Calculation at Chesswood

Addition

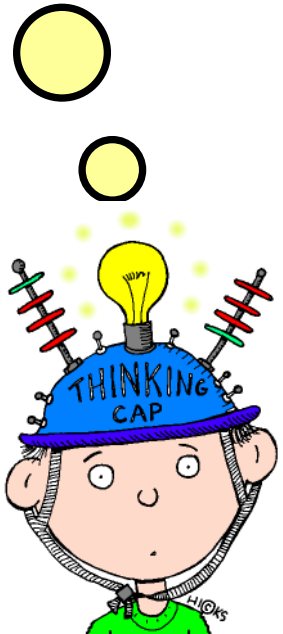
Subtraction

Multiplication

Division

Which method do I use?

What is my next step?



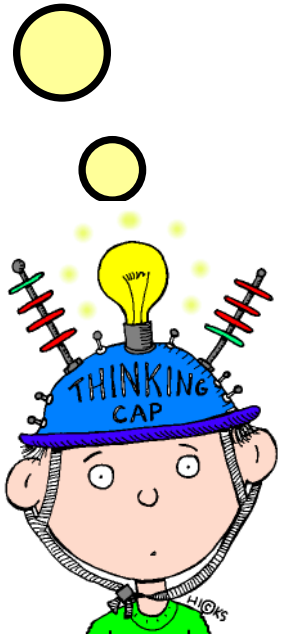
Year group core expectations written in bottom corner

Calculation at Chesswood

Addition

- Number Line
- Partitioning
- Expanded Column
- Compact Column

So which method do I use?



Year group core expectations written in bottom corner

Calculation at Chesswood

Addition 1

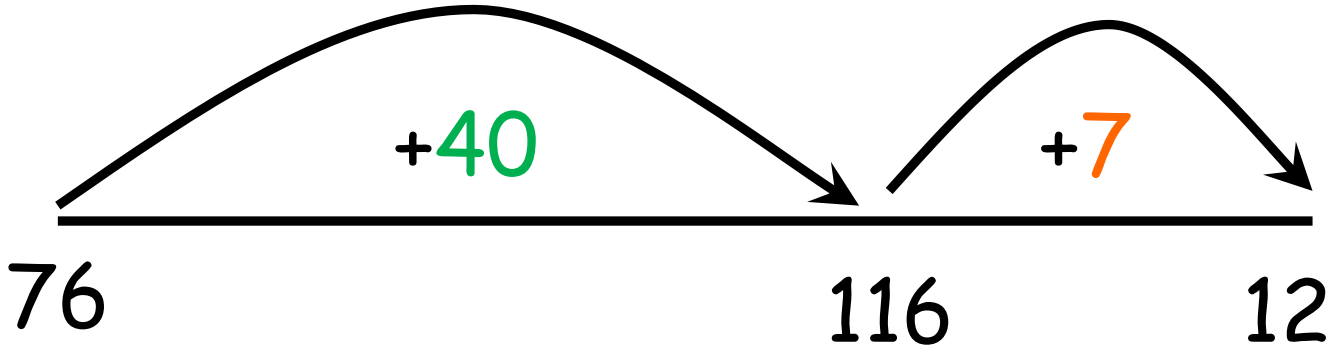
Number Line

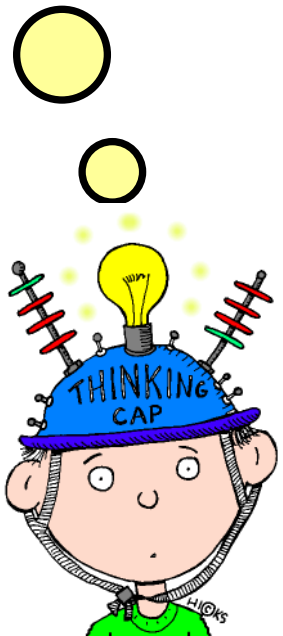
Draw a blank number line

Start with the largest number and partition the other

...47 is 40 + 7

So how can I add 76 and 47?





76 + 47 = 123

Calculation at Chesswood

Addition 2

Partitioning

$76 + 47 = 70 + 6 + 40 + 7$

Or it's best to write it like this...

This is where I partition each number... so 76 is 70 + 6 and 47 is 40 + 7

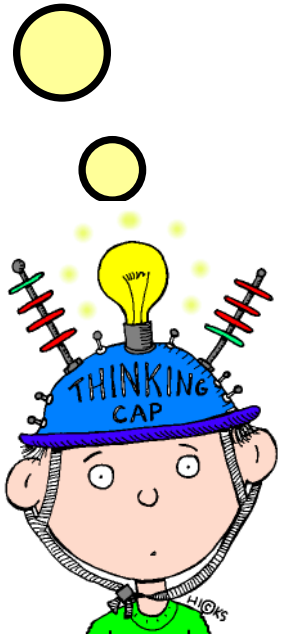
76 + 47

70 + 40 = 110

6 + 7 = 13

110 13

$110 + 13 = 123$



$76 + 47 = 123$

Year 1/2

Calculation at Chesswood

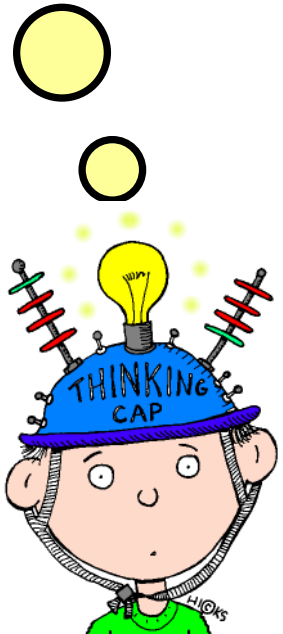
Addition 3

Horizontal Partitioning

Squared paper may help line up each number in its Ones (O), Tens (T) or Hundreds (H) columns.

I can start to partition the numbers in rows.

T	O		T	O		H	T	O
7	6	+	4	7	=			
7	0	+	4	0	=	1	1	0
	6	+		7	=		1	3
Recombine						1	2	3



76 + 47 = 123

Calculation at Chesswood

Addition 4

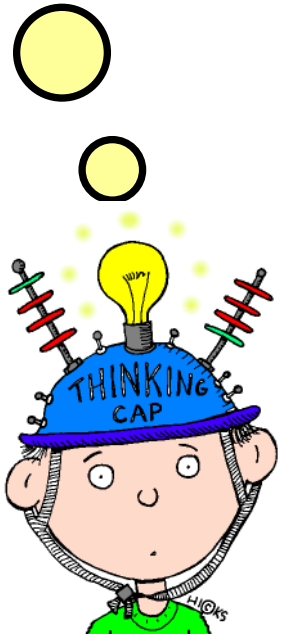
Expanded Column - Partitioning

Use squared paper to write the numbers in columns.

The numbers must be in columns!

I will start with the ones first.

$$\begin{array}{rr} & 70 + 6 \\ + & 40 + 7 \\ \hline & 110 + 13 = 123 \end{array}$$



$$76 + 47 = 123$$

Calculation at Chesswood

Addition 5

Expanded Column

Use squared paper to write the numbers in columns.

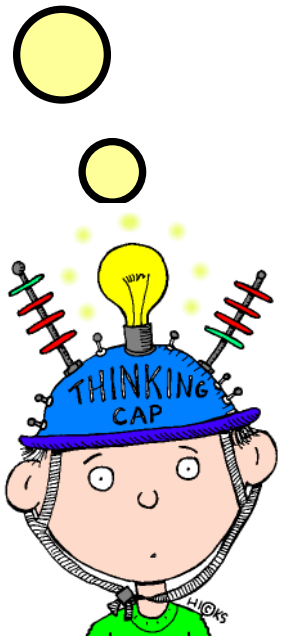
The numbers must be in columns!

I will start with the ones first.

$$\begin{array}{r} 7\ 6 \\ +\ 4\ 7 \\ \hline 1\ 3 \\ 1\ 1\ 0 \\ \hline 1\ 2\ 3 \\ \hline \end{array}$$

(6 + 7)

(40 + 70)



76 + 47 = 123

Calculation at Chesswood

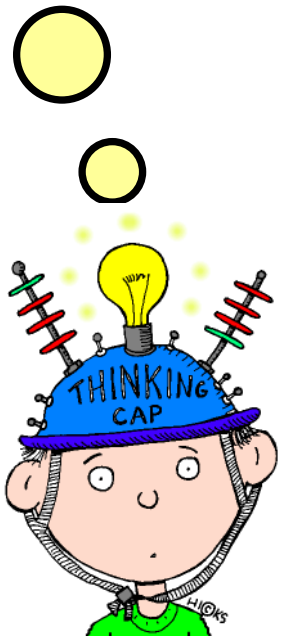
Addition 6

Expanded Column

Use squared paper to write the numbers in columns.

When I understand this I can do it without the brackets.

$$
\begin{array}{rl}
 & 2\ 7\ 6 \\
+ & 1\ 4\ 7 \\
\hline
 & 1\ 3 \quad (6 + 7) \\
 & 1\ 1\ 0 \quad (70 + 40) \\
 & 3\ 0\ 0 \quad (200 + 100) \\
\hline
 & 4\ 2\ 3 \\
\hline
\end{array}
$$



$$276 + 147 = 423$$

Calculation at Chesswood

Addition 7

Compact Column

Use squared paper to write the numbers in columns.

When I understand place value better, I can do it this way!

$$\begin{array}{r} 2\ 7\ 6 \\ +\ 1\ 4\ 7 \\ \hline 4\ 2\ 3 \\ \hline {\scriptstyle 1\quad 1} \end{array}$$

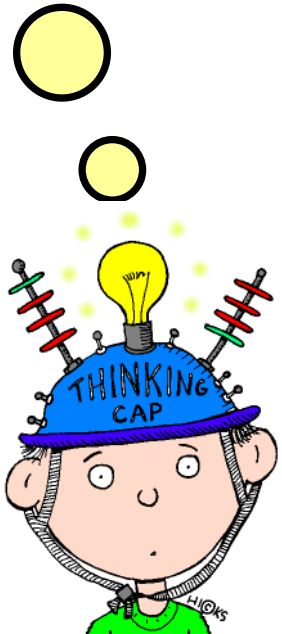
6 + 7 = 13

(Write the ten under the place value column to the left.)

7 + 4 + 1 = 12

(Write the ten under the place value column to the left.)

2 + 1 + 1 = 4



276 + 147 = 423

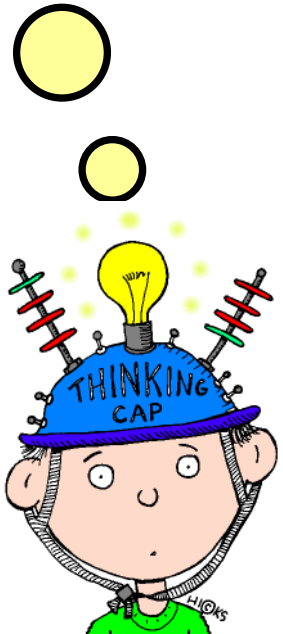
Year 3 GD
Year 4

Calculation at Chesswood

Subtraction

- Number Line
- Partitioning
- Expanded Column
- Compact Column

So which method do I use?



Year group core expectations written in bottom corner

Calculation at Chesswood

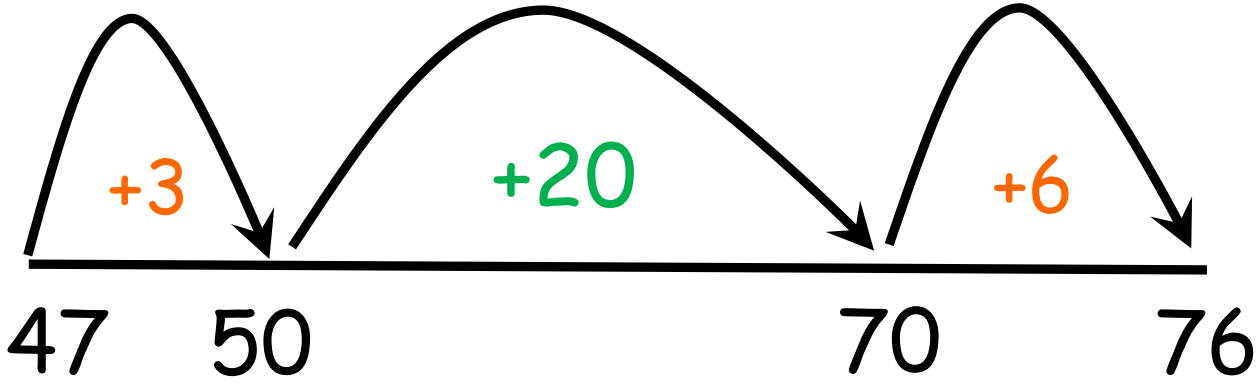
Subtraction 1

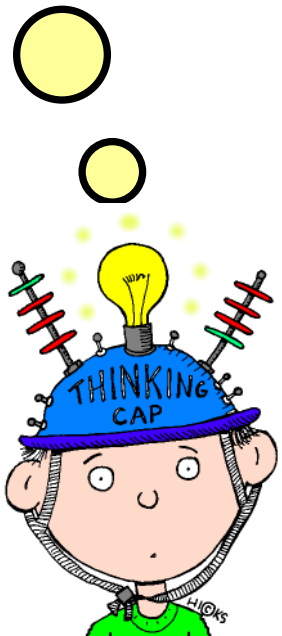
Counting on

Start with the 47 and 76 at each end of the number line.

Count on in jumps of ones or tens. Add up the jumps to find the difference between the numbers.

This can help me 'find the difference' between 76 and 47.





76 - 47 = 29

Year 1/2

Calculation at Chesswood

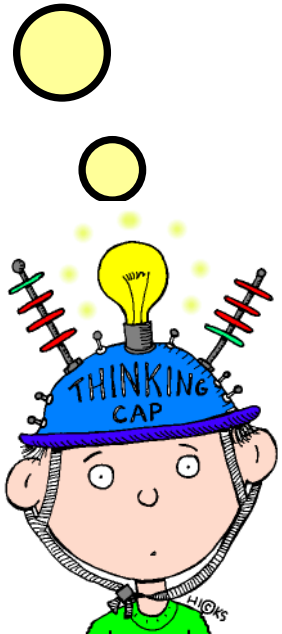
Subtraction 2

Counting back

Start with the 76 on the right of the number line.

Then count back, partitioning the 47. First subtract the tens, then subtract the ones.

76 - 47 =
76 - 40 = 36
36 - 7 = 29



76 - 47 = 29

Year 1/2

Calculation at Chesswood

Subtraction 3

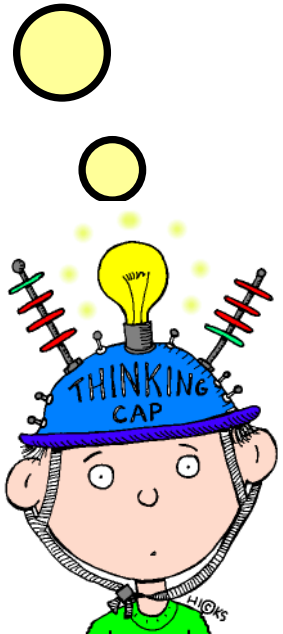
Horizontal Partitioning

Squared paper may help line up each number in its Ones (O) or Tens (T) columns.

I can start to partition in rows.

I will start with the ones.

T	O		T	O		T	O
7	6	-	4	7	=		
7	6	-		7	=	6	9
6	9	-	4	0	=	2	9



76 - 47 = 29

Calculation at Chesswood

Subtraction 4

Expanded Column

I can start to use my place value knowledge to subtract the ones and tens separately.

Use squared paper to write the numbers in columns.

If I subtract 7 from 6,
I get a negative number – I can't use this within a calculation!
I need to exchange a ten into ten ones: 10 + 6 = 16.
16 - 7 = 9

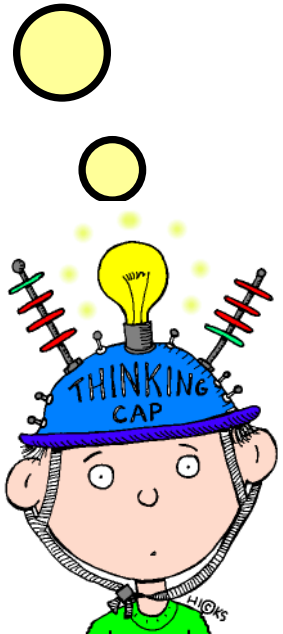
60 16

~~70~~ + ~~6~~

\- 40 + 7

20 + 9 = 29

Now I can subtract:
16 - 7 = 9
60 – 40 = 20



76- 47 = 29

Calculation at Chesswood

Subtraction 5

Expanded Column

Use squared paper to write the numbers in columns.

When I get more confident I can subtract larger numbers.

If I subtract 7 from 6, I get a negative number – I can't use this within a calculation! I need to exchange a ten into ten ones: 10 + 6 = 16. 16 - 7 = 9

But now I can't subtract 70 from 60! I need to exchange a hundred into ten tens: 100 + 60 = 160. 160 – 70 = 90

200 160 60 16

300 + ~~70~~ + ~~6~~

\- 100 + 70 + 7

200 + 90 + 9 = 299

376 -177 = 199

Year 3

Calculation at Chesswood

Subtraction 6

Compact Column

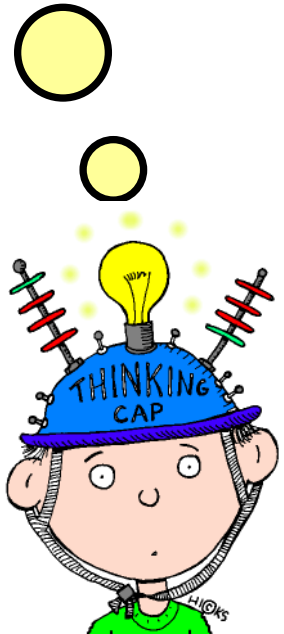
When I am more confident with place value, I can do it this way!

Use squared paper to write the numbers in columns.

If I subtract 7 from 6,
I get a negative number – I can't use this within a calculation!
I need to exchange a ten into ten ones: 10 + 6 = 16.
16 - 7 = 9

```
   2  16  1
  ~~3~~ ~~7~~ 6
-  1  7  7
-------------
   1  9  9
-------------
```

But now I can't subtract 70 from 60!
I need to exchange a hundred into ten tens: 100 + 60 = 160.
160 – 70 = 90



376 – 177 = 199

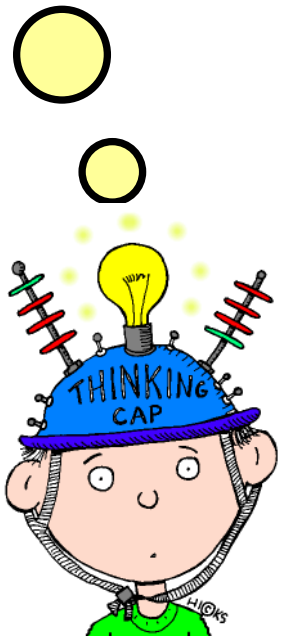
Year 3 GD
Year 4

Calculation at Chesswood

Multiplication

- Number Line
- Partitioning
- Partitioning - Grid
- Expanded Column
- Compact Column

So which method do I use?



Year group core expectations written in bottom corner

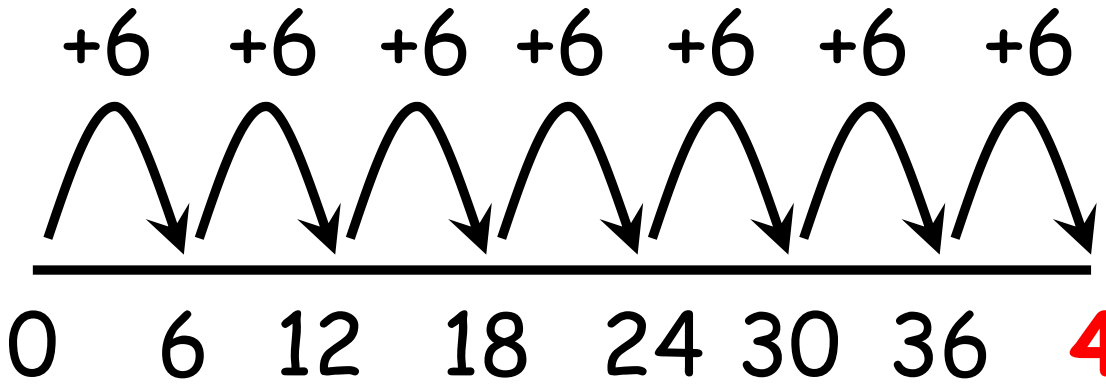
Calculation at Chesswood

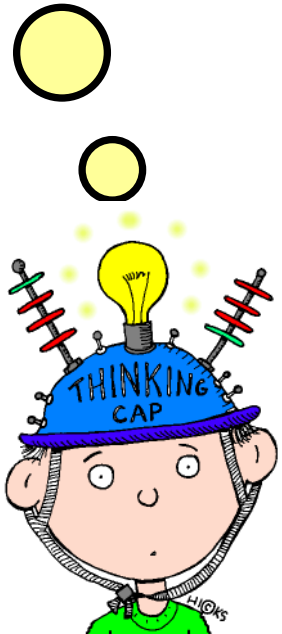
Multiplication 1

Number Line

We are multiplying by counting on… 6 each time, and do this 7 times. Start with 0 on the number line.

6 x 7 =
I can do this by counting on along a number line!





6 x 7 = 42

Year 2

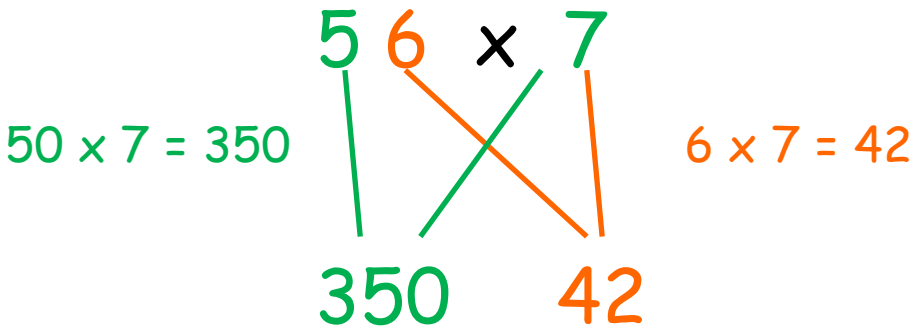
Calculation at Chesswood

Multiplication 2

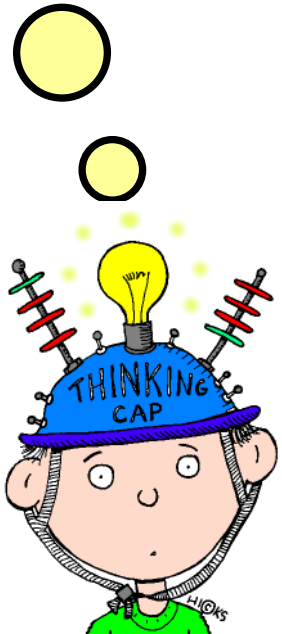
Partitioning

56 x 7 ..... partition 56 to **50** and **6**

This is where I partition the larger number.



350 + 42 = 392



56 x 7 = 392

Calculation at Chesswood

Multiplication 3

Grid - Short

56 x 7... partition 56 to 50 + 6

50 x 7 = 350

6 x 7 = 42

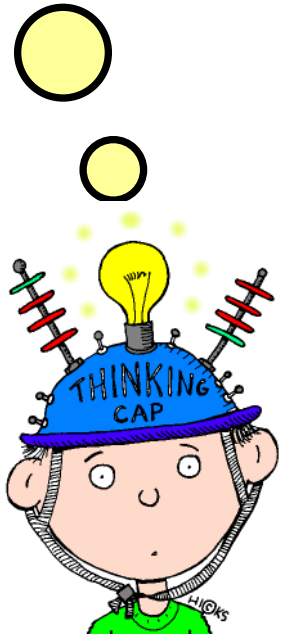
This is where I partition the larger number... I put the numbers in my grid.

7	50	6
	350	42

= 392

Now add 350 and 42

56 x 7 = 392



Calculation at Chesswood

Multiplication 4

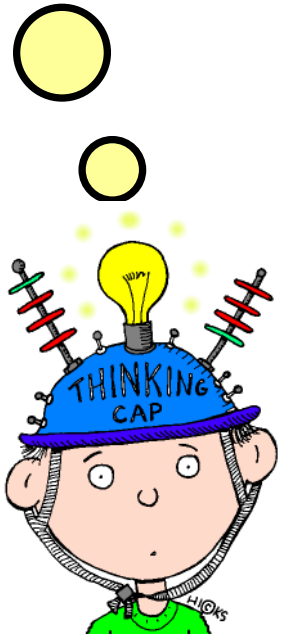
Grid - Long

I can use my partitioning skills in a larger grid.

56 x 27 ….. partition 56 to 50 + 6
and …… 27 to 20 + 7

	50	6	
20	1000	120	= 1120
7	350	42	= 392

1120 + 392 = 1512



56 x 27 = 1512

Year 3 GD
Year 4

Calculation at Chesswood

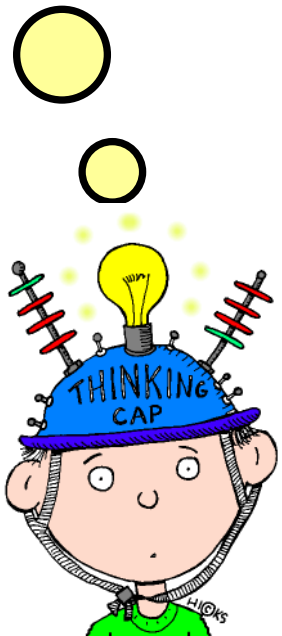
Multiplication 5

Expanded Column - Short

Use squared paper to write the numbers in columns.

When I understand this, I can do it without the brackets.

$$
\begin{array}{rr}
 & 56 \\
\times & 7 \\
\hline
 & 42 \quad (6 \times 7) \\
+ & 350 \quad (50 \times 7) \\
\hline
 & 392 \\
\hline
\end{array}
$$



$56 \times 7 = 392$

Year 3 GD
Year 4

Calculation at Chesswood

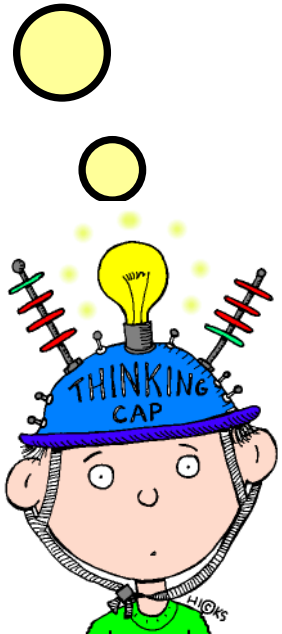
Multiplication 6

Expanded Column - Long

Use squared paper to write the numbers in columns.

When I understand this, I can do it without the brackets.

$$
\begin{array}{rrl}
 & 5\ 6 & \\
\times & 2\ 7 & \\
\hline
 & 4\ 2 & (6 \times 7) \\
 & 3\ 5\ 0 & (50 \times 7) \\
 & 1\ 2\ 0 & (6 \times 20) \\
+ & 1\ 0\ 0\ 0 & (50 \times 20) \\
\hline
 & 1\ 5\ 1\ 2 & \\
\hline
 & 1 &
\end{array}
$$



$$56 \times 27 = 1512$$

Calculation at Chesswood

Multiplication 7

Compact Column - Short

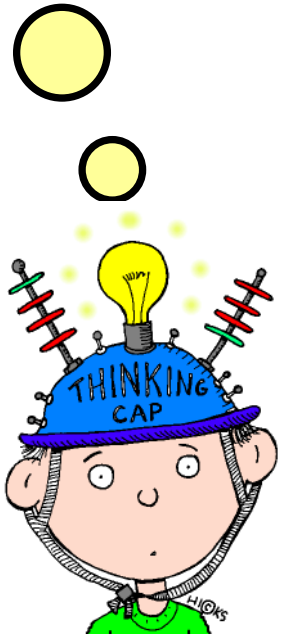
Use squared paper to write the numbers in columns.

I can calculate mentally and use carrying.
I must start with the ones.

$$\begin{array}{r} 5\,6 \\ \times \quad 7 \\ \hline 3\,9\,2 \\ \hline {\scriptstyle 4} \end{array}$$

(6 x 7 = 42)

(50 x 7 = 350)



56 x 7 = 392

Year 4 GD
Year 5

Calculation at Chesswood

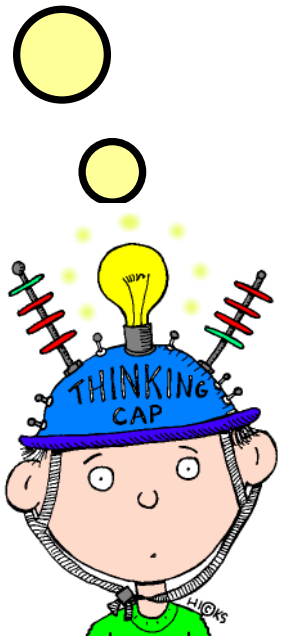
Multiplication 8

Compact Column - Long

I can calculate mentally and use carrying with larger numbers.

Use squared paper to write the numbers in columns.

$$
\begin{array}{rr}
 & 5\ 6 \\
\times & 2\ 7 \\
\hline
 & 3\ 9\ 2 \quad (56 \times 7) \\
 & {\scriptstyle 4} \\
+ & 1\ 1\ 2\ 0 \quad (56 \times 20) \\
 & {\scriptstyle 1} \\
\hline
 & 1\ 5\ 1\ 2 \\
\hline
\end{array}
$$



$$56 \times 27 = 1512$$

Year 5 GD
Year 6

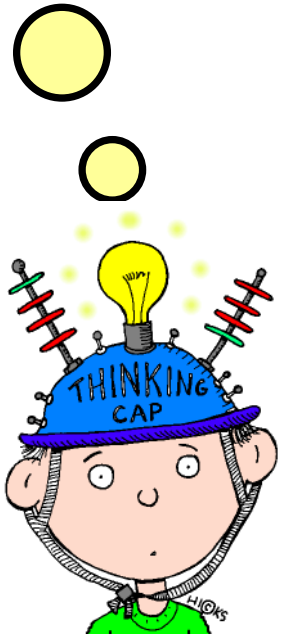
Calculation at Chesswood

Division

Number Line

Compact Method

So which method do I use?



Year group core expectations written in bottom corner

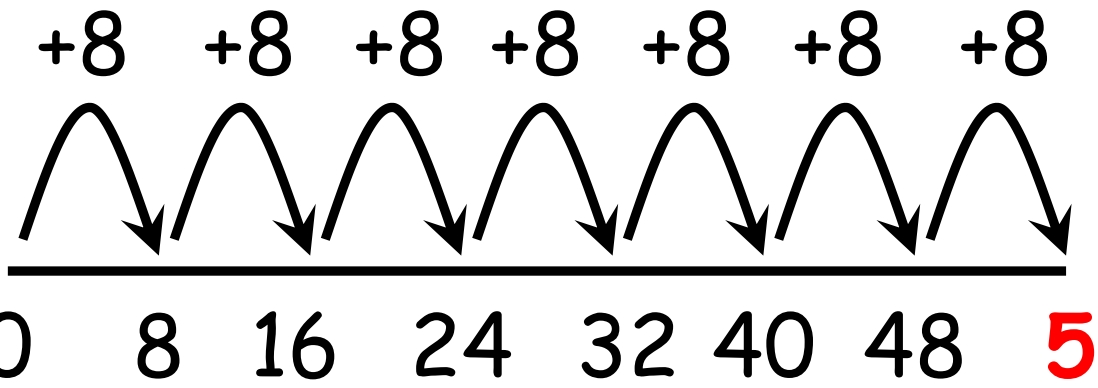
Calculation at Chesswood

Division 1

Number Line in small jumps

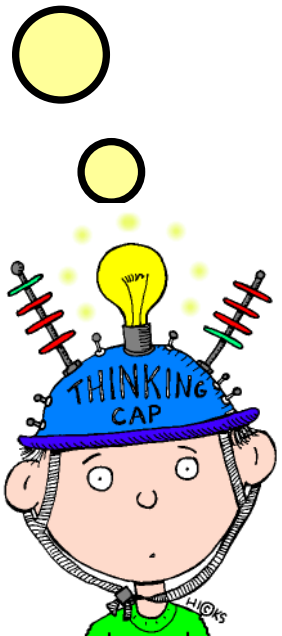
56 ÷ 8 =
Dividing - I can do this by counting on along a number line!

We are dividing by counting on 8 each time since we are dividing by 8.



It took 7 jumps to get to 56 … so 56 ÷ 8 is 7

56 ÷ 8 = 7



Calculation at Chesswood

Division 2

Number Line in chunks

Use a key facts box of known multiplication facts to support - 1 x, 2 x, 5 x and 10 x.

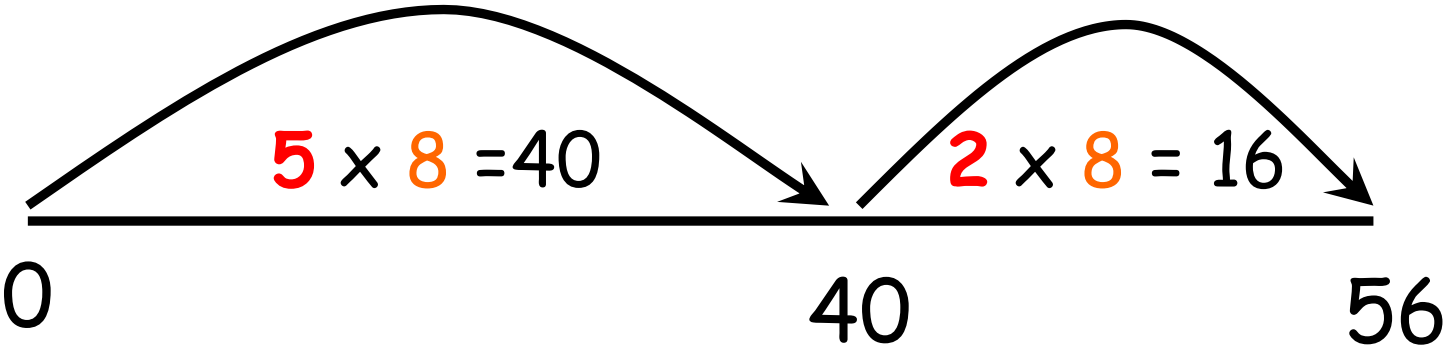
56 ÷ 8 =

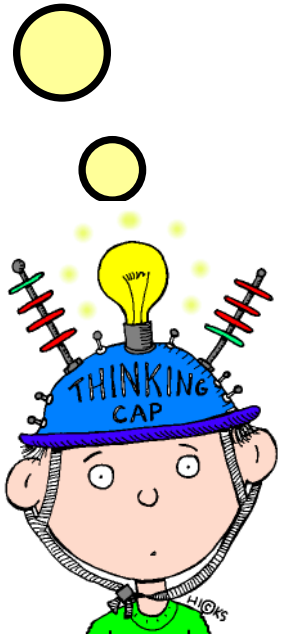
Use a number line to do this.

What jumps of 8 can you make on the number line towards 56?
5 x 8 = 40 would be good!

Now a jump of 2 x 8 = 16 would take you to 56.

Key Facts
1 x 8 = 8
2 x 8 = 16
5 x 8 = 40
10 x 8 = 80





Add 5 and 2 = 7.

56 ÷ 8 = 7

Calculation at Chesswood

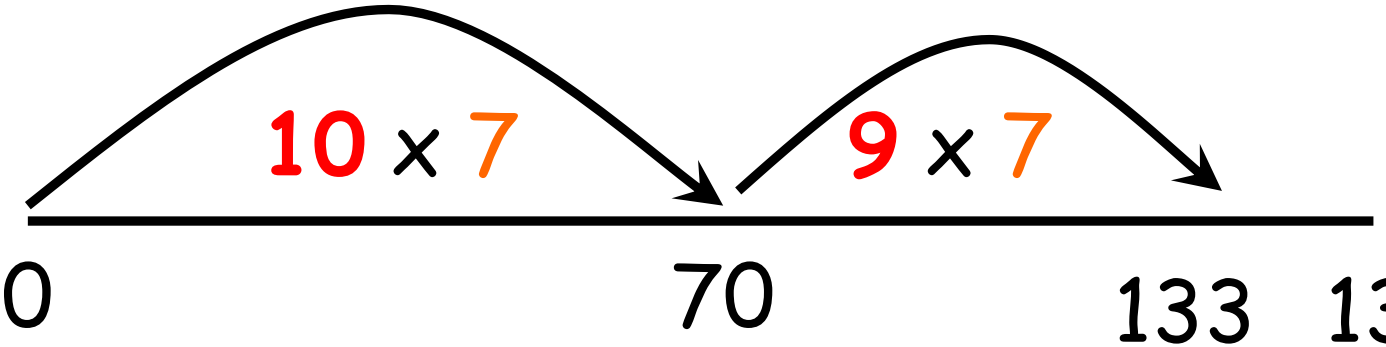
Division 3

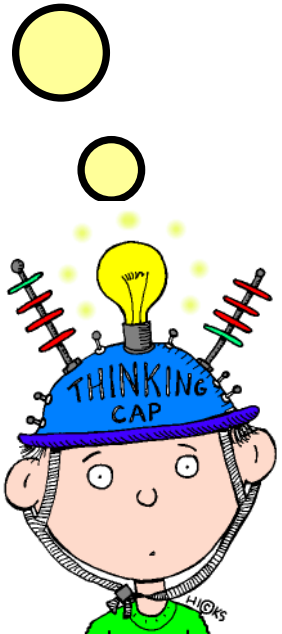
Number Line in chunks

What jumps of 7 can you make on the number line towards 135?
10 x 7 = 70 would be good!

Now a jump of 9 x 7 = 63 would take you to 133. But that's not 135. There's 2 remaining.

So how can I divide 135 by 7?





Add 10 and 9 = 19 and don't forget the remainder of 2.

$135 \div 7 = 19\ r2$

Calculation at Chesswood

Division 4

Compact Method - Short

Use squared paper to help write in the place value columns.

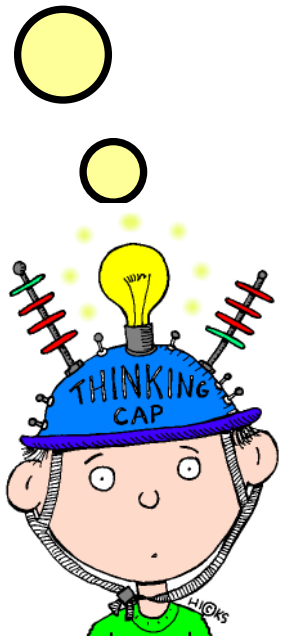
Always start dividing from the largest value digit (8 = 800)

256 ÷ 7 =
I must remember to calculate one digit at a time!

$$7 \overline{)\, 8^{1}7^{3}5} \quad 1\,2\,5$$

8 ÷ 7 = 1 r1
17 ÷ 7 = 2 r3
36 ÷ 7 = 5

(Write the remainder next to the digit in the place value column to the right.)



875 ÷ 7 = 125

Calculation at Chesswood

Division 5

Compact Method - Short

Use squared paper to help write in the place value columns.

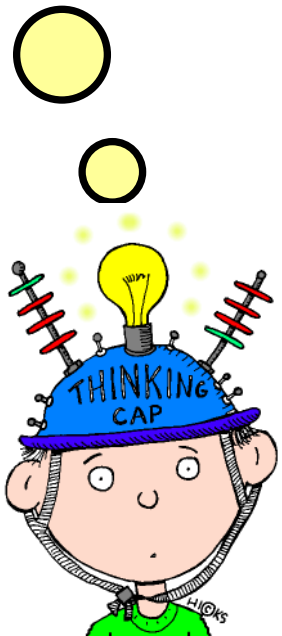
Always start dividing from the largest value digit (8 = 800)

256 ÷ 7 =
I must remember to calculate one digit at a time!

$$
\begin{array}{r}
1\ 2\ 5\ r1 \\
7\overline{)\ 8^{1}7^{3}6}
\end{array}
$$

8 ÷ 7 = 1 r1
17 ÷ 7 = 2 r3
36 ÷ 7 = 5 r1

(Write the remainder next to the digit in the place value column to the right.)



876 ÷ 7 = 125 r1

Year 4 GD
Year 5

Calculation at Chesswood

Division 6

Compact Method - Long

$$
\begin{array}{r}
4\ 7 \\
2\overline{)\ 9\ 4} \\
\quad 9\downarrow \\
-\ 8\downarrow \\
\hline
\quad 1\ 4 \\
-\ 1\ 4 \\
\hline
\quad\ \ 0
\end{array}
$$

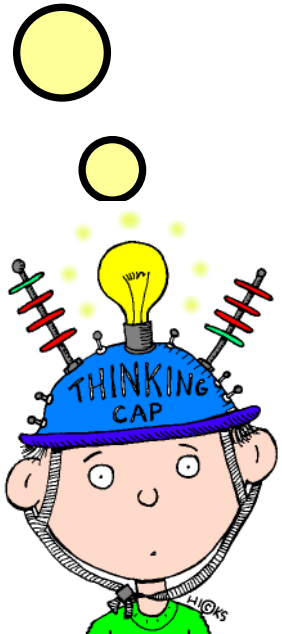
9 ÷ 2 = 4 r1

14 ÷ 2 = 7

94 ÷ 2 =
I must remember
to calculate one digit
at a time!
Knowing my times tables
will help.

Use squared paper to help write in the place value columns.

Always start dividing from the largest value digit (4 = 40)



94 ÷ 2 = 47

Year 4 GD
Year 5

Calculation at Chesswood

Division 7

Compact Method - Long

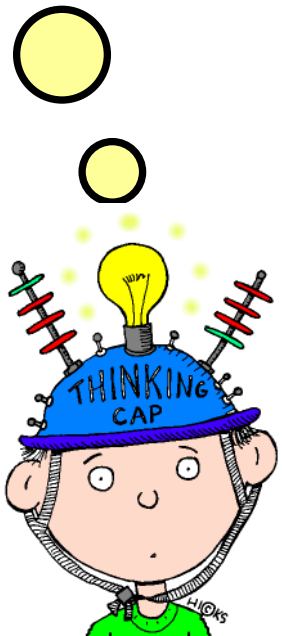
876 ÷ 7 =
I must remember
to calculate one digit
at a time!
Knowing my times tables
will help.

```
  1 2 5 r1
7 | 8 7 6
    8
   -7
    1 7
  - 1 4
      3 6
    - 3 5
        1
```

8 ÷ 7= 1 r1
17 ÷ 7 = 2 r3
36 ÷ 7 = 5 r1

Use squared paper to help write in the place value columns.

Always start dividing from the largest value digit (8 = 800)



876 ÷ 7 = 125 r1

Calculation at Chesswood

Division 8

Compact Method - Long

$$
\begin{array}{r}
0\,2\,3\,2\ r8 \\
16\overline{)\,3\,7\,2\,0} \\
3\,7 \\
-3\,2 \\
\hline
5\,2 \\
-\,4\,8 \\
\hline
4\,0 \\
-\,3\,2 \\
\hline
8
\end{array}
$$

3 ÷ 16 = 0 r3

37 ÷ 16 = 2 r5

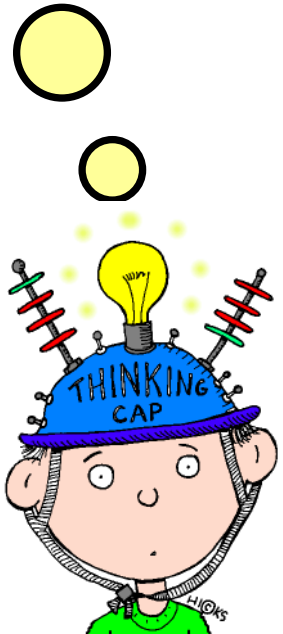
52 ÷ 16 = 3 r4

40 ÷ 16 = 2 r8

3720 ÷ 16 =
I must remember to calculate one digit at a time!
A 'cheat sheet' would help.

Use squared paper to help write in the place value columns.

Always start dividing from the largest value digit (3 = 3000)



3720 ÷ 16 = 232 r8

Year 5 GD
Year 6

Calculation at Chesswood

Division 9

Compact Method – Long
Converting the remainder

```
   0 2 3 2 . 5
16| 3 7 2 0 . 0
  3 7
 -3 2
    5 2
  - 4 8
      4 0
    - 3 2
        8 0
      - 8 0
          0
```

Decimals: include another 0 after the decimal point and keep calculating in the same way (up to 2 decimal places).

I can convert a remainder into a fraction or a decimal.

Fractions: remainder 8 out of 16 ($\frac{8}{16} = \frac{1}{2} = .5$)

3720 ÷ 16 = 232 r8 or $232\frac{8}{16}$
or $232\frac{1}{2}$ or 232.5
or round to 233!