

SERVICES FOR SCHOOLS

# Hampshire mathematics planning tool for pupils with SEND

Pre-Year 1 – Year 1



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# Introduction

The Planning Tool for pupils with SEND has been developed by Hampshire Inspector Advisory Service (HIAS) to aid teachers in meeting the learning needs of pupils with Special Educational Needs and Disabilities (SEND) whose current attainment is well below that of their peers, in some or all aspects of the curriculum.

The Rochford Review (2016) recognised the need for pupils with SEND, working below age related expectations to have ‘the opportunity to demonstrate both attainment and progress’ taking account of the ‘potential differences in the way these pupils learn’.

‘There has always been a proportion of pupils for whom we cannot use these statutory assessments as they have not completed the relevant programmes of study when they reach the appropriate chronological age.

The Rochford Review recognises that age-related expectations are not appropriate for a significant proportion of pupils working below the standard of the national curriculum tests, many of whom have SEND that affect their rate of cognitive development or speed of learning. It is important that they have the opportunity to demonstrate both attainment and progress, and that the way we measure their progress accounts for potential differences in the way these pupils learn.’

**The Rochford Review 2016**

The planning tool supports teachers to identify an appropriate starting point and plan aspirational expectations of progress over time. It is intended that the tool is used to create suitably personalised learning for individual pupils with the expectation this is integrated into whole class teaching by removing barriers and enabling participation in whole class learning.

In creating the plan, teachers need to use diagnostic information gathered through a range of activities including day to day interactions with the pupil, information from parents and other professionals working alongside the pupil.

For example, assessment may show a child in Year 5 is working within the national curriculum expectations for year 2 in maths, year 2 in some domains for writing and year 3 in some domains for reading. When using the Year 2 or Year 3 planning tool it is expected that the pupil has mastered the curriculum content in a particular strand from the previous year group.

The Pre-Year 1 document has been written to outline the skills, knowledge, concepts and strategies needed to progress from the Early Years Foundation Stage to the Year 1 curriculum. While the National Curriculum statements remain the same, additional skills, knowledge, concepts and strategies that would further support the child have been added. This planning tool document is specifically for children with SEND in Year 1.

Comments in blue relate particularly to priorities for children in Year 1 working below the Year 1 expectations and bridge the gap between EYFS expectations and Year 1.

The following planning tools are included in the pack:

|             | Pre-Year 1 – Year 1 | Year 1 | Year 2 | Year 3 |
|-------------|---------------------|--------|--------|--------|
| Mathematics | ✓                   | ✓      | ✓      | ✓      |

# Principles

Members of the Rochford Review agreed a set of principles to inform the development of their recommendations. HIAS have also adopted those principles that are relevant to underpin the pedagogical thinking behind the planning tools.

## Principles from The Rochford Review (2016)

- Every pupil should be able to demonstrate his or her attainment and progress.
- Parents and carers should receive meaningful information about the achievement and progress their child makes and should be involved appropriately in assessment processes.
- Equality is not always about inclusion. Sometimes equality is about altering the approach according to the needs of the pupils.
- Curriculum should drive assessment and not the other way around.
- Key milestones should be clear and unambiguous.
- It should also be possible to assess the application of knowledge, understanding and skills in a range of different contexts.
- The language used to describe the achievements and progress of these pupils should always be positive, inclusive and should be jargon free.

In addition, the following principles informed by SEND Code of Practice underpin the guidance for the use of the English and the mathematics SEND planning tools.

Pupils make most progress when **class teachers**:

- remain responsible for all the pupil's learning – including directing the work of teaching assistants, utilising the advice of specialist staff, and ensuring pedagogy is consistent across all learning provision
- set high expectations for every pupil, whatever their prior attainment
- use high quality teaching as the first step in responding to pupils who have or may have SEND
- plan to address potential areas of difficulty and to remove barriers to pupil achievement where possible
- SENCOs and TAs have regular opportunities to update their pedagogical knowledge of effective teaching of pupils with SEND

- use high quality formative assessment information to inform teaching and learning, based on activities that involve interaction and dialogue between teachers and pupils and between pupils, including assessing and evaluating the impact of targeted support and interventions
- are supported by Senior Leaders and the SENCO in making decisions

(SEND Code of Practice 2015)

In addition, class teachers should:

- teach pupils to become metacognitive learners
- develop and enhance pupil's self-esteem through the quality of interaction and appropriate level of challenge
- use pupil's own real-life experiences, familiar contexts and interests to engage and motivate
- develop efficient communication strategies between all adults, to ensure new skills are applied and embedded in classroom work
- meet with parents, at least 3 times a year to review progress towards learning outcomes and set new ones

### **Pupils make most progress in Mathematics and English when:**

- pupils have the opportunity to become fluent in the fundamentals of the subject through varied and frequent practice with increasingly complex tasks over time - ensuring pupils have opportunities to generalise and apply their learning in a range of contexts
- tasks are used to develop conceptual understanding
- pupils are supported to recall and apply knowledge increasingly rapidly, accurately and reliably over time
- pupils are expected to communicate their thinking using appropriate subject specific language and communication (signs, symbols or technology)
- pupils are supported to use discussion in order to learn; they should be able to elaborate and explain clearly their understanding and ideas

# Target group

Teachers will need to make bespoke use of the planning tools to target individual pupil's specific areas of need. The document is not designed to be used to inform teaching and learning for the majority of pupils in mainstream school.

As for the guiding principles, HIAS have used the SEND Code of Practice and The Rochford Review to identify the target group of pupils:

6.17 Children who are making less than expected progress given their age and individual circumstances.

This can be characterised by **progress** which:

- is significantly slower than that of their peers starting from the same baseline
- fails to match or better the child's previous rate of progress
- fails to close the attainment gap between the child and their peers
- widens the attainment gap'

*(SEND Code of Practice 2015)*

Children who will not have completed the relevant programme of study when they have reached the appropriate chronological age.

*(Rochford Review)*



# Pedagogical thinking

The SEND planning tool is a curriculum document that breaks down barriers to understanding and therefore progress. It can be used in its entirety or just the relevant sections for each individual child. For example, a child on the autistic spectrum may be operating at age related expectations in many areas of the mathematics curriculum, but assessment has identified elements of comprehension in problem solving where the child is operating well below their peers.

An element of pedagogical thinking behind the planning tools is that pupils with SEND may never achieve the full curriculum, however what they do learn is learnt with depth and rigour. Therefore, slowing down on content, teaching less but teaching it well is essential. Many approaches can be used to achieve this such as precision teaching, pre-teaching and overlearning to ensure success.

## Overlearning

Use an overlearning approach to secure and embed the concept. Over learning is 'the systematic use of repetition, both within and between lessons, in the attempt to ensure that newly acquired skills and material are automatised, consolidated in memory, so that they can be readily applied or recalled when needed, and will not be disrupted by subsequent lesson material.'

**Rose, Jim Identifying and Teaching Children and Young People with Dyslexia and Literacy Difficulties, 2009**

This means that what pupils with SEND do achieve, they achieve more deeply by working through the learning hierarchy, over an appropriate time scale. They may not learn everything - but what they do learn, they learn well and will be able to apply with some independence.

Pupils may demonstrate this deeper learning through some of the following responses:

- describing it in his or her own words
- representing it in a variety of ways, (eg using concrete materials, pictures and symbols)
- explaining it to someone else
- making up his or her own examples (and non-examples) of it
- seeing connections and make links
- recognising it in new situations and contexts
- applying it independently in a range of situations.

(Teaching for Mastery, OUP, 2015)

# General guidance

## Ensure you know the whole child

It is essential that the adults working with the child have a clear understanding of the pupil's special educational need or disability:

- who is their favourite cartoon character/football player/pop star? Keep up to date as preferences change
- how do they spend their evenings and weekends?
- what is the length of their attention span?
- does technology motivate them?
- are they a visual, kinaesthetic or auditory learner?
- what barriers to learning does their special need create?
- are they motivated by competition, eg against a peer/against the clock or not?

## Developing and maintaining self-esteem and self-worth:

- use pre teaching to enable pupils to grow in confidence with new concepts, texts, vocabulary in preparation for a sequence of learning
- encourage pupils to look back on their achievements to see how far they have progressed
- how does the pupil see themselves as a learner?
- does the pupil regularly experience success?
- are there opportunities to build on prior success?
- are their successes valued and celebrated alongside their peers, wider school community and family?
- are their concept successes shared regardless of skill gaps, eg celebrate the content even if spelling is poor
- are teachers designing tasks that pupils can achieve with independence?
- are they intrinsically or extrinsically motivated? While pupils are extrinsically motivated use a clear rewards system whilst encouraging intrinsic motivation
- are teachers considering where they are carrying out their learning?
- is the pupil's voice actively heard in decision making about their learning?
- give meaningful feedback at an appropriate level to develop independence.

### **Create learning that is perceived more achievable:**

- is the cognitive load of the task itself too much to enable learning to take place?
- consider how abstract the task is and therefore level of difficulty for some pupils
- consider alternative ways of recording outcomes in ways that work for them, eg diagrams, bullet points, mind map
- facilitate opportunities for pupils to link new concepts to prior learning
- be explicit about next steps in learning and ensure they are clear about their success
- use language pupils relate to e.g. refer to 'levelling up' which is terminology used in computer gaming
- chunk up tasks, eg chop up an A4 sheet and only give one section at a time
- use speech-to-text software or a recording device/app to capture learning
- schedule breaks if appropriate for the child.

### **Created learning that is perceived as more desirable:**

- ensure the learning is appropriately challenging and engaging
- offer different medium, eg different type of pen/coloured paper
- ensure tasks are age appropriate, eg use celebrities/football teams/computer games/current films to hunt for phonemes with older pupils, use current chart songs to find rhyming words
- give a clear purpose to learning, eg a real reason to publish
- be clear in expectations for success in every lesson, eg 'there is no writing in this lesson today' or 'I would like 3 sentences in this session'
- link learning to real life where possible, eg identify phonemes in family members names for writing birthday cards
- use concrete resources effectively, eg talking clipboards to reduce load on working memory
- create age appropriate tasks, eg use a rap not a song, avoid APPs that are too young
- avoid as far as possible tasks being too 'different' from their peers
- use multisensory learning approaches, eg letter formation on a touch screen, in the sand, chalk on a wall
- give pupils some choice, eg 'you can do it like this or with this'.

### **Create task design and resources that are more accessible for SEND pupils:**

- use adult modelling widely
- enlarge tasks onto A3
- secure background subject knowledge by using multimedia approaches, eg online clips, graphic novels etc
- avoid too much text on one page
- support words with visuals alongside whenever possible
- highlight key words in the instructions
- provide a word bank to support
- ensure order of questions/tasks is very clear, ie left to right and top to bottom
- break tasks into manageable goals.

### **Adapt adult language to encourage participation and success:**

- refer to 'tasks/activities' rather than 'work'
- ensure work is never used as a punishment
- allow plenty of time for pupil to process instructions.

# The Mathematics Planning Tool for pupils with SEND

The Planning Tool supports pupils with SEND in developing mathematical understanding in line with the aims of the mathematics national curriculum to:

- 'become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.'

**Mathematic National Curriculum 2013**

The Mathematics Planning Tools focus on the following domains: number and place value; addition and subtraction; multiplication and division; fractions. Each domain also has some 'Key Concepts' pupils should know by the end of the year in order to meet end of year expectations as suggested in the national curriculum documents.

For each domain, curriculum strands have been identified which underpin the national curriculum statements. The Planning Tool offers ideas for teachers for potential gaps in curriculum knowledge, misconceptions and or skills that pupils need to gain to meet a national curriculum statement.

For example, the curriculum strands for number and place value include the following:

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

These curriculum strands are further broken down into some component parts to enable teachers to fine tune planning needed in areas for which a particular pupil needs further support. Pupils need to make progress in all these components parts to make progress overall in number and place value. In each domain consideration is given to the importance of problem solving. This might be annotated as to the types of problems pupils have experience of and can solve confidently and independently. It might be annotated to identify the phrases pupils can interpret successfully for the mathematics needed, eg 'altogether', 'total', 'spent' etc. It is an essential consideration for assessment in each domain.

## Spoken Language

The Early Years Foundation Stage and national curriculum for English and mathematics reflects the importance of spoken language in pupils' development across the whole curriculum - cognitively, socially and linguistically.

The Hampshire Reading and Writing planning tools should be referred to for additional support when planning to meet the needs of individual pupils.

The development of children's spoken language underpins all seven areas of learning and development. Children's back-and-forth interactions from an early age form the foundations for language and cognitive development. The number and quality of the conversations they have with adults and peers throughout the day in a language-rich environment is crucial. By commenting on what children are interested in or doing and echoing back what they say with new vocabulary added, practitioners will build children's language effectively.

Communication and Language

***Statutory framework for the Early Year's Foundation Stage, September 2021***

Spoken language underpins the development of reading and writing. The quality and variety of language that pupils hear and speak are vital for developing their vocabulary and grammar and their understanding for reading and writing. Teachers should therefore ensure the continual development of pupils' confidence and competence in spoken language and listening skills.'

***English National Curriculum 2013***

The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. They must be assisted in making their thinking clear to themselves as well as others and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

***Mathematics National Curriculum 2013***

# 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)

|   |  |
|---|--|
| <p><b>Oral counting</b></p> <ul style="list-style-type: none"> <li>Can you count to 10, 20, 15, 100?</li> </ul> <p><i>Look for accurate number strings, teens, ty numbers, crossing tens boundaries. Keep going until accurate counting breaks down</i></p> <ul style="list-style-type: none"> <li>Can you count back from 10, 20, 17, 32 in ones?</li> </ul> |  |
| <p><b>Counting on</b></p> <ul style="list-style-type: none"> <li>Can you continue counting when I stop?</li> </ul> <p><i>Start at 1 and at different points e.g. start at 7, at 23</i></p>  |  |

Suggested diagnostic question →

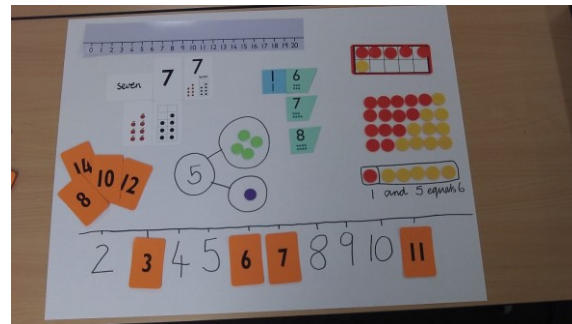
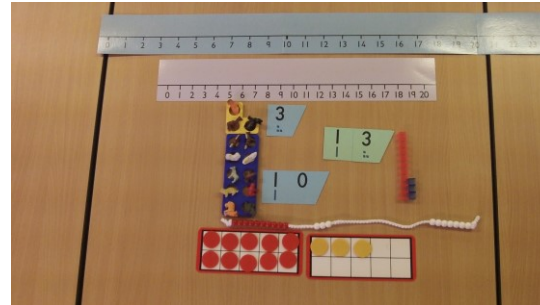
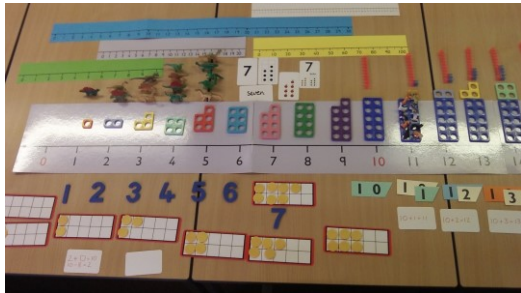
← Qualitative notes about pupil responses

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

# Effective Mathematics Pedagogy

It is assumed that teachers and adults will use a concrete, pictorial abstract (CPA) approach to teaching and learning. This involves the use of a range of unstructured and structured concrete resources, (eg counters, place value cards, Dienes etc) and the use of a range of mathematical models and diagrams, (eg number lines, bar models, arrays etc). The context used for mathematical reasoning and problem solving should make sense to the pupil.

Pupils need focused continuous opportunities to develop their mastery of mathematical language from 'simple' everyday words and phrases to more formal mathematical terms and symbols. Individual pupil's developing understanding of the multiple connections between words, symbols, meanings, contexts and procedures related to operations and domains provides important assessment information about progress and attainment. Teacher assessment should consider to what extent the pupil is able to apply the mathematics to solve problems. The context used for mathematical reasoning and problem solving should be accessible and make sense to the pupil.





# How to use the planning tool documents

## Understanding the layout of the planning tools

National curriculum non-statutory guidance

### Pre-Year 1 to Year 1 Planning Tool

Key concepts

|   |  |
|---|--|
| <p><b>Number and Place Value</b></p> <p>Year 1: National Curriculum notes and guidance (non-statutory)</p> <ul style="list-style-type: none"> <li>• Pupils practice counting (1, 2, 3...), ordering, (eg first, second, third...), and to indicate a quantity, (eg 3 apples, 2 cookies), including solving simple concrete problems, until they are fluent.</li> <li>• 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.</li> <li>• They practice 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.</li> <li>• They recognise and create repeating patterns with objects and with shapes.</li> </ul> <p><b>Curriculum strands</b></p> <p>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:</p> <ul style="list-style-type: none"> <li>• counting (including pattern spotting and making)</li> <li>• comparing numbers</li> <li>• identifying, representing and estimating numbers</li> <li>• reading and writing numbers</li> <li>• understanding place value.</li> </ul> <p><b>Problem-solving</b></p> <p>Teacher assessment should consider to what extent the pupil is able to apply conceptual understanding of number and place value to solve problems.</p> | <p><b>Key concepts</b></p> <ul style="list-style-type: none"> <li>• The order of numbers enables comparison between numbers.</li> <li>• As you count on the quantity represented by the number becomes larger and becomes smaller as you count back.</li> <li>• Numbers greater than 9 are formed by combining more than one digit and numbers between 10 and 20 start with a '1'.</li> <li>• The position of a digit in a number indicates its value.</li> <li>• The place value system is based on units of 10.</li> <li>• Knowing number names (reading tens numbers can be confusing in terms of place value, eg, 11, 12, 13, 14.</li> </ul> |
|---|--|

National curriculum statements

| Skills, knowledge and concepts   |  | NC expectations – Year 1  |
|--|--|---|
| Can use marks on a page, counters or cubes linked in a tower for each 'action' to keep track of the total.       | Can use a tally to keep track of a count of 5 and 1 or 2 more.   | Identify and represent numbers using objects and pictorial representations including the number line. |
| Estimate how many objects they can see and check by counting them.<br>Makes a reasonable estimate up to 10 (20). | Can mark numbers on structured number lines (1-10, 1-20, 1-30) showing awareness of position of multiples of 10.   |   |
| Can subitise small numbers in different ways 3-7 (8-10)<br>(also in Addition and subtraction/Number bonds).      | Can use tens frame to represent same number in different ways and compare different numbers using two tens arrays. |   |

**Strategies:**

- use dice in board games to encourage subitising and recognising dot patterns used for 1-6
- use finger patterns to represent all numbers to five and then 10
- use counters and a range of objects to arrange in patterns including dice patterns
- place numbers of object less than 10 in tens frames using different arrangements
- place objects on number lines
- estimate numbers of objects in jars and boxes.

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

Within the planning tool, each skill, knowledge and concept point is written as a pupil 'can' statement. This is to acknowledge and celebrate the pupil's strengths and understanding – giving a positive starting point and mind-set for pupils and adults involved in supporting learning. They are suggested not exhaustive ideas.

### **Process for using the Planning Tools**

- 1 Complete diagnostic assessment activities including day-to-day AfL to identify starting points.
- 2 Identify focus domains where the planning tools would support pupil progress.
- 3 Narrow down the focus to key strands that will inform planning and teaching. Develop a plan that, wherever possible, follows the whole class planning.
- 4 Identify skills, knowledge and concepts to inform bespoke planning, alongside strategies to teach new learning.
- 5 The planning tool can be used as an annotated working document to show areas in which the pupil is making progress.

## **Early Years Foundation Stage Handbook (September 2021)**

For pupils who may be working between the Early Learning Goals in the Early Years Foundation Stage (EYFSP) and the year 1 national curriculum expectations, further guidance and information about the curriculum and assessment at the end of Foundation Stage can be found in the EYFSP handbook: [Statutory framework for the early years foundation stage \(publishing.service.gov.uk\)](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/97222/statutory-framework-for-the-early-years-foundation-stage.pdf). Extracts are provided below.

### **Assessment at the end of the EYFS – the Early Years Foundation Stage Profile (EYFSP)**

- 2.9. In the final term of the year in which the child reaches age five, and no later than 30 June in that term, the EYFS Profile must be completed for each child.
- 2.11. Each child's level of development must be assessed against the early learning goals (see Section 1). Practitioners must indicate whether children are meeting expected levels of development, or if they are not yet reaching expected levels ('emerging'). This is the EYFS Profile.
- 2.14. The Profile must be completed for all children, including those with special educational needs or disabilities (SEND). Reasonable adjustments to the assessment process for children with SEND must be made as appropriate. Providers should consider whether they may need to seek specialist assistance to help with this. Children will have differing levels of knowledge, skills and abilities across the Profile and it is important that there is a full assessment of all areas of their development, to inform plans for future activities and to identify any additional support needs.

## Early Learning Goals (ELG)

### ELG: Number

Children at the expected level of development will:

- have a deep understanding of number to 10, including the composition of each number
- subitise (recognise quantities without counting) up to 5
- automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

### ELG: Numerical Patterns

Children at the expected level of development will:

- verbally count beyond 20, recognising the pattern of the counting system
- compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity
- explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

# Pre-Year 1 to Year 1 Planning Tool

## Number and Place Value

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

- Pupils practice 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 practice 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 (including pattern spotting and making)
- comparing numbers
- identifying, representing and estimating numbers
- reading and writing numbers
- understanding place value.

## 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.

## Curriculum strand – Counting

| Skills, knowledge and concepts  |   | NC expectations – Year 1  |
|---|---|---|
| Can say the number sequence from 1-10.  | Can say the number sequence from 10 back to 1.  | <p><b>ELG: Numerical Patterns</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>Verbally count beyond 20, recognising the pattern of the counting system;</li> <li>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</li> <li>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</li> </ul> <p>Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number.</p> <p>Count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens.</p> <p>Given a number, identify one more and one less.</p> |
| Can say the number sequence between 10 and 20 including accuracy with 'teen' numbers.                       | Can say the forward number sequence between 1-10 starting on any number.  |   |
| Can say the number sequence from 1-10 (1-20, 1-30, 1-100).  | Can say the number sequence backwards from 10-1 (20-1, 30-1, 100-1).  |   |
| Within the range 1- 10 (1-20, 30-1, 1-100) can count forwards from a given number to another given number.  | Within the range 10- 1 (20-1, 30-1, 100-1) can count backwards from a given number to another given number.                   |   |
| Can say the number that is 1 more than a given number (2 to 5, 6-10).                                       | Can find 1 less than any number up to 10.   |   |
|   | Can find 1 less than any number up to 20.   |   |
| Can say the number after a given number in the range 1-10 (1-20, 1-30, 1-100) without dropping back to 1.   | Can say the number before a given number in the range 1-10 (1-20, 1-30, 1-100) without counting up through all numbers first. |   |
| Recognises patterns in the number sequences from 1-20 (1-30, 1-100) and uses this to say them/self-correct. | Can find 10 more than any given number $U + 10 = ?$ (teen numbers), (10-20).  |   |
| Points to or moves objects when counting.   | Counts an irregular arrangement of up to 10 objects.  |   |
| Can count actions or sounds which can't be moved.   | Recognise that the number of objects in a set does not change if they are moved around.                                       |   |
| Understands that numbers can be used as labels  | Estimate how many objects they can see and check by counting them   |   |

| Skills, knowledge and concepts  |   | NC expectations – Year 1 |
|---|---|--------------------------|
| Can count accurately up to 3/4 objects and beginning to count beyond 10.<br>Can accurately count 10 (to 20, to 30) objects. | Counts objects up to 10 and beginning to count beyond 10.       |                          |
| Can count for a short sequence in multiples of 2 (5).   | Uses step counting to count larger groups of objects (2s, 10s). |                          |

### **Strategies:**

- *give children a reason to count in a variety of contexts: everyday routines, handing out/ collecting in equipment in any lessons not just in mathematics, label equipment trays with number and word labels*
- *use finger patterns to support counting to 5 then 10*
- *match number cards with collections of interesting objects*
- *play board games involving counting; hide and seek games involving counting; keeping a tally alongside other games of skill eg throwing bean bags in hoops counting how many inside/ outside the hoop*
- *read and discuss 'counting' books, making and illustrating own versions or 'missing' pages*
- *model the sequence of numbers using resources that show 'one more/ less' clearly creating a 'staircase' model*
- *use birthday cards to discuss number related to age to support recognising numerals of personal significance*
- *make number lines available for reference alongside all tasks*
- *use counting small world figures, objects, counters*
- *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, what number is one more/less?*
- *use blank number lines to place number cards on, fill in missing gaps by writing the number.*

## Curriculum strand – pattern as part of number and calculation

| Skills, knowledge and concepts  |   | Pattern spotting and making  |
|---|---|--|
| Can notice simple AB patterns in a range of contexts and talk about them, eg 'next', 'after', 'before', 'same as' 'again' etc.                    | Identifying patterns in music, stories, poetry and visual arts.                                 | <p>Noticing, exploring and continuing pattern is at the heart of mathematics (Devlin 2000).</p> <p>'The human brain is good at identifying patterns. The process begins at birth as babies are drawn to human faces (Murray and Andrews 2000). By 6 months of age babies can identify faces including the faces of monkeys) more efficiently than adults. This ability is what has enabled the human brain to develop mathematical thinking...' (Pound 2006)</p> |
| Can identify and talk about an object pattern unit in an AB pattern with several pattern unit repeats.<br>(size, colour, orientation, object)     | Can include sounds and actions in repeating patterns.   |  |
| Can continue a AB pattern verbalising their thinking using a range of objects, eg blue cube, yellow cube, blue cube..., leaf, stick, leaf, stick. | Can talk about different unit patterns ABC (ABB; ABBC; AABB) and continue next unit of pattern. |  |
| Can continue an AB pattern using interlocking resources.  | Can create own patterns using ABC (ABB; ABBC; AABB).  |  |
| Can create own AB patterns explaining the unit of repeat.<br>(size, colour, orientation, object)  | Can talk about patterns where the given pattern stops mid-unit.                                 |  |
| Can spot errors and correct AB patterns.  | Can spot errors in a pattern ABC (ABB; ABBC; AABB).   |  |

**Strategies:**

- *look for and discuss patterns, eg in wallpaper samples, wrapping paper and textiles*
- *look for patterns in floor coverings, buildings*
- *use a range of everyday objects to create patterns in straight lines changing one feature, more than one feature between each 'next' object*
- *use a range of mathematical shapes to create patterns, (eg same shape, size, but different colours etc)*
- *look at pattern in numbers*
- *string beads in patterns to make necklaces*
- *use a range of objects placed around the edge of a circular or rectangular paper plate*
- *count how many of each X are needed to complete a pattern*
- *make patterns with deliberate errors*
- *talk about patterns which 'don't work' and why.*



## Curriculum strand – Comparing numbers

| Skills, knowledge and concepts   |  | NC expectations – Year 1  |
|--|--|---|
| Can count out two sets of small numbers of objects up to 5 (10), arrange in a line to compare using language of 'more', eg 5 is more than 3. | Can count out two sets of small numbers of objects up to 5 (10), arrange in a line to compare using language of 'fewer', eg 3 is fewer than 5. | <p><b>ELG: Numerical Patterns</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>Verbally count beyond 20, recognising the pattern of the counting system;</li> <li>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</li> <li>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</li> </ul> <p>Use the language of:</p> <ul style="list-style-type: none"> <li>equal to</li> <li>more than</li> <li>less than (fewer)</li> <li>most</li> <li>least.</li> </ul> |
| Can compare two sets of objects recognising when there is the same number in each (equal).   | Can identify first, second, third and last in a line of up to 5 objects.   |   |
| Can use a structured (empty) number line to compare position of two numbers 0-10, (0-20, 0-30).  | Can say whether two numbers are close together or far apart (through oral counting or number line model) 0-10 (0-20, 0-30).                    |   |
| Can use language of 'more/ fewer' to describe two sets of objects with links to > < signs.   | Can order numbers 1-10 (1-20, 1-30).   |   |
| Can use structured resources, eg Numicon to compare numbers 1-10 (1-20, 1-30+).  | Can use a structured (empty) number line to compare position of two numbers related to multiples of 10.  |   |
| Can identify first, second, third and last in a line of up to 5 objects. Then 5-10 objects.  | Can use language of ordinality up to tenth (twentieth).  |   |

## Strategies:

- *use illustrations in counting books to discuss 'fewer' and 'more'*
- *use finger patterns to discuss 'one more' and 'one less' making the appropriate changes to fingers patterns to 5 then 10*
- *play board games involving collection of playing pieces for each player to discuss who has more or fewer pieces during the game*
- *use every-day routines and opportunities within all lesson for pupils to use the language of 'fewer' and 'more'*
- *make number lines available for reference alongside all activities*
- *use everyday contexts like house numbers in a street to order consecutive numbers*
- *using cards with number symbols and matching with counting objects*
- *representing and comparing two quantities to say which is more/less using counters and or small world objects*
- *using number line model to locate particular numbers and compare to other numbers using positional language, eg 'before', 'next', 'after'*
- *use  $>$   $<$   $=$  signs on cards to place between two numbers (symbols), or quantity of objects or combination of two if vocabulary secure.*

## Curriculum strand – Identifying, representing and estimating numbers

| Skills, knowledge and concepts  |  | NC expectations – Year 1  |
|---|--|---|
| Can use marks on a page, counters or cubes linked in a tower for each 'action' to keep track of the total.          | Can use a tally to keep track of a count of 5 and 1 or 2 more.   | Identify and represent numbers using objects and pictorial representations including the number line. |
| Estimate how many objects they can see and check by counting them.<br>Makes a reasonable estimate up to 10 (20).    | Can mark numbers on structured number lines (1-10, 1-20, 1-30) showing awareness of position of multiples of 10.   |   |
| Can subitise small numbers in different ways 3-7 (8-10)<br>(also in <i>Addition and subtraction/Number bonds</i> ). | Can use tens frame to represent same number in different ways and compare different numbers using two tens arrays. |   |

### Strategies:

- *use dice in board games to encourage subitising and recognising dot patterns used for 1-6*
- *use finger patterns to represent all numbers to five and then 10*
- *use counters and a range of objects to arrange in patterns including dice patterns*
- *place numbers of object less than 10 in tens frames using different arrangements*
- *place objects on number lines*
- *estimate numbers of objects in jars and boxes.*

## Curriculum strand – Reading and writing numbers

| Skills, knowledge and concepts  |   | NC expectations – Year 1                                   |
|---|---|--|
| Can read numerals 1-5 (1-10, 1-20).<br>Can recall and write accurately numbers 1-10 (1-20). | Can link number words with symbols and sets of objects.<br><br>Can write number words ten, six, three, seven; two, four, five, nine; one, eight, twenty; teens numbers. | Read and write numbers from 1 to 20 in numerals and words. |

### Strategies:

- *play pelmanism games with cards showing number words and number symbols*
- *place collections of objects on cards showing number words or number symbols*
- *write number/word labels for collections of objects*
- *use structured number lines as reference for number symbols*
- *use structured resources and place value arrow cards to support reading and writing of teens numbers*
- *add number word cards to structured number lines.*

## Curriculum strand – Understanding Place Value

| Skills, knowledge and concepts   |  | NC expectations – Year 1  |
|--|--|---|
| Can talk about all teen numbers as ‘ten and...’.eg 10 and 1 more is 11, 10 and 2 more is 12 etc.   |  | Year 1 Non–statutory guidance:<br><i>“Pupils begin to recognise place value in numbers beyond 20 by reading, writing, counting and comparing up to 100 supported by objects and pictorial representations”.</i> |
| Can use a range of structured resources, eg straws, bead strings, place value cards, Numicon, to demonstrate teens numbers.  | Can use a range of structured resources, eg straws, bead strings, place value cards, Numicon, to demonstrate 11-20 (20-30).  |   |
| Can confidently find teens numbers on a structured number line relative to ‘10’.   | Can confidently find two-digit numbers to 30 on a structured number line relative to multiples of 10.  |   |
| Can use ‘teen’ and ‘ty’ vocabulary accurately, eg 14, 40.  | Can continually ‘add 10’ to any one-digit number recognising the oral counting pattern, eg 7, 17, 27, 37 using structured resources, eg numicon, dienes, place value cards, to model the numbers and pattern.    |   |
| Can draw an empty number line and mark where two-digit numbers would be and explain the position compared to 10 and 20. Understands the significance of the order of digits, ie 14 and 41 are in different positions on a number line related to cardinal value (tens and ones) and ordinal value (14 = 10 and 40 more, 41 = 40 and 1 more). | Can continually ‘subtract 10’ from a 2-digit number recognising the oral counting pattern, eg 37, 27, 17, 7 using structured resources, eg Numicon, dienes, place value cards, to model the numbers and pattern. |   |

**Strategies:**

- *count more than 10 objects and use to fill up tens frames and identify the 'units or 'ones' left over*
- *use a range of structured resources to show place value for a particular number and the number before/after, eg 12,13,14*
- *use blank and structured number lines to look at position of number compared to multiples of 10*
- *make all numbers in a sequence using structured resources, eg 1-23 or 10-25 to model the relationship between numbers (1 more/less, 10 more/less).*

## Addition and Subtraction

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

Pupils memorise and reason with number bonds to 10 and 20 in several forms, (eg  $9 + 7 = 16$ ,  $16 - 7 = 9$ ,  $7 = 16 - 9$ ). They should realise the effect of adding or subtracting zero. This establishes addition and subtraction as related operations.

Pupils combine and increase numbers, counting forwards and backwards.

They discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms: put together, add, altogether, total, take away, distance between, difference between, more than and less than, so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly.

### Key concepts

- Recognise that the number of objects in a group stays the same when the objects are rearranged, but changes if objects are removed from or added to the group.
- Numbers can be partitioned into two (or more) parts to form number bonds. Knowing one number bond enables deriving another.
- Relate language such as: altogether, more than, fewer than, less, add, in total, sum of, take away, subtract, left, how many? With the use of the symbols +, – and =.
- Understand addition and subtraction in terms of 'part-part- whole' structure.
- Teen numbers can be written as '10 + U', eg  $14 = 10 + 4$ .

### Curriculum strands

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

- number bonds
- mental calculations
- written recording.

### Problem-solving

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

## Curriculum strand – Number bonds

| Skills, knowledge and concepts  |  | NC expectations – Year 1   |
|---|--|--|
| Understands quantities can be partitioned into parts and combined.  | Can use the language of ‘first then now’ to talk about changes in quantities.<br><br>(refer to NCETM Mastery Professional development materials spine 1)       | <p><b>ELG: Number</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>• Have a deep understanding of number to 10, including the composition of each number;</li> <li>• Subitise (recognise quantities without counting) up to 5;</li> <li>• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</li> </ul> <p>Represent and use number bonds and related subtraction facts within 20.</p> |
| Can subitise small numbers in different ways 3-7 (8-10, 11-20) using counting objects and structured resources, eg Numicon. | Can use bar models and two-part diagrams to show partitions of all units numbers (10, 11-20).  |  |
| Can record different partitions of numbers 3-5 using + and = signs.   | Can use two part ‘cherry’ models to show partitions of groups of objects 3-5.  |  |
|   | Can use two part ‘cherry’ models to support talking about ‘taking away’ and how many ‘left’.   |  |
| Can record different partitions of numbers 6-10, (11-20) using + and = signs.   | Can use bar models and two-part diagrams to show partitions of all units numbers (10, 11-20) identifying the related subtraction fact with each addition fact. |  |
| Understands $X + 1$ can be interpreted as ‘next number’ and ‘1 more’ without the need to count all.                         | Understands teen number subtract 10 = units digit and can use structured resources to explain, eg Numicon, place value cards.                                  |  |
| Understands $X - 1$ can be interpreted as ‘number before’ and ‘1 less’ without the  | Understands the pattern linking number bonds to 10 with number bonds to 20 (addition).   |  |



| Skills, knowledge and concepts  |  | NC expectations – Year 1 |
|---|--|--------------------------|
| need to take away and then count all. (0-5, 0-10, 0-20).  | Understands the pattern linking number bonds to 10 with number bonds to 20 (addition and subtraction). |                          |
| Understands $X + U$ where $X = 10$ can be calculated using place value without the need to count all. | Can use structured resources to show addition facts of all units numbers (to 10, 11-20).               |                          |
| Understand the term 'double' in practical contexts, double 1-3 (4-7, 8-10).                           | Understand the term 'half' in practical contexts, even numbers: 2, 4, 6, 8, 10.                        |                          |
| Knows doubles of all numbers 1-3 (4-7, 8-10) and can show using resources and on a bar model.         | Knows halves of all even numbers to 10 and can show using resources and on a bar model.                |                          |

### Strategies:

- *use 5 fingers on each hand makes a total of 10 fingers altogether*
- *use finger patterns to know number bonds to 5*
- *use counters to show part whole combinations link to bar model representations on squared paper for all numbers to 10, 20*
- *use counters or counting objects to model all number sentences with explicit focus on language use eg 'If I know  $3 + 2$  equals five then five take away 3 must be 2'*
- *use place value arrow cards alongside other resources to show place value calculations, eg  $14 - 10 = 4$ ,  $10 + 5 = 15$ ,  $5 + 1 = 6$ ,  $6 - 1 = 5$*
- *use small world contexts and problem solving to provide a purpose for finding and deriving number bonds.*

## Curriculum strand – Mental calculations

| Skills, knowledge and concepts  |   | NC expectations – Year 1   |
|---|---|--|
| Use recall of number bonds to check solutions (addition) 3-7 (8-10, 11-20).     | Group calculations into solutions $>$ $<$ then $=$ to 10.   | <p><b>ELG: Number</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>• Have a deep understanding of number to 10, including the composition of each number;</li> <li>• Subitise (recognise quantities without counting) up to 5;</li> <li>• Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.</li> </ul> <ul style="list-style-type: none"> <li>• Add and subtract one-digit and two-digit numbers to 20, including zero.</li> <li>• Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.</li> </ul> |
| Use recall of number bonds to check solutions (subtraction) 3-7 (8-10, 11-20).  | Uses inverse to solve missing box calculations using number bonds 3-7 (8-10, 11-20).                            |  |
| Use known fact to solve related fact, eg if $3 + 4 = 7$ then $3 + 5$ must be 8. | Identify calculations that can be worked out easily with counting forwards/backwards, ie $+1$ , $+2$ , $+/-3$ . |  |

### Strategies:

- *model the number sentence with counters, objects and cover over leading to missing box representations*
- *focus on the language of part-part-whole to support inverse*
- *model how one number fact is related to another.*

## Curriculum strand – Written recording

| Skills, knowledge and concepts   |   | NC expectations – Year 1  |
|--|---|---|
| Draw pictures to show solutions for problems involving addition.   | Draw pictures to show solutions for problems involving subtraction.   | <ul style="list-style-type: none"> <li>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs.</li> </ul> |
| Uses a combination of concrete resources and numerals to represent addition (subtraction) problems involving numbers less than 10. | Link the abstract use of numerals up to 10 with their pictorial recording for solutions to calculations and problems. |   |
| 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).   |   |
| 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:**

- *use tactile numeral cards, (eg made from sandpaper, velvet and string), magnetic and foam numbers to support adult modelling and pupil recall of how to form numerals correctly when writing them*
- *use magnetic and foam numbers to create number sentences matching pictorial images of the context used/concrete resources with the abstract number sentence (expression or equation)*
- *discuss with the pupil the way they have used numerals and any other marks to record their solution*
- *support pupils to ‘talk out loud’ in whole sentences 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.*

## Curriculum strand – Problem-solving

| Skills, knowledge and concepts  |  | NC expectations – Year 1  |
|---|--|---|
| Identify number sentence needed and show solution using concrete objects: using aggregation for addition.     | Identify number sentence needed and show solution using concrete objects: using reduction for subtraction. | <ul style="list-style-type: none"> <li>'Solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = * - 9</math>.</li> </ul> |
| Identify number sentence needed and show solution using concrete objects: using partitioning for subtraction. | Identify number sentence needed and show solution on a number line and a bar model.                        |   |
| Identify number sentence needed and show solution using concrete objects: using augmentation for addition.    | Use bar models to solve missing box calculations, eg $6 + ? = 10$ , $9 = 11 - ?$ .                         |   |
|   | Use bar models to find all possibilities, eg $8 = ? + ?$ .   |   |

### Strategies:

- *use oral rehearsal 'Think it, Say it. Like it Write it' described in Hampshire writing planning tool for pupils with SEND to support talking about and understanding a problem leading to recording solution*
- *use problem contexts which the pupil understands through lived experience and that fascinate and interests them.*

*Key ideas to develop skills, knowledge and concepts when problem solving involving addition and subtraction:*

- *addition, using aggregation, subtraction using partitioning*
- *addition, using augmentation, subtraction using reduction.*

## 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  $5 \times 2$  and  $2 \times 5$ .

### 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
- 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.

## Curriculum strand – Multiplication and division facts

| Skills, Knowledge and Concepts   |   | NC expectations – Year 1   |
|--|---|--|
| Can use counting objects or real-life objects to organise into groups of two                     | Can count in 2s to 10.  | <p><b>ELG: Numerical Patterns</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>Verbally count beyond 20, recognising the pattern of the counting system;</li> <li>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</li> <li>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</li> </ul> <p>Count in multiples of twos, fives and tens.</p> <p>(copied from <i>Number and Place Value</i>)</p> |
| Can use counting objects to put into groups of 2 (10, 5).  | Can count in 2s to 20.  |  |
| Can organise a multiple of two (10, 5) into an array using counters/ objects with adult support. | Can count in 10s (5s) to 50.                                    |  |
|  | Can count in 10s to 100.  |  |
| Can identify how many groups of 2 (10,5) there are in a collection of objects.                   | Can perceive describe an array in two ways, eg 4 x 2 and 2 x 4. |  |
| Can relate doubles of a number to 2 x using a bar model.   | Can find half a number up to 10 in the context of a fair share. |  |
|  | Can relate half a number to $x \div 2$ using a bar model.       |  |

### Strategies:

- use pictorial representations, counters, cubes to model the calculation needed linking the use of the language 'lots of'/'groups of'
- 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.

## Curriculum strand – Written calculations

| Skills, Knowledge and Concepts  |   | NC expectations – Year 1 |
|---|---|--------------------------|
| Can talk about and draw pictures to show groups of objects 2s/pairs.  | Can show repeated groups of 2 (10, 5) on a structured number line.                            | N/A                      |
| Can talk about and draw pictures to show groups of objects 2s/pairs (10s, 5s).  | Can show counting back in 2s (10s, 5s) on a structured number line.                           |                          |
| Can create an array with objects to show multiples of 2 (10, 5).  | Can read and interpret the symbols $\times$ and $=$ to solve multiplication number sentences. |                          |
| Can use the vocabulary and symbols to describe multiplication number sentences $\times 2$ ( $\times 10$ , $\times 5$ ). | Can read and interpret the symbols $\div$ and $=$ to solve division number sentences.         |                          |

### Strategies:

- *use tactile numeral cards, (eg made from sandpaper, velvet and string), magnetic and foam numbers to support adult modelling and pupil recall of how to form numerals correctly when writing them*
- *use magnetic and foam numbers to create number sentences matching pictorial images of the context used / concrete resources with the abstract number sentence (expression or equation)*
- *discuss with the pupil the way they have used numerals and any other marks to record their solution*
- *support pupils to 'talk out loud' when recording number sentences using appropriate vocabulary in a problem context*
- *make explicit links between number sentences, number line recording and or arrays in a problem context*
- *place counters, objects onto blank bar model diagrams*
- *ensure pupils can relate 'numbers' used to the problem context*
- *record multiplication pictorially and as repeated addition.*



## Problem-solving

| Skills, Knowledge and Concepts  |   | NC expectations – Year 1   |
|---|---|--|
| Can use repeated addition 2s (10s, 5s) to solve simple multiplication problems. | Can use repeated subtraction in 2s (10s, 5s) to solve simple grouping problems. | Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher. |

### Strategies:

- *use oral rehearsal 'Think it, Say it. Like it Write it' described in Hampshire writing planning tool for pupils with SEND to support talking about and understanding a problem leading to recording solution*
- *use problem contexts which the pupil understands through lived experience and that fascinate and interests them*
- *support pupils to 'talk out loud' when recording number sentences using appropriate vocabulary in a problem context*
- *make explicit links between number sentences, number line recording and or arrays in a problem context*
- *place counters, objects onto blank bar model diagrams to show groups of twos, fives and tens*
- *ensure pupils can relate 'numbers' used to the problem context*
- *record multiplication pictorially and as repeated addition.*

## Fractions

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

Pupils are taught half and quarter as ‘fractions of’ discrete and continuous quantities by solving problems using shapes, objects and quantities. For example, they could recognise and find half a length, quantity, set of objects or shape. Pupils connect halves and quarters to the equal sharing and grouping of sets of objects and to measures, as well as recognising and combining halves and quarters as parts of a whole.

### Key concepts

- Fractions express a relationship between a whole and equal parts of the whole.
- Halving involves partitioning an object, shape or quantity into two equal parts.
- Quarters arise from partitioning a whole object, shape or quantity into four equal parts.
- A quarter is smaller than a half of the same object, shape or quantity and a half is larger than a quarter of the same object, shape or quantity.
- Two quarters and one half of the same whole are equivalent.

### Curriculum Strands

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

- recognising fractions.

### Problem-solving

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

## Curriculum strand – Recognising fractions

| Skills, Knowledge and Concepts   |  | NC expectations – Year 1   |
|--|--|--|
| Can use objects and explain that sharing an even set of objects equally between two results in two groups of equal size. | Can show that sharing odd numbers of objects between two results in one left over.                         | <p><b>ELG: Numerical Patterns</b><br/>Children at the expected level of development will:</p> <ul style="list-style-type: none"> <li>Verbally count beyond 20, recognising the pattern of the counting system;</li> <li>Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;</li> <li>Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.</li> <li>Recognise, find and name a half as one of two equal parts of an object, shape or quantity.</li> <li>Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</li> </ul> |
| Can show half of shapes by folding accurately and labelling each part as a half.   | Draws pictures and uses diagrams to show halves (quarters) including bar models.                           |  |
| Can recognise half an hour as half of a clock face linked to 'half past the hour'.                                       | Understands the difference between sharing between two and equal sharing between two.                      |  |
| Recognises halves (and not halves) in length.  | Can recognise when a part is not a half (quarter) in number and explain why.                               |  |
| Recognise and use vocabulary of less than/ more than half, half full.  | Can show quarters of shapes by folding in half and half again accurately and label each part as a quarter. |  |
| Recognise and combine halves of objects to find the number of whole objects.   |  |  |
| Can write a half as $\frac{1}{2}$ ( $\frac{1}{4}$ ).   |  |  |
| Count in halves using objects to support.  | Recognise and combine quarters of objects to find the number of whole objects.                             |  |
| Can show that a quarter of a set of objects results in four groups of equal size.  | Count in quarters using objects to support.  |  |
| Knows that any one of a group of four equal groups is a quarter.   | Can use a bar model to show half of numbers (quarter of numbers).  |  |

**Strategies:**

- *ensure pupils are working practically before and alongside any recording using appropriate vocabulary to talk about what they are doing*
- *ensure pupils use whole sentence answers, eg 'if the circle is the whole shape then this is half of the shape/ circle'*
- *make links with everyday tasks and routines.*

Key contexts for developing skills, knowledge and concepts of fractions:

- *shape*
- *number*
- *time*
- *length*
- *capacity and volume.*

# Supporting Resources

## 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, eg start at 7, at 23*

|  |  |
|--|--|
| <p><b>Object counting</b></p> <ul style="list-style-type: none"> <li>▪ How many dinosaurs/objects do you think are here?</li> <li>▪ Can you count them?</li> </ul> <p>Choose a handful, ie. 3 – 10, 10 – 20, 20 – 30 of interesting objects to count, eg dinosaurs not multilink</p> <p><i>Look for accurate counting, moving, touching objects whilst saying the number name – one to one correspondence</i></p> <ul style="list-style-type: none"> <li>▪ Can you give me 6 beads?</li> </ul> <p><i>Does the child know when to stop the count?</i></p> |  |
| <p><b>Writing numbers</b></p> <ul style="list-style-type: none"> <li>▪ Can you write 2, 5, 8 etc (numbers to 10, numbers to 20, 2-digit numbers to 100)?</li> </ul> <p><i>Look for reversals, lack of confidence, looking at resources to copy numbers from, reversals of 2-digit numbers, eg 52 ad 25</i></p>   |  |
| <p><b>Number before, number after</b></p> <ul style="list-style-type: none"> <li>▪ Can you say the number after/before...</li> </ul> <p><i>In the range 0-10; 0-20; 0-30, 0-50, 0-100 etc</i></p> <p><i>Does the child start at one or can they say the next number in the sequence?</i></p>   |  |
| <p><b>Number recognition 0 – 10, 20, 100</b></p>   |  |

|   |  |
|---|--|
| <ul style="list-style-type: none"> <li>▪ Can you read this number?</li> <li>▪ Can you find this number?</li> </ul> <p>Using a set of out of order number cards, eg 0 – 20, 100 ... which is number 12? Number 21? ....</p> <p><i>Can the child find a given number?<br/>Distinguish between: 13, 30 and 31 etc<br/>Know names for multiples of 10 to 100?</i></p>   |  |
| <p><b>Number sequencing</b></p> <ul style="list-style-type: none"> <li>▪ Can you put these numbers in order from the smallest to the largest?</li> </ul> <p><i>Using a set of shuffled consecutive numbers, then a set of random number cards 0 – 100 (as appropriate) can the child order consecutive numbers then random numbers?</i></p>   |  |
| <p><b>Place value</b></p> <ul style="list-style-type: none"> <li>▪ Does the child understand the value of each digit in 2-digit (then 3-digit) numbers?</li> </ul> <p><i>Using structured, eg Numicon, Dienes and unstructured, eg bundles of straws, bags of 10 objects, coins and arrow cards can the child make the numbers in the previous three sections? Can they talk about the value of the digits and find their position on a structured number line?</i></p> |  |
| <p><b>Counting in steps</b></p> <ul style="list-style-type: none"> <li>▪ Starting from 0 can you count</li> </ul>   |  |

forward/backward in 2s, 10s?

- Starting from zero.
- Starting from a single digit number.
- Starting from any number.



The following are examples of calculations in a context. You will need to adjust the numbers in the calculations according to responses to previous questions.

**Addition: If I have 4 dinosaurs and 3 more come along, how many will I have altogether?**

(5 add 3,  $9 + 4$ ,  $9 + 10$ ,  $13 + 9$ ,  $13 + 19$  etc)

Does the child:

- use objects, count both sets
- use pictorial recording
- write a number sentence to match the calculation needed
- count on in ones
- use known number facts
- count on from the biggest number
- count on using a structured number line
- count on in tens/ones using an empty number line
- use any other recording to help with the calculation?

**Subtraction: If I have 7 dinosaurs and 4 go off for a walk, how many will I have left?**

(8 subtract 4,  $10 - 7$ ,  $23 - 4$ ,  $23 - 10$ )

Does the child:

- use objects, count a set, take some away, count how many are left
- use pictorial recording
- write a number sentence to match the calculation needed
- count back in ones
- count back in ones using a structured number line
- use known number facts

- count back in tens/ones using a empty number line
- count on when appropriate
- use any other recording to help with the calculation?

**Summary notes: Addition and Subtraction**

# Diagnostic Assessment: Multiplication and Division

Name.....

Year group .....

Date .....

Pupil profile: (notes and relevant information)

## Counting in steps

- Can you count forward/backward in 2s, 10s?  
Starting from zero (multiples)  
Starting from a single digit number  
Starting from any number
- Can you count forward/backward in multiples of 5s?

## Doubling and halving

What is double this number?

eg 3, 5, 7, 10

What is half this number?

eg 4, 8, 10, 20

*What strategies does the child use?*

If this is half of the number can you tell me what the whole number was?

*(Could have half of the quantity 'hidden' under a cover)*

What is half of this whole shape?

*(paper shapes needed to enable pupils to fold or draw lines to show half)*

The following are examples of calculations in a context. You will need to adjust the numbers in the calculation according to responses to previous questions.

### **Multiplication**

I have 4 sweets in one party bag, how many sweets would be in 2 bags?

*(use other multiples, where known facts might be used and where children have to use other strategies)*

Does the child:

- use objects to solve the calculation
- use pictorial recording
- write a number sentence to match the calculation needed
- use repeated addition
- count in multiples
- use multiplication facts
- use a number line or other informal recording.

**Division:**

If I have 6 cakes and share them between 2 people, how many will each person have? (sharing)

I have 6 cakes for a party and I need to put 2 cakes on each plate, how many plates will I need? (grouping)

Does the child:

- use objects to solve the calculation
- draw a picture or other informal recording
- use a number line
- use repeated addition/subtraction
- count in multiples
- write a number sentence to match the calculation needed
- use multiplication/division facts?

Summary notes

# Mathematical Diagnostic Assessment: Fractions

Name .....

Year group .....

Date .....

## Pupil Profile (notes and relevant information)

### Half (quarter) of a shape

Can you fold

- this square (triangle, rectangle, circle, etc) in half (quarters)?
- these strips of paper (different lengths) in half (quarters)?

Give different shapes with folds (not all that fold into halves/quarters)

- Can you show me which shapes have been folded in half (quarter)?
- How do you know these are folded in half (quarter)?

### Symbolisation

How do you record one half (one quarter, one third) in symbols?

|   |  |
|---|--|
| <p><b>Half/quarter of a quantity</b></p> <ul style="list-style-type: none"> <li>• Show me half of these fish (start with 6 fish, build up quantity as appropriate) Pupil to use chosen objects to show how they are working out their answer.</li> <li>• Show me one quarter of....</li> <li>• Shade half of a shape, when the shape is divided into an even number of equal pieces.</li> <li>• Shade one quarter of a shape when the shape is divided into 8 (12, 16, 20, etc) pieces.</li> </ul>                                |  |
| <p><b>Counting in halves/quarters</b></p> <ul style="list-style-type: none"> <li>• How many halves make one (two, three, etc) whole?</li> <li>• How many halves do you have if you have two and a half apples?</li> <li>• How many quarters make one whole one?</li> <li>• Can you count in halves (quarters)?</li> <li>• If one quarter of a pizza is eaten, what fraction of the pizza is left?</li> <li>• If one quarter of children go home from school for lunch, what fraction of children have lunch at school?</li> </ul> |  |
| <p><b>Fractions of a quantity (Bar model)</b></p> <ul style="list-style-type: none"> <li>• Use a bar model to show half of eight (10, 12, 18, etc).</li> <li>• Pupils use objects to show solution.</li> </ul> <p>Use a bar model to show one quarter of 8 (12, 16, 20, etc).</p>   |  |

## Comparing Fractions

Using a shape

- Is a quarter of this shape more or less than half of this shape?
- Is a third of this shape more or less than a half of this shape?

Using a quantity, eg 12 counters

- Is half of these 12 counters more or less than one quarter of these 12 counters?
- Is one third of these 12 counters more or less than one half of these 12 counters?



## Summary notes: Fractions

Counting

Recognising (shape/ number)

Comparing (shape/ number)

Equivalence

The following are examples of calculations in a context. Adjust the fractions used and numbers in the calculations according to responses to previous questions. Provide opportunities to use objects, draw pictures and or diagrams to show solutions.

|   |  |
|---|--|
| <b>Halves and quarters of one whole</b> <ul style="list-style-type: none"><li>• If one half of a pizza is eaten, what fraction of the pizza is left?</li><li>• If one quarter of a pizza is eaten, what fraction of the pizza is left?</li><li>• If two quarters of a pizza is eaten, what fraction of the pizza is left?</li></ul>   |  |
| <b>Halves and quarters of a number</b> <ul style="list-style-type: none"><li>• If one quarter of children go home from school for lunch, what fraction of children have lunch at school?</li><li>• If half of class are boys, and there are ten boys. How many children are there in the class?</li><li>• One quarter of the cookies are chocolate and there are five chocolate cookies. How many cookies are there altogether?</li></ul> |  |
| <b>Third of one whole</b> <ul style="list-style-type: none"><li>• If one third of a pizza is eaten, what fraction of the pizza is left?</li></ul>   |  |
| <b>Thirds of a number</b> <ul style="list-style-type: none"><li>• There were 12 cakes. The girls ate one third of them. How many did they eat?</li></ul>  |  |

## Summary notes: Fractions

# National Curriculum 2014 – Year 1

| Year   | Number and place value  | Addition and subtraction  | Multiplication and division   | Fractions  | Measurement  | Geometry   |  |
|--------|---|---|---|--|--|--|--|
|        |   |   |   |  |  | Properties of shapes   | Position and direction   |
| YEAR 1 | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number</li> <li>count, read and write numbers to 100 in numerals; count in multiples of twos, fives and tens</li> <li>given a number, identify one more and one less</li> <li>identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least</li> <li>read and write numbers from 1 to 20 in numerals and words.</li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> <li>represent and use number bonds and related subtraction facts within 20</li> <li>add and subtract one-digit and two-digit numbers to 20, including zero</li> <li>solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as <math>7 = \square - 9</math>.</li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.</li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>recognise, find and name a half as one of two equal parts of an object, shape or quantity</li> <li>recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.</li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>compare, describe and solve practical problems for: <ul style="list-style-type: none"> <li>lengths and heights (e.g. long/short, longer/shorter, tall/short, double/half)</li> <li>mass or weight (e.g. heavy/light, heavier than, lighter than)</li> <li>capacity/volume (full/empty, more than, less than, quarter)</li> <li>time (quicker, slower, earlier, later)</li> </ul> </li> <li>measure and begin to record the following: <ul style="list-style-type: none"> <li>lengths and heights</li> <li>mass/weight</li> <li>capacity and volume</li> <li>time (hours, minutes, seconds)</li> </ul> </li> <li>recognise and know the value of different denominations of coins and notes</li> <li>sequence events in chronological order using language such as: before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening</li> <li>recognise and use language relating to dates, including days of the week, weeks, months and years <ul style="list-style-type: none"> <li>tell the time to the hour and half past the hour and draw the hands on a clock face to show these times.</li> </ul> </li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>recognise and name common 2-D and 3-D shapes, including: <ul style="list-style-type: none"> <li>2-D shapes (e.g. rectangles (including squares), circles and triangles)</li> <li>3-D shapes (e.g. cuboids (including cubes), pyramids and spheres).</li> </ul> </li> </ul> | <p>Pupils should be taught to:</p> <ul style="list-style-type: none"> <li>describe position, directions and movements, including half, quarter and three-quarter turns.</li> </ul> |

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