

Introduction to the Assessment Tools

This section contains two Assessment Tools. The first is Assessment Signposts, designed to help teachers identify where to start pupils on the teaching programme. The second is the Individual Record of Progress (starting on page 10), this is designed to be used for detailed tracking of individual pupil's progress, where this is appropriate.

Numicon Assessment Signposts

Pupils of any age and ability meeting Numicon for the first time must have opportunities to play and explore the equipment. Teachers should check that pupils are competent with the basic Firm Foundations or Closing the Gap activities (see Assessment Signposts I – II) before using Numicon Shapes and Number Rods in Kit 1 and Kit 2 Activities. Each Assessment Signpost consists of a question about what the pupil can do and an activity which will show the teacher whether or not the pupil understands. The Signpost then indicates what should be done next, depending on the pupil's response.

Working through the Assessment Signposts will help teachers identify gaps in pupils' understanding. Some pupils may appear competent at some isolated aspects of the programme but it is important that they are not moved on too far until the gaps are plugged. For example, a pupil may be able to call Numicon Shapes by their number names and assign numerals to them but be unable to create repeating patterns. As the ability to sequence is a key skill for mathematics it would be important

for the pupil to develop this skill before moving on. The Signposts cover Numicon Firm Foundations Kit, Closing the Gap with Numicon (the Kit for pupils of any age experiencing difficulty with basic number ideas) and Numicon Kit 1 in which place value, equivalence, basic addition and subtraction facts and developing arithmetic strategies beyond counting are addressed. Misconceptions around these key ideas are often the root cause of difficulty for many older pupils, so each Signpost is important. When pupils have understanding of the activities in Kit 1, they have the foundation of understanding to be able to tackle the work in Kit 2. As they work through the Kit 2 programme, their understanding can be assessed using the Key questions shown on each card.

The Assessment Signposts are not designed to be a comprehensive assessment for pupils with special needs, although they will show teachers where to start these pupils on the teaching programme. The Record of Progress will help teachers to identify smaller steps within each Signpost to plan and set targets.

Assessment Tool 1: Assessment Signposts

1. Can pupil match Shapes and copy the pattern of a Shape with Pegs on the Baseboard?

How to find out

- Show pupil a 7-shape and ask him/her to make the corresponding pattern with Pegs on the Baseboard.
- Make a 9-pattern with Pegs on the Baseboard and ask pupil to find the corresponding Shape.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 2a, 2b,
3a, 5a, 6a

Closing the Gap: 1, 2a, 5

Old Foundation Cards: 1-2

2. Can pupil copy a repeating pattern?

How to find out

- Make yellow red yellow red (at least five repeats) repeating pattern with Pegs on the Numicon Baseboard.
- Ask pupil to copy the pattern on the Baseboard.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 5b

Closing the Gap:

Pattern Card

Old Foundation Cards:

2a Making Connections

3. Can pupil continue a repeating pattern?

How to find out

- Make a blue green blue green repeating pattern (three repeats) with the Pegs on the Numicon Baseboard.
- Ask pupil to continue the pattern.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 5b

Closing the Gap:

Pattern Card

Old Foundation Cards:

2a Making Connections

4. Can pupil order Shapes and give them number names?

How to find out

- Give pupil a set of jumbled I-10 Shapes. Ask pupil to put them in order starting with the I-shape.
- Point to a 6-shape ask pupil to say its number name. Continue to ask him/her to name each Shape (not in order).

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 3b, 4a,
4b, 6b, 7a

Closing the Gap: 2b, 3a,

3b, 4a, 4b, 6

Old Foundation Cards: 3, 4

5. Can pupil attach numerals to Numicon Shapes and patterns without counting?

How to find out

- Scatter Shapes 1 – 10 on table.
- Give pupil a set of shuffled 1-10 Numeral Cards. Ask him/her to put each Numeral Card on its corresponding Shape.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 7b, 8a, 8b

Closing the Gap: 7

Old Foundation Cards: 5, 6

6. Can pupil build each Numicon pattern (without counting) in response to both hearing the number word and seeing the numeral?

How to find out

- Show pupil the numeral 8 and ask him/her to build the corresponding pattern.
- Say '10' and ask pupil to build the corresponding pattern.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 8b, 9a

Closing the Gap: 8

Old Foundation Cards: 8, 7

7. Can pupil devise his/her own repeating patterns with Pegs?

How to find out

- Give pupil a basket of mixed Pegs and ask him/her to make a repeating pattern e.g. red, blue, red, blue, red, blue etc.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 5b

Closing the Gap:

Pattern Card

Old Foundation Cards:

2a Making Connections

8. Can pupil combine the Shapes to show addition and explain using the words 'add, plus and equals'?

How to find out

- Give pupil a 3 and a 4-shape and ask him/her to add them together and say the addition. Pupil should answer clearly 'three add four makes/equals seven'.
- Ask pupil to make up an addition story using 3 and 4.
- Ask pupil to show the Shapes needed to solve the problem 'There were six cars in the car park, two more cars were driven in, how many cars in the car park altogether?'

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Firm Foundations: 10, 11b

Closing the Gap: 9b, 10a,

11a

Old Foundation Cards: 9,

10b

9. Can pupil show 'take away' subtraction by hiding part of a Shape?**Can pupil show 'difference' subtraction?****Can pupil use the 'inverse-of-addition' to add on to reach a target number?****How to find out**

- Give pupil a 9-shape ask him/her to 'take away' three and say the subtraction. Pupil should hide the three Numicon pattern of the 9-shape and answer clearly 'nine take away three leaves/equals six'.
- Ask pupil to make up a subtraction story using 9 and 3.
- Ask pupil to use Numicon to show the subtraction 'There were six apples in a basket, three were eaten, how many were left?'
- Give pupil a 2-shape and a 10-shape and ask him/her to find the difference and say it. S/he should cover part of the 10-shape with the 2-shape and answer clearly 'the difference between 10 and 2 is/equals 8' or 'the difference between 2 and 10 is/equals 8'.
- Ask pupils to solve the subtraction 'if you have 6 cups and you want 9, how many more cups do you need?'

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Firm Foundations: I2, I3

Closing the Gap: I1b, I2a, I2b, I3a

Old Foundation Cards: I1, I2

10. Can pupil say the number that would be one more and one less of any number from 1-10?**How to find out**

- Show pupil any Numicon Shape from 1-10 and ask him/her what 'one more' would be/equal, what 'one less' would be/equals. Pupil should answer by saying each number. Check all numbers up to 10. Use knowledge of pupil's understanding to decide whether to ask 'one less than one' and 'one more than ten'.

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Firm Foundations:

I1a (one more), I2b (one less)

Closing the Gap:

I0b (one more), I2a (one less)

Old Foundation Cards:

I0a (one more), I1b (one less)

11. Can pupil count accurately to at least 20?**How to find out**

- Give pupil a basket of thirty five objects and ask him/her to count them. S/he should count accurately one to one to at least 20.

Note: Before starting the place value work on Kit I Numbers and the Number System Card 3B pupil should count accurately to at least 30.

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Firm Foundations: I

Closing the Gap:

Counting Card

Kit I, Numbers and the Number System Cards: IA and IB (Give daily counting opportunities supported with number lines).

12. Can pupil devise a repeating pattern using any non-mathematical objects and record by drawing or colouring?

How to find out

- Ask pupil to make a repeating pattern from a choice of objects (e.g. shells, buttons, leaves, toy cars) and then record their pattern.
- Ask pupil to make a repeating pattern with sounds and/or actions.

Yes? Move on to next question

No? Go to:

Kit I: Using Pattern 1a

13. Can pupil use coloured cubes to devise a repeating pattern which includes quantity and record with numerals?

How to find out

- Ask pupil to build a pattern from a selection of coloured cubes. The pattern must use different amounts, e.g. 1 red, 2 blues, 3 yellows, 1 red, 2 blues, 3 yellows.
- Ask pupil to record the pattern by colouring on squared paper and then to assign a series of numbers to the pattern e.g. 1, 2, 3, 1, 2, 3, etc.

Yes? Move on to next question

No? Go to:

Kit I, Using Pattern, 2a

14. Can pupil write an addition using + = when given two Shapes?

How to find out

- Give pupil a 3-shape and a 7-shape and ask him/her to write the sum and answer. S/he should write $3 + 7 = 10$, or $7 + 3 = 10$.

Yes? Move on to next question

No? Check Assessment Signpost 8 above, If pupil can demonstrate language of addition go to:

Kit I, Calculating Cards 1A, 1B, 2A and 2B.

15. Can pupil write a sum in response to an addition story?

How to find out

- Ask pupil to write the sum to solve the problem: Two children were playing on the swings, three were playing on the slide. How many children were playing? S/he should write $2 + 3 = 5$ or $3 + 2 = 5$.
- Ask pupil to make up his/her own story from the sum $1 + 7 = 8$

Yes? Move on to next question

No? Check Assessment Signpost 8 above, If pupil can demonstrate language of addition go to:

Kit I: Calculating Cards 1A, 1B, 2A and 2B.

16. Can pupil write a subtraction using – and = in response to a subtraction shown with Numicon?

How to find out

- Give pupil a 7-shape and ask 'Please can you show 7 take away 2 and write the subtraction?'. Pupil should hide 2 of the 7-shape and write $7 - 2 = 5$.

Yes? Move on to next question

No? Check Assessment Signpost 9 above, if pupil can demonstrate language of subtraction go to:

Kit I: Calculating Cards 2A, 2B, 3A.

17. Can pupil write a subtraction in response to a story?

How to find out

- Ask pupil to write the subtraction to solve the problem 'There were eight flowers in the garden, a child came along and picked seven of them, how many flowers were left?'. S/he should write $8 - 7 = 1$.
- Ask pupil to make up his/her own story from the subtraction $10 - 4 = 6$.

Yes? Move on to next question

No? Check Assessment Signpost 9 above, If pupil can demonstrate language of subtraction go to:

Kit I: Calculating Cards 2A, 2B, 3A.

18. Can pupil systematically build and record addition facts of any number to 10?

How to find out

- Ask pupil to build addition facts of 7 with Numicon or Number Rods, and record as sums. Pupil should build facts in order starting with $1 + 6$. Where pupil is working haphazardly rather than systematically s/he will need more work on sequence.

Can pupil systematically take apart addition facts of any number to 10 built with Numicon Shapes, and record as subtraction facts?

How to find out

- Ask pupil to build addition facts of 8, in order starting with 1, using either Numicon Shapes or Number Rods. Then ask him/her to show subtraction facts of 8 by taking the pattern apart and recording the subtractions. Pupil should work systematically, where s/he is working haphazardly s/he will need more work on sequence.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Kit I: Using Pattern 2a, 3a, 4a (building addition facts)

Kit I: Using Pattern 3b, 4b (taking apart addition facts)

19. Does pupil have confident mental recall \pm of all numbers within 10?

How to find out

- Ask pupil to answer orally from reading additions and subtractions on Kit I Photocopy Masters, sheets 8–11.
- Read additions and subtractions aloud from Kit I Photocopy Masters, sheets 8–11. Ask pupil to say the answers.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Kit I: Calculating 4a–8b.

20. Does pupil have secure understanding of place value?**How to find out**

- Show pupil several 2-digit numbers 15, 39, 43, 50, 81 (from 0-100 Number Card Pack in Kit I) ask him/her to read them. Then ask pupil to build the numbers with Numicon.
- Say several 2-digit numbers (13, 28, 60, 82) one at a time and ask pupil to write them.
- Put out Numicon Shapes to show 35 and ask pupil to write the number

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Kit I: Numbers and the Number System 2a-7a

21. Can pupil add or subtract 10 from any 2-digit number?**How to find out**

- Show pupil 47 (from 0-100 Number Card Pack in Kit I) and ask him/her 'What would 10 more than this number be?' S/he should answer 57. Then ask him/her 'What would 10 less than this number (showing Number card 47) be?' S/he should answer 37.
- Ask pupil to make up an arithmetic story from $47 + 10 = 57$, or $47 - 10 = 37$.
- Assess pupil's understanding of addition and subtraction of 10 with teen numbers by repeating the assessment questions above substituting 18 for 47.

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Kit I: Numbers and the Number System 7b

22. Can pupil count in the fives sequence with understanding?**How to find out**

- Ask pupil to count in fives whilst putting Numicon 5-shapes on the Numicon Tens Number Line.
- Ask pupil to point or highlight the 5 sequence on a number line whilst s/he counts in fives. Ask pupil to point or highlight the 5 sequence on a number square whilst s/he counts in fives.
- Ask pupil to continue the written sequence 5, 10, 15.

Yes? Move on to next question**No? Go to the activity from the relevant Numicon Kit:**

Kit I: Using Pattern 5b

23. Can pupil recall facts of 10 when solving 3-digit addition?**How to find out**

- Write additions: $6 + 7 + 4$, $5 + 7 + 3$. Ask pupil how s/he would solve them. S/he should answer that s/he knows $6 + 4 = 10$ and that $10 + 7 = 17$.
- Repeat for the second example.

Yes? Move on to next question

No? Go to the activity from the relevant Numicon Kit:

Kit 1: Calculating 7b, 9a

24. Can pupil use recall of facts of all numbers to 10 and his/her understanding of place value to solve \pm problems mentally?**How to find out**

- Write the following additions and subtractions: $40 + 30 =$, $60 - 20 =$, $64 + 4 =$, $57 - 3 =$, $52 + 8 =$, $70 - 5 =$
- Ask pupil to write the answers, sit with him/her to observe his/her ease of recall.

Yes? Move on to next question

No? Check Assessment Signpost 20 above, If pupil can demonstrate competency with place value go to:

Kit 1: Calculating 8b, 11a, 11b, 12a, 12b, Using Pattern 6a, 6b

25. Can pupil bridge through 10 using addition or subtraction of a single digit?**How to find out**

- Ask pupil how s/he would solve $8 + 6$. Expect the answer that the 6 can be split into 2 (to reach 10) and 4 more to reach 14. Be aware however that some pupils may use a different strategy.
- Ask pupil how s/he would solve $13 - 5$. Expect the answer that the 5 can be split into 3 (to subtract down to 10) and 2 less down to 8.

Yes? Pupil is now ready to begin Kit 2. Whilst working through Kit 2, assess pupil's understanding using the Key Questions shown on each card and set word problems which require pupil to use each strategy as it is learnt.

No? Go to the activity from the relevant Numicon Kit:

Kit 1: Calculating 13a, 13b

Assessment Tool 2: Individual Record of Progress

The Individual Record of Progress, designed to be photocopied for use with individual pupils, shows the small detailed steps of the full Numicon teaching programme, up to and including the teaching activities in Kit 2. It is arranged in three sections which relate to the three strands of the teaching programme Numbers and The Number System, Using Pattern and Calculating.

Numbers and The Number System

This section includes recognition of Numicon Shapes, knowing the Numicon Patterns, Counting and Place value. We suggest that teachers regularly assess pupil's counting until they are secure in the count sequence. This may be done by first asking the pupil how far s/he can count. Then choosing a number within the pupil's counting range and asking him/her to count on from that number, and back from that number. Repeat with three or four different numbers from within the counting range. It is worth bearing in mind that when pupils are learning to count multiples of ten are common sticking points, once pupils have counted across a multiple of ten the pattern helps them to remember the next part of the count sequence.

Using Pattern

Includes copying, continuing and creating repeating patterns, order, beginning algebra, patterns of similar calculations and number sequences. There are many detailed steps in this section because the ability to understand and use pattern is a key skill for learning mathematics.

It may not be necessary to check every step in the later number sequences but we have included them to give teachers ideas about the different sequences that pupils need to practise.

Calculating

This section covers the operations of addition, subtraction, multiplication and division. The steps within each arithmetic operation include practical arithmetic; learning the appropriate mathematical language; introducing signs; recording and using and applying.

Using the Record of Progress

We suggest that the Record of Progress is used where individual pupil's progress needs to be closely monitored. Progress will need to be tracked through the three sections in parallel. The steps within each section are numbered consecutively.

The Record of Progress is also useful as a general guide when planning. It is also worth referring to the Key Mathematical Ideas sections in the Teaching Guides which indicate difficulties that pupils may encounter.



Name: _____

Date of Birth: _____

Numbers and the Number System

Recognition of Shapes, Counting and Place value

Pupil is able to	Comments
1. Recite numbers to...	
2. Match Numicon Shapes by colour.	
3. Recognize Numicon Shapes by colour.	
4. Find Numicon Shape to match Numicon pattern built with Pegs on Base Board 2 3 4 5 6 7 8 9 10. (do not use number names with the pupil yet, see later steps.)	
5. Build Numicon pattern with Pegs on Base Board in response to seeing the Numicon Shape 2 3 4 5 6 7 8 9 10 (do not use number names with the pupil yet, see later steps).	
6. Count objects to... (note pupil's one-to-one counting range)	
7. Recognize numbers within stories and rhymes.	
8. Compare two Shapes and say which has more holes and which has fewer/less holes.	
9. Find position of Numicon Shape on Numicon Number Line by matching.	
10. Find Numicon Shape in response to hearing the number name 2 3 4 5 6 7 8 9 10.	
11. Name Numicon Shapes 2 3 4 5 6 7 8 9 10 (pupil says number name in response to seeing Shape).	
12. Recognize numerals (pupil points to numeral in response to hearing the number name) 2 3 4 5 6 7 8 9 10.	
13. Name numerals (pupil says number name when shown numerals – out of order) 2 3 4 5 6 7 8 9 10.	
14. Remove 2 objects from a set of 10.	





Recognition of Shapes, Counting and Place value, Continued

Pupil is able to	Comments
15. Remove 5 objects from a set of 10.	
16. Remove 9 objects from a set of 10.	
17. Match numerals and Numicon Shapes together 2 3 4 5 6 7 8 9 10.	
18. Find out how many to 10 without counting (by arranging into Numicon patterns) 2 3 4 5 6 7 8 9 10.	
19. Find the last number in a count to 10 on Numicon Number Line.	
20. Begin to write numerals 1-10.	
21. Use counting confidently in different situations.	
22. Match Number Rods by colour.	
23. Recognize Number Rods by colour.	
24. Find Number Rods in response to hearing the number name 2 3 4 5 6 7 8 9 10.	
25. Name Number Rods (pupil says number name in response to seeing Rod) 2 3 4 5 6 7 8 9 10.	
26. Count on from any number within counting range (teacher establishes counting range by asking pupil how far s/he can count and then chooses a number to count on from).	
27. Say which is larger/smaller when looking at 2 numerals within 10.	
28. Find last number in a count to 10 on a number line.	
29. Record last number in a count to 10.	





Recognition of Shapes, Counting and Place value, Continued

Pupil is able to	Comments
30. Put a list of 4 random numerals within 10 in order.	
31. Recall '1 more' than all numbers to 10.	
32. Recall '1 more' than any number within counting range.	
33. Count back from any number within counting range (teacher establishes counting range by asking pupil how far s/he can count and then chooses a number to count back from).	
34. Recall '1 less' than all numbers to 10.	
35. Recall '1 less' than any number within counting range.	
36. Count objects accurately to 30 (one-to-one).	
37. Recognize teen numerals (pupil points to numeral in response to hearing number name – not in order) 11 12 13 14 15 16 17 18 19 20.	
38. Name numerals (pupil says teen number name when shown numerals – not in order) 11 12 13 14 15 16 17 18 19 20.	
39. Build a teen number with Numicon Shapes or Rods in response to seeing the numeral 11 12 13 14 15 16 17 18 19 20.	
40. Build a teen number with Numicon Shapes or Rods in response to hearing the number name 11 12 13 14 15 16 17 18 19 20.	
41. Name teen numbers built with Numicon Shapes or Rods 11 12 13 14 15 16 17 18 19 20.	
42. Write teen numbers in response to hearing the number.	
43. Write teen numbers in response to seeing them built with Shapes or Rods (not in order).	
44. Find the last number in a count to 20 on Numicon Number Line.	



Recognition of Shapes, Counting and Place value, continued.

Pupil is able to	Comments
45. Say which is larger/smaller when looking at 2 numbers within 20.	
46. Find last number in a count to 20 on a 0-100 number line.	
47. Put a list of 4 random numerals within 20 in order.	
48. Find out how many to 20 without counting (by arranging into Numicon patterns) 11 12 13 14 15 16 17 18 19 20.	
49. Find 'teen' 'ty' numbers on number line without confusion (e.g. 15 and 50).	
50. Name and write any number to 100 built with Numicon Shapes or Number Rods (some pupils may need to work first to 30 and then 40 before they can do this with higher numbers).	
51. Build any number to 100 with Numicon Shapes or Number Rods in response to hearing and seeing the number name (some pupils may need to work first to 30 and then 40 before they can do this with higher numbers).	
52. Name any numeral to 100 (pupil says number name when shown numerals – not in order).	
53. Write any numeral to 100 (or pupil points to numeral) in response to hearing number name – not in order (some pupils may need to work first to 30 and then 40 before they can do this with higher numbers).	
54. Say which is larger/smaller when looking at two 2-digit numbers within 100.	
55. Recall half of 2 4 6 8 10. With Numicon Shapes or Number Rods show half of 12 14 16 18 20 and recall.	
56. Put a list of 7 random numerals beyond 20 in order (smallest to largest and largest to smallest).	
57. Mentally work out half of 20 40 60 80 100.	
58. Show half of 30 50 70 90 using Numicon Shapes or Number Rods.	

Working beyond 100 pupil uses structured apparatus to:
1) build numbers to 1000, 2) name numbers, 3) recognize, say and write numbers

Pupil is able to:	Comments
59. Build any number to 1000 with structured apparatus in response to hearing and seeing the number (some pupils may need work step by step 100-121 and then to 200 before moving to higher numbers)	
60. Name and write any number to 1000 built with structured apparatus (some pupils may need work step by step 100-121 and then to 200 before moving to higher numbers)	
61. Read any number to 1000	
62. Say which is larger/smaller when looking at two 3-digit numbers within 1000	
63. Put a list of 7 random numerals beyond 100 in order (smallest to largest and largest to smallest)	

Using Pattern

Pattern, order and sequence

Pupil is able to:	Comments
1. Show understanding of language of size and comparison: Bigger, biggest Smaller, smallest Larger, largest, Longer, longest Shorter shortest, Taller, tallest Heaviest, lightest.	
2. Use comparative language when comparing two Numicon Shapes or Number Rods.	
3. Use language of size/comparison.	
4. Understand language of position: on, in, top, bottom, side, next to, up, down, middle, outside, inside, above, below, before, after, first, last	
5. Use language of position.	
6. Order 3 objects according to size.	

Pattern, order and sequence

Pupil is able to:	Comments
7. Order more than 3 objects according to size.	
8. Order Numicon Shapes to...	
9. Order Number Rods to...	
10. Order Numicon Shapes I-10.	
11. Order Number Rods I-10.	
12. Copy an 'ab, ab'* pattern by matching.	
13. Copy and continue an 'ab, ab'* pattern	
14. Devise 'ab, ab'* patterns using a range of objects and apparatus.	
15. Copy an 'abc, abc'** pattern.	
16. Copy and continue an 'abc, abc'** pattern.	
17. Devise 'abc, abc' patterns using a range of objects and apparatus.	
18. Copy, continue and devise an extended range of repeating patterns, e.g. abb, abb; aabb, aabb.	
19. Copy, continue and devise patterns in P.E., Music and Art.	
20. Record simple repeating patterns (colouring, printing, drawing).	
21. Show awareness of pattern in the world around them.	

* 'ab ab' means alternating pattern e.g red blue red blue.

** 'abc abc' means repeating a sequence of three elements.



Pattern, order and sequence

Pupil is able to:	Comments
22. Show a '1 more' pattern with Numicon Shapes or Rods.	
23. Use Numicon Shapes or Rods to explain a '1 less' pattern.	
24. Copy and continue an abb, abb pattern arranged vertically.	
25. Devise an abb, abb pattern arranged vertically.	
26. Copy and continue an abbccc, abbccc pattern arranged vertically.	
27. Devise an abbccc, abbccc pattern arranged vertically.	
28. Record patterns by colouring.	
29. Assign numbers to repeating patterns (see Kit 1 Using Pattern Card 2A).	
30. Continue the sequence of assigned numbers in these patterns.	
31. Copy and continue a symmetrical pattern e.g. abbccc, cccbba pattern.	
32. Copy and continue a 'descending pattern' e.g. cccbba, cccbba pattern.	
33. Build a 'descending pattern' independently.	
34. Assign numbers to 'descending pattern'.	
35. Continue sequence of assigned numbers in 'descending patterns'.	
36. Devise symmetrical patterns.	



Pattern, order and sequence

Pupil is able to:	Comments
37. Record symmetrical patterns by colouring.	
38. Assign numbers to symmetrical patterns.	
39. Continue sequence of assigned numbers in symmetrical patterns.	
40. Build, record and assign numerals to an even numbers pattern (and predict next number).	
41. Build, record and assign numerals to an odd numbers pattern (and predict next number).	
42. Build, record and assign additions to a '1 more' pattern (1 + 1, 2 + 1, 3 + 1 etc.).	
43. Build, record and assign subtractions to a '1 less' pattern' (10 - 1, 9 - 1, 8 - 1 etc.).	
44. Respond to = by saying 'equals' or 'balances' and make the action for the sign.	
45. Use = in response to an equivalence shown with Numicon Shapes in a Pan Balance.	
46. Record the above using + = e.g. 5 + 4 = 9 and 9 = 4 + 5.	
47. Build and order addition facts of all numbers to 10 and explain what they have done.	
48. Record the above using + =.	
49. Show subtraction facts of all numbers to 10 in order and explain what they have done.	
50. Record the above using - =.	
51. Predict subsequent additions from the pattern 1 + 9, 2 + 8, 3 + 7 etc.	

Pattern, order and sequence

Pupil is able to:	Comments
52. Predict subsequent subtractions from the pattern 10 – 1, 10 – 2, 10 – 3 etc.	
53. Solve additions with empty box notation using Pan Balance.	
54. Record the above using + =.	
55. Devise equivalent additions and subtractions within their working range e.g. $3 + 3 = 9 - 6$; $7 + 3 = 13 - 3$; $30 + 30 = 90 - 60$.	

Sequences using the Number Line: Working within 100 using Numicon Shapes and the Numicon Tens Number Line

Pupil is able to:	Comments
56. Build with Numicon Shapes and recite the sequence of 10's (starting at 0).	
57. From the sequence of Shapes, write down the sequence of 10's numerically (starting at 0).	
58. Build with Numicon Shapes and recite the sequence of 5's (starting at 0).	
59. From the sequence of Shapes, write down the sequence of 5's numerically (starting at 0).	
60. Build with Numicon Shapes and recite the sequence of 3's (starting at 0).	
61. From the sequence of Shapes, write down the sequence of 3's numerically (starting at 0).	
62. Build sequences with Numicon in response to written number sequences 10's, 5's, 3's, 2's.	

Working within 100 without Numicon apparatus

Pupil is able to:	Comments
63. Recognize and continue to record a forward sequence of odd numbers (starting at 1).	

Working within 100 without Numicon apparatus

Pupil is able to:	Comments
64. Recognize and continue to record a forward sequence of even numbers (starting at 0).	
65. Recognize and continue to record a backward sequence of odd numbers (starting at any odd number).	
66. Recognize and continue to record a backward sequence of even numbers (starting at any even number).	
67. Recognize and continue to record a forward sequence of 10's (starting at 0).	
68. Recognize and continue to record a backward sequence of 10 (starting at any multiple of 10)	
69. Recognize and continue to record a forward sequence of 10 (starting at any number).	
70. Recognize and continue to record a backward sequence of 10's (starting at any number).	
71. Recognize and continue to record a forward sequence of 5's (starting at zero).	
72. Recognize and continue to record a backward sequence of 5's (starting at any multiple of 5).	
73. Recognize and continue to record a forward sequence of 3's (starting at zero).	
74. Recognize and continue to record a backward sequence of 3's (starting at any multiple of 3).	

Working within 100 on forward missing number sequences that start at 0

Pupil is able to:	Comments
75. Find missing numbers in a forward sequence of odd numbers.	
76. Find missing numbers in a forward sequence of even numbers.	
77. Find missing numbers in a forward sequence of 10's.	



Working within 100 on forward missing number sequences that start at 0

Pupil is able to:	Comments
78. Find missing numbers in a forward sequence of 10's (starting at any number).	
79. Find missing numbers in a forward sequence of 5's.	
80. Find missing numbers in a forward sequence of 3's.	
81. Find missing numbers in a backward sequence of odd numbers (starting from any odd number).	
82. Find missing numbers in a backward sequence of even numbers (starting from any even number).	
83. Find missing numbers in a backward sequence of 10s (starting from any multiple of 10).	
84. Find missing numbers in a backward sequence of 10s (starting at any number).	
85. Find missing numbers in a backward sequence of 5s (starting from any multiple of 5).	
86. Find missing numbers in a backward sequence of 3s (starting from any multiple of 3).	

Working up to 1000 on forward and backward sequences of 50 and 25

Pupil is able to:	Comments
87. Repeat forward and backward sequences as above beyond 100	
88. Recognize, continue and record a forward sequence of 50s (starting at 0)	
89. Recognize, continue and record a backward sequence of 50s starting at any multiple of 50.	
90. Recognize, continue and record a forward sequence of 25s starting at 0.	
91. Recognize, continue and record a backward sequence of 25s starting at any multiple of 25.	



Calculating

Addition, Subtraction, Multiplication and Division

Pupil is able to:	Comments
1. Respond to numbers and mathematical ideas in rhymes and stories.	
2. Begin to use language of arithmetic (and, more, take away, makes etc).	

Practical addition within 10 without counting

Pupil is able to:	Comments
3. When using Numicon, demonstrate awareness that numbers can be combined to make a larger one.	
4. Combine any two numbers totalling within 10 without counting using Numicon Shapes or Number Rods and explain what they have done.	
5. Use Numicon Shapes or Number Rods to make an addition, in response to: How can you make 7?, Can you add 4 and 5?	
6. Respond to a story arithmetically e.g. when asked "two ducks on the pond and two more joined them" replies, "2 and/add 2 equals 4".	
7. Use Numicon Shapes or Number Rods to create story e.g. combine 2-shape and 3-shape and say e.g. "there were two pupils playing and three more came to join in so there were five altogether".	
8. Begin to mentally recall all addition facts within 10 without apparatus.	
9. Respond to + sign by saying 'and' add, 'plus' and make the action for the sign.	
10. Read aloud a written addition and demonstrate with Numicon Shapes or Number Rods.	
11. Use Numicon Shapes or Number Rods to build an addition and write the sum.	
12. Respond to story with an addition e.g. respond to two ducks on the pond and two more swam up to them, by writing $2 + 2 = 4$.	

Practical addition within 10 without counting, continued

Pupil is able to:	Comments
13. Create a story from a written addition e.g. responds to $4 + 2 = 6$ by saying, "there were four snails crawling along the top of the wall and two crawling along the bottom, so there were six snails altogether".	
14. Show understanding that addition is commutative.	
15. Mentally recall addition facts within 10 without apparatus.	

Practical subtraction within 10 without counting

Pupil is able to:	Comments
16. When using Numicon show awareness that subtraction from a number results in a smaller number.	
17. Show subtraction (as take away) with Numicon or Number Rods and explain using vocabulary involved in taking away.	
18. Recognize the difference between two numbers within 10 using Numicon Shapes or Number Rods.	
19. Show subtraction (as comparison and difference) with Numicon Shapes or Number Rods and explain using vocabulary involved in comparing.	
20. Use Numicon Shapes or Number Rods to show a subtraction, in response to: How can you show 7 take away 3?, Can you take away 4 from 10?, Can you show the difference between 10 and 8?	
21. Respond to a subtraction story e.g. when asked "there were three cars in a car park and one was driven away. How many were left?" replies '3 take away 1 equals 2'.	
22. Create a take away story and illustrate it with Numicon Shapes or Number Rods e.g. "I had ten sweets and I ate four, so I only have six left.", by taking the 10-shape and hiding 4.	
23. Begin to mentally recall subtraction facts.	
24. Respond to – sign by saying 'take away', 'subtract', 'the difference between' and make the action for the sign.	
25. Read aloud a written subtraction and demonstrate with Numicon Shapes or Number Rods.	
26. Use Numicon Shapes or Number Rods to show a subtraction and write it.	

Practical subtraction within 10 without counting continued,

Pupil is able to:	Comments
27. Respond to story with a subtraction e.g. respond to six ducks on the pond and two swam away by writing $6 - 2 = 4$.	
28. Create a story from a written subtraction e.g. responds to $3 - 1$, by saying, "three apples on a plate one was eaten, how many were left".	
29. Recall mentally subtraction facts within 10 without Numicon.	

Calculating with numbers higher than 10

(Note: at each of the Higher Number stages should be able to respond to stories/problems arithmetically and compose arithmetic problems)

Pupil is able to:	Comments
30. Add and subtract whole tens e.g. 50 ± 30 .	
31. Add and subtract U to/from TU without crossing 10s e.g. 56 ± 3 .	
32. Add and subtract whole tens to/from TU e.g. 64 ± 10 , (also ± 30).	
33. Add and subtract completing to multiples of 10 e.g. $58 + 2$, $83 - 3$.	
34. Add or subtract units to/from units up to 20 e.g. $9 + 6$, $16 - 7$.	
35. Recall double facts of 6 7 8 9 10.	
36. Add or subtract U to/from TU crossing 10s e.g. $58 + 7$, $63 - 5$.	
37. Add or subtract TU and TU without crossing 10s e.g. 56 ± 33 .	
38. Recall mentally doubles of multiples of 5.	
39. Add and subtract TU and TU crossing tens e.g. 56 ± 37 .	

Multiplication

Pupil is able to:	Comments
40. Use Numicon to show multiplication and explain using language of multiplication.	
41. Respond to x sign by making the action for the sign in multiplications and using language.	
42. Read a written multiplication and build it with Numicon Shapes or Number Rods.	
43. Respond to a multiplication story e.g. when asked "there were three bicycles ridden along the road, how many wheels?" replies, '3 times 2 equals 6' and writes $3 \times 2 = 6$.	
44. Create a multiplication story.	
45. Show understanding that multiplication is commutative.	
46. Mentally recall multiplication facts, 2s, 5s and 10s.	

Division

Pupil is able to:	Comments
47. Use Numicon to show division and explain using language of division.	
48. Respond to \div sign by making the action for the sign in division questions and using language.	
49. Read a written division and show with Numicon Shapes or Number Rods.	
50. Respond to a division story e.g. when asked "ten pencils shared between two people, how many each?" replies 'Ten divided into two equals five' and writes $10 \div 2 = 5$.	
51. Create a division story.	
52. Read division and use the inverse of multiplication to solve it.	
53. Solve a division with a remainder using Numicon Shapes or Number Rods e.g. $10 \div 3 = 3$ remainder 1.	
54. Mentally recall division facts of 2s, 5s and 10s. Begin to mentally recall division facts of 3s and 4s.	