Year Group objectives

Year 1

Counting and understanding number

Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same; estimate a number of objects that can be checked by counting

Compare and order numbers, using the related vocabulary; use the equals (=) sign

Read and write numerals from 0 to 20 then beyond; use knowledge of place value to position these numbers on a number track and number line

Use the vocabulary of halves and quarters in context

Knowing and using number facts

Count on and back in ones, twos, fives and tens and use this knowledge to derive the multiplies of 2, 5 and 10 to the tenth multiple

Recall the doubles of all numbers to at least 10

Calculating

Solve practical problems that involve combining groups of 2, 5 and 10, or sharing into equal groups

Counting in equal groups using real life objects and pictures 3 lots of 2 or 2 lots of 3

Models and images

Counting in 2s
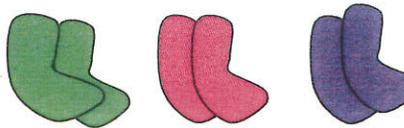
We have got 6 socks. How many pairs have we got?
Children need to have equal opportunities to work on division as grouping and division as sharing

Division as grouping
6 cookies grouped in 2s, 3 bags of cookies.
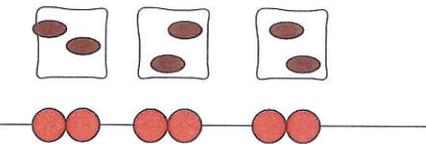
Division as sharing
6 cookies shared between 2 girls, 3 cookies each.

I have got 50p. How many 10p coins have I got?

10 20 30 40 50

Use counting up in groups to encourage children to see this as a strategy for division: 'How many twos in six?'
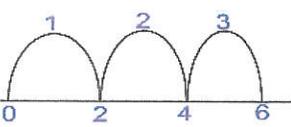
Also see story contexts shown in Foundation Stage Multiplication page.

Ways in which children could record

We have got 8 vehicles, that's 4 groups of 2.
2 + 2 + 2 + 2 = 8

Children might draw plates and cookies

I am sharing the 10 cookies between my friend and me
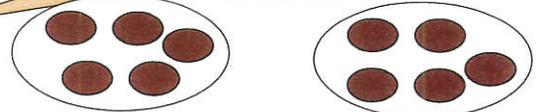
Children may choose to record with drawings of objects, bead strings or number lines

If I have 12 socks – how many pairs do I have?

1 2 3 4 5 6
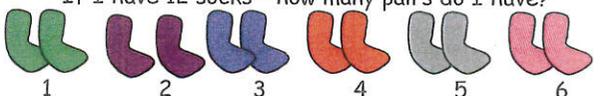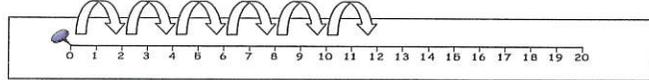
on a hundred bead string
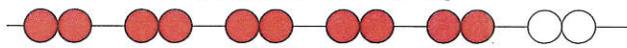
See also halving images on multiplication page

Year Group objectives

Year 2

Counting and understanding number

Read and write two-digit and three-digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers

Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two-digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of 10 and 1

Order two-digit numbers and position them on a number line; use the greater than (>) and less than (<) signs

Estimate a number of objects; round two-digit numbers to the nearest 10

Find one half and three quarters of shapes and sets of objects

Knowing and using number facts

Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves

Derive and recall multiplication facts for the 2,5 and 10 times tables and the related division facts, recognise multiples of 2,5 and 10

Use knowledge of number facts and operations to estimate and check answers to calculations

Calculating

Represent repeated addition and arrays as multiplication and sharing and repeated subtraction (grouping) as division, use practical and informal methods and related vocabulary to support multiplication and division, including calculations with remainders.

Use the symbols = - x and ÷ to record and interpret number sentences involving all four operations; calculate The value of an unknown in a number sentence e.g. ☐ ÷ 2 = 6

Models and images

Models from real life images

What number sentences could we write about these images of arrays?

How many groups of 2 are there in 6? – there are 3

$2 + 2 + 2 = 6$
$6 ÷ 2 = 3$
6 divided into 2s is 3 groups

6 grouped into 3s is 2 groups
$3 ÷ 3 = 6$
$6 ÷ 3 = 2$
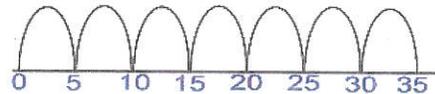6 divided into 3s is 2 groups

Grouping problem

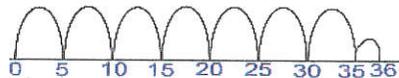Lollipops cost 5p, how many could I buy for 35p
$35 ÷ 5 = 7$

Sharing problem

I have 36 lollipops to share equally with 5 people how many will they each get? I know 5 x 7 = 35
$36 ÷ 5 = 7 r 1$
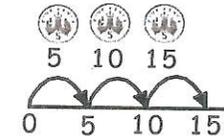
Modelling the structured then empty number line –

Use Grouping ITP and ICT resource suggestions on Steps
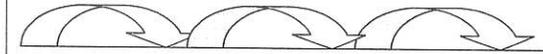
to Success ITP

Ways in which children could record

I have 15p how many 5p coins have I got

$5p + 5p + 5p = 15p$ **$15p ÷ 5p = 3$**

Children may show jumps of different sizes, e.g. 2s, 5s, 10s on an Empty Number Line

Describe the jumps if the last number is 9

Can you help Percy the Park Keeper share the 12 biscuits between rabbit, hedgehog and mole?
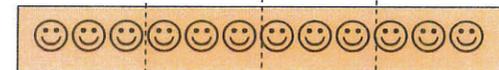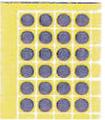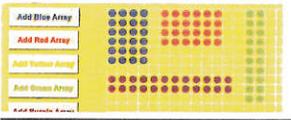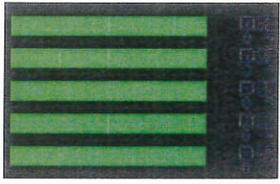

What if he had only 10 biscuits to share between them?

Halving

Can you make a tower that's half red and half green?

Folding a strip of stickers into half and then quarters

Progression in calculation- Division

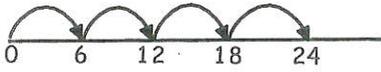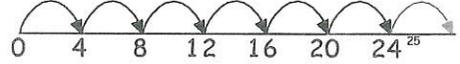| Year Group objectives	Models and images	Ways in which children could record
Year 3 *Counting and understanding number* Read, write and order whole numbers to at least 1000 and position them on a number line; count on from and back to zero in single-digit steps or multiples of 10 Partition three-digit numbers into multiples of 100, 10 and 1 in different ways Round two-digit or three-digit numbers to the nearest 10 or 100 and give estimates for their sums and differences Read and write proper fractions (e.g. ¾) interpreting the denominator as the parts of a whole and the numerator as the number of parts: identify and estimate fractions of shapes, use diagrams to compare fractions and establish equivalence. *Knowing and using number facts* Derive and recall multiplication facts for the 2,3,4,5,6 and 10 times tables and the corresponding division facts; recognise multiplies of 2,5 or 10 up to 1000 *Calculating* Multiply one digit and two digit numbers (e.g. 13 x 3, 50 ÷ 4) round remainders up or down depending on the context Understand that division is the inverse of multiplication and vice versa, use this to derive and record related multiplication and division number sentences Understand that division is the inverse of multiplication and vice versa; use this to derive and record related multiplication and division number sentences Find unit fractions of numbers and quantities e.g. 1/2 1/3 1/4 and 1/6 of 12 litres	**Use known facts to derive unknown facts** $4 \times 6 = 24$ $6 \times 4 = 24$ $24 \div 4 = 6$ $24 \div 6 = 4$ Use arrays in context to support imagery – wrapping paper, bun tins, ice cube trays, cakes in boxes etc… Understand division as **grouping**: We have £12. Tickets cost £4. We can buy 3 tickets. Solved by putting the coins into groups of 4. Understand remainders including money and measures- I have £14 to buy presents for 4 people. I want to spend an equal amount on each- how much can I spend? How much is left over? What could we do with £2 Array Creator Spreadsheet Fractions ITP Measuring Cylinder ITP showing ¼ of 12 litres	$24 \div 4 = 6$ 0 4 8 12 16 20 24 $24 \div 6 = 4$ 0 6 12 18 24 **Round up or down depending on the context:** 0 4 8 12 16 20 24 25 **Round up** We have got £25. Tickets cost £4. $4 \times 6 = 24$ We can buy 6 tickets we have not got enough money for 7. **Round down** 25 children are going camping. Each tent sleeps 4 children. $4 \times 6 = 24$ We will need 7 tents. **Children may record their understanding of division as the inverse of multiplication in a variety of ways** 1/6 of 24 is 4 6x4=24 4x6=24 24 divided by 6 is 4 1/4 of 24 is 6
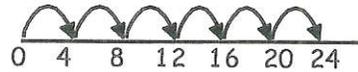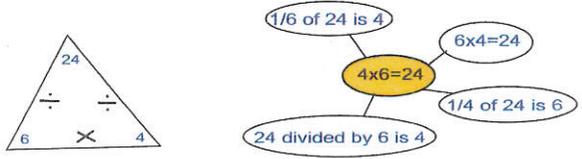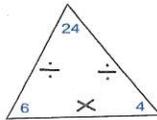
Year Group objectives

Year 4   Counting and understanding number

Recognise and continue number sequences formed by counting on or back in steps of constant size

Use decimal notation for tenths and hundredths and partition decimals; relate the notation to money and measurement; position one-place and two-place decimals on a number line

Recognise the equivalence between decimal and fraction forms of one half, quarters, tenths and hundredths

Use diagrams to identify equivalent fractions e.g. $\frac{3}{4}$ and 6/8 interpret mixed numbers and position them on a number line e.g. 3 $\frac{1}{2}$

Use the vocabulary of ratio and proportion to describe the relationship between two quantities e.g. There are two red beads to every 3 blue beads or 2 in every 5 beads are red. Estimate a proportion – about one quarter of the apples in the box are green

Knowing and using number facts

Identify the doubles of two-digit numbers; use these to calculate doubles of multiples of 10 and 100 and derive the corresponding halves

Derive and recall multiplication facts up to 10 x 10, the corresponding division facts and multiples of numbers up to 10 up to the tenth multiple

Use knowledge of rounding, number operations and inverses to estimate and check calculations

Identify pairs of fractions that total one

Calculating

Multiply and divide numbers to 1000 by 10 and then 100 (whole number answers) understanding the effect, relate to scaling up or down
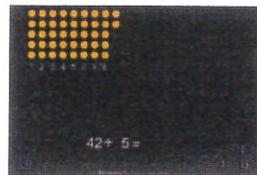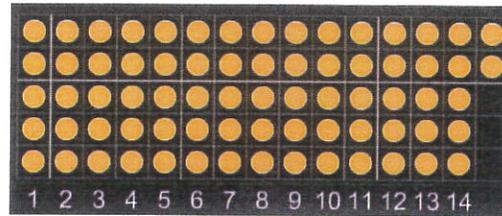
Develop and use written methods to record, support and explain multiplication and division of two digit numbers by a one digit number including division and remainders (e.g. 15x9, 98÷6)

Find fractions of numbers, quantities or shapes e.g. 1/3 of plums
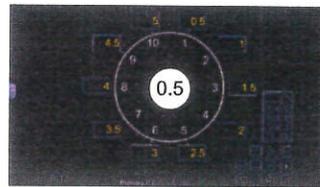
Use a calculator to carry out one and two step calculations involving all four operations recognising negative numbers in the display, correct mistaken entries and interpret the display correctly in the context of money
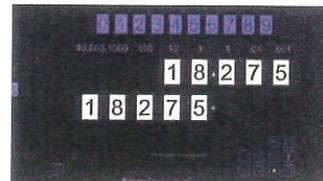
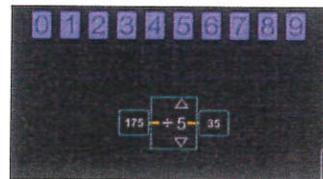## Models and images

72÷5 = 14 groups of 5 and 2 remaining

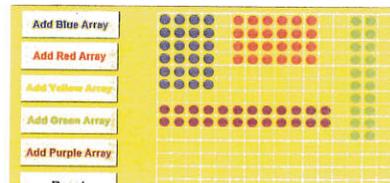1 2 3 4 5 6 7 8 9 10 11 12 13 14

42÷ 5 =

Remainders ITP

0.5

Number Dials ITP

18.275

18275

Moving Digits ITP

0 1 2 3 4 5 6 7 8 9

175 ÷ 5 35

Function Blocks ITP

Model the connections between division and fractions

Add Blue Array
Add Red Array
Add Yellow Array
Add Green Array
Add Purple Array

Array Creator Spreadsheet

Ways in which children could record

Division with remainders
72 ÷ 5 = 14 r 2

10x5   4x5

0   50   70 72 75
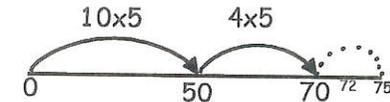
The answer is 14r2, because I can make 14 whole jumps of 5 and I have 2 left over.

63 children are going camping. Each tent sleeps 4 children. How many tents are needed?

10x4   5x4

0   40   60 63 64
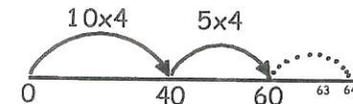
The answer is 16 tents. 15 tents would have 4 children in each and the last tent would have 3 children in it.

Using known number facts

an eighth is 3

12 is 0.5 of 24

24

1/12 of £24 is £2

¼ of 240 is 60

240 ÷ 80 = 3

6 is 0.25 of 24

2400 ÷ 30 = 80
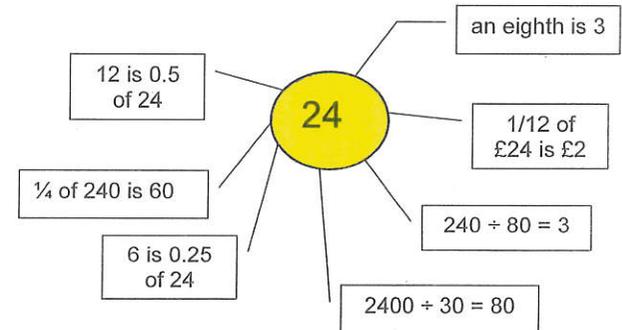
Year Group objective

Year 5

Counting and understanding number

Count from any given number in whole-number and decimal steps, extending beyond zero when counting backwards; relate the numbers to their position on a number line

Explain what each digit represents in whole numbers and decimals with up to two places, and partition, round and order these numbers

Express a smaller number as a fraction of a larger one (recognise 5 out of 8 is 5/8) find equivalent fractions 7/10 = 14/20 and relate fractions to their decimal representations

Understand percentages as the number of parts in every hundred and express tenths and hundredths as percentages

Use sequences to scale numbers up or down, solve problems involving proportions of quantities e.g. decrease quantities in a recipe designed to feed 6 people

Knowing and using number facts

Recall quickly multiplication facts up to 10 x10 and use them to multiply pairs of multiples of 10 and 100; derive quickly corresponding division facts

Identify pairs of factors of two digit whole numbers and find common multiples (e.g. for 6 and 9)

Use knowledge of rounding, place value, number facts and inverse operations to estimate and check calculations

Calculating

Use understanding of place value to multiply and divide whole numbers and decimals by 10,100 or 1000

Refine and use efficient written methods to multiply and divide htu x u tu x tu u.t x u and htu ÷ u

Find fractions using division e.g. 1/100 of 5kg and percentages of numbers and quantities 10% of £80

Use a calculator to solve problems involving decimals and fractions and interpret the display in the context of measures
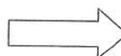
Models and images

Use of bead strings and counting sticks to review decimals, tenths and percentages
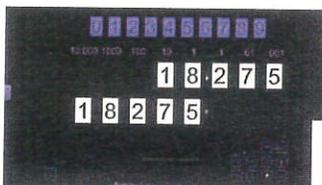

Model arrays to show factors:

36 →

36 x 1 and 1 x 36
18 x 2 and 2 x 18
12 x 3 and 3 x 12
9 x 4 and 4 x 9
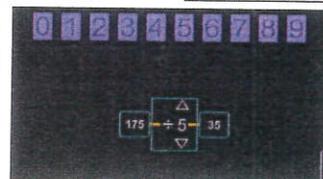6 x 6

Number Dials ITP

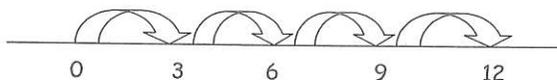18.275
18275

Moving Digits ITP

Function Blocks ITP

175 ÷ 5 = 35

Modelling real life problems

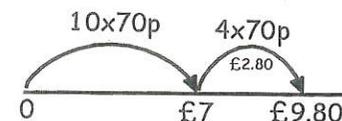How many pieces of wood 1.5m long will I be able to cut from 12m?

(1.5 x.2)   2   2   2   = 8

0   3   6   9   12

Ways in which children could record

Making sense of remainders

We have got £10. Chocolate bars cost 70p each. How many bars can we buy?

10x70p   4x70p
                £2.80

0   £7   £9.80

We can buy 14 bars and we will get 20p change.

Using a number line to begin to express a quotient as a fraction

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

0   5   10   15   20   24   25

I can make 4 jumps of 5. I can only jump 4 parts of the last jump of 5. So the answer is $4 \frac{4}{5}$.

Using known facts and knowledge of inverse operations 225 ÷ 9

X 10 knowledge and doubles

I know 9 x 10 = 90 so 9 x 20 = 180. That leaves 45. I know 9 x 5 = 45, so I've got 20 lots and 5 lots making 25 lots. So, that means that 225 ÷ 9 = 25

Year Group objectives

Counting and understanding number

Express a larger whole number as a fraction of a smaller one e.g. recognise that 8 slices of a 5 slice pizza represents 8/5 or 1 3/5 pizza. Simplify fractions by cancelling common factors; order a set of fractions by converting them to fractions with a common denominator

Express one quantity as a percentage of another e.g. express £400 as a percentage of £1000; find equivalent percentages, decimals and fractions

Solve simple problems involving direct proportion by scaling quantities up or down

Knowing and using number facts

Use knowledge of place value and multiplication facts to 10 x 10 to drive related multiplication and division facts involving decimals e.g. 0.8 x 7 4.8 ÷ 6

Use knowledge of multiplication facts to derive quickly squares of numbers to 12 x 12 and the corresponding squares of multiples to 10

Recognise that prime numbers have only two factors and identify prime numbers less than 100, find the prime factors of two digit numbers

Use approximations, inverse operations and tests of divisibility to estimate and check results

Calculating

Calculate mentally with integers and decimals TU x U, TU ÷ U, U.t x U, U.t ÷ U

Use efficient methods to multiply and divide integers and decimals by a one digit integer and to multiply two digit and three digit integers by a two digit integer

Relate fractions to multiplication and division e.g. 6 ÷ 2 = ½ of 6 = 6 x ½ express a quotient as a fraction or decimal e.g. 67 ÷ 5 = 13.4 or 13 and 2/5. Find fractions and percentages of whole number quantities e.g 5/8 of 96 65% of £260

Use a calculator to solve problems involving multi step calculations

Models and images

Where possible model the approach to division by setting the calculations in a range of real life contexts e.g.
- Measures – 'How many of us can have a 200ml drink if we've got 5 litres of juice?
- Money – 'The school tuck shop sells bananas at 35p each. In one day the takings from bananas were £23.80. How many bananas were sold?

Encourage pupils to choose methods appropriate to the numbers they are working with.

Give pupils a range of calculations to sort according to the methods they'd choose for solving them. Discuss and model appropriate choices.

Discuss and model the appropriate use of calculators for estimating and calculating answers.

x	8	4	10	1
8	64	32	80	
10	80			
3	24	12		
9	72	36	90	

Multiplication and Division Facts Spreadsheet

128

32
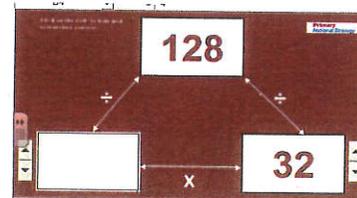
Multiplication and Division Trios Spreadsheet

Ways in which children could record

There are 468 chairs in the hall. There are 36 chairs in each row. How many rows are there?

10x36   3x36
108
0   360   468   = 13 rows of chairs
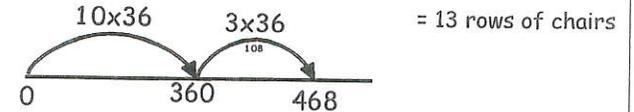
To express a quotient as a decimal:
21 ÷ 5 = 4.2

0   5   10   15   20 21   25

I can make 4 jumps of 5. I can only make 1/5 of the next jump of 5 so the answer is 4.2

21 ÷ 5 = 4 r 1
21 ÷ 5 = 4 & 1/5
           or 4 & 2/10
21 ÷ 5 = 4. 2

972 ÷ 36 = 27

20x36   5x36   2x36
180   72
0   720   900 972   = 27x36
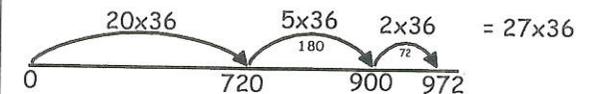
Writing decimal answers in context
5 people won £19 in a raffle. How much did each receive?

19 ÷ 5 = £3 each and there's £4 left over...£1 divided between 5 is 20p so £4 would be 80p...so it's £3.80 each