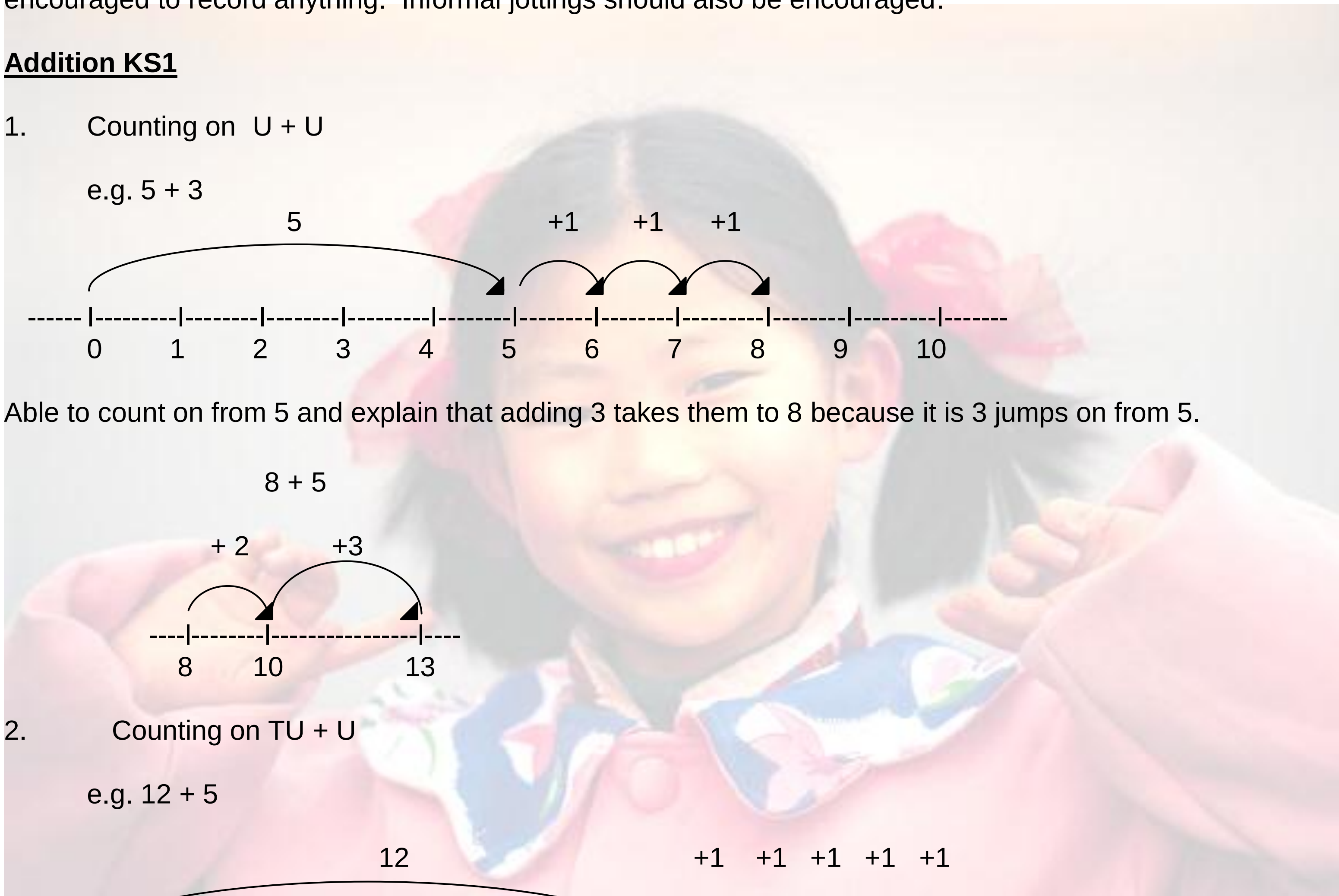
Written Strategies

Children should be able to explain what they are doing with the use of practical apparatus before they are encouraged to record anything. Informal jottings should also be encouraged.



<u>Addition KS1</u>

1. Counting on U + U

e.g. 5 + 3

5 +1 +1 +1

0 1 2 3 4 5 6 7 8 9 10

Able to count on from 5 and explain that adding 3 takes them to 8 because it is 3 jumps on from 5.

8 + 5

+ 2 +3

8 10 13

2. Counting on TU + U

e.g. 12 + 5

12 +1 +1 +1 +1 +1

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Step 1.
I can count on in 1's

Step 2.
I can add numbers below 10 to 10

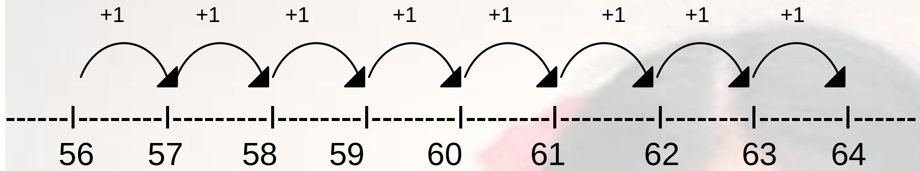
Step 3
I can use + and = symbols

Step 4
I can use a number line to help me add two lower digit two digit numbers together.

Step 5
I can add a TU and U number together without crossing the 10s.

3. Extend to higher numbers TU + U

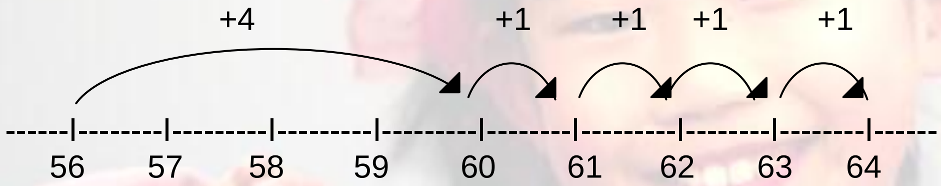
e.g. 8 + 56



Children progress from published number lines to drawing their own to show understanding.

Step 6
Can put the biggest number first to help me add numbers

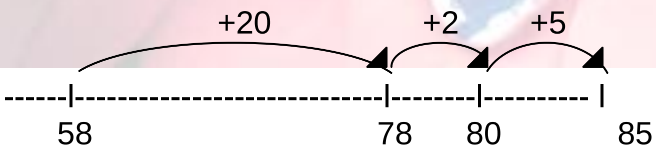
4.



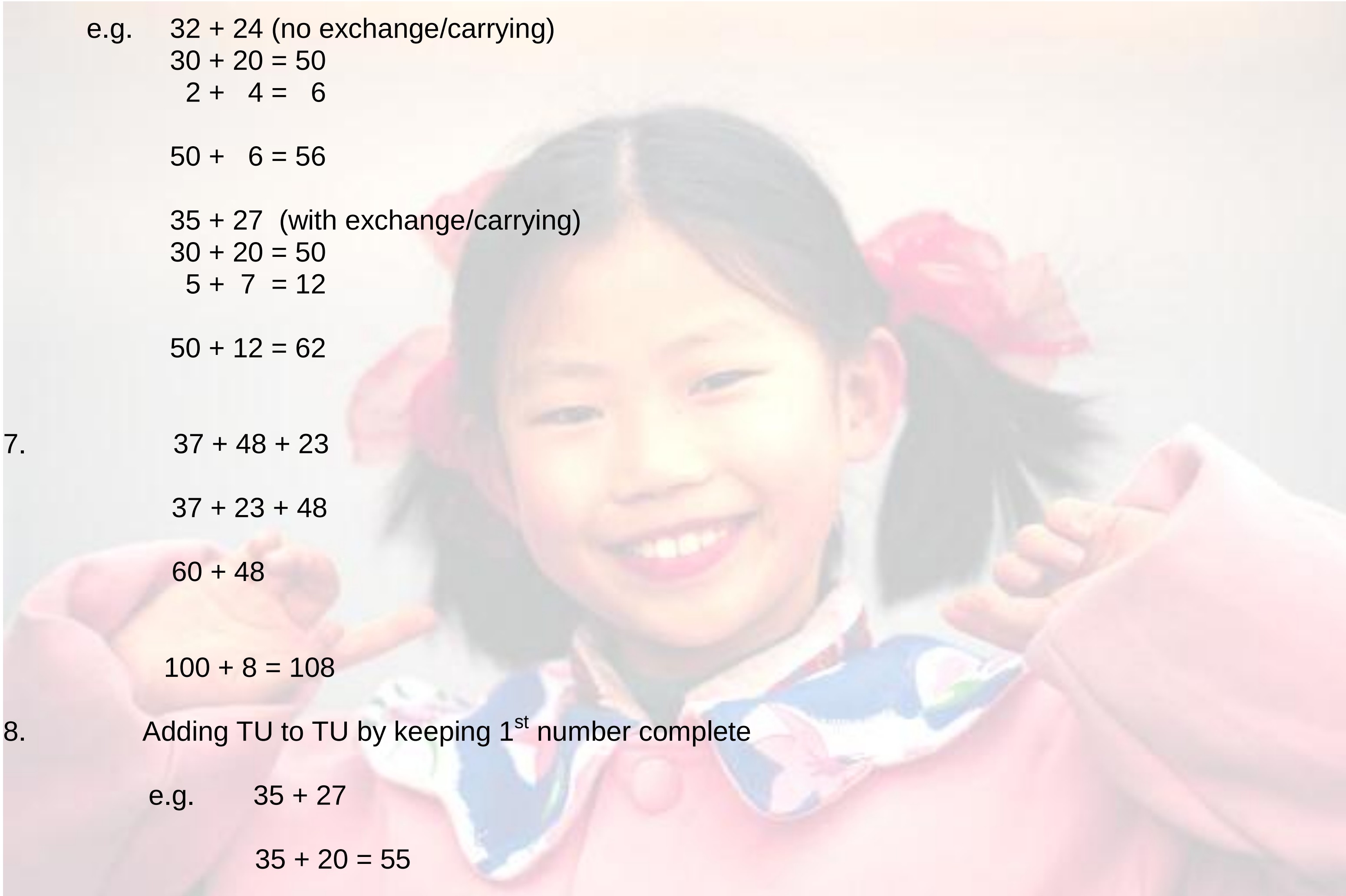
Step 7
I can use my number bonds to help me bridge (get past) tens when I am adding

When children are able to add numbers on a number line and explain clearly what they are doing they no longer need to record what they are adding above the jumps, if they find it laborious.

5. 27 + 58 = 58 + 27



6. Adding TU to TU through partitioning.



e.g. 32 + 24 (no exchange/carrying)
30 + 20 = 50
2 + 4 = 6

50 + 6 = 56

35 + 27 (with exchange/carrying)
30 + 20 = 50
5 + 7 = 12

50 + 12 = 62

Step 8
I can partition into tens and units to add TU to TU

7. 37 + 48 + 23

37 + 23 + 48

60 + 48

100 + 8 = 108

Step 9
I can add numbers in any order, to make the calculation easier.

Step 10
I can add TU + TU, crossing the tens' boundary.

8. Adding TU to TU by keeping 1st number complete

e.g. 35 + 27

35 + 20 = 55

55 + 7 = 6

Step 11
I can use different jottings to help me work out addition calculations.

Subtraction KS1

1. Counting back   U – U

   e.g. 9 – 6

   -1 -1 -1 -1 -1 -1

```
---|---------|--------|--------|---------|--------|--------|--------|--------|--------|--------|------
   0         1        2        3         4        5        6        7        8        9        10
```

Able to count back and explain.

2. Counting back TU – U

   e.g. 15 – 7

   -1 -1 -1 -1 -1 -1 -1

```
-----|-----| -----|-----|------ | -----|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------| ------|-------|---
      5      6     7     8        9      10       11       12       13       14       15       16       17       18       19      20
```

3. Extend to partitioned jumps

   e.g. 15 – 7
   15 – 5 = 10
   10 – 2 = 8

   -2 -5

```
------| ------| ------| ------| -----|--------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-------| ------|-------|---
   5       6       7       8    9       10        11       12       13       14       15       16       17       18       19      20
```

Step 1
I can count back in 1s along a washing line.

Step 2
I can take a smaller amount from a larger amount and work out how many are left.

Step 3
I can record taking away with: a picture, a number sentence.

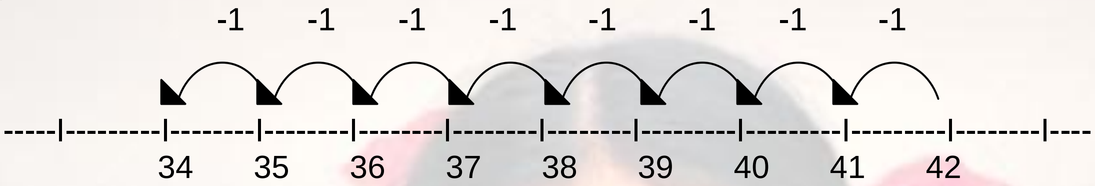
Step 4
I can use take away words: fewer, less than, take away.

Step 5
I know that if I take away a number from another number, the number I am left with will be smaller than my first number.

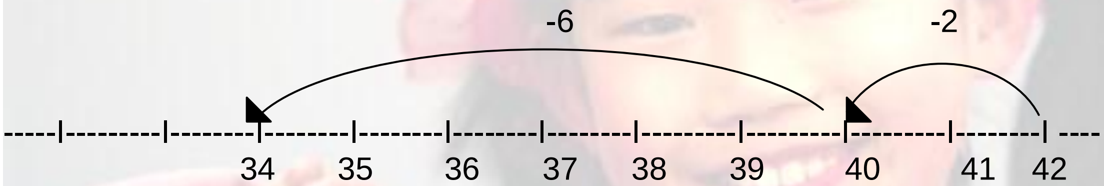
Step 6
I know how much to take away to leave a given number. E.g. 18 - ? = 12

4. Extend to higher numbers.

e.g. 42 – 8



5. Children progress from using published number lines to being able to draw their own and to apply number bonds in partitioned jumps



6. Subtracting TU – TU

Partitioning second number only – refer to number 7. in addition section.

e.g. 52 – 27

52 – 20 = 32
32 - 7 = 25

Step 7
I am beginning to use my knowledge of number bonds to subtract a 1 digit number from a 2 digit number.

Step 8
I can use a number line to subtract TU from TU crossing the tens' boundary

Step 9
I can use jottings efficiently to support, record and explain my calculations

Multiplication KS1

(Teach ÷ alongside × using number lines and arrays)

1. Children need to be able to group objects and explain what they are doing clearly.(Year 1)

2. Be able to count on and back in equal groups(Year 1
3. Relate groups of the same number to x tables and explain.

4. Record as arrays and be able to give related facts.

e.g.	x x x	3 groups of 4 = 12	x x x x
	x x x		x x x x
	x x x	4 groups of 3 = 12	x x x x
	x x x		

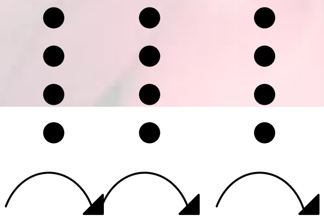
5. Understand inverse

e.g.	x x x	How many groups of 3 can be made from 12?	x x x x
	x x x		x x x x
	x x x	How many groups of 4 can be made from 12?	x x x x
	x x x	How do you know?	

6. Count groups on a number square and recognise patterns

7. Count on, in groups, on a number line U x U

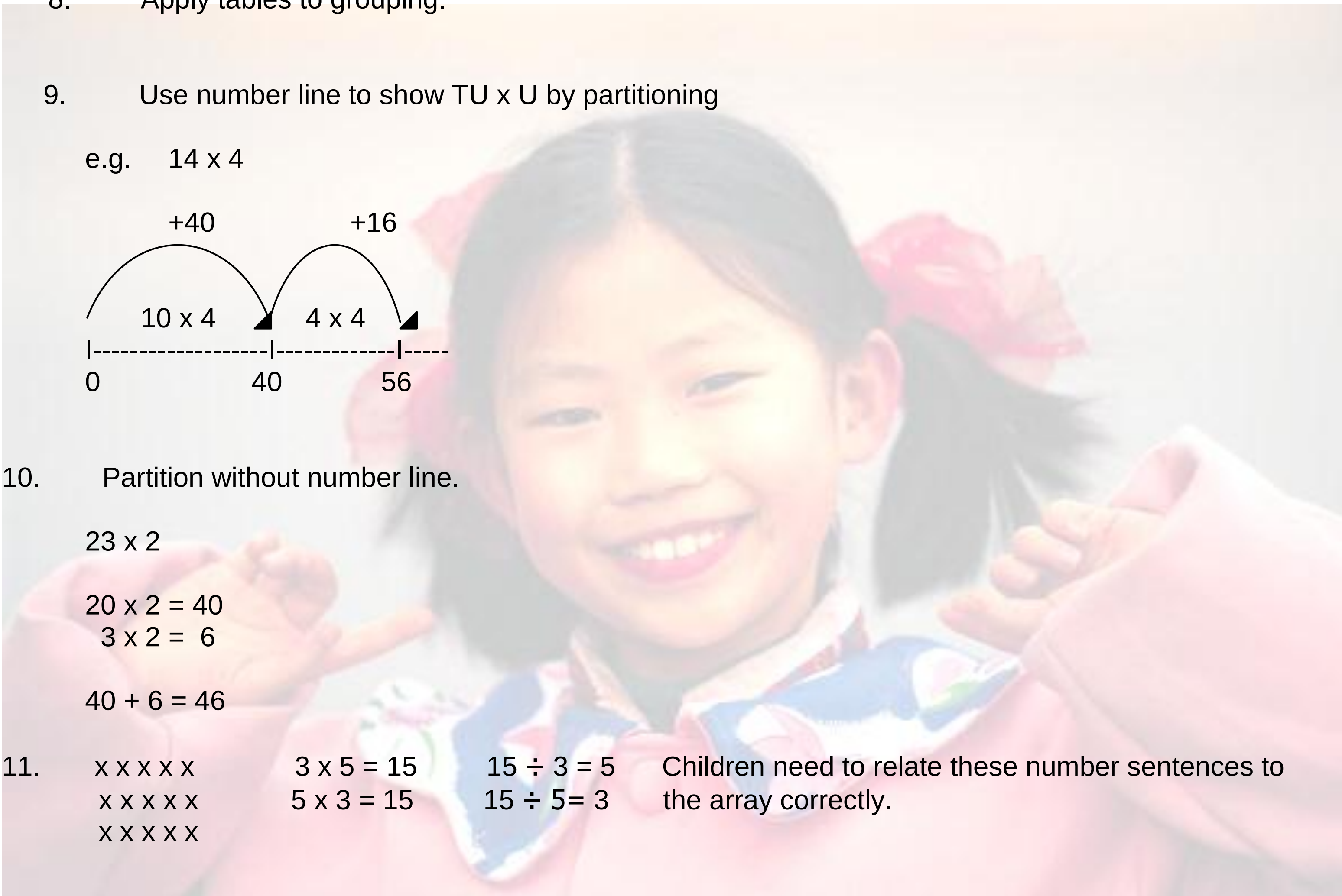
e.g. 3 x 4 (3 groups of 4)



Step 1 (starts in year2)
I can solve a simple multiplication problem using apparatus and record this in a number sentence using x and = symbols.

```
|---------|---------|---------|
0         4         8         12
```

8. Apply tables to grouping.



9. Use number line to show TU x U by partitioning

e.g. 14 x 4

```
          +40                 +16

      10 x 4            4 x 4
|------------------|-------------|-----
0                 40            56
```

10. Partition without number line.

23 x 2

20 x 2 = 40
3 x 2 = 6

40 + 6 = 46

11.

x x x x x x x x x x x x x x x	3 x 5 = 15 5 x 3 = 15	15 ÷ 3 = 5 15 ÷ 5= 3	Children need to relate these number sentences to the array correctly.

Step 2
I can use a number line to show repeated grouping and relate confidently to x 2 and x 10 tables. Beginning to do so with x5, x4 and x3.

Step 3
I can partition a 2 digit number and multiply by a single digit number

Step 4
I can use prior knowledge, including inverse to solve empty box problems
E.g.
□ x 7 = 21

step 5
I can explain inverse using arrays or number lines

Division KS1

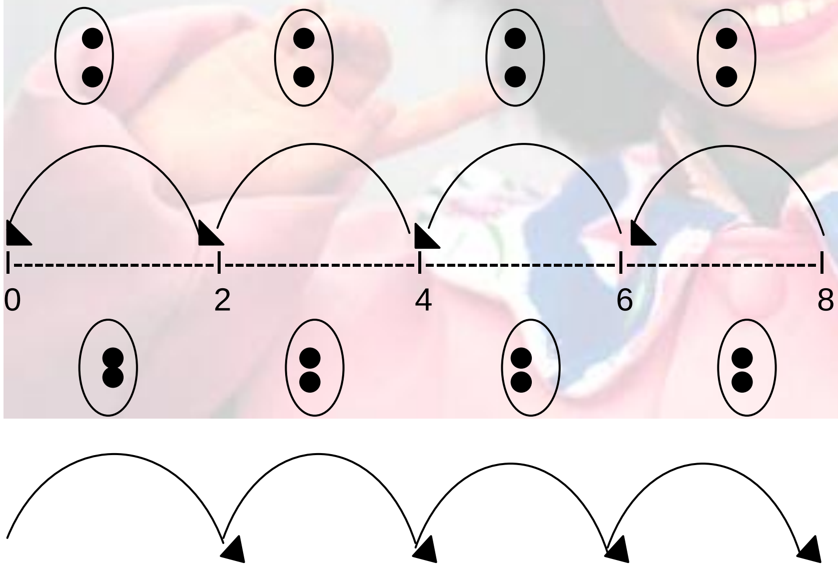
Division needs to be given in context, wherever possible, to ensure understanding of sharing and grouping.

1. Practical examples of sharing including remainders.

   e.g. *I have 7 sweets to share between 3 of us, what shall I do?*

2. Understand grouping and be able to explain arrays.

3. Divide U by U on a number line counting on and back in equal groups without a remainder.



8 – (4 groups of 2) = 0

0 + (4 groups of 2) = 8

Step 1
I can share small numbers in practical contexts.

Step 2 (Year2)
I can solve a simple division problem using apparatus and record this as a number sentence e.g. 6 ÷ 2 = 3

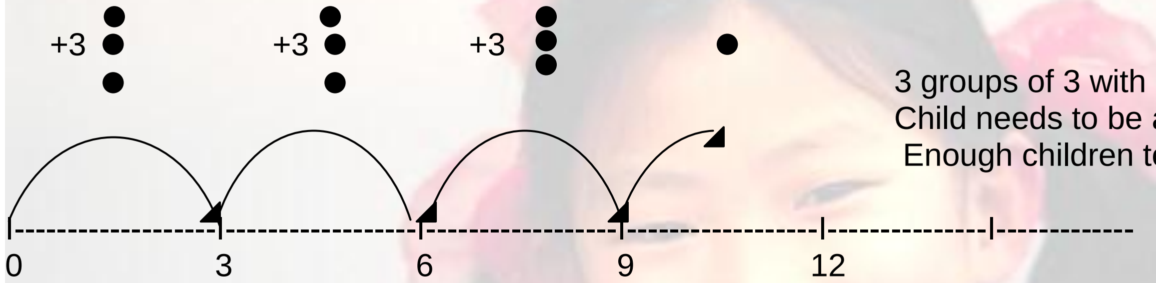
Step 3
I can draw a picture to show my understanding of dividing 2 digits by 1 digit e.g. 16 ÷ 2 = 8

|------------------|------------------|------------------|------------------|
0 2 4 6 8

4. Able to practically show and explain links to tables as shown on the number line

5. Divide U by U on a number counting on and back in groups with and without remainder.

10 children need to play a game in groups of 3. How many groups will there be?



3 groups of 3 with one child left over
Child needs to be able to explain there are not
Enough children to make the next group of 3

Be able to show and practically explain links to tables.

Understanding that the answer is the same either way.

6. TU÷U with and without remainder on a number line.

Step 4
I can use a number line to show how I divided using groups u ÷ u

Step 5
I can use my knowledge of tables to help me divide.

Step 6
I understand ÷ as repeated subtraction or repeated addition.

Step 7
I can explain the inverse of division using arrays.

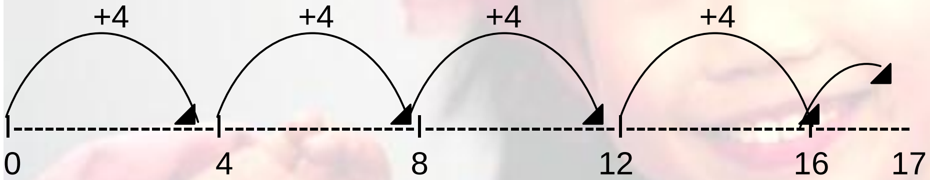
7. Ensure children know the appropriate way to answer a ÷ question

e.g. (a) as a fraction – usually where measure or food can be divided into fractions.
(b) rounding up or down – where we need another whole box even though we only have 3 eggs – round up. Where all boxes have to be full – round down.
(c) Where a remainder is appropriate – where I have 17 children to sit at 4 tables each with 4 chairs – what do I need to do? (see *NNS* pp. 56-7)

8. Count on a number line in equal groups: divide TU by U using number line with and without remainder

Step 8
I can divide numbers that leave a remainder and answer appropriately.

e.g. 17 ÷ 4 = 4 R 1



1 left out of the next 4 i.e. ¼

Calculators

Children need to be able to compute competently at all levels and explain what they are doing and why it works.

However, there are times e.g. in problem solving, where use of a calculator is appropriate. This may be for several reasons.

1. The child knows the type of calculation that is required, but the numbers are too large or complex and this will inhibit the chances of arriving at the correct solution.

Step 1 only applies to end of year 2.
I can use a calculator to check my additi
subtraction calculations.

2. In a trial and improvement situation where repeated calculations are necessary but demotivating to be done mechanically.
3. Time is short and the calculator is, therefore, an efficient use of time.
4. As a proof or checking tool.
5. When needing to handle large amounts of numbers efficiently e.g. adding lists.

Children should be encouraged to use calculators from Reception, where they can be used in play situations for number recognition, onwards.
The more familiar children are with calculators the greater their confidence and the better their use of them will be.
Children need to be taught when it is appropriate to use calculators and should be able to choose when they use them as long as their reason is justifiable.
Children should not use calculators instead of learning written methods of calculation.

Higham Ferrers Nursery and Infant school
Calculation policy.