Calculation Policy: Y5

Mathematical **Manipulatives** | Key **Representations**

Progression in **Procedures**

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Key vocabulary

Place value: ones, tens, hundreds, column, ascending, descending, consecutive

Addition: sum, addend, add

Subtraction: difference, subtrahend, subtract

Multiplication: product, multiplicand, multiplier, multiply, repeated addition, composite number, multiple, product, factor

Division: quotient, dividend, divisor, divide, repeated subtraction, factor

Fractions: denominator, numerator, equal part, whole

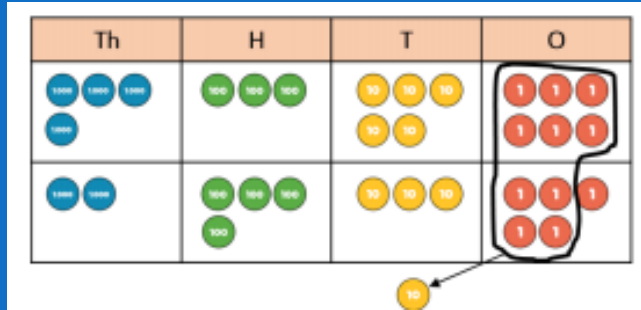Manipulatives: place value counters, Dienes

Representations: represent, representation, numberline, array, row/column, Part-Part-Whole diagram, bar model
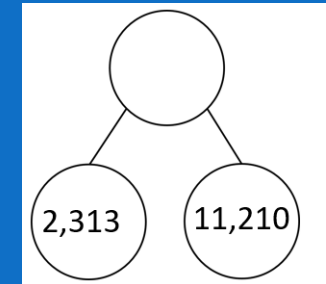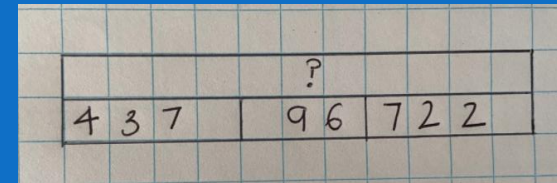
YEAR 5: Addition

Manipulatives

The recommended manipulatives (physical resources) for adding numbers with more than 4- digits are **place value counters and Dienes.** This should build on prior knowledge.
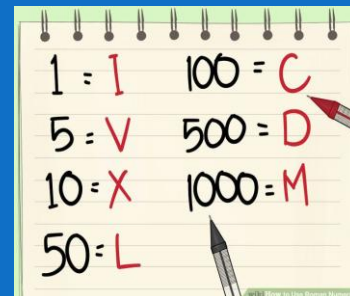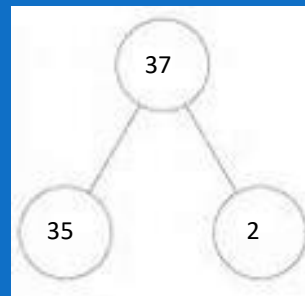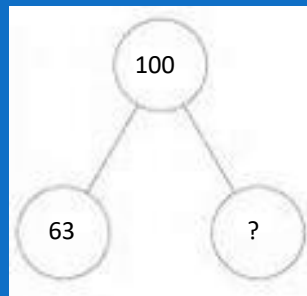

Representations

The key representations used are **place value grids, bar models and part-part-whole diagrams** (which encourage children to apply their knowledge of place value).

Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.

Procedural knowledge

The key methods is **formal column addition.**

	Th	H	T	O
	4	3	5	6
+	2	4	3	5
	6	7	9	1
			1	

Key vocabulary: sum, addend, add

Addition in Year 5

1.   The recommended manipulatives (physical resources) for adding numbers with more than 4-digits are **place value counters and dienes.**

2.   The key representations used are: **part-part-whole diagrams and , bar models** (which encourage children to apply their knowledge of place value) and **place value grids**.
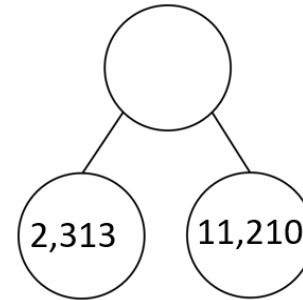
3.   The key methods is **formal column addition.**

1

Th	H	T	O
🔵🔵🔵 🔵	🟢🟢🟢	🟡🟡🟡 🟡🟡	🔴🔴🔴 🔴🔴🔴
🔵🔵	🟢🟢🟢 🟢	🟡🟡🟡	🔴🔴🔴 🔴🔴

2

Part-whole diagram: 2,313 and 11,210

3

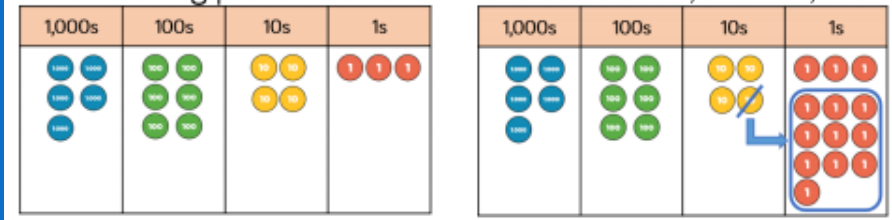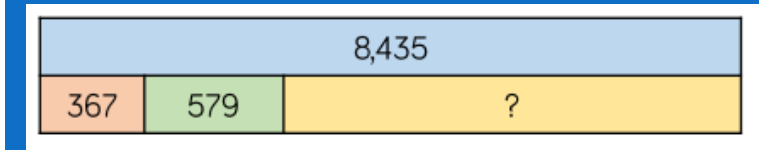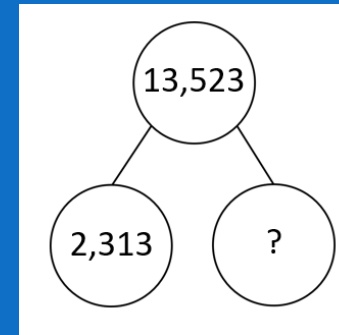|	Th	H	T	O
		4	3	5	6
+		2	4	3	5
		6	7	9	1
				1	

YEAR 5: Subtraction

Manipulatives

The recommended manipulatives (physical resources) for subtracting numbers with more than 4-digits are **place value counters and Dienes.**

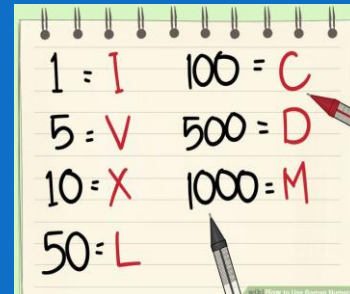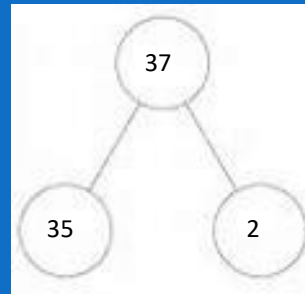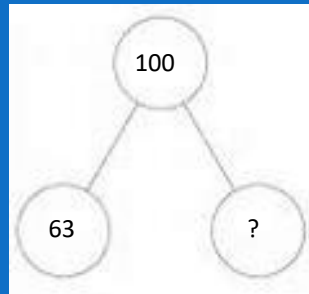Dexter is using place value counters to calculate 5,643 − 4,316

Representations

The key representations used are **place value grids, bar models and part-part-whole diagrams** (which encourage children to apply their knowledge of place value).

Factual knowledge

The key factual knowledge includes recall of addition/subtraction facts to 100 and doubling/halving facts to 100 and Roman Numerals I-M.

1 = I   100 = C
5 = V   500 = D
10 = X   1000 = M
50 = L

Procedural knowledge

The key methods is **formal column subtraction.**

	Th	H	T	O
	5	6	3/4	1 3
−	4	3	1	6
	1	3	2	7

Key vocabulary: difference, minuend, subtrahend, subtract
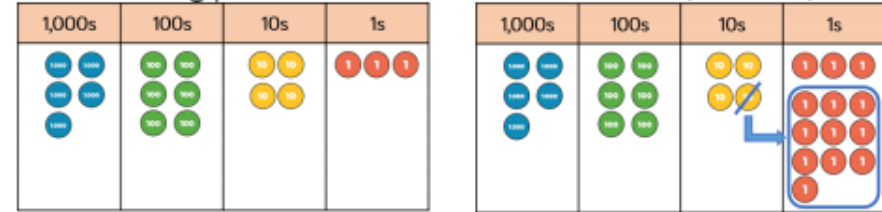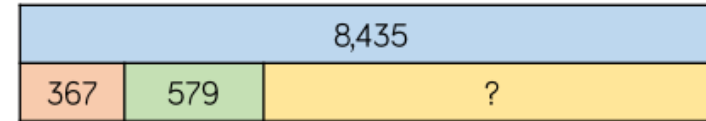
Subtraction in Year 5

1. The recommended manipulatives (physical resources) for subtracting numbers with more than 4- digits are **place value counters and dienes.**

2. The key representations used are: **part-part-whole diagrams, bar models** (which encourage children to apply their knowledge of place value) and **place value grids**.

3. The key methods is **formal column subtraction.**

1

Dexter is using place value counters to calculate 5,643 − 4,316

1,000s	100s	10s	1s

1,000s	100s	10s	1s

2

8,435		
367	579	?

3

	Th	H	T	O
	5	6	3̷⁴ ¹3	
−	4	3	1	6
	1	3	2	7

Manipulatives

The recommended manipulatives (physical resources) for multiplying numbers with up to 4- digits are **place value counters and Dienes.**

Representations

The key representations used are **number lines, place value grids and bar models.**

Factual knowledge

The key factual knowledge includes recall of all multiplication tables.

Procedural knowledge

The key methods are **grid method** and **formal column multiplication.**

Key vocabulary: product, multiplicand, multiplier, multiply, repeated addition
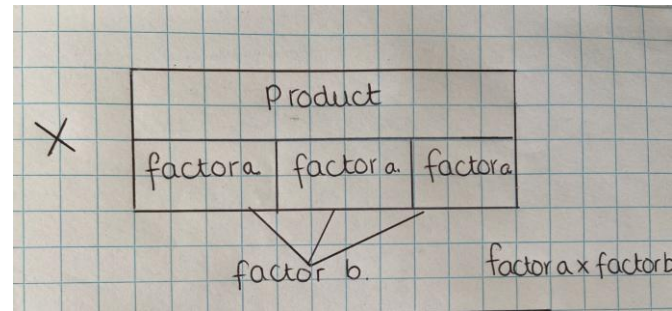
Multiplication in Year 5

1. The recommended manipulatives (physical resources) for multiplying 4- digit numbers by 2-digit numbers are **place value counters and dienes.**

2. The key representations used are: **bar model** and **place value grids**.

3. The key methods are **Grid method**, **and formal column method.**

1

Annie earns £1,325 per week. How much would he earn in 4 weeks?

Thousands	Hundreds	Tens	Ones
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1
1000	100 100 100	10 10	1 1 1 1 1

2

Product

factor a	factor a.	factor a

factor b.

factor a x factor b

3

×	40	4
30	1,200	120
2	80	8

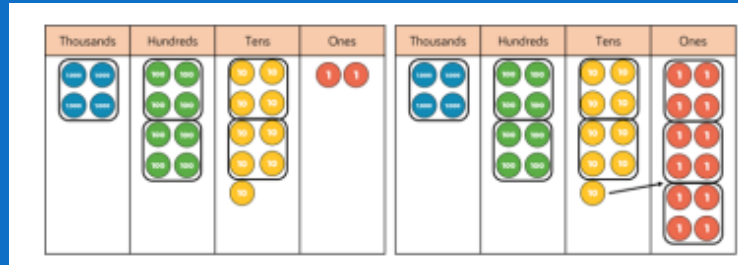| ×		2	3
		1	4
		9	2	(23 × 4)
	2	3	0	(23 × 10)

YEAR 5: Division

Manipulatives

The recommended manipulatives (physical resources) for Division numbers with up are **place value counters and Dienes.**

Representations

The key representations used are **bar models and part- part whole models.**

Factual knowledge

The key factual knowledge includes recall of all multiplication tables.

Procedural knowledge

The key methods are **short division.**

Key vocabulary: quotient, divisor, dividend, divide, repeated subtraction

Division in Year 5

1

1. The recommended manipulatives (physical resources) for dividing 4- digit numbers by 2- digit numbers are **place value counters and dienes.**
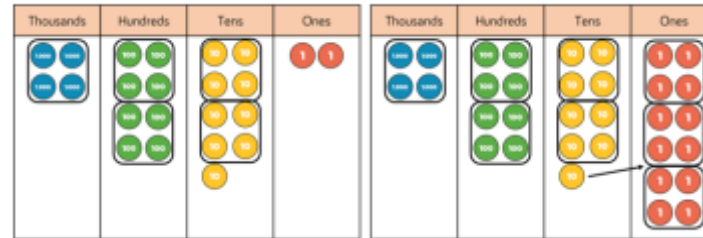
2

2. The key representations used are: **blank number lines** (to show the link with repeated addition**), and bar model**.

3. The key methods are **short division.**

3

Jack is dividing 84 by 4 using place value counters.

First, he divides the tens.   Then, he divides the ones.

YEAR 5: Fractions

Manipulatives

The recommended manipulatives (physical resources) for fractions are **Cuisenaire**.

Equivalent trains of one color - complete pattern

Representations

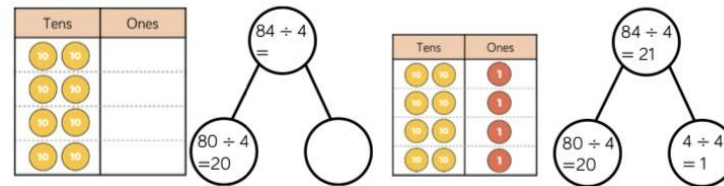The key representations are **number lines, PPW diagrams and bar models.**
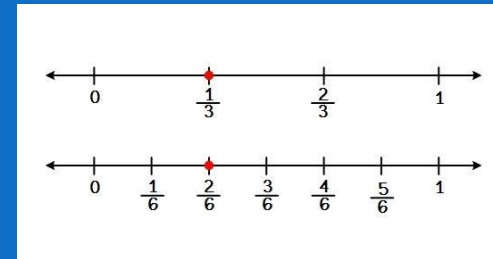
$$\frac{1}{5} \times 7 = \frac{7}{5} = 1\frac{2}{5}$$
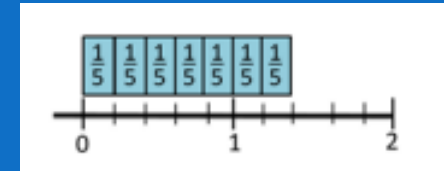
Factual knowledge

The key factual knowledge includes the recall and recognition of **equivalent fractions** (whose denominators are multiples of the same number); writing **decimal numbers as fractions**.

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$$

$$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$$

$$\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20}$$

[for example, 0.71 = $\frac{71}{100}$]

Procedural knowledge

The key procedures are **converting** between mixed numbers and fractions, **adding/subtracting** fractions with different denominators and **multiplying** fractions by integers.

$$2\frac{3}{4} = \frac{(4 \times 2) + 3}{4} = \frac{11}{4}$$

$$\frac{3}{4} + \frac{4}{5}$$

$$\times 5 \quad \frac{15}{20} + \frac{16}{20} \quad \times 4 \quad = \frac{31}{20}$$

Key vocabulary: denominator, numerator, equal part, whole, equivalent, ascending, descending, unit fraction, non-unit fraction, tenth
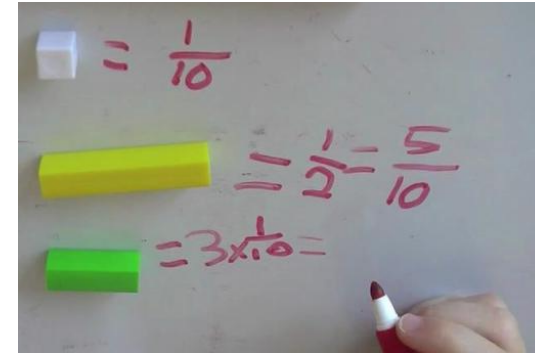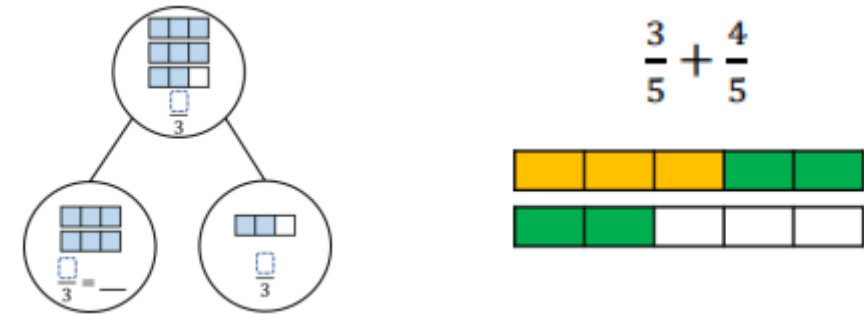
Fractions in Year 5

1. The recommended manipulatives (physical resources) for fractions are Cuisenaire.

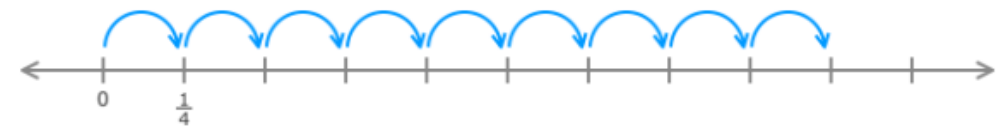2. The key representations are **blank number lines, part-part-whole diagrams** and **bar models**.

3. The key procedural knowledge includes: **counting in fractions on a number line, ordering** fractions with the same denominator, **multiplying fractions by integers.**

①

②

$$\frac{3}{5} + \frac{4}{5}$$

③

The model shows the product of $\frac{1}{4}$ and 9.

Multiply:

$$\frac{1}{4} \times 9 = \frac{\square}{\square}$$