PROGRESSION THROUGH CALCULATIONS FOR DIVISION

MENTAL CALCULATIONS

(ongoing)
These are a **selection** of mental calculation strategies:
See NNS Framework Section 5, pages 52-57 and Section 6, pages 58-65

Doubling and halving

Knowing that halving is dividing by 2

Deriving and recalling division facts

Tables should be taught everyday from Y2 onwards, either as part of the mental oral starter or other times as appropriate within the day.

Year 2	2 times table 5 times table 10 times table
Year 3	2 times table 3 times table 4 times table 5 times table 6 times table 10 times table
Year 4	Derive and recall division facts for all tables up to 10 x 10
Year 5 & 6	Derive and recall quickly division facts for all tables up to 10 x 10

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
30 x 7 = 210, 300 x 7 = 2100, 3000 x 7 = 21 000, 0.3 x 7 = 2.1 etc

Dividing by 10 or 100

Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.
Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Use of factors

378 ÷ 21	378 ÷ 3 = 126 126 ÷ 7 = 18	378 ÷ 21 = 18

Use related facts
Given that 1.4 x 1.1 = 1.54
What is 1.54 ÷ 1.4, or 1.54 ÷ 1.1?

Teachers should record the methods and strategies which the children can use confidently and records should be passed to the next teacher on transition. Record sheets are provided (see appendix 2).

MANY MENTAL CALCULATION STRATEGIES WILL CONTINUE TO BE USED. THEY ARE NOT REPLACED BY WRITTEN METHODS.

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

YR and Y1

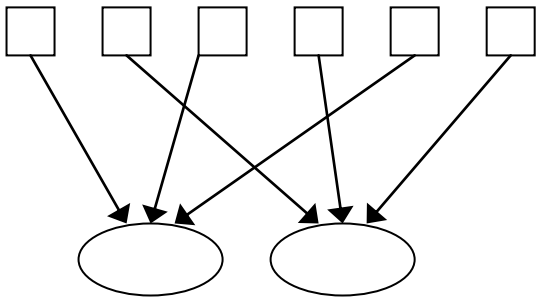
Children are given lots of practical opportunities to develop their understanding of division. Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.

Y2

Children will develop their understanding of division and use jottings to support calculation; they use practical apparatus to support the concept of sharing in real life contexts.

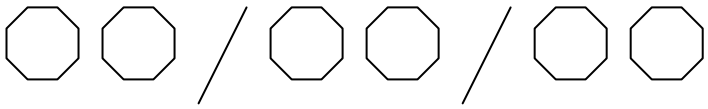
- ✓ **Sharing equally**

6 sweets shared between 2 people, how many do they each get?



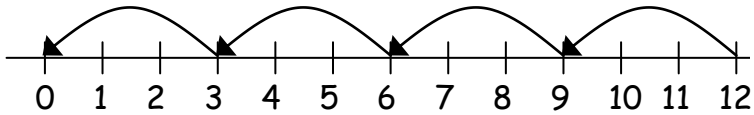
✓ **Grouping or repeated subtraction**

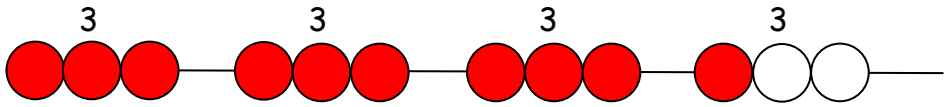
There are 6 sweets, how many people can have 2 sweets each?



✓ **Repeated subtraction using a number line or bead bar**

12 ÷ 3 = 4





The bead bar will help children with interpreting division calculations such as 10 ÷ 5 as 'how many 5s make 10?'

✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ ÷ 2 = 4 20 ÷ △ = 4 □ ÷ △ = 4

Y3

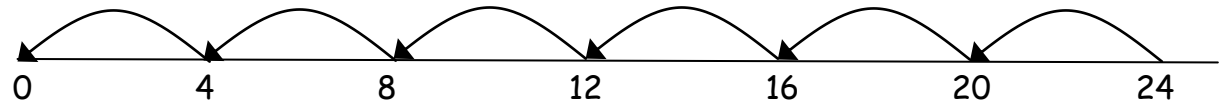
Children continue to use practical apparatus and use their understanding of arrays in multiplication to develop their understanding of division. Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

- ✓ **Repeated subtraction using a number line**

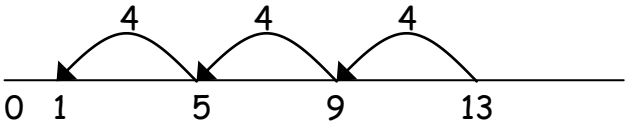
Children will use an empty number line to support their calculation.

24 ÷ 4 = 6



Children should also move onto calculations involving remainders.

13 ÷ 4 = 3 r 1



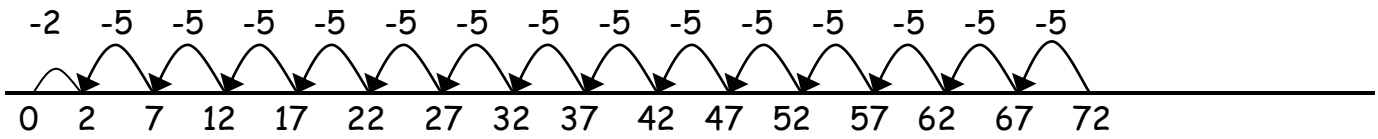
- ✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

26 ÷ 2 = □ 24 ÷ △ = 12 □ ÷ 10 = 8

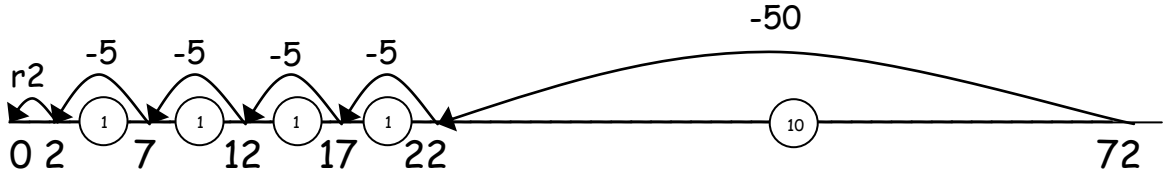
Y4

Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s – numbers with which the children are more familiar.

72 ÷ 5



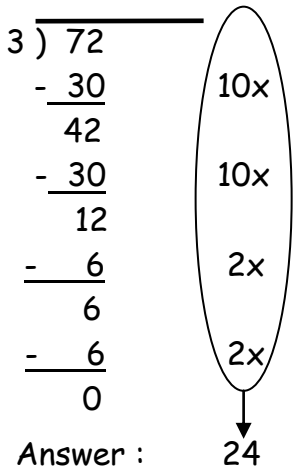
Moving onto:



Then onto the vertical method:

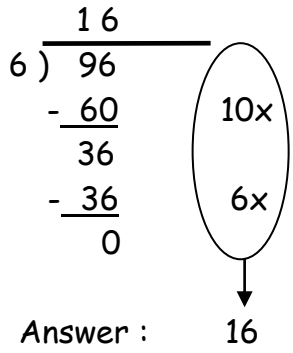
Short division TU ÷ U

72 ÷ 3



Leading to subtraction of other multiples.

96 ÷ 6



Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

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)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?
Answer: 8 (the remaining 6 apples still need to be placed into a box)

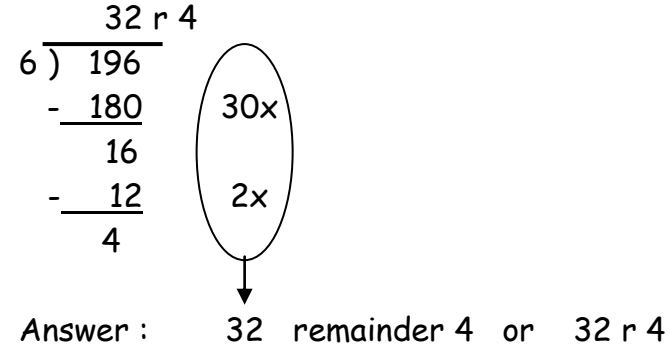
Y5

Children will continue to use written methods to solve short division TU ÷ U.

Children can start to subtract larger multiples of the divisor, e.g. 30x

Short division HTU ÷ U

196 ÷ 6



Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

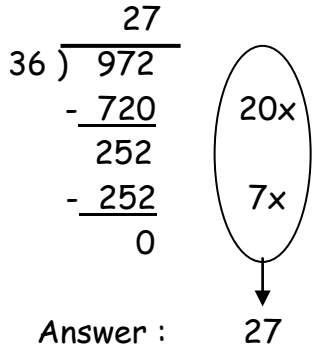
Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Y6

Children will continue to use written methods to solve short division TU ÷ U and HTU ÷ U.

Long division HTU ÷ TU

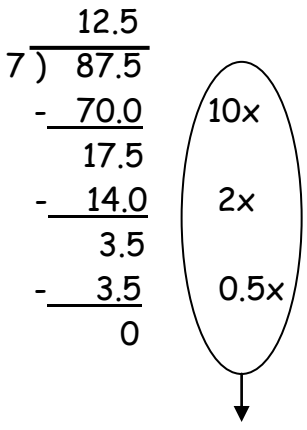
972 ÷ 36



Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3\ ^{2}/_{10}$ which could then be written as $3\ ^{1}/_{5}$ in its lowest terms.

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

87.5 ÷ 7



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.**

Children should use practical apparatus until they are confident without it.
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 who use English as an additional language or children who arrive from other schools may already have efficient methods for calculating. The children should be encouraged to use their methods but they should also be able to explain the methods they are using. If it is apparent that a child is unable to explain the method they are using (and this is not due to a lack of English language) or they have a lack of understanding of the method they are using, then the children should be taught the methods in the calculation policy with an emphasis on explaining how the method works.