 \div 7 = 4$ Divide 28 into 7 groups. How many are in each group?

Progression in Calculations

Objective and strategies	Concrete	Pictorial	Abstract
Division within arrays	Link division to multiplication by creating an array and thinking about the number sentences that can be created. Eg $15 \div 3 = 5$ $5 \times 3 = 15$ $15 \div 5 = 3$ $3 \times 5 = 15$	Draw an array and use lines to split the array into groups to make multiplication and division sentences.	Find the inverse of multiplication and division sentences by creating four linking number sentences. $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$
Division with a remainder	$14 \div 3 =$ Divide objects between groups and see how much is left over	Jump forward in equal jumps on a number line then see how many more you need to jump to find a remainder. Draw dots and group them to divide an amount and clearly show a remainder. remainder 2	Complete written divisions and show the remainder using r. $29 \div 8 = 3$ REMAINDER 5 dividend divisor quotient remainder

Maths