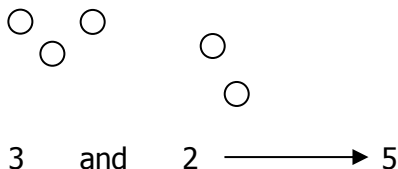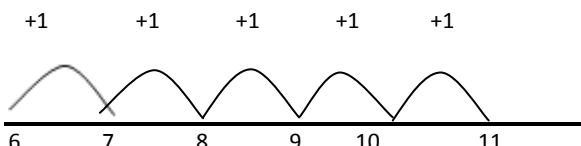# St Philip's Catholic Primary School
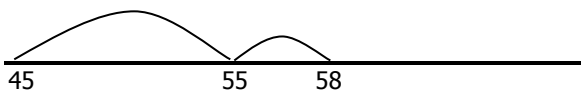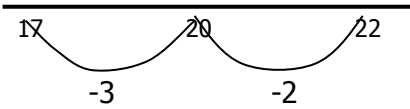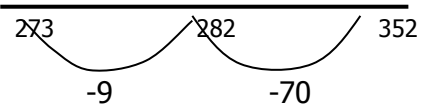
Supporting your Child with Calculation
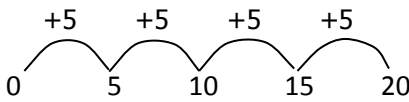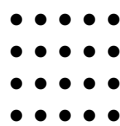
Addition

Start with:	Begin to record numbers.
	O O O O O 3 and 2 ⟶ 5
	Record addition by: - showing jumps on prepared lines - drawing own number line eg 6 + 5 = 11 +1 +1 +1 +1 +1 6 7 8 9 10 11

	Partition 2 digit numbers eg 35+23 (not crossing the tens or hundreds) using different methods of recording:
	 • number line eg 45+13 =
	       +10 +3
	
	 45 55 58
	
	   not using number line eg
	 35 +23
	 30 + 20 = 50
	 5 + 3 = 8
	 50 + 8 = 58

……..recording least significant digit first, preparing for 'carrying' below the line (compact recording).
 	
    358
 +   73
     11
   120
   300
    431
	……..recording least significant digit first, preparing for 'carrying' below the line (compact recording).
	
	    625 783
	 + 48 + 42
	    673 825
	     1 1
	
	          367
	      + 85
	       452
	       1 1

	Addition of decimals –
	 Ensure that children know the importance of 'lining up' the decimal points particularly when adding mixed amounts eg 16.4 m. + 7.68 m.
	
	     1 6 . 4
	    + 7 . 6 8
	     2 4 . 0 8 m
	      1 1

Subtraction

Start with:	Find own way of recording for subtraction eg cross-outs.
	○ ○ ○ ○ ○ ⊗ ⊗
	7 – 2 = 5
	Solve practical problems in a real or role play context.
	Record simple subtraction in a number sentence using the – and = signs eg. There were 8 cakes on a plate. Mary ate 3 of them. How many were left?
	○ ○ ○ ○ ○ ⊗ ⊗ ⊗
	8 – 3 = 5
	Use empty number lines to • Bridge through a multiple of 10 eg 22 – 5 = 17(counting back)
	17 20 22
	-3 -2
Use empty number lines to • Subtract larger numbers eg 352 – 79 = 273(counting back)	Continue to develop compact decomposition with different numbers of digits and decimals. Note: Children should understand the importance of lining up units digits under units digits, tens under tens etc.
273 282 352	5 '7 6 4 .' 0
-9 -70	- 8 2 1 . 6
	4 9 4 2 . 4

Multiplication

Start with:	Oral counting in twos and tens. How many shoe lace holes are there on this shoe? Oral counting on and back in small steps Eg. 2's, 3's, 5's
Understand multiplication as repeated addition eg There are 5 pencils in one packet. How many pencils in 4 packets? lllll lllll lllll lllll=5+5+5+5 or 4 lots of 5 or 4 x 5 This can also be shown as repeated jumps on a number line. +5 +5 +5 +5 0 5 10 15 20	**Understand multiplication as describing an array.** • • • • • • • • • • 5 x 4 = 20 4 x 5 = 20 • • • • • • • • • •

Develop informal written methods eg **partitioning.** It is important that children are taught to <u>always approximate first</u> in order to get a sensible idea of what the answer must be (partitioning supports this well).
Begin with 'teens' numbers eg 13 x 8, then progress rapidly on to multiples of ten eg 23 x 8 (approx. ans. - between 160 and 200)
 	
23 x 8 = (20 x 8) + (3 x 8) = 160 + 24 = 184
	Grid method
	
	        x 20 3
	        8 160 24 =184
	23 x 8 = 184

	Long multiplication – begin with the 'grid' method. Eg. 72 x 38
	(ans. approx. 70 x 40 = 2800)
	
	<table><tr><td>**x**</td><td>**70**</td><td>**2**</td></tr><tr><td>**30**</td><td>2100</td><td>60</td></tr><tr><td>**8**</td><td>560</td><td>16</td></tr></table>
	= 2160
	  576 +
	  2736

Progress as appropriate to vertical expanded recording **multiplying by the most significant digit first.** Record like this:
   23
x   7   Expanded
  140 (20 x 7)
   21 (3 x 7)
  161
When appropriate, using expanded recording, begin to record **least significant digit first**, in order to prepare children for teaching compact standard method
	Compact Standard Method ie.
	  23
	x 7 23
	  21 leading to → x 7
	 140 161
	 161 2

Division

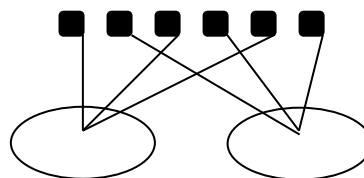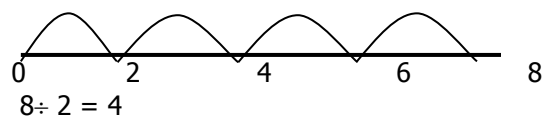|	
Solve practical problems in a real or role play context. How many pairs of socks are there in the drawer? Can you cut the cake in half? How many pieces are there? How many cakes are there in the box? Take half of them out.	We need to put 12 cakes into boxes of 3 or 4. How many boxes will we have? How many wheels do we need to make 3 cars?
	Understand the operation of division as **Sharing equally** Eg 6 sweets are shared equally between 2 people. How many sweets does each one get?
Understand the operation of division as **Grouping** (or repeated subtraction) Eg There are 15 apples in a box. How many bags of 5 apples can be filled? **ie**. How many groups of 5 can you make from 15? 	Grouping should also be modelled on a **number line** eg. 8 children are put into teams of 2. How many teams are there? ie How many groups of 2 are there in 8? $8 \div 2 = 4$ 8 cakes are put into boxes of 4. How many boxes are there? ie How many groups of 4 are there in 8? 0 4 8 $8 \div 2 = 4$
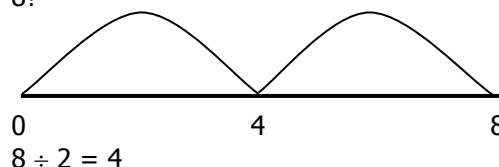
This leads on to **'chunking'** ie.10 times the divisor is calculated in one 'chunk' because it is quicker and more efficient. Eg. $72 \div 5$
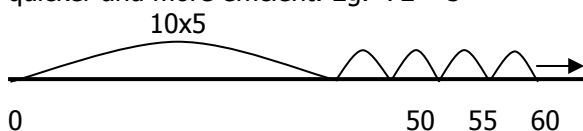 	
0   50   55   60
65   70   72
Answer: 14 r2
Repeated subtraction Eg.
$256 \div 7$ 256
            - 140 (20 x 7)
               116
            -   70 (10 x 7)
                46
            -   42 (6 x 7)
                 4
 Answer: 36 r4
	Finally teach standard compact division recording.
	
	Eg $197 \div 6$
	            $\underline{3\ 2\ r\ 5}$
	        6) 1 9^{1}7
	Answer: 32 r.5

Government examples of formal written methods

ADDITION AND SUBTRACTION

789 + 642 becomes

```
      7  8  9
  +   6  4  2
  ─────────────
  1   4  3  1
      1     1
```

Answer: 1431

874 − 523 becomes

```
      8  7  4
  −   5  2  3
  ─────────────
      3  5  1
```

Answer: 351

932 − 457 becomes

```
      8   12  1
      9̸   3̸   2
  −   4   5   7
  ─────────────
      4   7   5
```

Answer: 475

932 − 457 becomes

```
          1   1
      9   3   2
  −   4̸   5̸   7
      5   6
  ─────────────
      4   7   5
```

Answer: 475

SHORT MULTILPCATION

24 × 6 becomes

```
      2  4
  ×      6
  ──────────
  1   4  4
      2
```

Answer: 144

342 × 7 becomes

```
      3  4  2
  ×         7
  ─────────────
  2   3  9  4
      2  1
```

Answer: 2394

2741 × 6 becomes

```
  2   7  4  1
  ×         6
  ───────────────
  1 6   4  4  6
      4  2
```

Answer: 16 446

LONG MULTIPLICATION

24 × 16 becomes

```
         2
      2  4
  ×   1  6
  ──────────
  2   4  0
  1   4  4
  ──────────
  3   8  4
  ──────────
```

Answer: 384

124 × 26 becomes

```
      1  2
   1  2  4
  ×     2  6
  ────────────
  2  4  8  0
     7  4  4
  ────────────
  3  2  2  4
     1  1
  ────────────
```

Answer: 3224

124 × 26 becomes

```
      1  2
   1  2  4
  ×     2  6
  ────────────
     7  4  4
  2  4  8  0
  ────────────
  3  2  2  4
     1  1
  ────────────
```

Answer: 3224

SHORT DIVISION

$98 \div 7$ becomes

```
      1   4
    _____
  7 | 9   8
       2
```

Answer: 14

$432 \div 5$ becomes

```
        8   6   r 2
      _____
  5 | 4   3   2
           3
```

Answer: 86 remainder 2

$496 \div 11$ becomes

```
          4   5   r 1
        _____
  1  1 | 4   9   6
               5
```

Answer: $45\frac{1}{11}$

LONG DIVISION

$432 \div 15$ becomes

```
            2   8   r 12
        _____
  1   5 | 4   3   2
          3   0   0
        _____
          1   3   2
          1   2   0
        _____
              1   2
```

Answer: 28 remainder 12

$432 \div 15$ becomes

```
            2   8
        _____
  1   5 | 4   3   2
          3   0   0     15×20
        _____
          1   3   2
          1   2   0     15×8
        _____
              1   2
```

$$\frac{\cancel{12}}{\cancel{15}} = \frac{4}{5}$$

Answer: $28\frac{4}{5}$

$432 \div 15$ becomes

```
            2   8 · 8
        _____
  1   5 | 4   3   2 · 0
          3   0   ↓   ↓
        _____
          1   3   2
          1   2   0
        _____
              1   2   0
              1   2   0
        _____
                      0
```

Answer: 28·8