| Notes	**<u>Progression for Mental Addition</u> St Agnes Primary**

DEVELOPING COUNTING WITH UNDERSTANDING

- Count **forwards** and backwards in ones to at least 20 using practical equipment and a number track to support emerging 1:1 correspondence placing one object in each number space.
- Give **one more** and one fewer/less for numbers to 20 demonstrating understanding using practical equipment.


| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
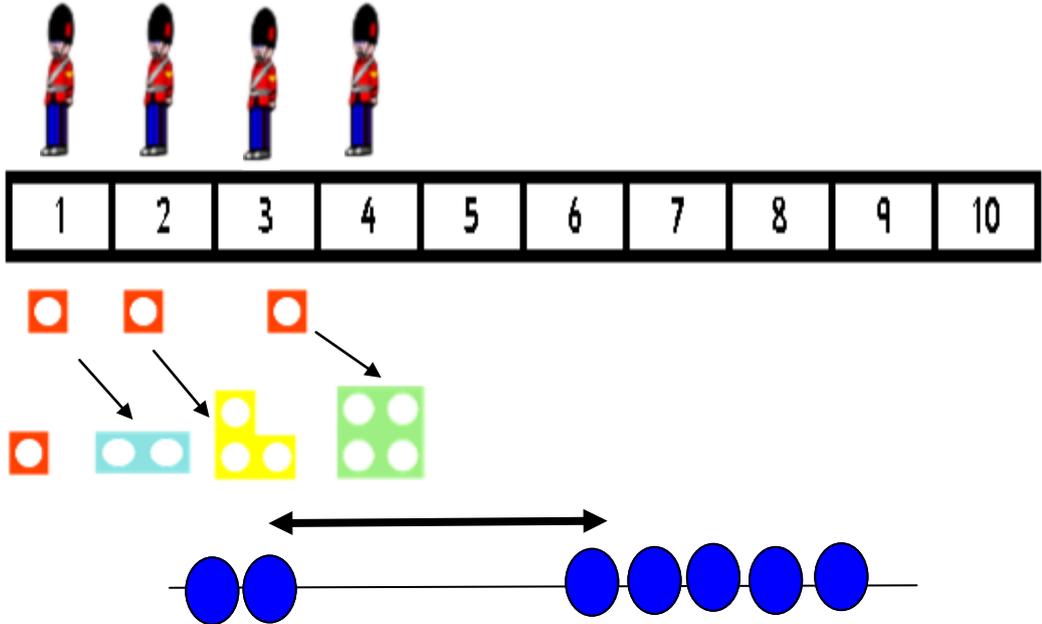
- One number name is given to each object e.g. two objects being incorrectly named as 'sev—ern' .

- Recognise that the last number in the count represents the total number of objects and that recounting is not necessary.

- Increasingly use pattern, e.g. Numicon pairs pattern ,to find out how many objects there are reducing the need to count in ones to find a total.   .

- Order structured equipment and numerals, 1 –10, 1-20 in a variety of ways to demonstrate understanding.

| Notes	**<u>Progression for Mental Addition</u>**

DEVELOPING UNDERSTANDING AND MENTAL METHODS

- Use developing mathematical ideas and methods to solve practical problems involving **<u>counting</u>** and comparing in a real or role play context using Models and Images to support learning. Children develop ways of recording calculations using addition boards, Numicon, pictures, fingers, number tracks and bead strings etc. **3 + 2 = 5**
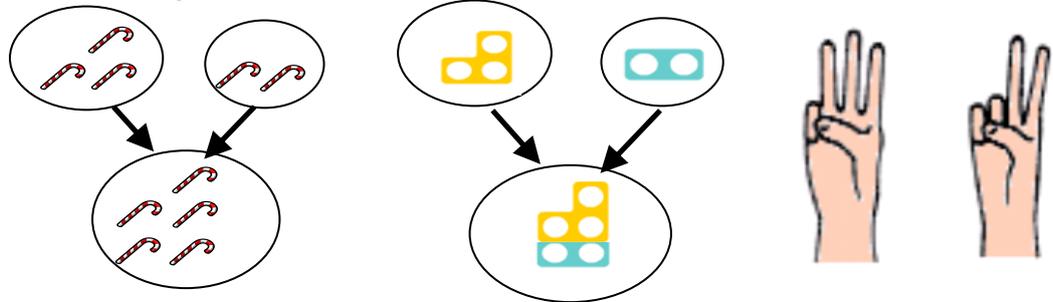
- Say how many there are when two groups of objects are combined to make a total; extend to three groups using imagery of combining sets to develop understanding.
- Begin to use vocab. involved in addition (more, and, add, make, sum, total, altogether, score… one more, two more…, how many more to make….? How many more is… than…?)
- Can answer questions such as:

  What is this number?   Which is more: 4 or 7?

  What number: comes after 10? Is one more than 5, 12? etc.
- Begin to relate addition to counting on. Encourage children to count on from the larger number.

- Uses related vocab. and symbols to describe and record addition number sentences.
- Recognises that addition can be done in any order to do mental calculations more efficiently.
- Put the larger number first and count on in ones (stepping), including beyond 10, using the bead string, number track or labelled number line.

4 + 3 = 7
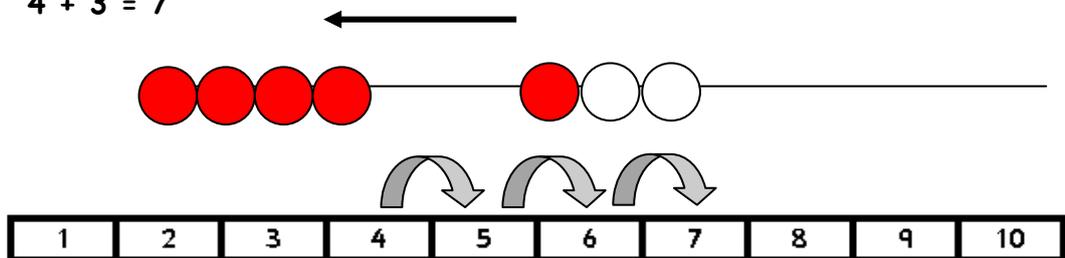
When children demonstrate 1:1 correspondence up to 30 move onto the fully marked and labelled number line.

8 + 5 = 13

| Notes	**<u>Progression for Mental Addition</u>**
	• Begin to interpret situations as addition calculations and explain reasoning, for example, can answer questions such as: *Lisa has 9 pens and Tim has 7 pens.* *How many pens do they have altogether?* 9 + 7 = 9 + 7 = 16 Children place the Numicon shapes together. They can check their answer by placing other numicon shapes on top e.g. 10 shape and 6 shape. Children develop their ability to record progressively using: • concrete objects and pictorial representations • concrete objects, pictorial representations, word and numeral cards • concrete objects, pictorial representations, numeral and symbol cards, can create a number sentence • concrete objects, pictorial representations, can explain with understanding and write the related number sentence using numerals and symbols.
	<u>MENTAL METHODS: PARTITIONING</u> The examples here are based on partitioning and support developing knowledge and recall of addition facts which leads to the later stages of progression in a written method. **<u>BRIDGING</u>** • With developing recall of number facts and '5 and a bit' add a pair of numbers mentally by **jumping** on a number line. 4 + 3 = 7 <u>bridging</u> through 5 +1 +2 1 2 3 4 5 6 7 8 9 10 11 12 • Children use both **<u>hands</u>** to show addition calculations of all numbers to 10 including using the '5 plus structure' (as in the ten frame image). Reinforce the calculation using the bead string and Numicon imagery. • Understands that more than two numbers can be added together, +3 +1 **0** 1 2 3 4 5 6 7 8 9 10 11 12
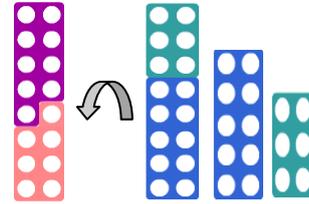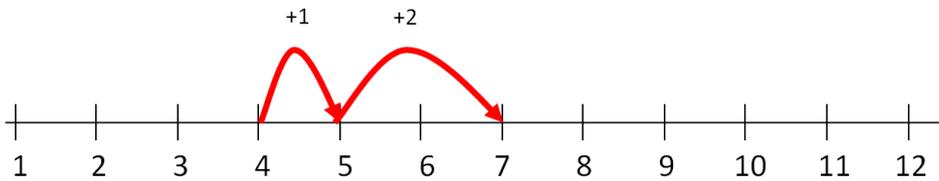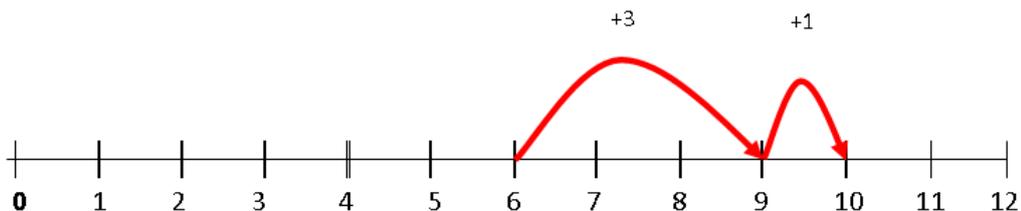
Notes	# Progression for Mental Addition

## Bridging through 10 using a number line.

8 + 5 = 13
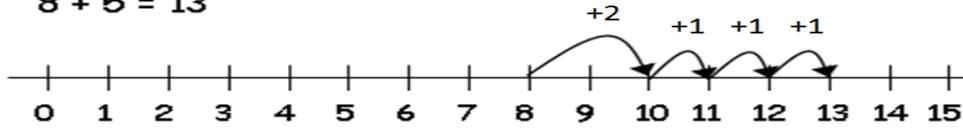

Children can become more efficient by using known number facts to count on. For example, 2 + 3 = 5.

8 + 5 = 13
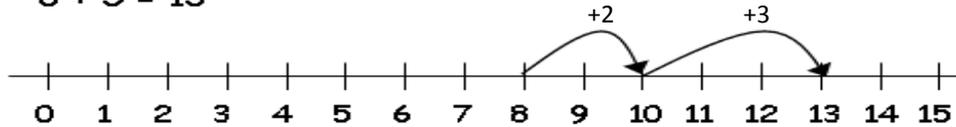
- For children to move towards the use of an empty number line, before removing the support, ensure they can order and position numbers on a line.
- With this understanding where children are reliably jumping begin to remove some of the support provided by the fully marked and labelled number line.
- Add a pair of numbers mentally by:
 jumping and **bridging** through 10

8 + 5 = 13
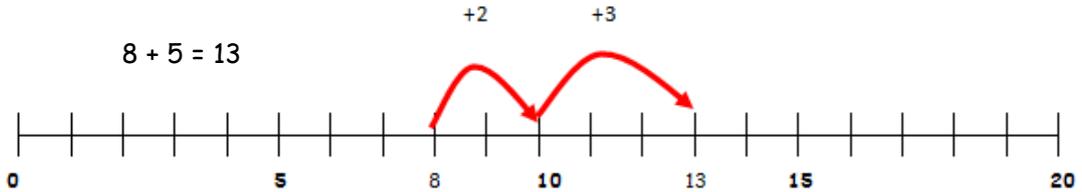
Move to a partially marked and labelled number line as soon as possible.

Jumping and **bridging** through 20

18 + 5 = 23

COMPENSATION

- Add a multiple of 10 and adjust by 1 (rounding and adjusting, compensation)
  13 + 9

  (13+10)-1

4
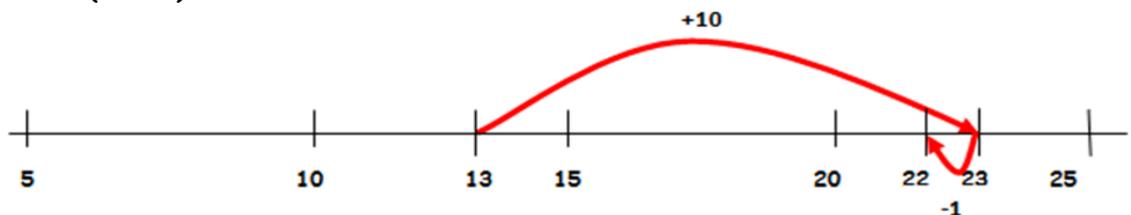
Notes	# Progression for Mental Addition

**MENTAL METHODS: PARTITIONING INTO COMPONENT PARTS**

Adding two 2-digit numbers — using Numicon

Children can collect the correct numicon shapes for the first number (36) and then collect the correct numicon shapes for the second number (21).

36 + 21 =
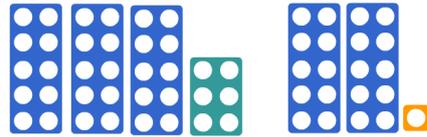
Children must partition the second number **only** (21). First, they add the tens to the first number (36 + 20 = 56). Then they add the units (56 + 1 = 57).
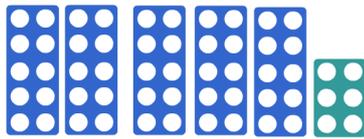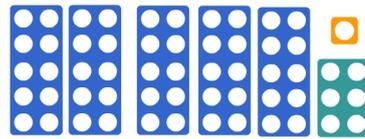
36 + 20 = 56   56 + 1 = 57

**PARTITIONING INTO COMPONENT PARTS ON AN EMPTY NUMBER LINE**
Using an empty number line partition the 'tens' first as the most significant digit on an empty number line.
Bridging through ten can help children become more efficient.

37 + 15 = 52

+10   +3   +2

37   47   50   52

34 + 23 = 57

+10   +10   +3
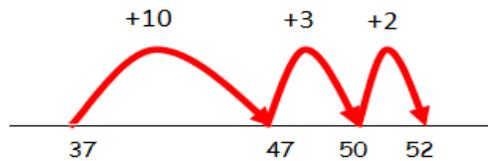
34   44   54   57
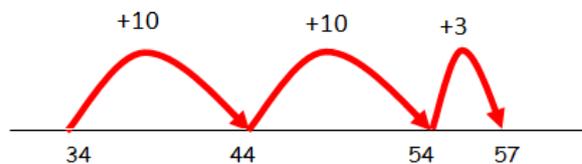
Children should only partition one number when adding. When children are first learning they will partition the second number but will soon learn it is more efficient to partition the smaller number and leave the bigger number as a whole.

| Notes	**<u>Progression for Mental Addition</u>**
	<u>PROBLEM SOLVING</u> Encourage children to use the number line for solving problems involving money, measures and time. See page 7 for examples. Children are continuing to add using their mental methods asking themselves the question: **Which mental method should I use?** They will look at the numbers in the calculation in order to make a decision about whether to use: • Partitioning • Reordering • Using near doubles • Compensation (rounding and adjusting) **<u>Partitioning</u>** When there is nothing special about the numbers, children will use partitioning. They will use different sized jumps depending on their level of confidence and efficiency. $34 + 65 = 99$ $47 + 58 = 105$ $245 + 82 = 327$ $2.7 + 3.4 = 6.1$
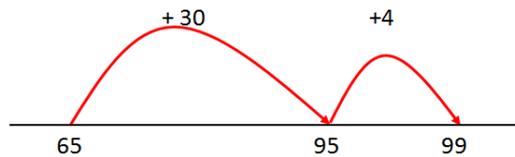
Notes	Progression for Mental Addition
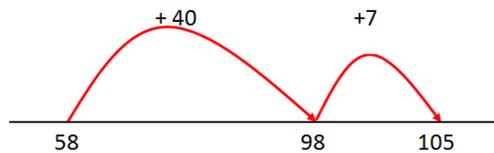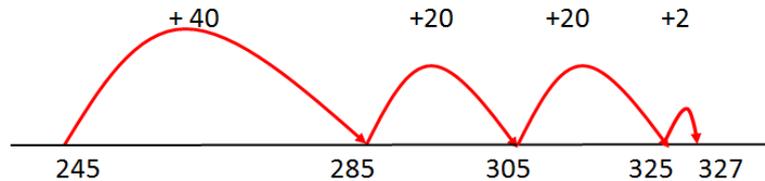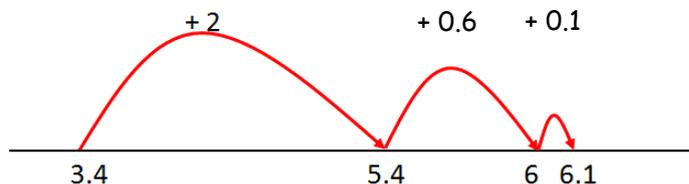
COMPENSATION (Rounding and adjusting)

34 + 19 = 53

+ 20

34   53 54

-1

56 + 29 = 85

+ 30

56   85 86

-1

149 + 79 = 228

+ 80

150   228 230

-2

4.3 + 2.9 = 7.2

+ 3

4.3   7.2 7.3

-0.1

Notes	**Progression for Mental Addition**	Y3-Y6
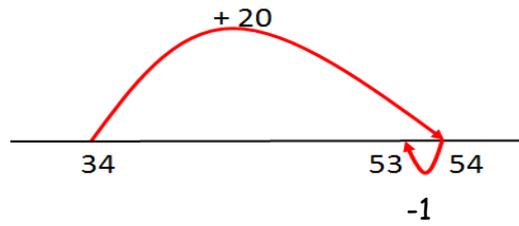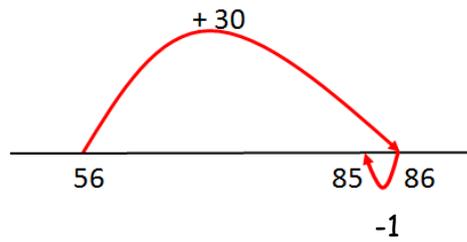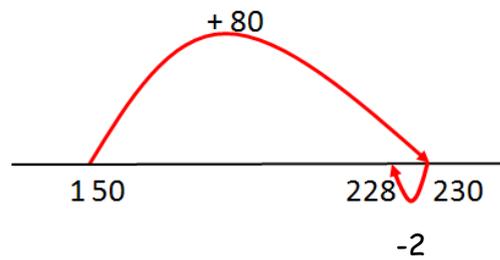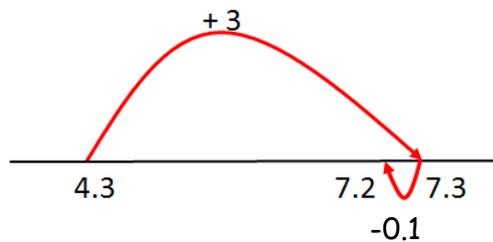
**Problem Solving**

Until children are confident when using a **written method** for addition and have understanding of decimals they should be encouraged to add two or more digits sums of money or measures using the number line.

£3.25 + 78p or 3.25m + 78cm

```
         + 75p              +3p
       _____           ____
      /      \         /    \
     /        \       /      \
    /          v     /        v
 _____
   £3.25          £4.00     £4.03
```

Encourage children from all year groups to always use the number line when solving problems involving time.

Sarah left her home at 10.45am and arrived at the shops 35 minutes later. What time did she arrive? Answer: 11.20am

```
      + 15mins         +20mins
     _____          _____
    /      \        /        \
   /        \      /          \
  /          v    /            v
 _____
  10:45am      11:00am       11:20am
```