Progression in Calculations for Division

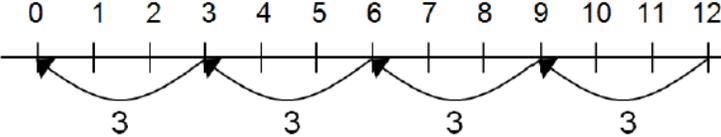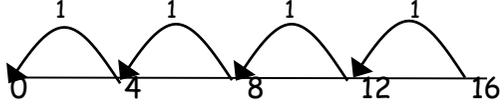| Stage	Concrete	Pictorial	Abstract
Division as grouping or repeated subtraction	Divide quantities into equal groups. Use cubes, counters, objects or place value counters to aid understanding. 10 	Repeated subtraction using a numbered number line. Use a number line to show jumps in groups. The number of jumps equals the number of groups. 0 1 2 3 4 5 6 7 8 9 10 11 12 3 3 3 3 Repeated subtraction using an empty number line 16 ÷ 4 = 4 1 1 1 1 0 4 8 12 16 Moving onto: 60 ÷ 5 = 12 1 1 10 50 0 5 10 60	28 ÷ 7 = 4 Divide 28 into 7 groups. How many are in each group?
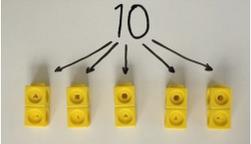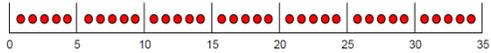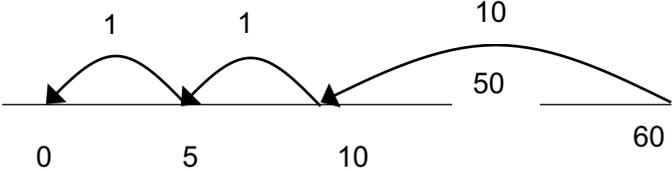
| Division with a remainder | 14 ÷ 3 =
 Divide objects between groups and see how much is left over
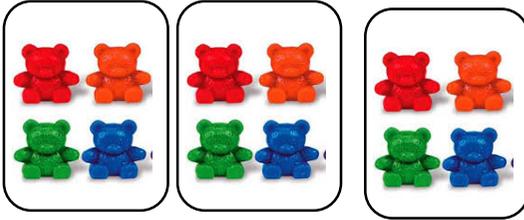
  | Draw dots and group them to divide an amount and clearly show a remainder.
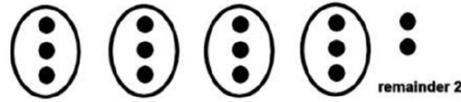
 13 ÷ 4 = 3 r 1
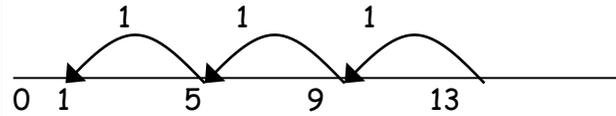
 Moving onto chunking:
 62 ÷ 5 = 12 r 2
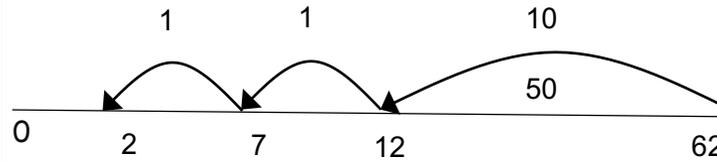
  | Complete written divisions and show the remainder using r.

 29 ÷ 8 = 3 REMAINDER 5
 ↑ ↑ ↑   ↑
 dividend divisor quotient   remainder |

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 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. $7 \times 4 = 28$ $4 \times 7 = 28$ $28 \div 7 = 4$ $28 \div 4 = 7$
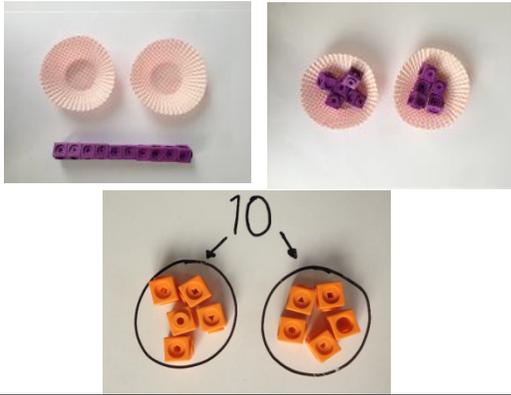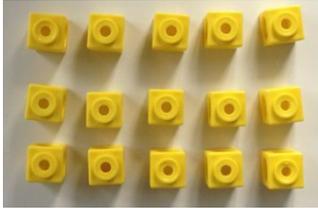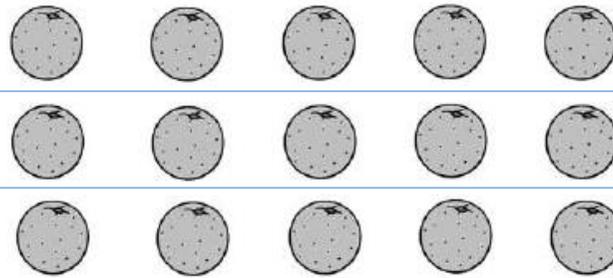
Short division			
	Calculations 42 ÷ 3 Use place value counters to divide using the bus stop method alongside 42 ÷ 3= Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over. We exchange this ten for ten ones and then share the ones equally among the groups. We look how much in 1 group so the answer is 14.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups. Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder. $$\begin{array}{r} 2\ 1\ 8 \\[2pt] {}^{3} \\ 4\,|\,8\ 7\ 2 \end{array}$$ Move onto divisions with a remainder. $$\begin{array}{r} 8\ 6\ \ r\ 2 \\[2pt] {}^{3} \\ 5\,|\,4\ 3\ 2 \end{array}$$
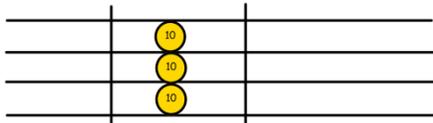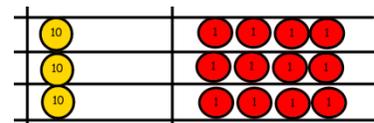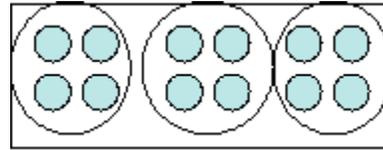
Long division	Long division is generally used when the divisor is greater than 10 or if a child cannot do the calculation mentally via the short division method.

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                27
         36 )  972
            -  720      20x
               252
            -  252       7x
                 0
Answer:          27
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432 ÷ 15 becomes

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                2   8   r 12
        1   5 | 4   3   2
                3   0   0
                1   3   2
                1   2   0
                    1   2
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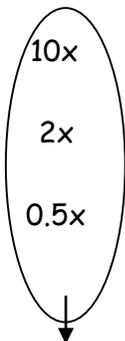
Answer: 28 remainder 12

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

87.5 ÷ 7

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               12.5
         7 )   87.5
           -   70.0     10x
               17.5
           -   14.0      2x
                3.5
           -    3.5     0.5x
                 0



         Answer :     12.5
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By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.

Children should not be made to go onto the next stage if:

1) they are not ready.
2) they are not confident.

Teachers should use grouping and sharing interchangeably throughout each year group.

Children should be encouraged to approximate their answers before calculating.

Children should be encouraged to check their answers after calculation using an appropriate strategy.

Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?

Answer: 7 (the remaining 6p is not enough to buy another sweet)

In years five and six children should learn to give remainders in a range of forms including fractions and decimals.