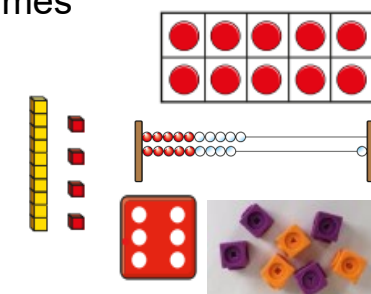
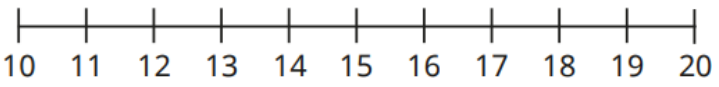
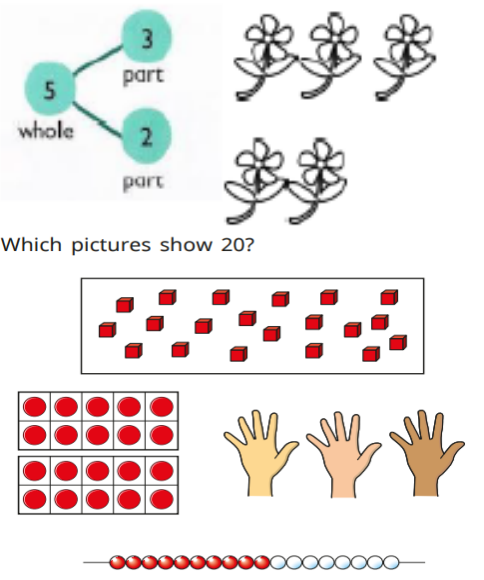
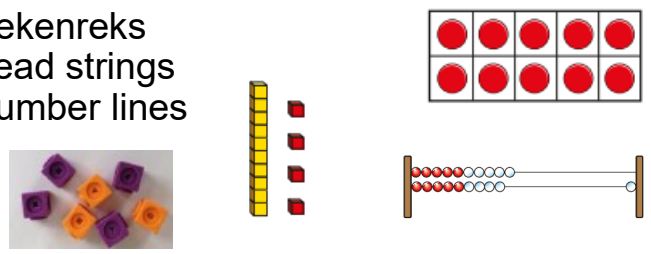
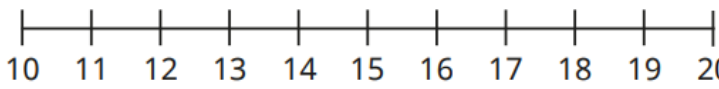
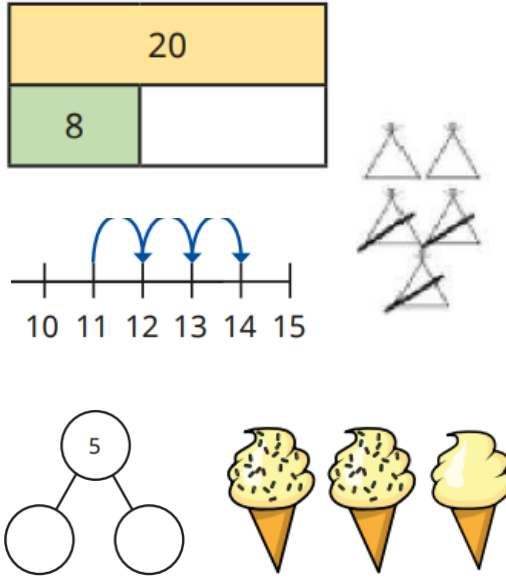




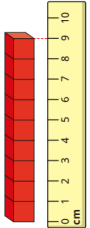




Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract						
<b>Key Stage 1</b>									
<p><b><u>Counting and Place Value</u></b></p> <p><b>Core Vocabulary:</b> Before, after, more, less, greatest, smallest, least, most, equal, odd, even, value, ones, tens, digit, numeral, partition, between, equivalent, inequality symbols, greater than, less than</p> <p><b>Y2:</b> hundred</p>	<p>Counters and tens frames Dienes Rekenreks Opportunities for 1-1 correspondence</p>  <p>Move on to number lines when secure with 1-1 correspondence.</p> 	 <p>Which pictures show 20?</p>	<table border="1" data-bbox="1720 343 2161 422"> <tr> <td>15</td> <td>16</td> <td>17</td> <td></td> <td></td> <td></td> </tr> </table> <p>11 has <input type="text"/> ten and <input type="text"/> one.</p> <p>12 can be made of ... and ...</p> <p>1 less than 13 is .....</p> <p>1 more than 13 is ...</p>	15	16	17			
15	16	17							
<p><b><u>Addition and Subtraction</u></b></p> <p><b>Core Vocabulary:</b> Add, subtract, plus, takeaway, equation, equal to, more, less, difference, sum, total, altogether, number bond, inverse, double, near-double, half, halves</p>	<p>Counters and tens frames Dienes Rekenreks Bead strings Number lines</p>  <p>Move on to number lines when secure with 1-1 correspondence.</p> 		<p><math>10 = \square + 1</math></p> <p>a) <math>4 + 6 = \square</math></p> <p><math>4 + 16 = \square</math></p> <p><math>5 - 2 = \square</math></p> <p>The difference between 3 and 7 is ...</p> <p>8 is 2 more/less than ...</p>						

KS1	Concrete Resources	Pictorial	Abstract
<p><b>Shape</b>  <b>Core Vocabulary:</b>            Cube, cuboid, pyramid, sphere, cone, cylinder, circle, triangle, square, flat, curved, straight, round, corner, vertex, vertices, hollow, solid, face, side, edge, group, sort, equal, polygon</p> <p><b>Y2:</b> quadrilateral, symmetry, symmetrical, reflect, pattern</p>	<p>Range of 2D and 3D shapes.</p> <p>Sorting hoops.</p>	<p>Which of the shapes are triangles?</p>  <p>Sort the shapes into <b>cylinders</b> and <b>spheres</b>.</p> 	<p>What is the name of a shape with 4 equal sides?</p> <p>Draw a rectangle.</p> <p>Does a triangle always have 3 sides?</p>
<p><b>Measure—Length and Height</b></p> <p><b>Core Vocabulary:</b>            Long, longer, longest, short, shorter, shortest, tall, taller, tallest, double, half, centimetre, length, height</p> <p><b>Y2:</b> millimetre, kilometre</p>	<p>Range of objects differing in size.</p> <p>Ribbon in varying lengths.</p> 	<p>Which ribbon is longer?</p>   <p>How tall is the tower?</p>	<p>Measure ... in centimetres.</p> <p>The ... is shorter than the ...</p> <p>The longest object is the .... and the shortest is the ....</p> <p>X is double the length of Y. How long is X?</p>
<p><b>Measure—Mass and Volume</b></p> <p><b>Core Vocabulary:</b>            Full, half full, empty, container, weigh, weight, mass, capacity, volume, balance, heavy, heavier, heaviest, light, lighter, lightest, scale.</p> <p><b>Y2:</b> gram, kilogram, litre, millilitre</p>	<p>Cups, jugs, measuring cylinders, weighing scales, balance scales.</p>	<p>What is the mass of each object?</p> <p>a)</p>  	<p>Which container can hold more marbles?</p> <p>What is the mass of the ... in cubes?</p> <p>Does a taller glass always hold more water?</p>

# KS1

## Concrete Resources

## Pictorial

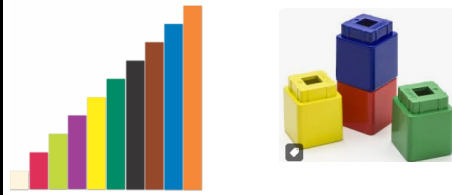
## Abstract

### Fractions

#### Core Vocabulary:

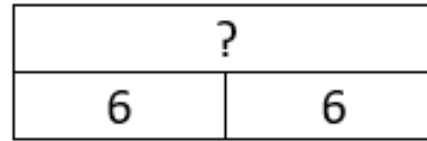
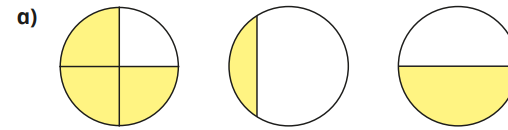
Whole, equal parts, half, halves, quarter, share equally

Y2: three quarters, third, fraction of amount, equivalent



Range of physical resources that can be split into halves and quarters e.g. an apple.

Which shapes show one half?



How many equal parts do you need to find a quarter?

Are the parts equal?

If 3 is half, what is the whole?

If double 4 = 8, how can I find half of 8?

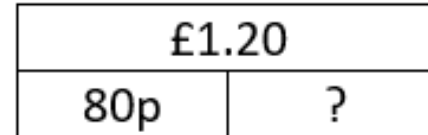
### Money

#### Core Vocabulary:

Value, coin, pound, pence, penny, note, equal to



Write < or > to compare the amounts.



What is the value of each coin?

What is the value of eight 2p coins?

How many ways can I make 13p?

First, I had £1. Then Kate gave me 30p. Now I have £1.30.

### Time

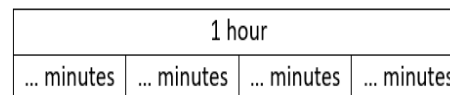
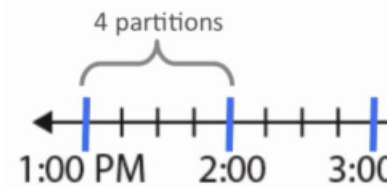
#### Core Vocabulary:

Days of the Week

Seasons

Months of the Year

Before, after, hour, minute, second, half hour



What time of day might I eat dinner?

What month comes after May?

How many seconds in one minute? Minutes in an hour?

What hand should be pointing at the '2' to show 2 o'clock?

## Additional Year 2 Vocabulary

**Data:** count, tally, sort, vote, graph, block diagram, pictogram, represent, table, label, title.

**Temperature:** Thermometer, degrees, coldest, hottest.

Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract
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**Key Stage 2—check pupils have consolidated KS1 learning before moving on.**


**Counting and Place Value**

**Core Vocabulary:**  
See Key Stage One.

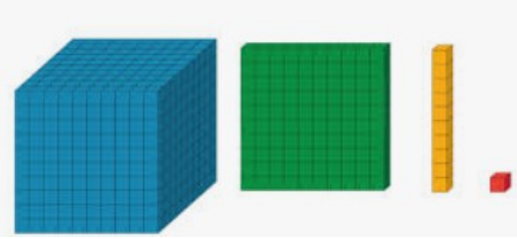

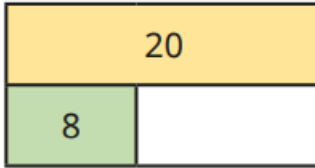
**New to Y3:**  
Thousand, Roman Numerals I to XII

**New to Y4:** decimal, tenth, hundredth, round, negative integer, powers of 10

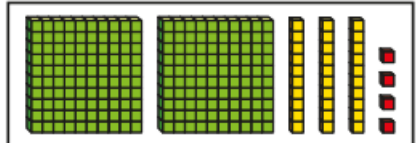
Counters and tens frames used flexibly to show e.g. 10s in 100, tenths in one whole, hundredths in one tenth



Dienes used to scaffold understanding of tenths and hundredths in to one whole. Dienes to support understanding of numbers (including decimals) being 10, 100, 1000 times larger and smaller.

What numbers are shown?



91 has  tens and  ones.

What is 10 more than each number?  
a) 362                      b) 180

**<, = or >?**

Write the missing phrase.

a) 328 \_\_\_\_\_ 344  
b) 916 \_\_\_\_\_ 490

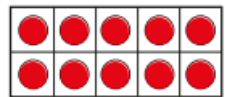
**Addition and Subtraction**

**Core Vocabulary:**  
See Key Stage One.

**New to Y3:** Column addition/subtraction

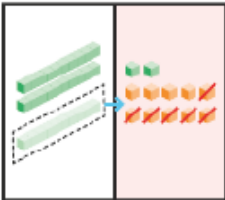
**New to Y6:** Order of operations

Counters and tens frames  
Dienes  
Place Value Grids  
Number lines



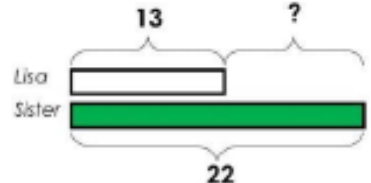
Use Dienes to model regrouping.

Step 1 Regroup 1 ten into 10 ones.  
Subtract the ones.  
12 ones - 6 ones = 6 ones




	tens	ones
	2	12
	<del>3</del>	<del>2</del>
-	1	6
		6

Lisa is 13 years old. Her sister is 22 years old.  
Find the difference in age between them.



Start at the bigger number and count back the smaller number showing the jumps on the number line.



a) 6,058 + 1  
6,058 + 2  
6,058 + 3  
6,058 + 4  
5 + 6,058

312 + 50 =  
312 - 50 =

Mr Hall has £1,342 in the bank.  
a) Mr Hall puts in £500 more.  
How much money does he have in the bank now?

Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract
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**Key Stage 2**

**Multiplication and Division**

**MULTIPLICATION**

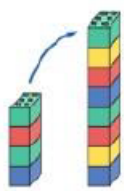
**Core Vocabulary:** Odd, even, lots of, groups of, multiply, multiple, repeated addition, array, row, column, double, halve, share, share equally, equal groups of, divide, divided, left, left over, product, factor, commutative

**New to Y4:** scale up, scale down, convert


**New to Y5:** factor pair, composite, prime, square, cubed

**New to Y6:** common factor, common multiple


Use practical activities to show how to double a number.




double 4 is 8



Count in multiples supported by concrete objects in equal groups.



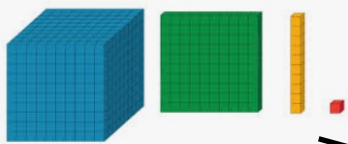
3 + 3 + 3



Commutativity.

Group physical objects or use Numicon pieces to show repeated addition.

**Multiplication with 2 and 3 digit numbers without regrouping.....**

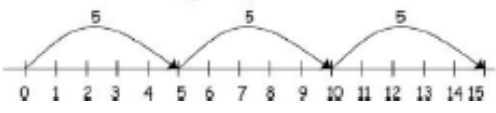


Use dienes to physically multiply 2- or 3-digit numbers.

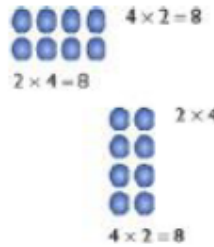
Powers of 10: Use dienes to model multiplying by 10 and 100 by e.g. swapping tens rods for hundreds flats.

Double 8 =

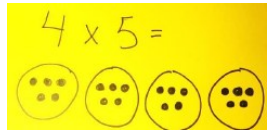
8	8
---	---



Repeated addition

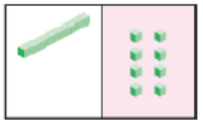


Commutativity.




4 x 5 =

We need to multiply 2 ones by 4



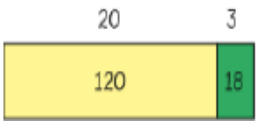

**12 x 4**

Then, multiply 1 ten by 4:



So, 12 x 4 = 48

Use bar models to break down T/H/O e.g. 6 x 23


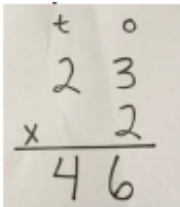



5 + 5 + 5 = 15  
3 + 3 + 3 + 3 + 3 = 15  
5 x 3 = 15  
3 x 5 = 15

Repeated addition

a) 5 x 1  
5 x 10  
50 x 10  
5 x 100

What do you notice?

Expanded method → Compacted method

Tickets cost £5 per person.  
56 tickets have been sold so far.  
How much money has Class 4 collected?

Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract
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**Key Stage 2**

**Multiplication and Division**

**MULTIPLICATION**

**Core Vocabulary:** Odd, even, lots of, groups of, multiply, multiple, repeated addition, array, row, column, double, halve, share, share equally, equal groups of, divide, divided, left, left over, product, factor, commutative

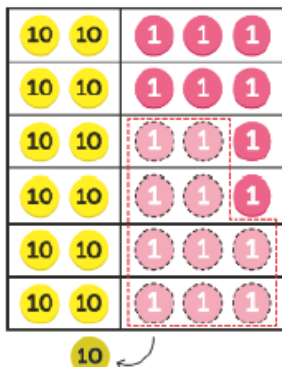
**New to Y4:** scale up, scale down, convert

**New to Y5:** factor pair, composite, prime, square, cubed

**New to Y6:** common factor, common multiple

2 and 3 digit multiplication with regrouping

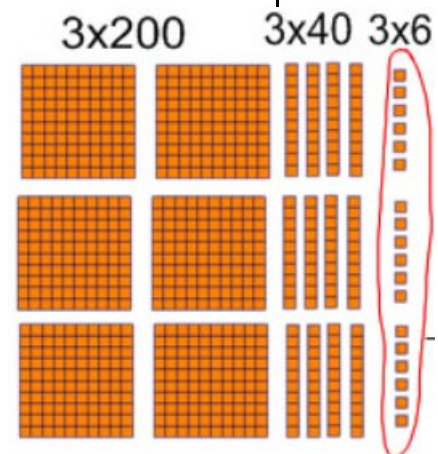
Use PV counters to physically represent numbers e.g.  $6 \times 23$



Partition numbers using dienes and identify where 10 ones need to be swapped for a ten or 10 tens need to be swapped for a hundred etc.

(Use for both concrete and pictorial).

E.g.  $246 \times 3$



Hundreds	Tens	Ones
100	10 10	1 1 1 1
100	10 10	1 1 1 1
100	10 10	1 1 1 1

a) What multiplication is Filip working out?  
b) What is the answer to Filip's multiplication?

Use bar models to help pupils understand the concept of multiplication

$23 \times 6$

Total =				
23				

Jenny earned £23 per week.  
She worked for 6 weeks.  
How much money did she earn in total?

First, Ben saved £312.  
Then, Anna saved 7 times as much money as Ben.  
Now Anna has **£2184**.

**$246 \times 3 = 738$**

Expanded method.	Compacted method.
$\begin{array}{r} 246 \\ \times 3 \\ \hline 18 \\ 120 \\ 600 \\ \hline 738 \end{array}$	$\begin{array}{r} 246 \\ \times 3 \\ \hline 738 \end{array}$

Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract
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**Key Stage 2**

**Multiplication and Division**

**DIVISION**


**Core Vocabulary:**  
 Odd, even, lots of, groups of, multiply, multiple, repeated addition, array, row, column, double, halve, share, share equally, equal groups of, divide, divided, left, left over, product, factor, commutative

**New to Y4:** scale up, scale down, convert

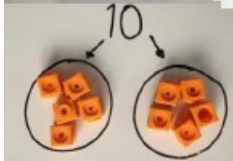
**New to Y5:** factor pair, composite, prime, square, cubed

**New to Y6:** common factor, common multiple

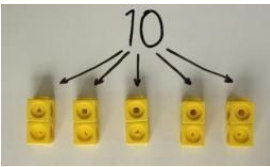
Division as sharing



Physical sharing of objects into equal groups.

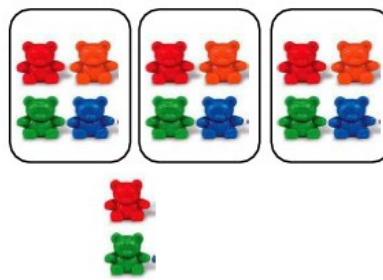


Division as grouping

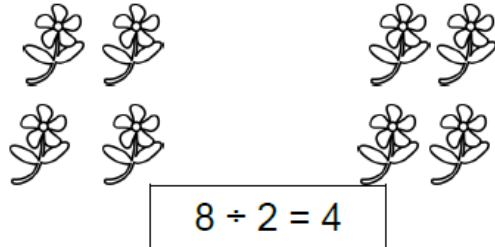


Use manipulatives to divide quantities into equal groups.  
 Example: *I have 10 biscuits and give 2 to each child; how many children get biscuits?*

Division with remainders

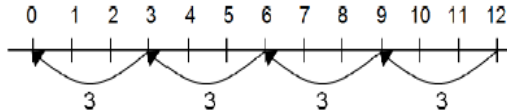


Divide objects into equal groups and identify how much is left over when cannot be split equally.




$8 \div 2 = 4$

Use a number line to show jumps in groups. The number of jumps equals the number of groups.




32			
?	?	?	?

32 divided in to 4 equal groups = ..... In each group.



Draw dots and group them to divide an amount and clearly show a remainder.



Share 12 buns between 3 people  
 $12 \div 3 = 4$

First there were 8 sweets. Then the sweets were divided equally between 2 people. Now each person has 4 sweets.

Divide 28 into 7 groups. How many in each group?  
 $28 \div 7 =$

5	1	0	5
---	---	---	---

$29 \div 8 = 3 \text{ r } 5$

First there were 29 flowers. Next, the flowers were split equally across 8 vases. Now each vase has 3 flowers and there are 5 flowers left.

Year Group and Calculation Focus	Concrete Resources	Pictorial	Abstract
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**Key Stage 2**

**Multiplication and Division**

**DIVISION**

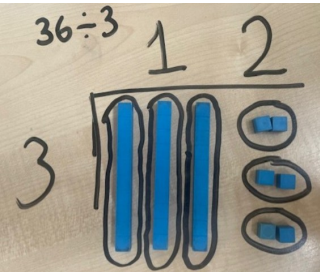
**Core Vocabulary:** Odd, even, lots of, groups of, multiply, multiple, repeated addition, array, row, column, double, halve, share, share equally, equal groups of, divide, divided, left, left over, product, factor, commutative

**New to Y4:** scale up, scale down, convert

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**New to Y6:** common factor, common multiple

Short Division—no remainder

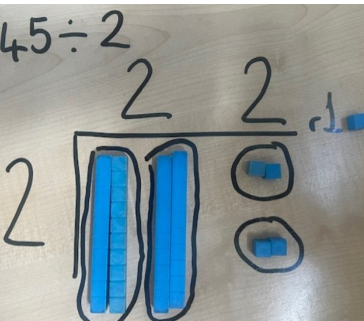


Use dienes to partition and represent a number in e.g. tens and ones.

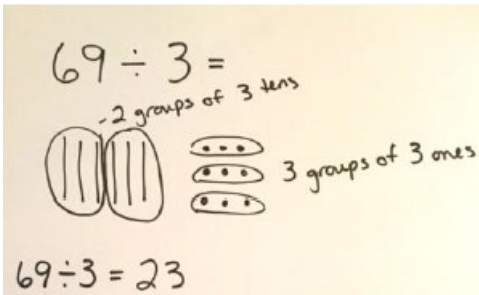
See how many groups of the divisor can be made with each value.

*'I can divide 36 in to 3 equal groups of 1 ten and 3 equal groups of 2 ones. Each group has a total of 12.'*

Short Division—remainders and decimals

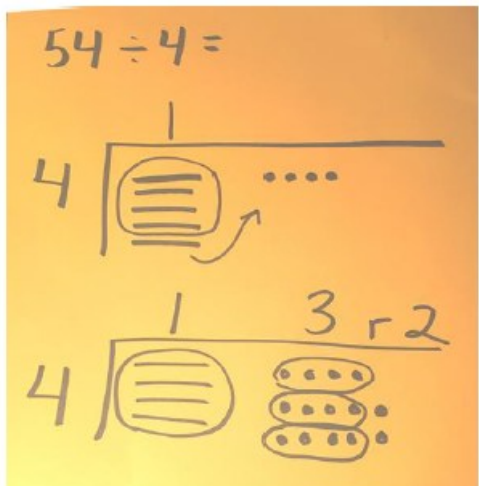


Use dienes and partitioning to divide with and find remainders.



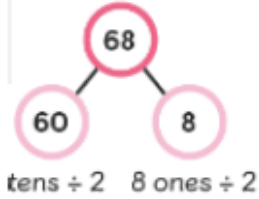
$69 \div 3 = 23$

$54 \div 4 = 13 \text{ r } 2$

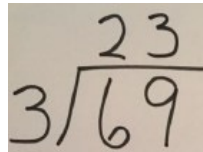


$54 \div 4 = 13 \text{ r } 2$

Link to mental partitioning

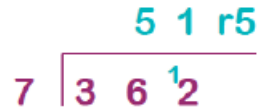


Use dienes or place value counters to support transition to compact division methods.

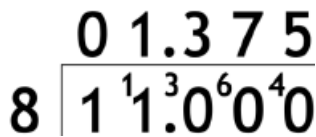


$8 \overline{) 045} \begin{matrix} 3 \\ 3 \\ 6 \\ 0 \end{matrix}$

$362 \div 7 = 51 \text{ r } 5$



When confident with compact method, introduce use of decimals to divide accurately.



$8 \overline{) 1375} \begin{matrix} 1 \\ 7 \\ 1 \\ 0 \\ 0 \\ 0 \end{matrix}$

## Key Stage 2—Vocabulary Progressions

For initial learning C-P-A activities, see Key Stage One pages

Shape	Fractions, Decimals and Percentages	Measure	Geometry	Data	Algebra
<p><b>Core Vocabulary:</b> see Key Stage One</p> <p><b>New to Y3:</b> Horizontal, vertical, perpendicular, parallel</p> <p><b>New to Y4:</b> right angle, acute angle, obtuse angle, area, perimeter</p> <p><b>New to Y5:</b> regular, irregular</p> <p><b>New to Y6:</b> circumference, diameter, radius</p>	<p><b>Core Vocabulary:</b> See Key Stage One.</p> <p><b>New to Y3:</b> Numerator, denominator, unit fraction, non-unit fraction, tenth</p> <p><b>New to Y4:</b> Equivalent fractions and decimals</p> <p><b>New to Y5:</b> proper fraction, improper fraction, mixed number, percentage, fifths, proportion, ratio</p> <p><b>New to Y6:</b> Simplify</p>	<p><b>Core Vocabulary:</b> See Key Stage One.</p> <p><b>New to Y3:</b> leap year, 12/24-hour clock</p> <p><b>New to Y4:</b> convert</p> <p><b>New to Y5:</b> volume, imperial, metric</p>	<p><b>Core Vocabulary:</b> See Key Stage One.</p> <p><b>New to Y3:</b> Greater/less than 90°, orientation</p> <p><b>New to Y4:</b> coordinates, translation, quadrant, X axis, Y axis</p> <p><b>New to Y5:</b> reflex angle, dimension</p> <p><b>New to Y6:</b> four quadrants</p>	<p><b>Core Vocabulary:</b> See Key Stage One.</p> <p><b>New to Y3:</b> chart, bar chart, frequency diagram, Carroll diagram, Venn diagram, axis, axes</p> <p><b>New to Y4:</b> Continuous data, line graph.</p> <p><b>New to Y6:</b> mean, average, pie chart</p>	<p><b>Y6</b> Substitute, variable, symbol, known value, linear number sequence</p>