

Overview of Progression in Division

FOUNDATION

Calculation Strategies

Laying foundations for grouping and sharing by maximising opportunities when counting

Number rhymes such as two, four, six, eight,
Ten fat sausages



Hop along in twos on a large number track



Counting in pairs
e.g. pairs of children
pairs of socks
eggs in an egg box
pairs of animals



Animals in 2s on farm

Count in ones but every other number in a whisper

YEAR 1

Calculation Strategies

Laying foundations for grouping and sharing by maximising opportunities when counting

When counting in 2s, 5s or 10s, using visual and kinaesthetic resources to model the count, ask:

Q: How many 2s / 5s / 10s have we counted?

Q: How many more 2s / 5s / 10s do we need to count to reach?

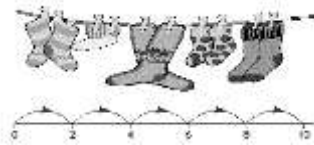
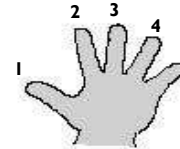
Numberline frog jumping



Matching groups of Numicon to a given plate.



Using fingers to represent 1's, 2's etc.



$$2 + 2 + 2 + 2 + 2 = 10$$

$$10 - 2 - 2 - 2 - 2 - 2 = 0$$

5 hops of 2

YEAR 2

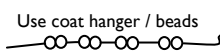
Calculation Strategies

Grouping

A bag of 6 sweets, how many children can have 2 sweets each?



Use Numicon

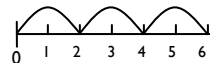


Use coat hanger / beads

Introduce the division sign to mean "divided into groups of"

Use fingers to represent different amounts e.g. 2's, 5's, 10's

Model on a numberline

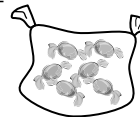


Use grouping ITP



Share Equally

Share a bag of 6 sweets between 2 children – one for you, one for you.....



Using Numicon

Overview of Progression in Division

YEAR 3

Calculation Strategies
Division as grouping (repeated subtraction)
 $12 - 3 - 3 - 3 - 3 =$
 $12 \div 3 = 4$
 12 divided into groups of 3

Introducing division as repeated subtraction

Use bead string in parallel with numberline

10 divided in to equal groups of 2

10 divided equally by 2

Division as sharing
 $93 \div 3 = 31$
 10 for you, 10 for you etc...
 $11 \div 2 = 5 \text{ r}1$

YEAR 4

Calculation Strategies
Division as grouping
 $TU \div U \quad 72 \div 5 =$
 Can we subtract 10 lots of 5?

Vertical or horizontal no. line can be used

14 R 2

YEAR 5

Calculation Strategies
Chunking on a numberline
 $HTU \div U$

Chunking
 Can we subtract 10 lots of 7 (or more)?

Answer: 36 remainder 4
 CHECK $(36 \times 7) + 4 = 256$

Overview of Progression in Division

YEAR 6

Calculation Strategies

Chunking

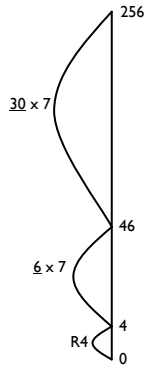
Can we subtract 10 lots of 7?
Can we subtract 20 lots of 7?
What is the biggest number of multiples of 10 we can subtract?

$$\begin{array}{r} 256 \\ - 210 \quad (30 \times 7) \\ \hline 46 \\ - 42 \quad (6 \times 7) \\ \hline 4 \end{array}$$

Answer: 36 remainder 4

$$\text{or } 36 \frac{4}{7}$$

(see Yr 7)



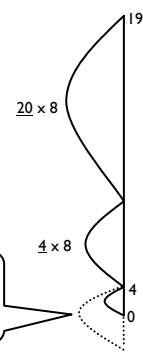
$$\begin{array}{r} 196 \div 8 \\ - 160 \quad (20 \times 8) \\ \hline 36 \\ - 32 \quad (4 \times 8) \\ \hline 4 \end{array}$$

Answer: 24 remainder 4

or 24.5

$$24 \frac{4}{8} = 24 \frac{1}{2} = 24.5$$

$$4 \text{ out of the next group of 8} = \frac{4}{8} = 0.5$$



YEAR 7

Calculation Strategies

Written method for dividing by a single digit number (Chunking)

HTU ÷ U

Can we subtract 10 lots of 7?
Can we subtract 20 lots of 7? Etc.....

$$\begin{array}{r} 256 \\ - 210 \quad (30 \times 7) \\ \hline 46 \\ - 42 \quad (6 \times 7) \\ \hline 4 \end{array}$$

Answer: 36 remainder 4

$$\text{or } 36 \frac{4}{7}$$

Use division to convert simple fractions into decimals ($\frac{1}{2}$, $\frac{1}{4}$)

$\frac{1}{2} = ?$

$$10 \div 2 = 5$$

$$1 \div 2 = 0.5$$

Multiply by $\frac{1}{2}$ or $\frac{1}{4}$ (divide by 2 or 4)
– dividing by 2 is the same as halving

$$\frac{1}{2} \text{ of } 18 = 18 \div 2 = \frac{18}{2}$$

$$\begin{array}{r} 178 \div 8 \\ - 160 \quad (20 \times 8) \\ \hline 18 \\ - 16 \quad (2 \times 8) \\ \hline 2 \end{array}$$

Answer: 22 remainder 2 or 22.25

$$22 \frac{2}{8} = 22 \frac{1}{4} = 22.25$$

YEAR 8

Calculation Strategies

Developing the use of settings to support division by 2 digit number (Chunking)

$$1428 \div 17$$

$$\begin{array}{r} 1428 \\ - 850 \quad (50 \times 17 = 850) \\ \hline 578 \\ - 340 \quad (20 \times 17 = 340) \\ \hline 238 \\ - 170 \quad (10 \times 17 = 170) \\ \hline 68 \\ - 34 \quad (2 \times 17 = 34) \\ \hline 34 \\ - 34 \quad (2 \times 17 = 34) \\ \hline 0 \end{array}$$

$$50 + 20 + 10 + 2 + 2 = 84 \\ \text{so } 1428 \div 17 = 84$$

Working out

$$100 \times 17 = 1700$$

$$10 \times 17 = 170$$

$$23.94 \div 6$$

$$\begin{array}{r} 23.94 \\ - 18 \quad (3 \times 6 = 18) \\ \hline 5.94 \\ - 3 \quad (0.5 \times 6 = 3) \\ \hline 2.94 \\ - 2.4 \quad (0.4 \times 6 = 2.4) \\ \hline 0.54 \\ - 0.54 \quad (0.09 \times 6 = 0.54) \\ \hline 0 \end{array}$$

$$3 + 0.5 + 0.4 + 0.09 = 3.99 \\ \text{so } 23.94 \div 6 = 3.99$$

Working out

$$0.1 \times 6 = 0.6 \\ 0.2 \times 6 = 1.2$$

YEAR 9

Calculation Strategies

Converting Fractions to Decimals

Explore patterns in converting sequences of fractions to decimals using a calculator, e.g. add 1 to numerator and denominator?

$$\frac{3}{4} = 0.75$$

$$\frac{7}{2} = 3.5$$

$$\frac{4}{5} = 0.8$$

$$\frac{8}{3} = 2.666$$

$$\frac{5}{6} = 0.8333$$

$$\frac{9}{4} = 2.25$$

gets larger

gets smaller

Short division

$$\begin{array}{r} 3 \div 8 \\ 0.375 \\ \hline 8 \overline{) 3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Long division

$$1269.05 \div 17$$

$$\begin{array}{r} 74.65 \\ 17 \overline{) 1269.05} \\ \underline{119} \\ 79 \\ \underline{68} \\ 110 \\ \underline{102} \\ 85 \\ \underline{85} \\ 0 \end{array}$$

etc.....