



Written progression through division

MENTAL CALCULATIONS

These are a selection of mental calculation strategies:

Doubling and halving

Knowing that halving is dividing by 2

Deriving and recalling division facts

*Tables should be taught every day, either as part of the mental oral starter or within **fast maths**.*

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 10×10

Year 5 & 6 Derive and recall quickly division facts for all tables up to 10×10
 Work out products such as 70×5 , 70×50 and 700×50 using the related fact 7×5 and their knowledge of place value.

Using and applying division facts

Children should be able to utilise their tables knowledge to derive other facts.

e.g. If I know $3 \times 7 = 21$, what else do I know?

$30 \times 7 = 210$, $300 \times 7 = 2100$, $3000 \times 7 = 21\ 000$, $0.3 \times 7 = 2.1$ etc

Dividing by 10 or 100

Knowing that the effect of dividing by 10; shift in the digits one place to the right.

Knowing that the effect of dividing by 100; shift in the digits two places to the right.

Use related facts

Given that $1.4 \times 1.1 = 1.54$

What is $1.54 \div 1.4$, or $1.54 \div 1.1$?

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 OUR CHILDREN TO ACHIEVE.

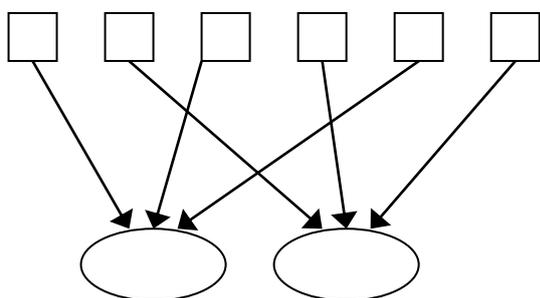
PROGRESSION THROUGH CALCULATIONS FOR DIVISION

Stage 1: Sharing and grouping

Children will develop their understanding of division and use jottings to support calculation

✓ **Sharing equally**

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

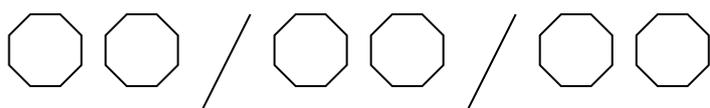


$$6 \div 3 = 2$$

$$3 \times 2 = 6$$

✓ **Grouping or repeated subtraction**

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



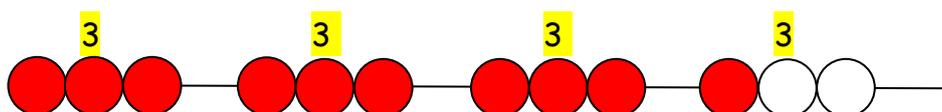
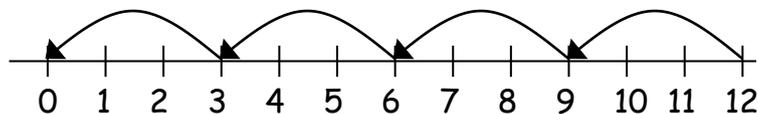
$$6 \div 2 = 3$$

$$2 \times 3 = 6$$

Stage 2: Repeated subtraction on a number line

- ✓ Repeated subtraction using a number line or bead bar

$$12 \div 3 = 4$$



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

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

$$\square \div 2 = 4$$

$$20 \div \triangle = 4$$

$$\square \div \triangle = 4$$

Stage 3: Repeated subtraction on a number line - with remainders

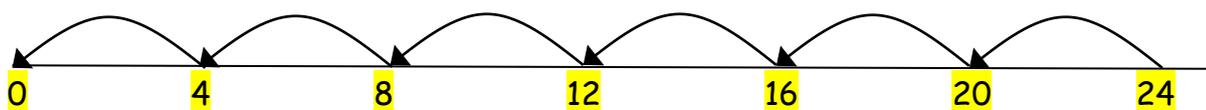
Ensure that the emphasis in Y3 is on grouping rather than sharing.

Children will continue to use:

✓ Repeated subtraction using a number line

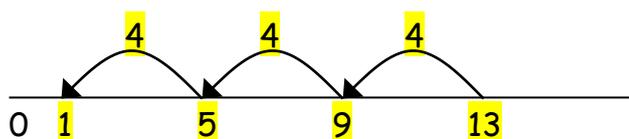
Children will use an empty number line to support their calculation.

$$24 \div 4 = 6$$



Children should also move onto calculations involving remainders.

$$13 \div 4 = 3 \text{ r } 1$$



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

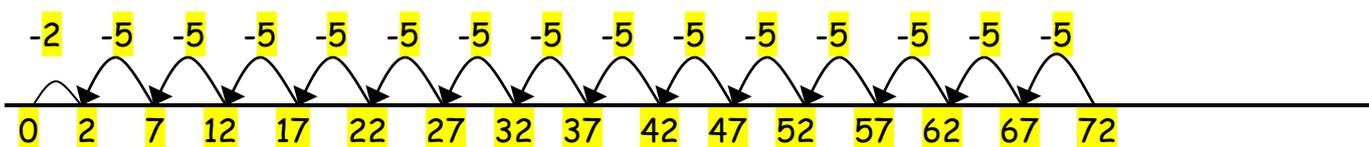
$$26 \div 2 = \square$$

$$24 \div \triangle = 12$$

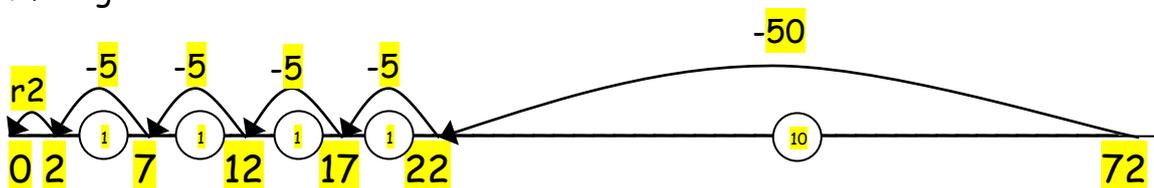
$$\square \div 10 = 8$$

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.

$$72 \div 5$$



Moving onto:



Stage 5: Short Division

Children will continue to use written methods to solve short division $TU \div U$.

Short Division

Short division of a two-digit number can be introduced to children who are confident with multiplication and division facts and with multiples of 10 mentally, and whose understanding of partitioning and place value is sound. Children must be secure in their understanding of long division before moving onto short division.

$$\begin{array}{r} 27 \\ 3 \overline{) 81} \end{array}$$

The accompanying language is 'How many threes divide into 80 so that the answer is a multiple of 10?' This gives 20 threes or 60, with 20 remaining. We now ask: 'What is 21 divided by three?' which gives the answer 7.

Children can convert remainders into decimals to at least 2 d.p.

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 know whether to leave a remainder or round the answer up or down accordingly. They should make sensible decisions about rounding up or down after division. For example, $240 \div 52$ is 4 remainder 32, but whether the answer needs to be rounded up to 5 or rounded down to 4 depends on the context.

Short Division of HTU \div U

$$\begin{array}{r} 97 \\ 3 \overline{) 291} \end{array}$$

The accompanying language is 'How many threes in 290?' (The answer must be a multiple of 10). This gives 90 threes or 270, with 20 remaining. We now ask: 'How many threes in 21?' which has the answer 7.

Short division of a three-digit number can be introduced to children who are confident with multiplication and division facts and with subtracting multiples of 10 mentally, and whose understanding of partitioning and place value is sound.

Children must be secure in their understanding of long division before moving onto short division. For most children this will be at the end of Year 5 or the beginning of Year 6.

Stage 6: Short Division - decimals

Any remainders could be shown as fractions, i.e. if the children were dividing 32 by 10; the

$$\begin{array}{r} 2.4 \\ 3 \overline{) 7.2} \\ \underline{6} \\ 12 \\ \underline{12} \\ 0 \end{array} \qquad \begin{array}{r} 12.5 \\ 7 \overline{) 87.5} \\ \underline{7} \\ 17 \\ \underline{14} \\ 35 \\ \underline{35} \\ 0 \end{array}$$

answer should be shown as $3 \frac{2}{10}$ which could then be written as $3 \frac{1}{5}$ in its lowest terms. Remainders can also be shown as integers, i.e. 3 remainder 2 or 3 r 2.

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

$$\begin{array}{r} 032.66 \text{ r} \\ 6 \overline{) 032.66} \\ \underline{196.400} \\ 0 \end{array}$$

Stage 7: Long division - 2 digit division

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

$$\begin{array}{r} 27 \\ 36 \overline{) 972} \\ \underline{360} \\ 612 \\ \underline{360} \\ 252 \\ \underline{252} \\ 0 \end{array}$$

10x
10x
7x

Answer = 27

Children will continue to use written methods to solve short division $TU \div U$ and $HTU \div U$.

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

- 1) They are not ready.
- 2) They are not confident.

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.