Vocabulary

Number	Addition & Subtraction	Multiplication & Division	Fractions	Measurement	Geometry	Statistics
integer	altogether	factor pair	percentage	imperial/ metric unit	parallel/ perpendicular	represent
formula	near double	prime	equal part	perimeter/ area	reflect/ translate	survey
ascending/ descending	inverse	square	equal sharing	circumference	x-axis/ y-axis/ quadrant	most/least common
consecutive	equivalent	cube	improper	currency	oblong/ rectilinear	line graph
method	ones/tens boundary	product	mixed	square metre	axis of symmetry	pie chart
relationship	regroup	quotient	ratio	width/ breadth	intersection	mean
prime factor	exchange	divisor/ dividend	proportion	GMT/BST	obtuse/ acute/ reflex/ right angle	outcome
approximate	difference	number pattern	numerator/ denominator	yard/foot/ inch	radius/ diameter	database

Order for learning the times tables

Step 1
Fire just 1 x 6, 2 x 6, 5 x 6, 10 x 6 at them first.
This will build up on their most secure existing table facts

Step 2
Add in 3 x 6, 4 x 6 when step 1 is frequently recalled correctly and instantly

Step 3
Build up with 6 x 6, 7 x 6, 8 x 6

Step 4
When looking at 9 x 6, 11 x 6 and 12 x 6, children should look at finding 10 x 6 and adjust
When they're ready, practice quick recall and related facts.

CPA approach to: **Subtraction**

| Objective & Strategy	Concrete	Pictorial	Abstract
Subtracting tens and ones Year 4 subtract with up to 4 digits. *Introduce decimal subtraction through context of money*	234 - 179 Model process of exchange using Numicon, base ten and then move to PV counters.	Children to draw pv counters and show their exchange—see Y3	$2\,\overset{1}{\cancel{3}}\,\overset{\overset{6}{\cancel{4}}}{\cancel{}}\,5\,4$ $-\,1\,5\,6\,2$ $\underline{1\,1\,9\,2}$ Use the phrase 'take and make' for exchange
Year 5- Subtract with at least 4 digits, including money and measures. *Subtract with decimal values, including mixtures of integers and decimals and aligning the decimal*	As Year 4	Children to draw pv counters and show their exchange—see Y3	$\cancel{3}\,\cancel{1}\,0\,\cancel{5}\,6$ $-\qquad 2\,1\,2\,8$ $\overline{2\,8,9\,2\,8}$ Use zeros for placeholders. $\overset{10}{7}\,\cancel{1}\,6\,\cancel{8}\cdot\overset{9}{0}$ $-\qquad 3\,7\,2\cdot 5$ $\overline{6\,7\,9\,6\cdot 5}$
Year 6—Subtract with increasingly large and more complex numbers and decimal values.			$\cancel{7}\,\cancel{8}\,\cancel{0},6\,9\,9$ $-\qquad 8\,9,9\,4\,9$ $\overline{6\,0,7\,5\,0}$ $\cancel{7}\,\cancel{0}\,5\cdot\cancel{4}\,1\,9\;kg$ $-\qquad 3\,6\cdot 0\,8\,0\;kg$ $\overline{6\,9\cdot 3\,3\,9\;kg}$
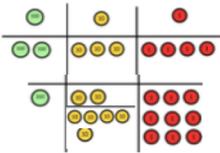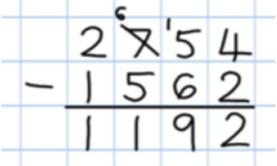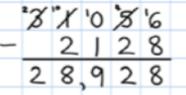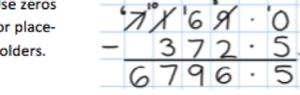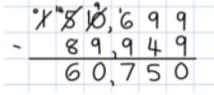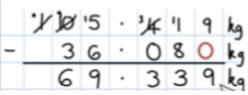
CPA approach to: **Addition**

Objective & Strategy	Concrete	Pictorial	Abstract
Y4—add numbers with up to 4 digits	Children continue to use dienes or pv counters to add, exchanging ten ones for a ten and ten tens for a hundred and ten hundreds for a thousand. 	 7 1 5 1 Draw representations using pv grid.	$3\,5\,1\,7$ $+\qquad 3\,9\,6$ $\overline{3\,9\,1\,3}$ Continue from previous work to carry hundreds as well as tens. Relate to money and measures.
Y5—add numbers with more than 4 digits. **Add decimals with 2 decimal places, including money.**	As year 4 Introduce decimal place value counters and model exchange for addition.	2.37 + 81.79 	72.8 $+\,54.6$ $\overline{127.4}$ $1\,1$ £23 · 59 $+$ £7 · 55 $\overline{£31 \cdot 14}$
Y6—add several numbers of increasing complexity Including adding money, measure and decimals with different numbers of decimal points.	As Y5	As Y5	$81,059$ $3,668$ $15,301$ $+\,20,551$ $\overline{120,579}$ Insert zeros for place holders. $23\cdot 361$ $9\cdot 080$ $59\cdot 770$ $+\quad 1\cdot 300$ $\overline{93\cdot 511}$
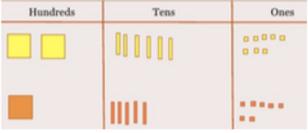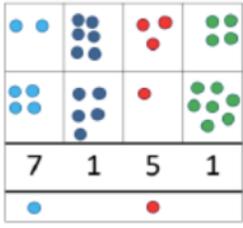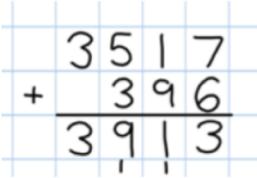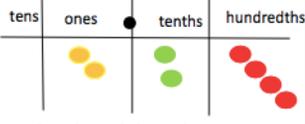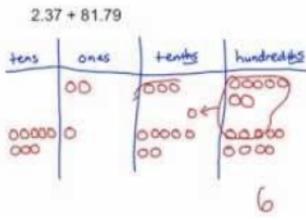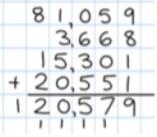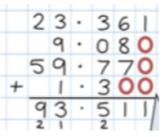
CPA approach to: **Multiplication**

Objective & Strategy	Concrete	Pictorial	Abstract
Column Multiplication for 3 and 4 digits x 1 digit.	It is important at this stage that they always multiply the ones first. Children can continue to be supported by place value counters at the stage of multiplication. This initially done where there is no regrouping. 321 x 2 = 642	 $\begin{array}{c|c|c|c} \times & 300 & 20 & 7 \\ \hline 4 & 1200 & 80 & 28 \end{array}$	327 x 4 ――― 28 80 1200 ――― 1308 327 × 4 ――― 1308 This will lead to a compact method.
Column multiplication	Manipulatives may still be used with the corresponding long multiplication modelled alongside.	 Continue to use bar modelling to support problem solving	18 x 3 on the first row (8 x 3 =24, carrying the 2 for 20, then 1 x 3) 18 x 10 on the 2nd row. Show multiplying by 10 by putting zero in units first 1234 × 16 ――― 7404 (1234 × 6) 12340 (1234 × 10) 19,744
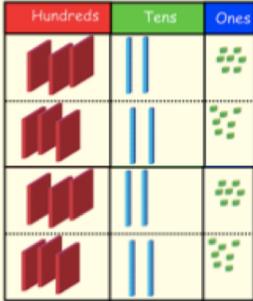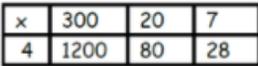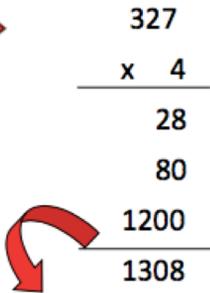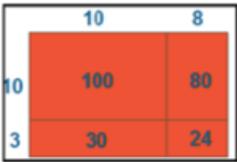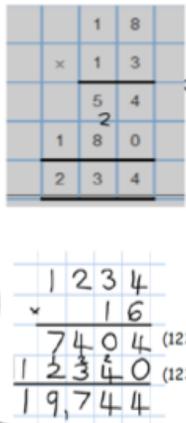
Objective & Strategy	Concrete	Pictorial	Abstract
Multiplying decimals up to 2 decimal places by a single digit.			Remind children that the single digit belongs in the units column. Line up the decimal points in the question and the answer. 3 . 1 9 × 8 ――― 2 5 . 5 2
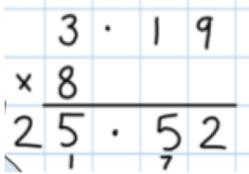
CPA approach to: **Division**

Objective & Strategy	Concrete	Pictorial	Abstract
Divide at least 3 digit numbers by 1 digit. Short Division	$96 \div 3$ Tens: 3, Units: 2 Use place value counters to divide using the bus stop method alongside Calculations $42 \div 3$ $42 \div 3 =$ Start with the biggest place value, we are sharing 40 into three groups. We can put 1 ten in each group and we have 1 ten left over. We exchange this ten for ten ones and then share the ones equally among the groups. We look how much in 1 group so the answer is 14.	Students can continue to use drawn diagrams with dots or circles to help them divide numbers into equal groups. Encourage them to move towards counting in multiples to divide more efficiently.	Begin with divisions that divide equally with no remainder. $$\begin{array}{c} 2\ 1\ 8 \\ \hline 4\ |\ 8\ ^3 7\ 2 \end{array}$$ Move onto divisions with a remainder. $$\begin{array}{c} 8\ 6\ \text{r}\ 2 \\ \hline 5\ |\ 4\ ^3 3\ 2 \end{array}$$ Finally move into decimal places to divide the total accurately. $$\begin{array}{c} 1\ 4\ .\ 6 \\ \hline 3\ 5\ |\ 5\ 1\ ^{16} 1\ .\ ^{21} 0 \end{array}$$ $$\begin{array}{c} 0\ 6\ 6\ 3\ \text{r}\ 5 \\ \hline 8)\ 5\ ^5 3\ ^5 0\ ^2 9 \end{array}$$
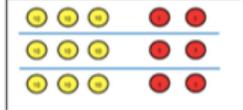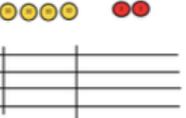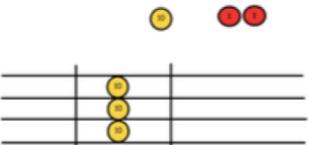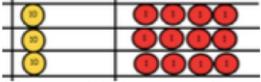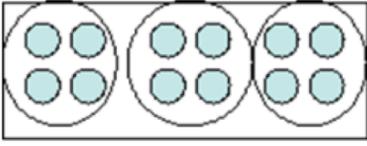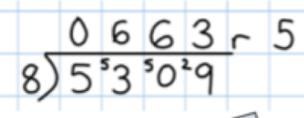
Long Division

Step 1—a remainder in the ones

```
        h t o
      0 4 1 R1
   4 ) 1 6 5
```

4 does not go into 1 (hundred). So combine the 1 hundred with the 6 tens (160).

4 goes into 16 four times.

4 goes into 5 once, leaving a remainder of 1.

```
      th h t o
      0 4 0 0 R7
   8 ) 3 2 0 7
```

8 does not go into 3 of the thousands. So combine the 3 thousands with the 2 hundreds (3,200).

8 goes into 32 four times (3,200 ÷ 8 = 400)
8 goes into 0 zero times (tens).
8 goes into 7 zero times, and leaves a remainder of 7.

CPA approach to: **Division**

Long Division

```
      h t o
      0 6 1
4 ) 2 4 7
      - 4
        3
```

When dividing the ones, 4 goes into 7 one time. Multiply $1 \times 4 = 4$, write that four under the 7, and subract. This finds us the remainder of 3.

Check: $4 \times 61 + 3 = 247$

```
    th h t o
       0 4 0 2
4 ) 1 6 0 9
         - 8
           1
```

When dividing the ones, 4 goes into 9 two times. Multiply $2 \times 4 = 8$, write that eight under the 9, and subract. This finds us the remainder of 1.

Check: $4 \times 402 + 1 = 1{,}609$

Long Division

Step 2—a remainder in the tens

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
t o 2 2)5 8	t o 2 2)5 8 - 4 1	t o 2 9 2)5 8 - 4 ↓ 1 8
Two goes into 5 two times, or 5 tens ÷ 2 = 2 whole tens -- but there is a remainder!	To find it, multiply $2 \times 2 = 4$, write that 4 under the five, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the leftover 1 ten. You combine the remainder ten with 8 ones, and get 18.

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
t o 2 9 2)5 8 - 4 1 8	t o 2 9 2)5 8 - 4 1 8 - 1 8 0	t o 2 9 2)5 8 - 4 1 8 - 1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply $9 \times 2 = 18$, write that 18 under the 18, and subtract.	The division is over since there are no more digits in the dividend. The quotient is 29.

CPA approach to: **Division**

Long Division

Step 2—a remainder in any of the place values

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o **1** 2) **2** 7 8	h t o 1 2) **2** 7 8 **- 2** **0**	h t o 1 8 2) **2** 7 8 - 2 ↓ 0 **7**
Two goes into 2 one time, or 2 hundreds ÷ 2 = 1 hundred.	Multiply 1 × 2 = 2, write that 2 under the two, and subtract to find the remainder of zero.	Next, drop down the 7 of the tens next to the zero.

Divide.	Multiply & subtract.	Drop down the next digit.
h t o 1 **3** 2) 2 7 8 - 2 **0 7**	h t o 1 3 2) 2 7 8 - 2 0 7 **- 6** **1**	h t o 1 3 2) 2 7 **8** - 2 0 7 - 6 1 **8**
Divide 2 into 7. Place 3 into the quotient.	Multiply 3 × 2 = 6, write that 6 under the 7, and subtract to find the remainder of 1 ten.	Next, drop down the 8 of the ones next to the 1 leftover ten.

1. Divide.	2. Multiply & subtract.	3. Drop down the next digit.
h t o 1 3 **9** **2**) 2 7 8 - 2 0 7 - 6 **1 8**	h t o 1 3 9 2) 2 7 8 - 2 0 7 - 6 **1 8** **- 1 8** **0**	h t o **1 3 9** 2) 2 7 8 - 2 0 7 - 6 1 8 - 1 8 0
Divide 2 into 18. Place 9 into the quotient.	Multiply 9 × 2 = 18, write that 18 under the 18, and subtract to find the remainder of zero.	There are no more digits to drop down. The quotient is 139.