

# Division methods

# 3 Strands of Division

Grouping:

divided between

Sharing:

divided by

Fractions:

divided into

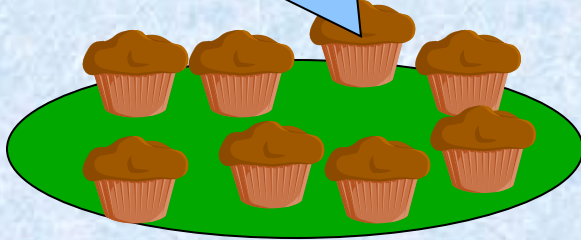
## Progression of Division

### Sharing (YR & Y1)

e.g.  $8 \div 2 =$

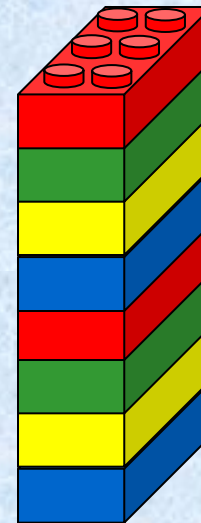
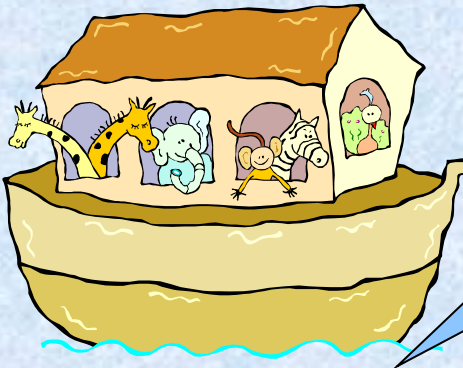
#### 1. Practical Sharing (concrete objects)

Can we share the cakes fairly between the four of us ?

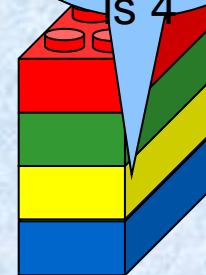


#### 2. Beginning to understand half

Put half of the animals into the ark.



Half of  
8  
is 4

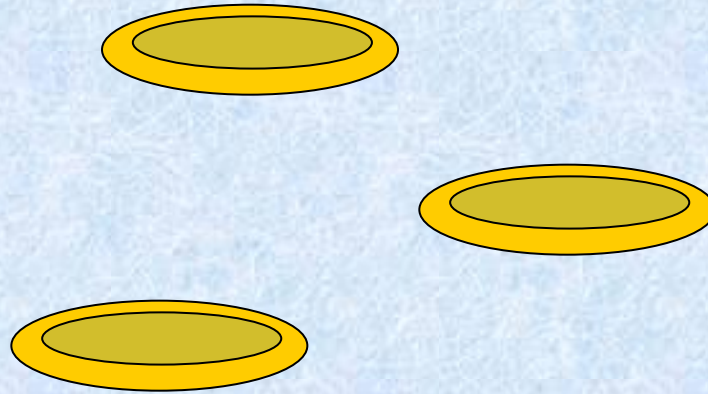
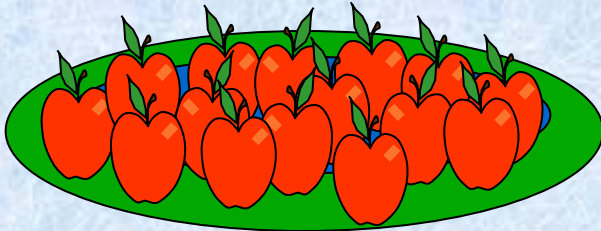


#### 3. Begin to understand division as grouping (repeated subtraction) or sharing

# Progression of Division

## Sharing and Grouping (Year 2) $15 \div 3 =$

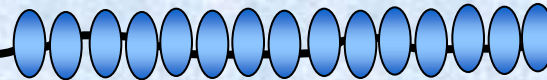
### 1. Sharing equally



### 2. Grouping (Model on which chunking is based)

How many groups of 3 can we make from these 15 ?

5 groups of 3



### 3. Number stories/ word problems

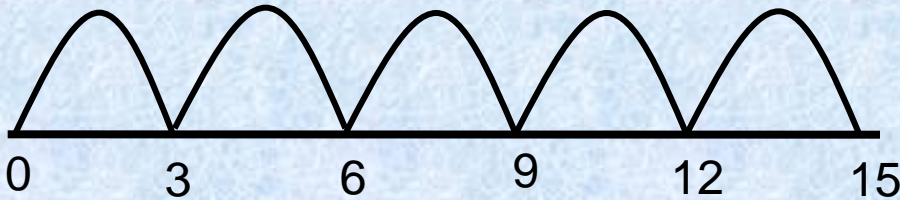
## Progression of Division

# Grouping and number lines (Year 3) e.g. $15 \div 3 =$

### 1. Grouping (linking to number lines)



How many  
3s in 15 ?



$$15 = 3 + 3 + 3 + 3 + 3$$

$$15 \div 3 = 5$$

$$15 \text{ divided by } 3 = 5$$

$$15 - 3 - 3 - 3 - 3 - 3 = 0$$

### 2. Dividing by 10 and 100

1	2	3	4	5	6
10	20	30	40	50	60
100	200	300	400	500	600

**Repeated addition and subtraction!**

### 3. Corresponding facts (Inverse operation)

$$3 \times 4 = 12 \text{ implies that } 12 \div 4 = 3$$

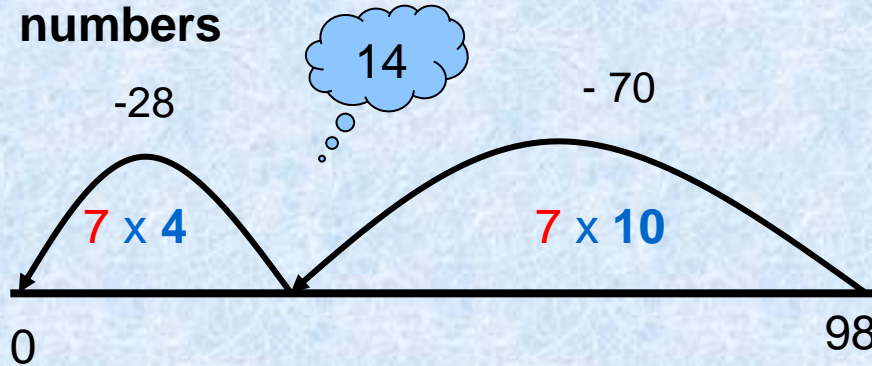
$$4 \times 3 = 12 \text{ implies that } 12 \div 3 = 4$$

### 4. Dealing with remainders practically

# Progression of Division

## Partitioning and informal methods (Year 4) e.g. $98 \div 7$

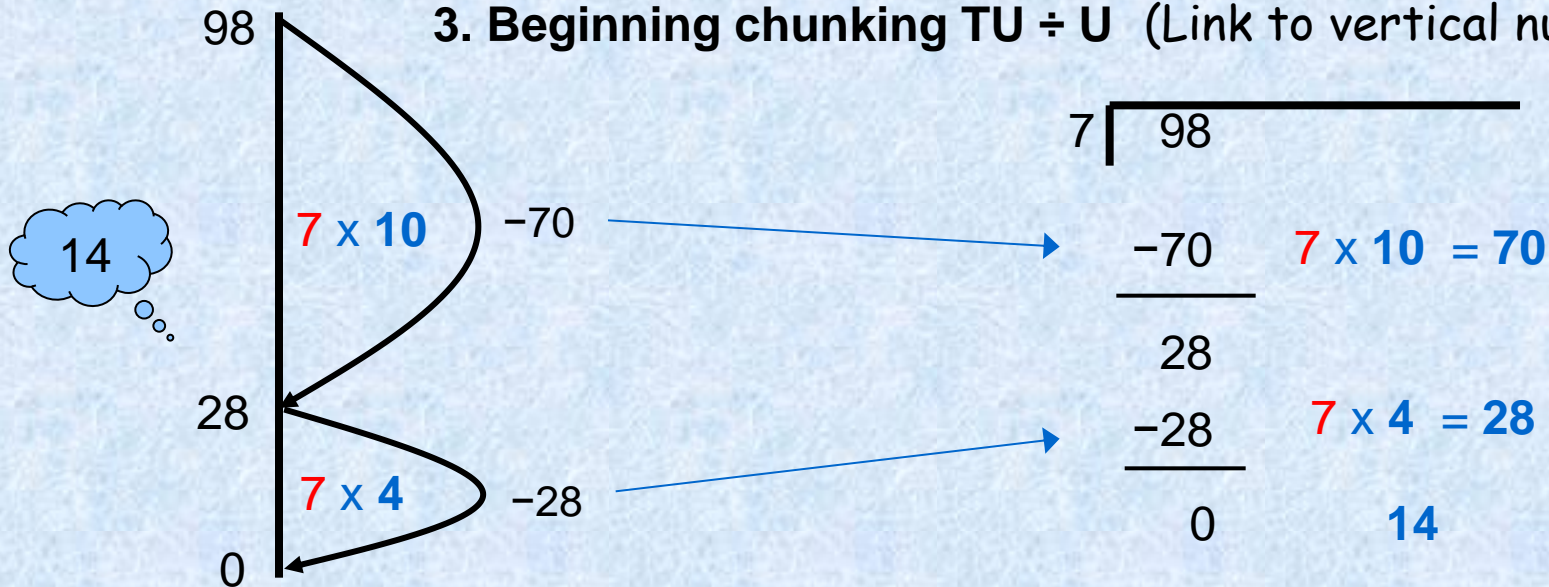
1. Use a number line to show the partitioning of larger numbers



2. Informal methods

$$\begin{array}{r} 98 \\ \swarrow \quad \searrow \\ 70 \quad + \quad 28 \\ \downarrow \quad \div 7 \quad \downarrow \\ 10 \quad + \quad 4 \quad = \quad 14 \end{array}$$

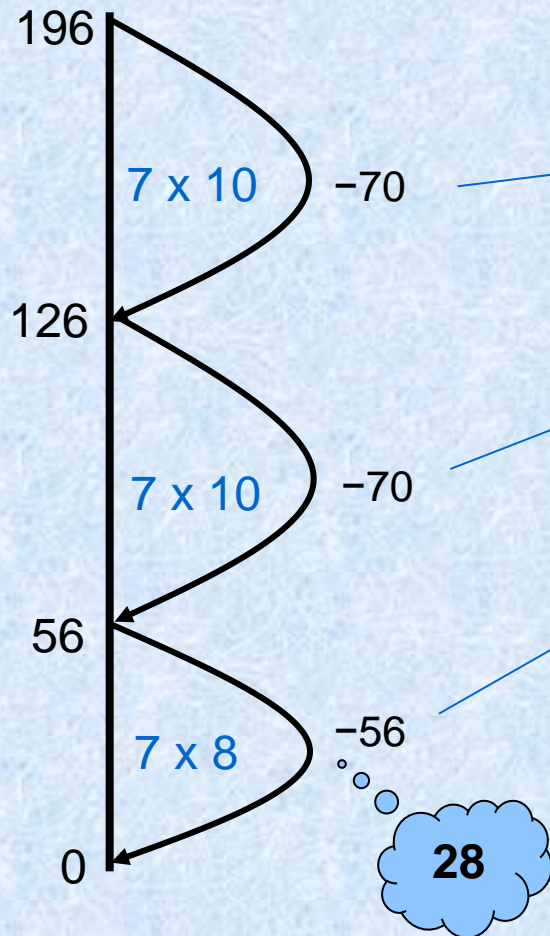
3. Beginning chunking  $TU \div U$  (Link to vertical number line)



## Progression of Division

# Vertical number line and chunking (Year 5) e.g. $196 \div 7$

1. Vertical number line for HTU  $\div$  U



2. Linking to expanded vertical layout

$$\begin{array}{r} 7 \overline{) 196} \\ \underline{-70} \quad 7 \times 10 \\ 126 \\ \underline{-70} \quad 7 \times 10 \\ 56 \\ \underline{-56} \quad 7 \times 8 \\ 0 \quad \quad \mathbf{28} \end{array}$$

3. Compact vertical layout

$$\begin{array}{r} 7 \overline{) 196} \\ \underline{-140} \quad 7 \times 20 \\ 56 \\ \underline{-56} \quad 7 \times 8 \\ 0 \quad \quad \mathbf{28} \end{array}$$

## Progression of Division

# Expanded and compact chunking method (Year 6)

(HTU  $\div$  TU and decimals)

1. Expanded, then compact vertical layouts for HTU  $\div$  TU

$$560 \div 24 =$$

$$\begin{array}{r} 24 \overline{) 560} \\ \underline{- 240} \quad 24 \times 10 \\ 320 \\ \underline{- 240} \quad 24 \times 10 \\ 80 \\ \underline{- 48} \quad 24 \times 2 \\ 32 \\ \underline{- 24} \quad 24 \times 1 \\ 8 \qquad \qquad \qquad \mathbf{23} \end{array}$$

Answer: 23 r 8

2. Extend to decimals with up to two decimal places

$$87.5 \div 7 =$$

$$\begin{array}{r} 7 \overline{) 87.5} \\ \underline{- 70.0} \quad 7 \times 10 \\ 17.5 \\ \underline{- 14.0} \quad 7 \times 2 \\ 3.5 \\ \underline{- 3.5} \quad 7 \times 0.5 \\ 0 \qquad \qquad \qquad \mathbf{12.5} \end{array}$$

Answer: 12.5

When returning to a written calculation at this stage, e.g. to revise or to extend to decimals or to numbers with more digits, it is a good idea to **start again with informal**, expanded methods. This helps to retain their understanding of the link between different methods and makes it easier for them to resort to the expanded method if they need to.