Hampshire Services
HIAS SCHOOL IMPROVEMENT

SERVICES FOR SCHOOLS

Hampshire mathematics planning tool for pupils with SEND

SAMPLE version

Hampshire County Council

www.hants.gov.uk

Contents

SAMPLE ONLY

This document is a taster version only

The full versions are individual year group booklets to support progress and attainment of Year 1, Year 2 and Year 3 national curriculum statements in the following domains.

- Year 1 mathematics: Number and Place value; addition and subtraction; multiplication and division; fractions
- Year 2 mathematics: Number and Place value; addition and subtraction; multiplication and division; fractions
- Year 3 mathematics: Number and Place value; addition and subtraction; multiplication and division; fractions

A diagnostic assessment resource, appendices and bibliography are also included in each booklet.

To order: please complete the online order form https://tinyurl.com/HIAS-toolkits and email to maths.centre@hants.gov.uk. For any enquiries please contact sheila.kyme@hants.gov.uk.
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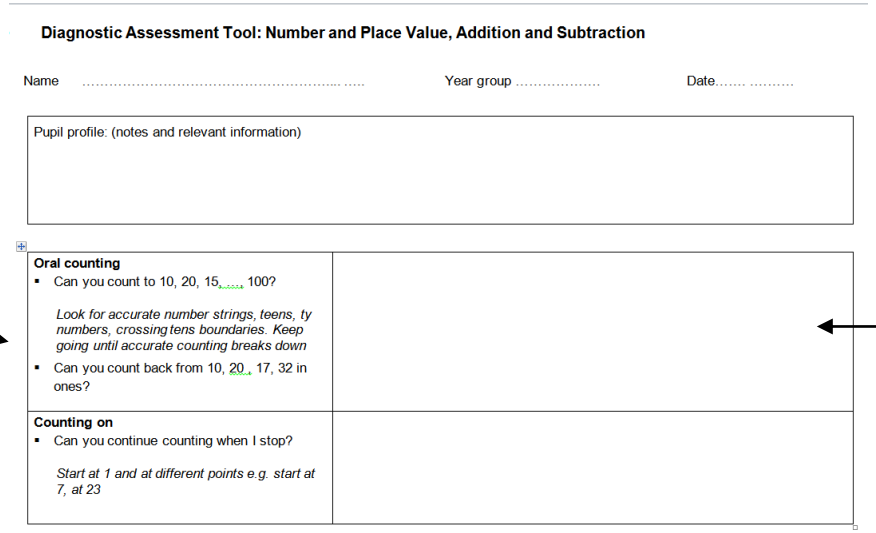
Training: The planning tools for pupils with SEND are also supported by training through the HIAS Mathematics team through INSETs, twilights or courses. For further details on the full range of services available please contact us using the following details:

Tel: 01962 874820 or email: hias.enquiries@hants.gov.uk

The Mathematics Planning Tool for pupils with SEND

Identifying a starting point

Included with the Planning Tool is a sample set of diagnostic questions that can be used to identify starting points for individual pupils. These questions support assessment in each of the mathematics curriculum domains in the Planning Tool. They are indicative of the types of questions which are useful to ask rather than exhaustive. Generally, pupil responses to these questions provides sufficient information to identify a starting point for individual pupils. The intended approach is of a 'conference', rather than a 'test', with the teacher focused on finding out what the pupil *can* do. Qualitative assessment information about the pupils' responses to questions used should be recorded. The questions can be used as part of planning as key assessment questions, in one session or used across several sessions/ lessons. The set of questions used needs to match with the domain(s) of mathematics the pupil will be about to work on in class. The diagnostic assessment questions can be used again after a period of time, appropriate to the pupil, as an indicator of progress through comparison with previous responses and to contribute to identifying starting points for next units of work. During the year, ongoing day to day assessments may mean that a teacher uses these questions only once in the year. Professional judgement should be used to determine how and when these questions are used.



Diagnostic Assessment Tool: Number and Place Value, Addition and Subtraction

Name ..... Year group ..... Date..... .....

Pupil profile: (notes and relevant information)	
Oral counting ▪ Can you count to 10, 20, 15,...., 100? *Look for accurate number strings, teens, ty numbers, crossing tens boundaries. Keep going until accurate counting breaks down* ▪ Can you count back from 10, 20, 17, 32 in ones?	
Counting on ▪ Can you continue counting when I stop? *Start at 1 and at different points e.g. start at 7, at 23*	

Suggested diagnostic question →

← Qualitative notes about pupil responses

Schools may also use commercially available tests to inform starting points with the SEND Planning Tool.

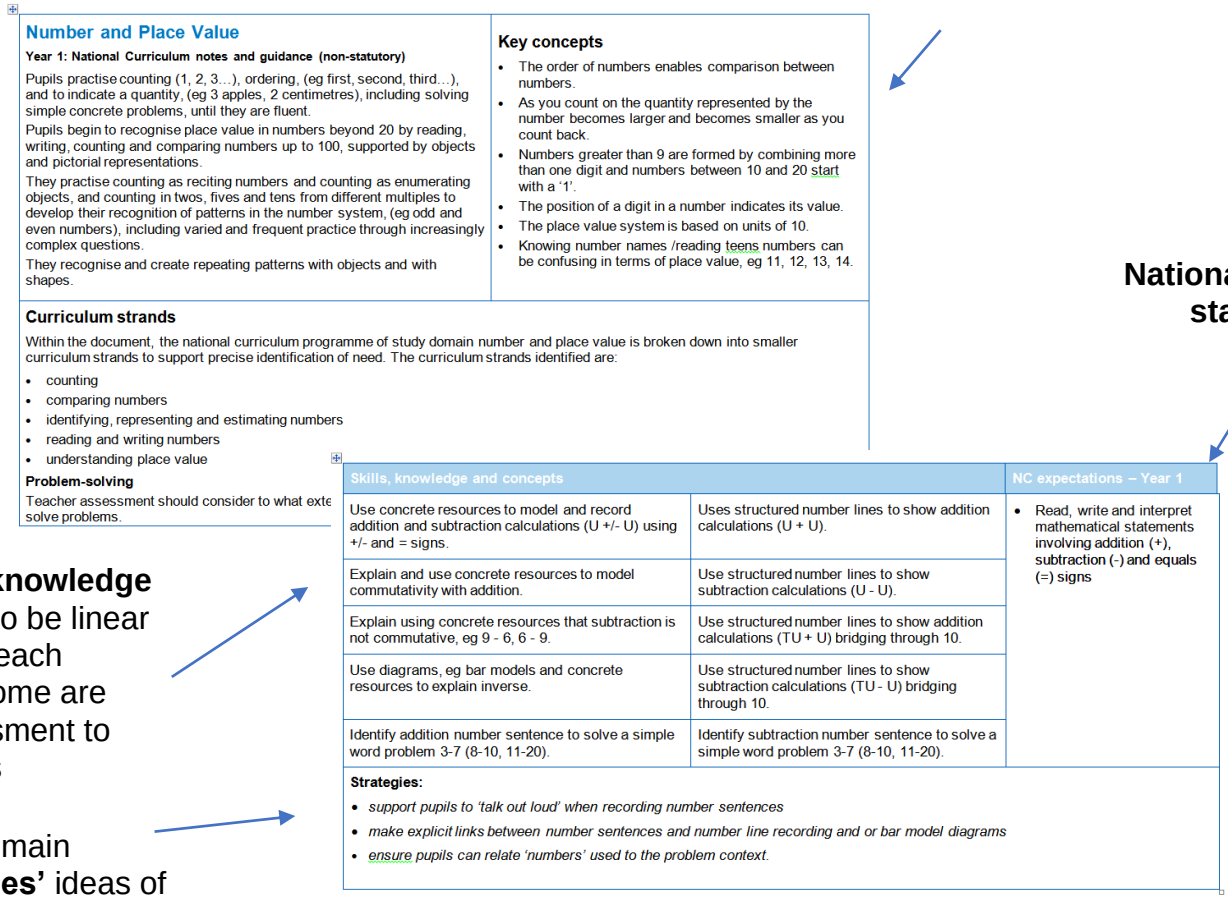
How to use the planning tool documents

Understanding the layout of the planning tools

National curriculum non-statutory guidance

Key concepts

National curriculum statements



Number and Place Value

Year 1: National Curriculum notes and guidance (non-statutory)

Pupils practise counting (1, 2, 3…), ordering, (eg first, second, third…), and to indicate a quantity, (eg 3 apples, 2 centimetres), including solving simple concrete problems, until they are fluent.

Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing numbers up to 100, supported by objects and pictorial representations.

They practise counting as reciting numbers and counting as enumerating objects, and counting in twos, fives and tens from different multiples to develop their recognition of patterns in the number system, (eg odd and even numbers), including varied and frequent practice through increasingly complex questions.

They recognise and create repeating patterns with objects and with shapes.

Key concepts

- The order of numbers enables comparison between numbers.
- As you count on the quantity represented by the number becomes larger and becomes smaller as you count back.
- Numbers greater than 9 are formed by combining more than one digit and numbers between 10 and 20 start with a '1'.
- The position of a digit in a number indicates its value.
- The place value system is based on units of 10.
- Knowing number names /reading teens numbers can be confusing in terms of place value, eg 11, 12, 13, 14.

Curriculum strands

Within the document, the national curriculum programme of study domain number and place value is broken down into smaller curriculum strands to support precise identification of need. The curriculum strands identified are:

- counting
- comparing numbers
- identifying, representing and estimating numbers
- reading and writing numbers
- understanding place value

Problem-solving

Teacher assessment should consider to what exte
solve problems.

Skills, knowledge and concepts		NC expectations – Year 1
Use concrete resources to model and record addition and subtraction calculations (U +/- U) using +/- and = signs.	Uses structured number lines to show addition calculations (U + U).	• Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
Explain and use concrete resources to model commutativity with addition.	Use structured number lines to show subtraction calculations (U - U).	
Explain using concrete resources that subtraction is not commutative, eg 9 - 6, 6 - 9.	Use structured number lines to show addition calculations (TU + U) bridging through 10.	
Use diagrams, eg bar models and concrete resources to explain inverse.	Use structured number lines to show subtraction calculations (TU - U) bridging through 10.	
Identify addition number sentence to solve a simple word problem 3-7 (8-10, 11-20).	Identify subtraction number sentence to solve a simple word problem 3-7 (8-10, 11-20).	

Strategies:

- *support pupils to 'talk out loud' when recording number sentences*
- *make explicit links between number sentences and number line recording and or bar model diagrams*
- *ensure pupils can relate 'numbers' used to the problem context.*

Each strand or domain includes '**Skills, knowledge and concepts**. These are not intended to be linear or that every child will need to be taught each element to achieve the full statement. Some are ideas for teaching, other ideas for assessment to identify barriers to learning for individuals

Each strand or domain includes '**Strategies'** ideas of approaches for teachers to try that may suit a particular pupil more aptly

Eg: Year 2 Planning Tool

Number and Place Value

Year 2: National Curriculum notes and guidance (non-statutory)

Using materials and a range of representations, pupils practise counting, reading, writing and comparing numbers to at least 100 and solving a variety of related problems to develop fluency. They count in multiples of three to support their later understanding of a third.

As they become more confident with numbers up to 100, pupils are introduced to larger numbers to develop further their recognition of patterns within the number system and represent them in different ways, including spatial representations.

Pupils should partition numbers in different ways, (eg 23 = 20 + 3 and 23 = 10 + 13) to support subtraction. They become fluent and apply their knowledge of numbers to reason with, discuss and solve problems that emphasise the value of each digit in two-digit numbers. They begin to understand zero as a place holder.

Key concepts

- The position (place) of a digit in a number determines its value.
- Understanding place value supports understanding of where a number is in relation to multiples of 10.
- Numbers ending in 9 or 1 are 'nearly' multiples of 10.
- Place value supports addition and subtraction calculations involving +/- 1 and +/- 10.

Curriculum strands

Within the document, the national curriculum programme of study domain number and place value is broken down into smaller curriculum strands to support precise identification of need. The curriculum strands identified are:

- counting (Example)
- comparing numbers
- identifying, representing and estimating numbers
- reading and writing numbers
- understanding place value
- number bonds
- mental calculations
- written recording

Problem-solving

Teacher assessment should consider to what extent the pupil is able to apply conceptual understanding of number and place value to solve problems.

Eg Curriculum strand – Counting Year 2

Skills, Knowledge and Concepts		NC expectations – Year
Can say the number sequence from 1-100.	Can say the number sequence from 100-1.	Count in steps of 2, 3, and 5 from 0, and in tens from any number, forward or backward.
Within the range 1-100 can count forwards from a given number to another given number.	Within the range 100-1 can count backwards from a given number to another given number.	
Can say the number after a given number in the range 1-100 without dropping back to 1.	Can say the number before a given number in the range 1-100 without counting up through all numbers first.	
Recognises patterns in the number sequences from 1-20 (1-100) and uses this to say them/ self-correct.	Can find 10 more than any given number (0-100).	
Can count accurately up to 100 objects.	Can find 10 less than any two-digit number (0-100).	
Can count in multiples of 2, 5, 10 and 3 to the fifth multiple (tenth multiple).	Uses step counting to count larger groups of objects including coins in context of money (2p, 10p, 5p).	

Strategies:

- *use counting objects, counters.*
- *use structured number lines with some numbers blanked out/ covered over*
- *use packs of number cards to create a number line model*
- *use packs of number cards, (shuffled or in order) to turn top card over; ask which number comes next? One more/less?*
- *use blank number lines to place number cards on, fill in missing gaps by writing the number*
- *use counting objects, counters.*

Eg: Year 3 Planning Tool

Addition and Subtraction

Year 3: National Curriculum Notes and Guidance (non-statutory)

Pupils practice solving varied addition and subtraction questions. For mental calculations with two-digit numbers, the answers could exceed 100.

Pupils use their understanding of place value and partitioning, and practice using columnar addition and subtraction with increasingly large numbers up to three-digits to become fluent (see Mathematics Appendix 1).

Key concepts

- Patterns in calculation are used to support reasoning about reasonable answers, eg 2 + 5, 20 + 50, 200 + 500.
- Key number facts for 100 and 1000 are used to support calculation, eg 50 + 50, 500 + 500, 25 + 75, 250 + 750, 10 + 90, 100 + 900 particularly in the context of measures.
- Using number bonds of 10 and 100 used to bridge to multiples of 10 and multiples of 100 to support calculation.

Curriculum strands

Within the document, the national curriculum programme of study domain number and place value is broken down into smaller curriculum strands to support precise identification of need. The curriculum strands identified are:

- number bonds (Example)
- mental calculations
- written recording
- inverse operations, estimating and checking answers

Problem-solving

Teacher assessment should consider to what extent the pupil is able to apply conceptual understanding of addition and subtraction to solve problems

Eg Curriculum strand – Number bonds Year 3

Skills, Knowledge and Concepts		NC expectations – Year 3
Can fluently subitise small numbers in different ways (3, 4, 5, 6, 7, 8, 9 and 10) using counting objects and structured resources, eg Numicon. Can record all the different partitions of numbers (3-20) using + and = signs and identify the linked subtraction facts.	Can use bar models and two part diagrams fluently to show partitions of all units numbers (10, 11-20) identifying the related subtraction fact with each addition fact relating this to multiple of 10 (100). 3 + 7, 30 + 70, 300 + 700 in context of money and measures.	Ensure fluency with use of number bonds to 20 relating numbers to 5 and 10, bridging through 10 (links to unit fractions and decimals). Ensure fluency with use of number bonds to 20 relating numbers to 5 and 10, bridging through 10 (links to unit fractions and decimals).
Understands X + 1 can be interpreted as 'next number' and '1 more' without the need to count all. (0-200, 500, 1000) including context of money and measure.	Can use bar models and part/ whole diagrams fluently to show place value partitions of three-digit numbers. 458 = 400 + 50 + 8, 450 + 8, 400 + 58 etc.	
Understands X - 1 can be interpreted as 'number before' and '1 less' without the need to take away and then count all (0-1000).	Understands three-digit number subtract 100 and multiples of 100 = two-digit/ units digit and can use structured resources to explain, eg Numicon, place value cards, eg 340 - 300 = 40.	
Understands X + U where X = 100 (or multiple of 100) can be calculated using place value without the need to count all (0-200, 0-500, 0-1000), eg 200 + 9 = 209.	Understands the pattern linking number bonds to 10 with number bonds to 20 (addition) 100 and 1000 3 + 7 = 10, 13 + 7 = 20, 53 + 47 = 100, 530 + 470 = 1000.	

Skills, Knowledge and Concepts		NC expectations – Year 3
Knows doubles of all numbers to 50 and can show using resources and on a bar model. Relates to three-digit numbers, eg 13 + 13 = 26, 130 + 130 = 260.	Understands the pattern linking number bonds to 10 with number bonds to 20 (addition and subtraction) and 100 (1000), eg 1 + 9, 11 + 9, 110 + 90, 910 + 90.	
Knows halves of all numbers to 50 and can show using resources and on a bar model.	Can use structured resources to show flexible partitioning of two (three) digit numbers, eg 65 = 60 + 5, 50 + 15, 40 + 25 etc. Relates this to finding multiples of 2, 5, 10, 3, 4, 8 to support division.	

Strategies

- *use place value counters ,to show part whole combinations linked to bar models fluently*
- *use counters or structured resources to model all number sentences with explicit focus on language use eg 'if I know 130 + 40 equals 170 then 170 take away 40 must equal 30'*
- *use place value cards alongside other resources to show place value calculations*
- *use combinations of tens arrays, dienes to link number bonds to 10 with number bonds to 20 and bonds to 100.*

Eg: Year 1 Planning Tool

Multiplication and Division

Year 1: National Curriculum Notes and Guidance (non-statutory)

Through grouping and sharing small quantities, pupils begin to understand: multiplication and division; doubling numbers and quantities; and finding simple fractions of objects, numbers and quantities.

They make connections between arrays, number patterns, and counting in twos, fives and tens.

Key concepts

- Counting in equal steps, eg in 5s involves noticing the number of groups of five as well as the total (product).
- Counting in multiples of 10 is linked to place value and numbers end in a 0.
- The array is a key model when thinking multiplicatively and can show commutativity, eg 5 x 2 and 2 x 5.

Curriculum strands

Within the document, the national curriculum programme of study domain multiplication and division is broken down into smaller curriculum strands to support precise identification of need. The curriculum strands identified are:

- multiplication and division facts (Example)
- written calculations

Problem-solving

Teacher assessment should consider to what extent the pupil is able to apply conceptual understanding of multiplication and division to solve problems.

Eg Curriculum strand – Multiplication and division facts Year 1

<table>
<tr><th colspan="2">Skills, Knowledge and Concepts</th><th>NC expectations – Year 1</th></tr>
<tr><td rowspan="2">Can use counting objects to put into groups of 2 (10, 5).</td><td>Can count in 2s to 10.</td><td rowspan="5">Count in multiples of twos, fives and tens.
(copied from Number and Place Value)</td></tr>
<tr><td>Can count in 2s to 20.</td></tr>
<tr><td rowspan="2">Can organise a multiple of two (10, 5) into an array using counters/ objects with adult support.</td><td>Can count in 10s (5s) to 50.</td></tr>
<tr><td>Can count in 10s to 100.</td></tr>
<tr><td>Can identify how many groups of 2 (10,5) there are in a collection of objects.</td><td>Can perceive describe an array in two ways, eg 4 x 2 and 2 x 4.</td></tr>
<tr><td>Can relate doubles of a number to 2 x using a bar model.</td><td>Can relate half a number to x ÷ 2 using a bar model.</td></tr>
</table>

Strategies:

- *use counters, objects to show groups, place on structured number lines*
- *transform groups of counters on structured number lines into arrays and vice versa*
- *use 2p, 5p, 10p coins to support counting in 2s, 5s and 10s.*

Eg: Year 3 Planning Tool

Fractions

Year 3: National Curriculum Notes and Guidance (non-statutory)

Pupils connect tenths to place value, decimal measures and to division by 10.

They begin to understand unit and non-unit fractions as numbers on the number line, and deduce relations between them, such as size and equivalence. They should go beyond the (0, 1) interval, including relating this to measure.

Pupils understand the relation between unit fractions as operators (fractions of), and division by integers.

They continue to recognise fractions in the context of parts of a whole, numbers, measurements, a shape, and unit fractions as a division of a quantity.

Pupils practise adding and subtracting fractions with the same denominator through a variety of increasingly complex problems to improve fluency.

Key Concepts

- Fractions are equal parts of a whole.
- The denominator represents the number of equal parts.
- There are links and relationships between unit fractions, eg $^1/_2$, $^1/_4$ and $^1/_8$.
- Equal parts of shapes do not need to be congruent but need to be equal in area.
- $^1/_{10}$ is the same as 0.1.
- Bar models are useful representations to support comparison and equivalence of fractions.
- The number line is a useful representation to show fractions are numbers and can be placed on the number line.

Curriculum strands

Within the document, the national curriculum programme of study domain number and place value is broken down into smaller curriculum strands to support precise identification of need. The curriculum strands identified are:

- counting in fractional steps
- recognising fractions – unit fractions
- comparing fractions (Example)
- equivalence
- addition and subtraction of fractions.

Problem-solving

Teacher assessment should consider to what extent the pupil is able to apply conceptual understanding of fractions to solve problems.

Eg Curriculum strand – Comparing fractions Year 3

Skills, Knowledge and Concepts		NC expectations – Year 3
Can use fraction wall (bar models) families to compare fractions (more/ less than a half? – then compared to other unit fractions).	Can use a number line to mark unit fractions and fractions with same denominator relative to one whole.	Compare and order unit fractions and fractions with the same denominators.
Understand that when comparing unit fractions a larger denominator means that unit fractions is a smaller part of the same whole.	Know that two halves = 1 whole, four quarters = 1 whole, three thirds = 1 whole	

Strategies:

- *make fraction wall models starting with the same length strip*
- *use language of 'equal parts', more than/ less than and equal to.*

Develop conceptual understanding of comparison of fractional parts within one whole:

- *more/ less than half*
- *how many more equal parts to one whole?*