



# Primary SEND Planning Tools

## HIAS Mathematics Team

Professional Development  
Accredited Lead

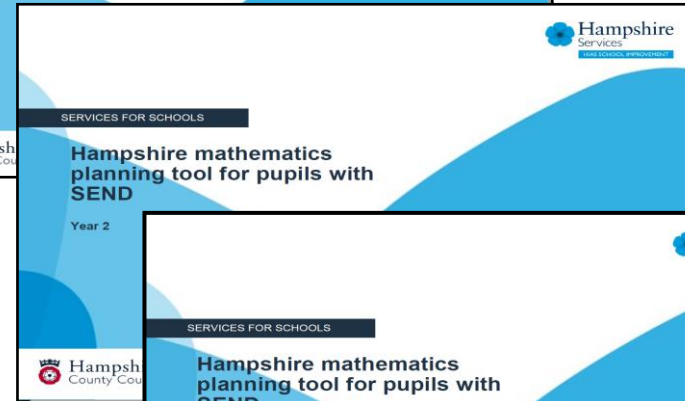
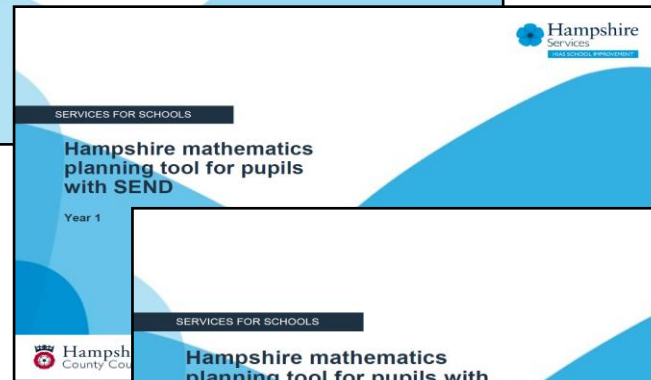
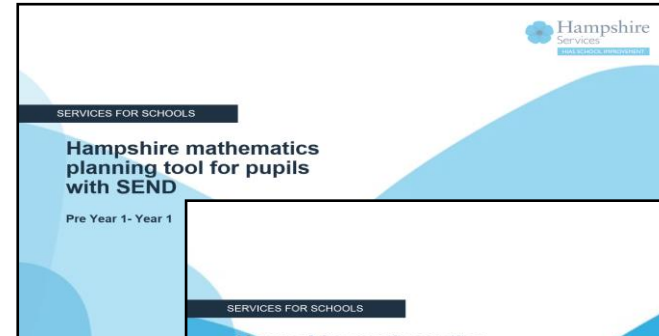
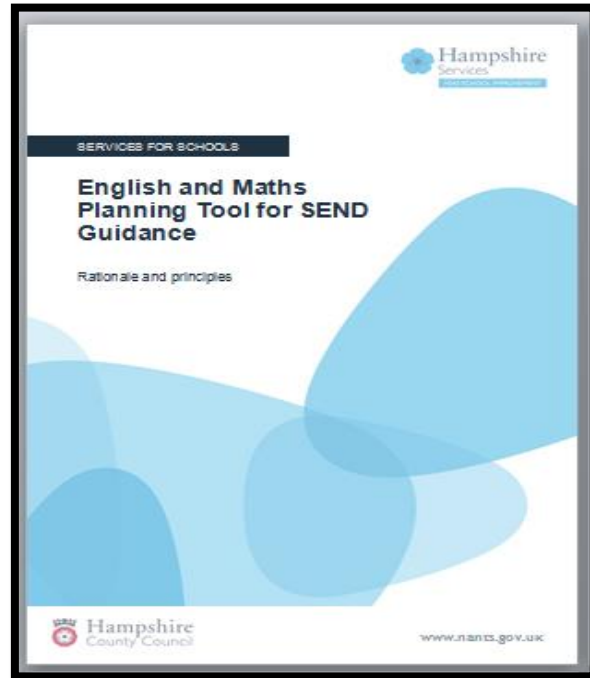


National Centre  
for Excellence in the  
Teaching of Mathematics

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# Hampshire Mathematics planning tools for pupils with SEND



## Primary SEND Tool kits:

- Pre Year 1 to Year 1
- Year 1
- Year 2
- Year 3

<https://maths.hias.hants.gov.uk>

Course materials

SEND Planning  
Tool Course



# Session 1

- Principles and rationale underpinning The English and Mathematics Planning Tool for pupils with SEND –for senior leaders, SENCOs, maths managers and class teachers
- Statutory expectations, guidance reports and resources supporting high quality provision and aspirations
- Using the tools to support planning and teaching: structure and organisation
- Pedagogy supporting high quality provision and aspirations
- Domains focus: number and place value, addition and subtraction including outcomes from pre course task
- Action Planning
- Gap Task



# Session 2

- Review outcomes from session 1
- Domains focus: multiplication and division, fractions
- Using the tools to support planning and teaching: structure and organisation
- Pedagogy supporting high quality provision and aspirations
- Assessment inc examples of bespoke school assessment
- Role of SENCo and MM in whole school dissemination: strategies
- Action Planning



# Special educational needs and disabilities code of practice: 0-25 years



Department  
for Education



Department  
of Health

## Special educational needs and disability code of practice: 0 to 25 years

Statutory guidance for organisations  
which work with and support children  
and young people who have special  
educational needs or disabilities

January 2015

‘Our vision for children with special educational needs and disabilities is the same as for all children and young people – that they achieve well in their early years, at school and in college, and lead happy and fulfilled lives.

This new Special Educational Needs and Disability Code of Practice will play a vital role in underpinning the major reform programme.’

‘... **Their special educational needs and disabilities will be picked up at the earliest point with support routinely put in place quickly, and their parents will know what services they can reasonably expect to be provided. Children and young people and their parents or carers will be fully involved in decisions about their support and what they want to achieve. Importantly, the aspirations for children and young people will be raised through an increased focus on life outcomes, including employment and greater independence.**’



Hampshire  
County Council

From the Parliamentary Under-Secretary of State for Health and the  
Parliamentary Under-Secretary of State for Children and Families

# Definition of SEND

A child or young person has SEN if they have a learning difficulty which calls for special educational provision to be made for him or her. SEN provision is that which is **different from or additional to that normally available** to pupils or students of the same age.

The Children & Families Act 2014

**‘Special educational provision is underpinned by high –quality teaching and is compromised by anything less.’**

1.24

Code of Practice, January 2015



# Needs and Diagnosis

Learning needs can be thought of in three ways:

- 1. all children have common needs**—for example, the need to receive effective teaching;
- 2. some children have specific needs that are shared with a similar group**—for example, pupils with a hearing impairment need access to means of audiological support; and
- 3. all children have individual needs**—for example, pupils with a Speech and Language Disorder may benefit from pre-teaching of vocabulary and scaffolded talk opportunities.

Special educational needs are defined in relation to learning in school, whereas a ‘diagnosis’ is the term used by medical and allied professionals in relation to identifying particular physical or mental health conditions with defined characteristics.

The key question is not, ‘What is most effective for pupils with dyslexia?’ The key question becomes:  
**‘What does this individual pupil need in order to thrive?’**

# Pedagogical approach

- Clarity around learning
- Lessen the cognitive load
- Slow down – teach less but teach it well
- 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 can apply with some independence





# Key documents: teaching and learning

- EEF: Making best use of Teaching Assistants
- EEF: Improving Mathematics in the Early Years and Key stage 1
- EEF: Special Educational Needs in Mainstream Schools
  
- NCETM Mastery Task booklets
- DfE June 2020 Mathematics Guidance Non- Statutory.

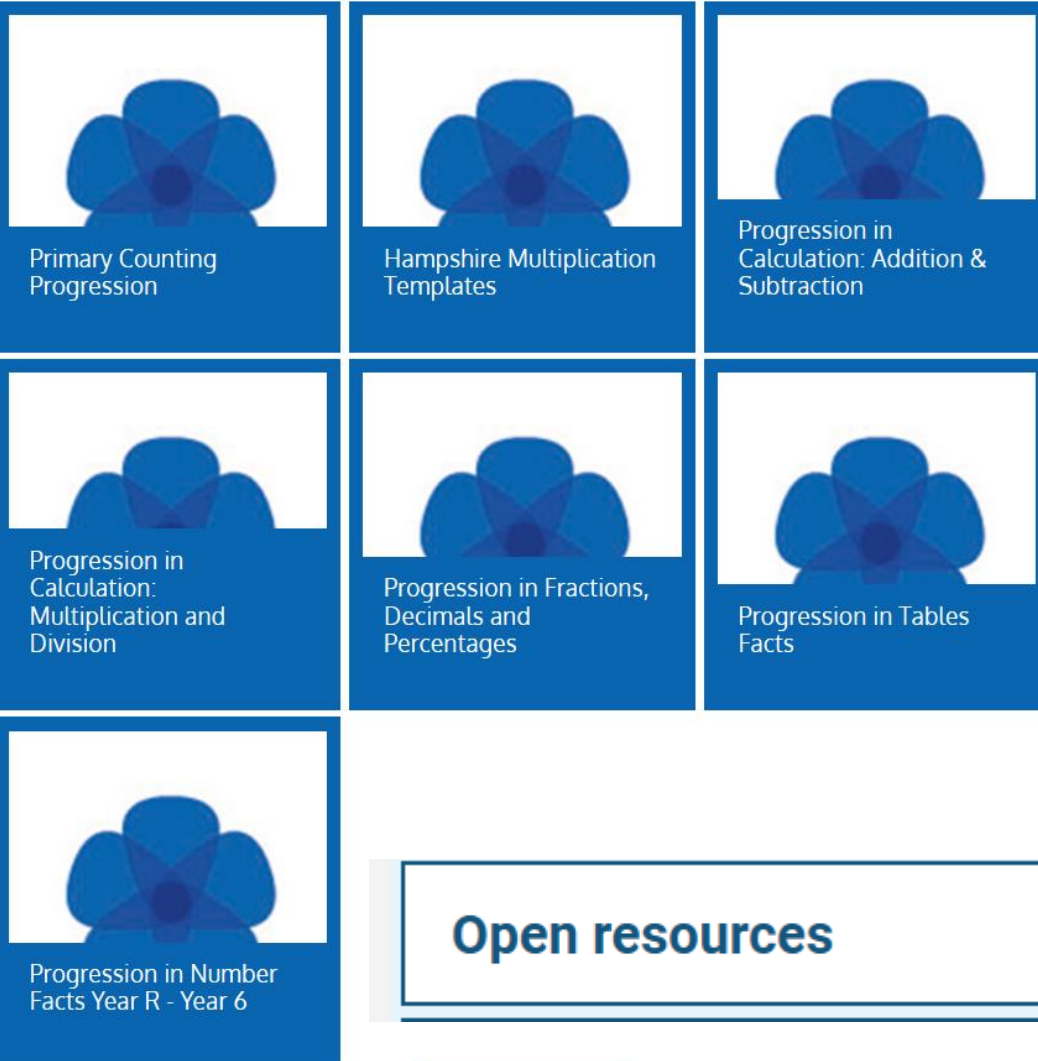
*inc 'Ready to progress' criteria*



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# HIAS maths team resources



- Progression in counting
- Progression in addition and subtraction
- Progression in multiplication and division
- Progression in fractions, decimals and percentages
- Key Number Facts from Year R to Year 3

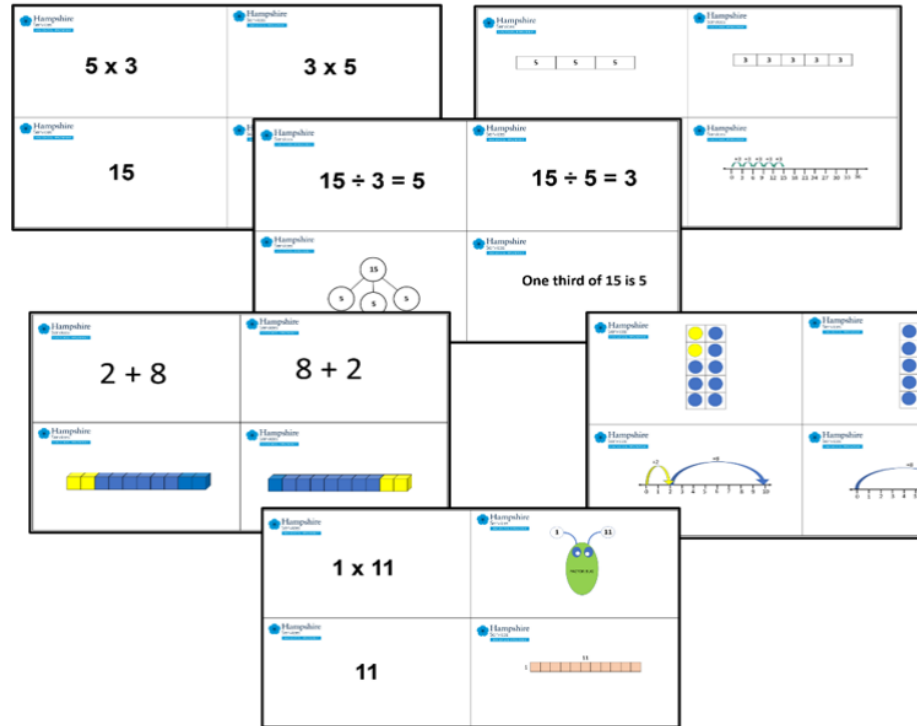
**Open resources**

<https://maths.hias.hants.gov.uk>



# Moodle Plus: HIAS maths team resources

Primary Number  
Facts: Matching  
cards to support  
recall and  
retrieval



- Number bonds to 10
- Number bonds to 20
- Complements to 10
- Complements to 100
- Fractions: halves, quarters, eighths
- Multiplication tables and linked division facts

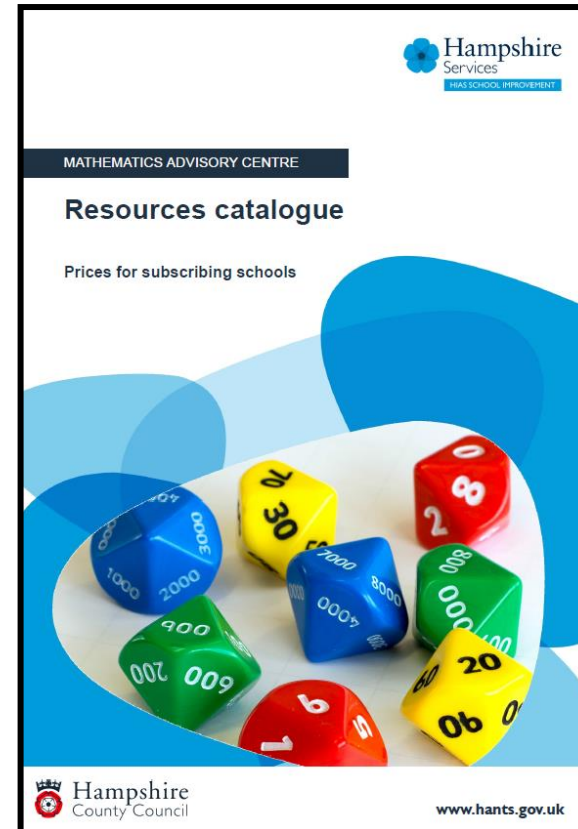
Moodle+

<https://maths.hias.hants.gov.uk>



# Maths Centre Resources: e.g. NPV

- Place value /dienes arrow cards
- Pack of Ten Frames with double sided counters
- Number lines:
  - 0-10; 0-20; 0-100; 0-30;
  - 0-100 ( multiples of tens)
  - Large horizontal Number line
- Bead string
- Numbers and Images ( multiple representation cards)



# Process for using the Planning Tools



SEN Code of  
Practice Ch 6

Complete diagnostic assessment activities including day-to-day AfL to identify starting points.

Identify focus domains where the planning tools would support pupil progress.

Narrow down the focus to key strands that will inform planning and teaching. Develop a plan that where ever possible follows the whole class planning.

Identify skills, knowledge and concepts to inform bespoke planning, alongside strategies to teach new learning.

The planning tool can be used as an annotated working document to show areas in which the pupil is making progress



## Understanding the layout of the planning tools

NT

National curriculum non-statutory guidance

**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.

**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 extent solve problems.

Key concepts

- 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 tens numbers can be confusing in terms of place value, eg 11, 12, 13, 14.

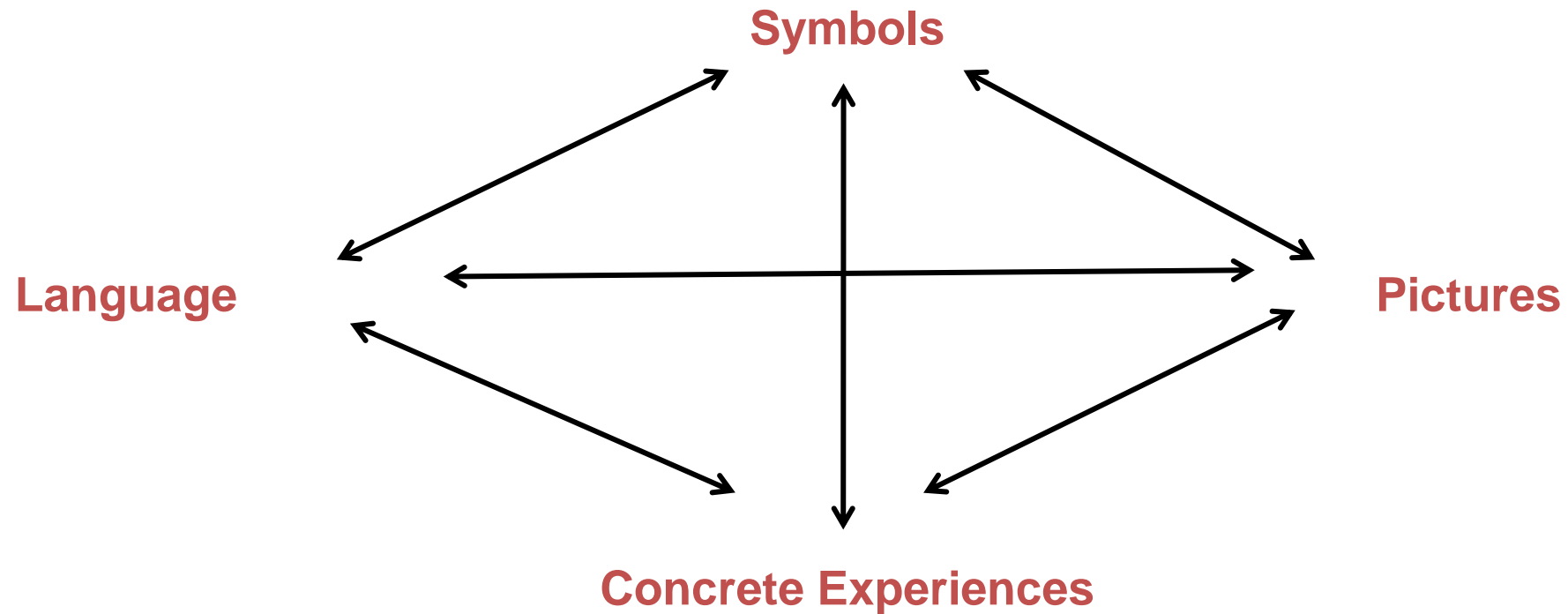
National curriculum statements

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).	<ul style="list-style-type: none"> <li>Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs</li> </ul>
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).	
<p><b>Strategies:</b></p> <ul style="list-style-type: none"> <li>support pupils to 'talk out loud' when recording number sentences</li> <li>make explicit links between number sentences and number line recording and or bar model diagrams</li> <li>ensure pupils can relate 'numbers' used to the problem context.</li> </ul>		

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

# Children need to make connections...



# High Quality Inclusive teaching

Building a coherent analysis of pupils' needs in each domain enables teachers to adapt tasks that:

- provide appropriate level of challenge
- address gaps in curriculum knowledge, errors or misconceptions
- precisely focus practise leading to greater independence and fluency
- are 'problematic' requiring pupils to 'use what they know' and develop problem solving strategies including a CPA approach to recording solutions





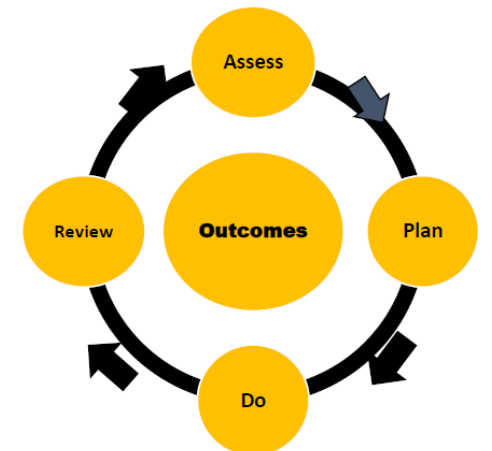
# Sharing experiences so far...focus on pupils

Share examples of pupil work arising from learning journeys supported by the planning tool.

How has the planning tool been used?

What has been successful so far?

What are the issues/ implications?



# Multiplication and Division

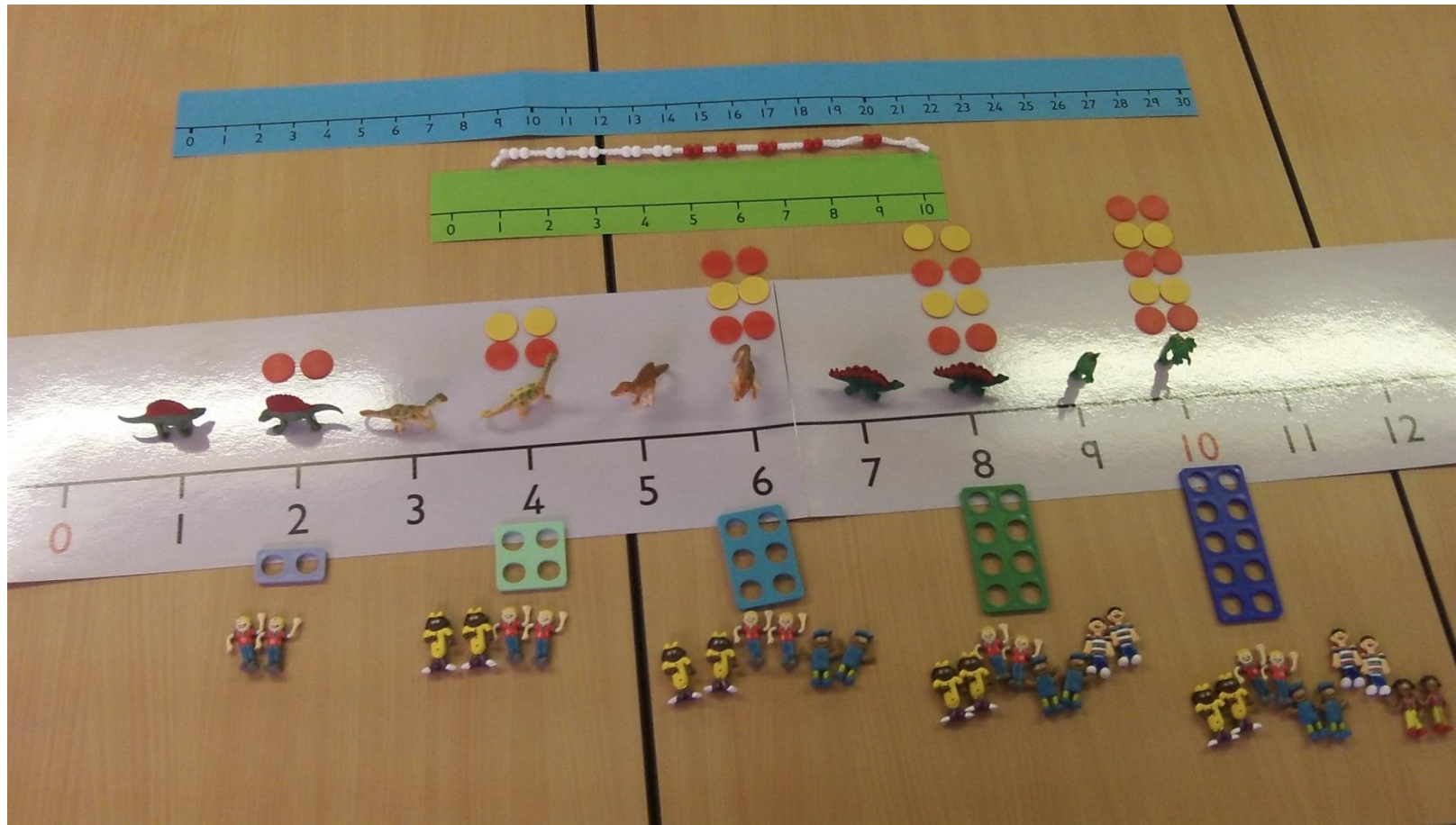
- **Multiplication and division facts** (counting in steps; vocabulary of 'groups of'; using arrays; using number lines; using bar models)
- **Mental calculations** (recall of facts  $\times$ ; recall of facts  $\div$ ; deriving facts)
- **Written calculations** (pictorial recording; using signs and symbols)
- **Inverse operations, estimating and checking answers**
- **Problem solving**

## *Conceptual and procedural fluency*

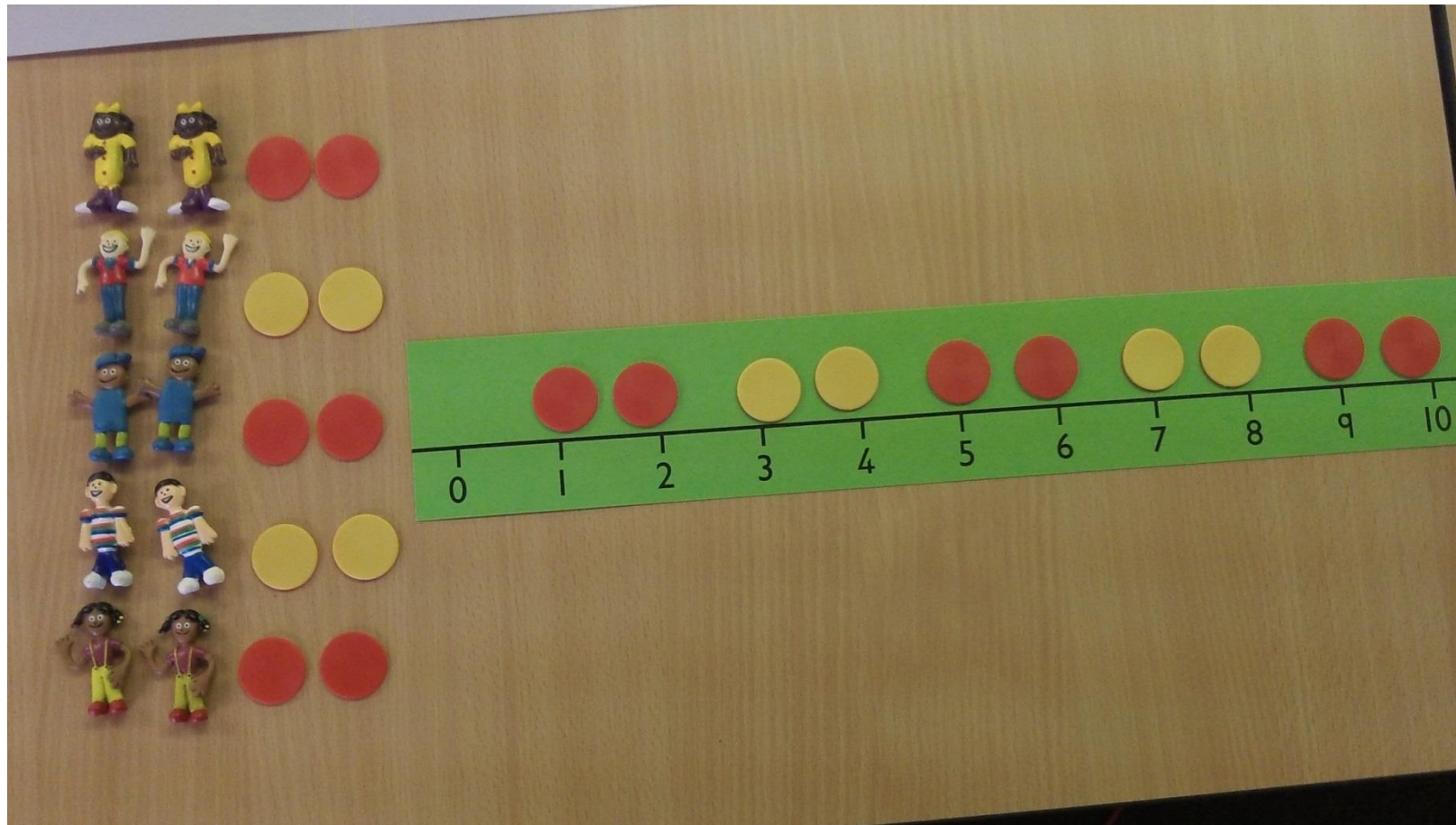
Key structured concrete resources  
Outcomes from pupil conferencing



# Concrete Pictorial Abstract (CPA)



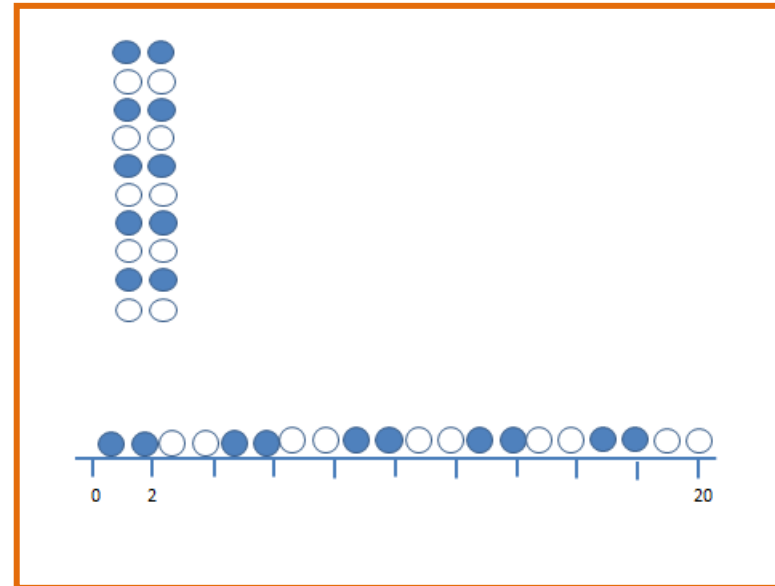
# Concrete Pictorial Abstract (CPA)



# Step Counting

## Conceptual variation


••	2	●●	●●
••	2+2=	○	○
••	2+2+2=	●●	●●
	2+2+2+2=	○	○
	2+2+2+2+2=	●●	●●
	2+2+2+2+2+2=	○	○
	2+2+2+2+2+2+2=	●●	●●
	2+2+2+2+2+2+2+2=	○	○
	2+2+2+2+2+2+2+2+2=	●●	●●
	2+2+2+2+2+2+2+2+2+2=	○	○





Counting in 2s, Multiples of 2


●●	2	2 X 1=
○	2+2=	2 X 2=
●●	2+2+2=	2 X 3=
○	2+2+2+2=	2 X 4=
●●	2+2+2+2+2=	2 X 5=
○	2+2+2+2+2+2=	2 X 6=
●●	2+2+2+2+2+2+2=	2 X 7=
○	2+2+2+2+2+2+2+2=	2 X 8=
●●	2+2+2+2+2+2+2+2+2=	2 X 9=
○	2+2+2+2+2+2+2+2+2+2=	2 X 10=





  
 $2 \times 1 = 2$

  
0 2 4 6 8 10 12 14 16 18 20


  
 $2 \times 2 = 4$


  
0 2 4 6 8 10 12 14 16 18 20


  
 $2 \times 3 = 6$


  
0 2 4 6 8 10 12 14 16 18 20

## Building patterns...

  
 $2 \times 3 = 6$

  
0 2 4 6 8 10 12 14 16 18 20

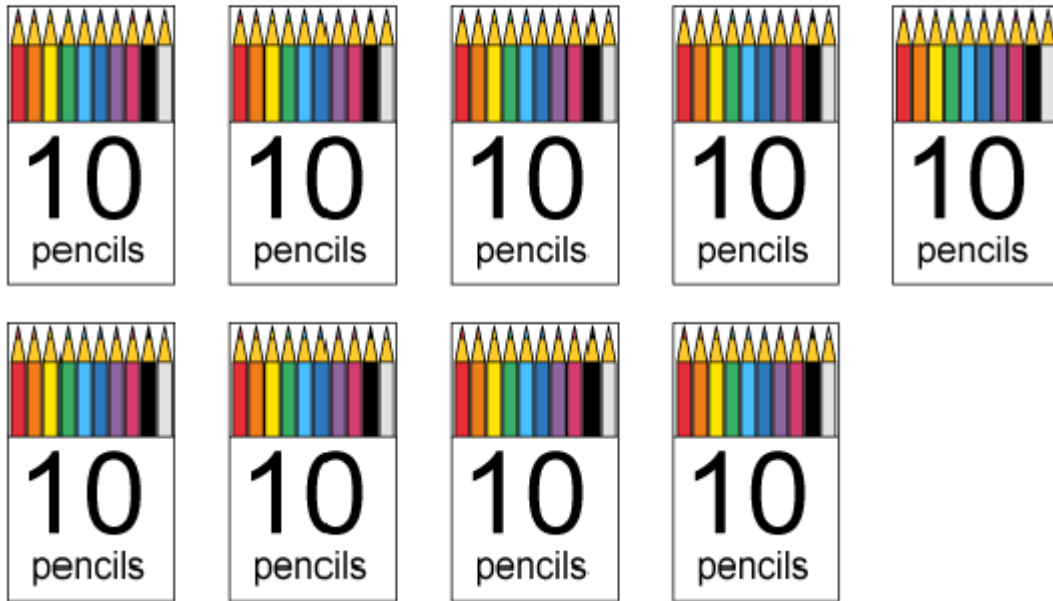
  
 $2 \times 4 = 8$

  
0 2 4 6 8 10 12 14 16 18 20



# Language focus from year 1

How many pencils are there?



“The pencils are in groups of 10, so we will count in tens.”

“Ten, twenty, thirty...”

“1 group of 10, 2 groups of 10, 3 groups of 10...”

In time, shortened to:

“1 ten, 2 tens, 3 tens...”

DfE RTP

1NF-2

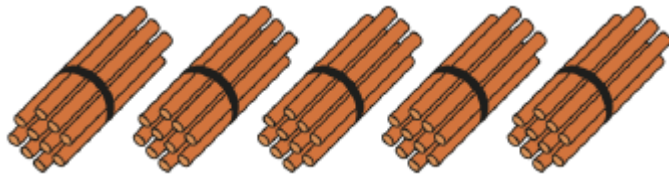


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# Counting - End of Year 1

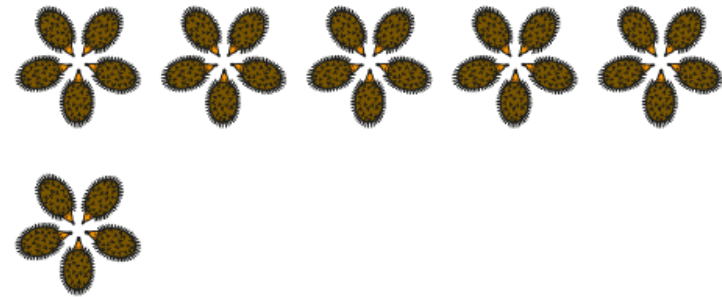
These sticks are grouped into bundles of 10. How many sticks are there altogether?



How many wheels are there altogether?  
Count in groups of 2.



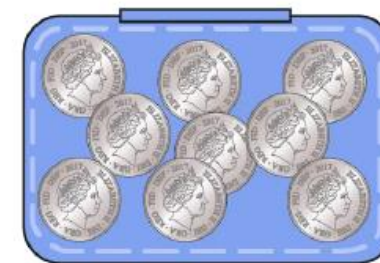
There are 5 hedgehogs in each group. How many hedgehogs are there altogether?



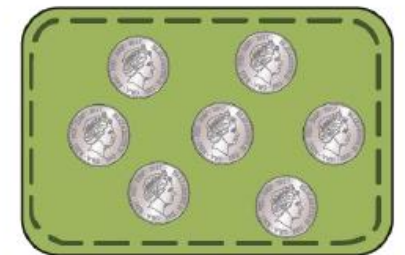
How much money is in each purse?



2p coins



10p coins



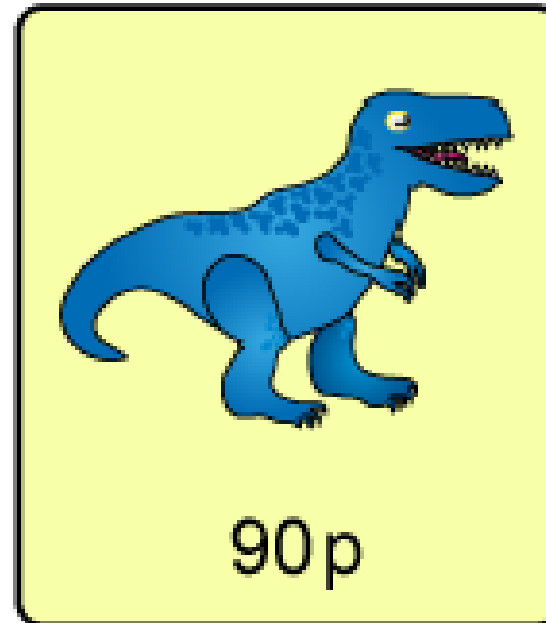
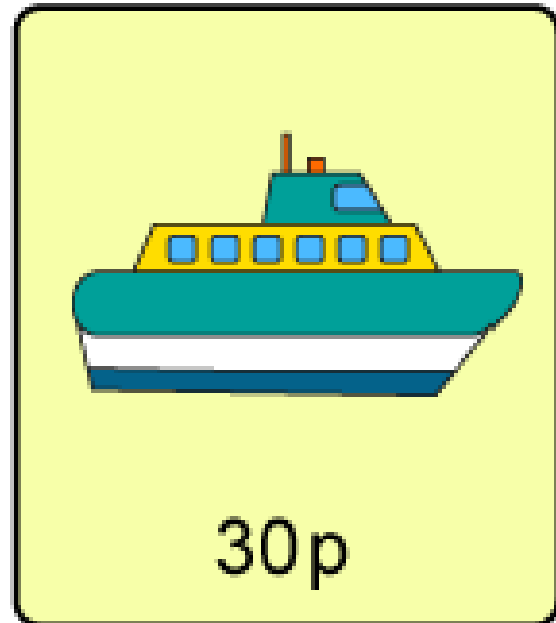
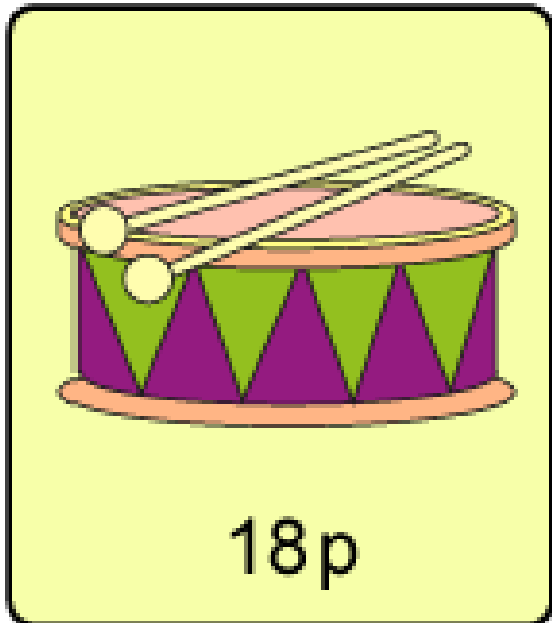
5p coins



# End of year 1

Task: Provide each pupil with 2p, 5p and 10p coins (real or otherwise), then ask pupils to show how to pay for:

- the drum with 2p coins
- the boat with 5p coins
- the dinosaur with 10p coins



DfE RTP  
1NF-2



# Teaching multiplication

Learn ▶ rehearse ▶ recall ▶ play / apply / assess

A lot of what is thought of as practice for multiplication tables, e.g. games using speed of recall, in reality actually falls under the rehearse and recall phases, rather than the initial learning, as they rely on children already having some base knowledge to draw upon. When children begin learning a new multiplication table, it is important to give time for exploration and building a picture of what is happening, allowing the opportunity to physically make the facts and then rehearse them in a range of ways before focusing on the memory and retrieval.

At the 'learning' phase, children benefit from seeing the multiplication table build up from the beginning, looking first at one group of the amount (e.g. 1 group / row of 3) and then building up by adding another group / row of 3 each time and seeing what the total becomes. This helps children to link multiplication to repeated addition, e.g. linking  $4 \times 3$  (four rows of three) to  $3 + 3 + 3 + 3$  and knowing that both make 12.

# Multiplication fact: 3 x 6

## Concrete

How many wheels on 6 tricycles?



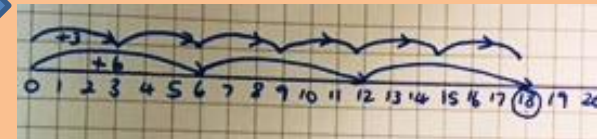
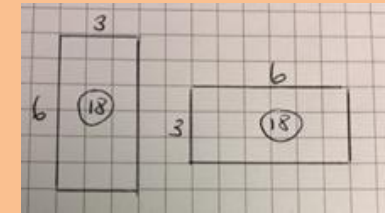
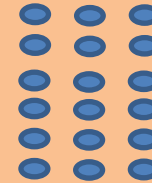
6 vases each have three flowers in. How many flowers?



## Pictorial



$$\begin{array}{r} 3 \quad 3 \quad 3 \quad 3 \quad 3 \quad 3 \\ \hline 18 \end{array}$$



Deep understanding/  
mastery

## Abstract

- $3 \times 6 =$
- $3 + 3 + 3 + 3 + 3 + 3 =$
- Can pupils take the written algorithm and “bring it to life” with contextual examples that it represents?

# Arrays

Say what you see



Using 'groups of', how could this array be described?

Which number sentences could be used to describe this array?

What other key vocabulary is needed?



# Exploring a number using 'grouping'

There are 12 apples.

If we put two (2) apples in each bag, how many bags would we need?




**If we put three (3) apples in each bag, how many bags would we need?**



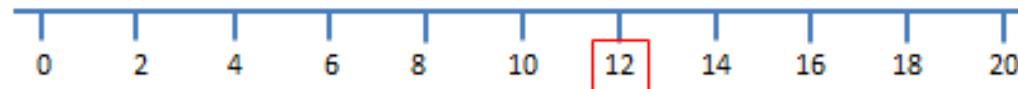
**If we put six (6) apples in each bag, how many bags would we need?**



Lucy had 12 apples.  
She put two in each bag.  
How many bags did she need?

  $2+2+2+2+2+2=12$   
*Two apples in 6 bags equals 12 apples altogether*

$$2 \times 6 = 12$$



3 friends wanted to share 6 apples. To make it fair they need the same amount each

What objects do you have that can be used as contexts?



Can you draw a picture of your answer?



ELG: They solve problems, including doubling, halving and sharing.



# Setting the scene for division...

## Sharing and grouping



The pet shop has 6 fish.....

Sharing:

they need to share the fish equally between 3 bowls. How many fish in each bowl?

Grouping:

They need to put 3 fish into each bowl...How many bowls does the pet shop need?

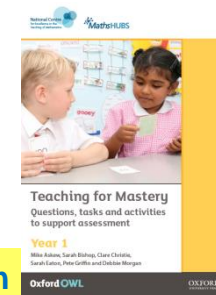


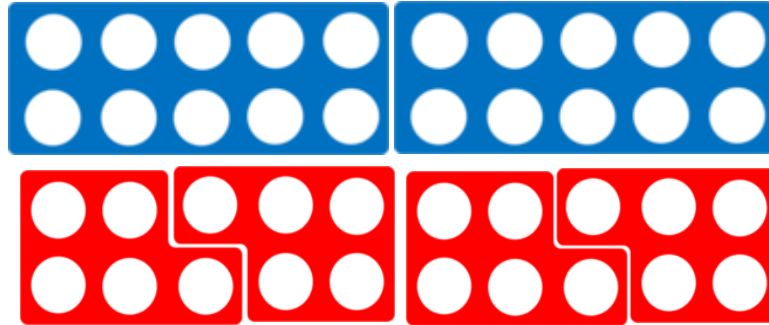
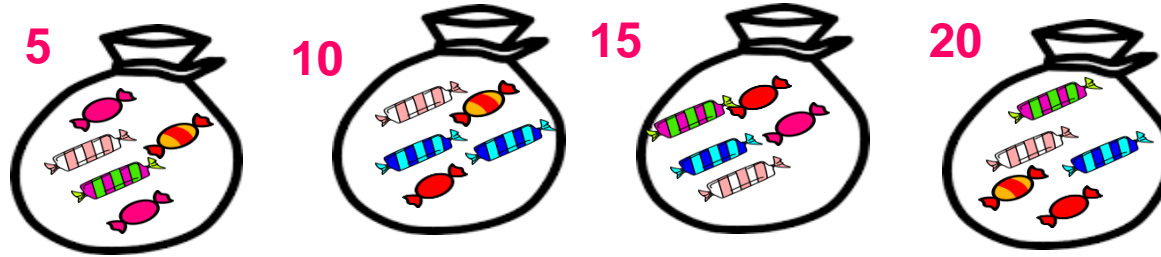


I can see 10 wheels. How many bicycles?

Show me how  
you got your  
answer

How can the  
question be  
changed?





20 divided into  
groups of 5



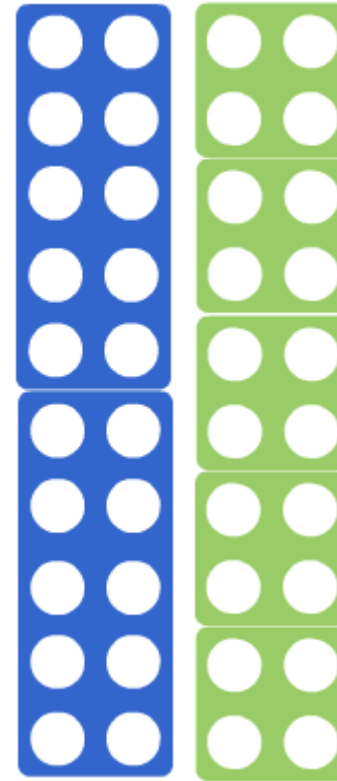
Sarah is filling party bags with sweets. She has 20 sweets altogether and decides to put 5 in every bag. How many bags can she fill?

$$5 + 5 + 5 + 5 = 20$$

$$5 \times 4 = 20 \quad 20 \div 5 = 4$$

So, there are 4 bags of sweets





If 5 friends want to share 20 Match Attax cards equally between them, how many Match Attax cards would they get each?

20 divided into 5 groups

$$4 + 4 + 4 + 4 + 4 = 20$$

$$4 \times 5 = 20 \quad 20 \div 5 = 4$$



So, the friends get 4 cards each





Share 12 into 4 groups

Divide 12 into 4

$$12 \div 4$$

4s into 12

12 divided by 4

How many 4s in 12?

How many groups of 4 in 12?



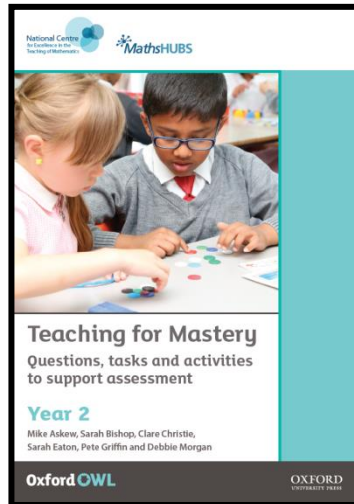
Write these addition sentences as multiplication sentences. The first one has been completed.

$$5 + 5 + 5 + 5 + 5 = 5 \times 5$$

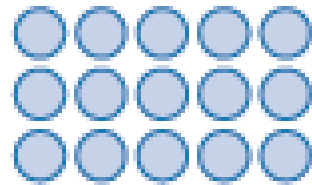
$$2 + 2 + 2 + 2 + 2 =$$

$$2 + 2 + 2 =$$

$$10 + 10 + 10 + 10 =$$



This array represents  $5 \times 3 = 15$ .



Consider links with number bonds imagery..

Write three other multiplication or addition facts that this array shows.  
Write one division fact that this array shows.



**By end of year 2 –recognise and record repeated addition, and record as multiplication. 2x 5x, 10x**



**“There are 3 equal groups of eggs.”**

**“There are 5 eggs in each group.”**

**“There are 3 groups of 5.”**

Pupils must be able to explain how each term in a multiplication expression links to the context it represents.

**“The 3 represents the number of groups.”**

**“The 5 represents the number of eggs in each group.”**

**“The 15 represents the total number of eggs.”**

Pupils must also be able to understand equivalence between a repeated addition expression and a multiplication expression:

$$5+5+5 = 3 \times 5 \quad (\text{three groups of } 5)$$

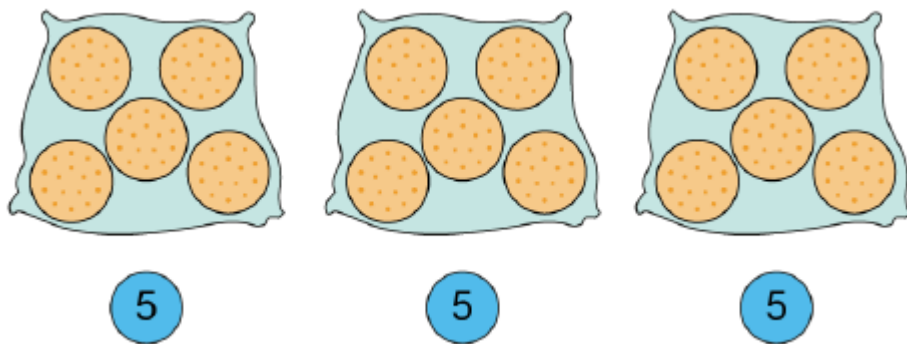


# By end of Year 2- grouping problems

Pupils need to be able to represent problems where the total quantity and group size is known, using multiplication equations with missing factors.

For example,

“There are 15 biscuits. If I put them into bags of 5, how many bags will I need?”



Pupils should then learn that unknown-factor problems can also be represented with division equations (quotitive division), for example, They should be able to use skip counting or their multiplication-table fluency to find the quotient:  $15 \div 5 = ?$   $15 \div 5 = 3$

Pupils should be able to describe how each term in the division equation links to the context and describe the division equation in terms of ‘division into groups’.

“The 15 represents the total number of biscuits.”

“The 5 represents the number of biscuits in each bag.”

“The 3 represents the number of bags.”

“15 divided into groups of 5 is equal to 3.”

# Pupil Conferencing Questions: Multiplication and Division

## Counting in steps:

Can you count forward/ back ward in 2s, 10s, 5s?

- Starting from zero
- Starting from a single digit number
- Starting from any number
- Can you count forward/ back ward in multiples of 5?

## 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
- Use an array

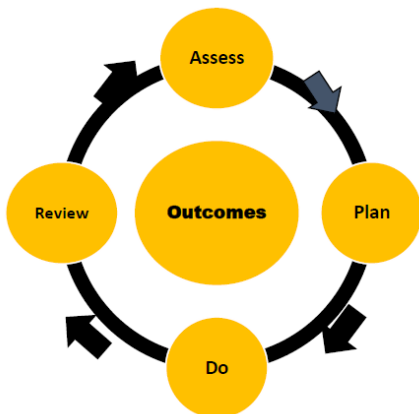
## Division:

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

If 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
- Use pictorial recording
- Write a number sentence to match the calculation needed
- Count in multiples
- Use multiplication/ division facts
- Use a number line or other informal recording





# Finding starting point to work towards NC statements e.g. multiplication and division

Using day to day assessment and any specific conferencing to identify the correct planning tool ie Y1, Y2 or Y3 in this domain for the pupil.

- Start from year 1 and work up.
- Use domain non- statutory guidance and ‘key concepts’

– *E.g. For this domain this pupil is working towards end of year 2 expectations*

- Select from the domain strands key aspects to work on so that there is a linked combination of those strands in the bespoke plan.

## National Curriculum written assuming previous knowledge and skills understood

### Multiplication and Division

#### Year 2: National Curriculum Notes and Guidance (non-statutory)

Pupils use a variety of language to describe multiplication and division.

Pupils are introduced to the multiplication tables. They practice to become fluent in the 2, 5 and 10 multiplication tables and connect them to each other. They connect the 10 x multiplication table to place value, and the 5 x multiplication table to the divisions on the clock face. They begin to use other multiplication tables and recall multiplication facts, including using related division facts to perform written and mental calculations.

Pupils work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete and continuous quantities, to arrays and to repeated addition. They begin to relate these to fractions and measures (for example,  $40 \div 2 = 20$ , 20 is a half of 40). They use commutativity and inverse relations to develop multiplicative reasoning (for example,  $4 \times 5 = 20$  and  $20 \div 5 = 4$ ).

#### Key concepts

- Counting in steps from 0 can be recorded as repeated addition and as multiplication.
- There are links and relationships between counting in steps of 2, 5 and 10 eg doubling and halving, commutativity.
- Each tables fact can be represented with an array, number line and bar model.
- Knowing a tables fact mean you can derive a division fact.
- Division can be sharing or grouping.
- Use the language of ‘equal groups of’, when multiplying or dividing.
- Knowing how each number in a multiplication and division number sentence relates to a problem eg there were 10 oranges put into bags with five in each bag. How many bags are needed?  $10 \div 5 = 2$  where 10 = the oranges, 5 is the number in each bag and 2 is the number of bags needed.

#### 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:

- multiplication and division facts
- mental calculations
- written calculations
- inverse operations and checking answers

#### Problem Solving

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



# Which of these prompts help to create a bespoke target for the pupil?

## Curriculum strand – Multiplication and division facts

Skills, Knowledge and Concepts	Expectations – Year 2
Can use counting objects to put into groups of 2 (10, 5, 3).	Can count in 2s to 10. Can count in 2s to 20.
Can organise a multiple of two (10, 5, 3) 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, 3) there are in a collection of objects.	Can count in 3s to 30.
Can organise groups of objects on a number line 2s (3s, 5s, 10s) and mark each multiple.	Can 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 relate half a number to $X \div 2$ using a bar model.
Recall fluently multiples of 2s to 20 and understand why these are all even products.	Recall division facts for each multiplication fact 2 x (10 x, 5 x).
Recall fluently multi	Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
Recall fluently multi	

### Pupils need to

- use models and images, concrete resources and signs and symbol notation
- discuss/ model their reasoning to support independence
- engage in problem solving tasks

# Fractions

- **Counting in fractional steps** (number line)
- **Recognising fractions** (reading and writing ; shape, number, time, length, capacity & volume)
- **Equivalence** (bar model, array, number and shape)
- **Problem solving**

***Conceptual and procedural fluency***

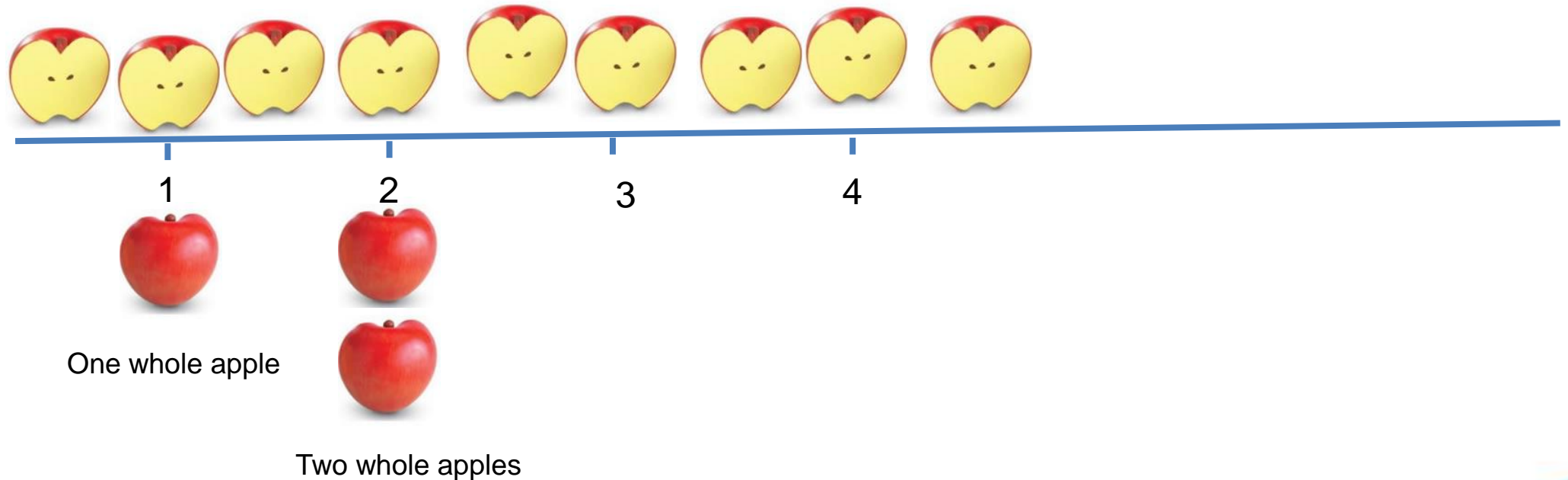
Key structured concrete resources

<https://www.ncetm.org.uk/resources/44558>



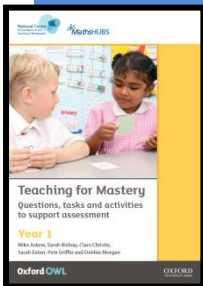
# Counting in halves

There are two halves of apple in one whole apple so there are 4 halves of apple in 2 whole apples



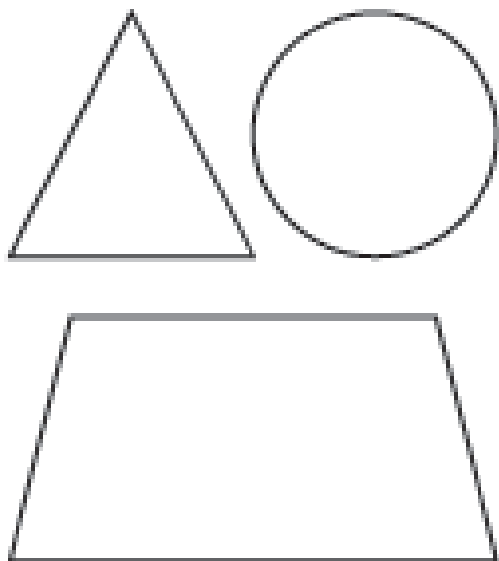
How many apples will I need for 6 halves of apples?





# NCETM Mastery Booklet Year 1: Progression in Fractions

Colour half of each whole shape:

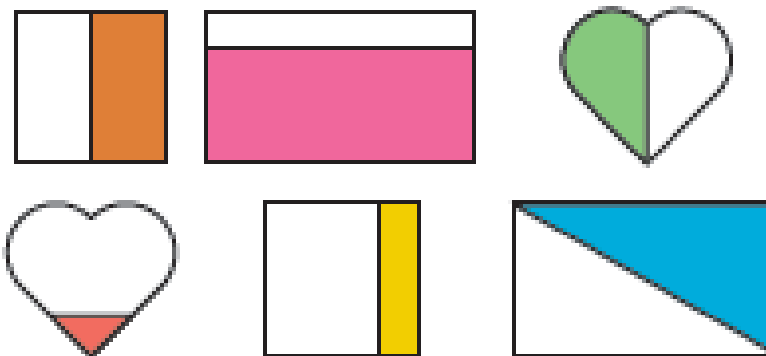


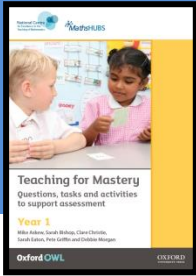
*Check that pupils do not think that just dividing a shape into any two pieces is halving but understand that they need to be equal pieces.*

Which of these show half of each whole shape?

Explain your reasoning.

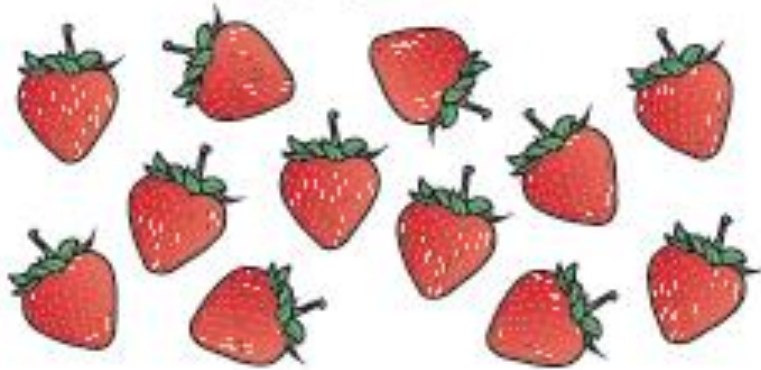
*Children should talk about the two parts needing to be equal parts of the whole.*



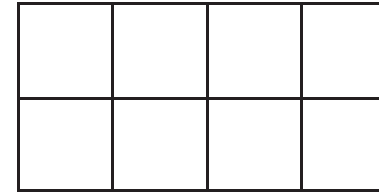


# NCETM Mastery Booklet Year 1: Fractions

Circle half of this group of strawberries.



Shade to show half of the whole shape.



Complete this halving wall.

20	
10	

Choose any number and create your own halving wall.

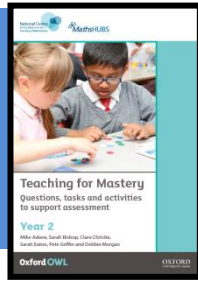
Four children share a pizza equally. Draw a diagram to show how much pizza each child gets.

What fraction of the pizza does each child eat?

Four children share a bag of 12 marbles equally. Draw a diagram to show how many marbles each child gets.

What fraction of the bag of marbles does each child get?





# NCETM Mastery Booklet Year 2: Fractions

Jo bought a bag of 12 cherries.  
Jo ate half the number of cherries in the bag.  
How many cherries did Jo eat?

Complete:

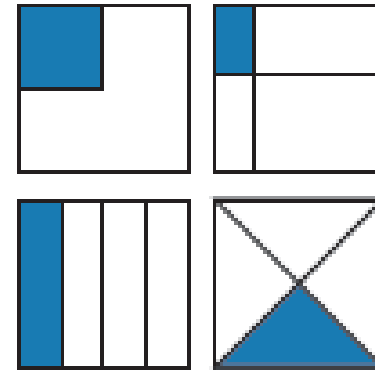
Half of 12 is

$\frac{2}{4}$  of 12 is

$\frac{1}{4}$  of 20 =

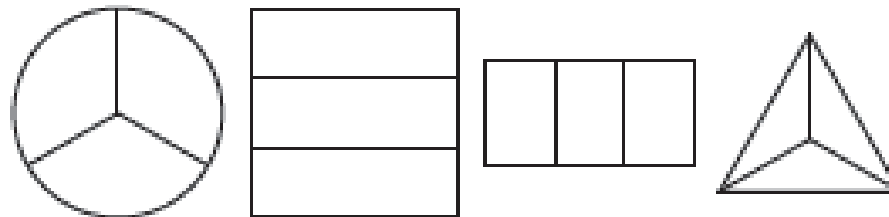
$\frac{3}{4}$  of 20 =

Which of these diagrams have  $\frac{1}{4}$  of the whole shaded?



Explain your reasoning.

Shade  $\frac{1}{3}$  of each shape.



# Diagnostic Assessment: Fractions

## Half (quarter) of a shape

- Given different shapes with folds (not all that fold into halves), can you show me which have been folded in half?
- How do you know these are folded in half?
- Can you fold this square (triangle, rectangle, circle, etc) in half (quarters)?
- Strips of paper in different lengths, can you fold them in half (quarters)?

## Counting in halves / quarters

- How many halves make one (two, three, etc) whole?
- How many halves do you have if you have two and a half apples?
- How many quarters make one whole one?
- Can you count in halves (quarters)?
- If one quarter of a pizza is eaten, what fraction of the pizza is left?
- If one quarter of children go home from school for lunch, what fraction of children have lunch at school?

## Symbolisation

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

---

## Half / quarter of a quantity

- 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
- Show me one quarter of....
- Shade half of a shape, when the shape is divided into an even number of equal pieces
- Shade one quarter of a shape when the shape is divided into 8 (12, 16, 20, etc) pieces

## Fractions of a quantity

- Use a bar model to show half of eight (10, 12, 18, etc)  
Pupils to use objects to access this if necessary
- Use a bar model to show one quarter of 8 (12, 16, 20, etc)
- If half of class are boys, and there are ten boys. How many children are there in the class?
- One quarter of the cookies are chocolate and there are five chocolate cookies. How many cookies are there altogether?





# Finding starting point to work towards NC statements e.g. fractions

Using day to day assessment and any specific conferencing to identify the correct planning tool ie Y1, Y2 or Y3 in this domain for the pupil.

- Start from year 1 and work up.
- Use domain non- statutory guidance and ‘key concepts’

– *E.g. For this domain this pupil is working towards end of year 2 expectations*

- Select from the domain strands key aspects to work on so that there is a linked combination of those strands in the bespoke plan.

## National Curriculum written assuming previous knowledge and skills understood

### Fractions

#### Year 2: National Curriculum Notes and Guidance (non-statutory)

Pupils use fractions as ‘fractions of’ discrete and continuous quantities by solving problems using shapes, objects and quantities. They connect unit fractions to equal sharing and grouping, to numbers when they can be calculated, and to measures, finding fractions of lengths, quantities, sets of objects or shapes. They meet  $\frac{3}{4}$  as the first example of a non-unit fraction.  $\frac{3}{4}$

Pupils should count in fractions up to 10, starting from any number and using the  $\frac{1}{2}$  and  $\frac{2}{4}$  equivalence on the number line (for example,  $1\frac{1}{4}$ ,  $1\frac{2}{4}$  (or  $1\frac{1}{2}$ ),  $1\frac{3}{4}$ , 2). This reinforces the concept of fractions as numbers and that they can add up to more than one.

### Key Concepts

- Fractions involve a relationship between a whole and equal parts of a whole. Ensure children express this relationship when talking about fractions. For example, ‘If the box of 20 chocolates is the whole, then 5 sweets are one quarter of the whole box of chocolates.’

### 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:

- counting in fraction steps.
- recognising fractions.
- equivalence.

### Problem-solving

Pupils should have opportunities to solve a range of simple problems involving part-whole reasoning



# Which of these prompts help to create a bespoke target for the pupil?



Skills, Knowledge and Concepts		NC expectations – Year 2
Can show $\frac{1}{4}$ s of shapes by folding accurately in half and half again and can label $\frac{1}{4}$ , $\frac{2}{4}$ ( and know is equal to half) and $\frac{3}{4}$ (as above).	Makes links between halving and 2 x multiplication facts (dividing by 4 and $\frac{1}{4}$ of, dividing by 3 and $\frac{1}{3}$ of).	Write simple fractions eg of $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$ .
For a variety of shapes can divide into quarters and shade in one half of the whole shape.	Knows half of a number is equal to $\frac{2}{4}$ of the same number.	

Pupils need to

- use models and images, concrete resources and signs and symbol notation
- discuss/ model their reasoning to support independence
- engage in problem solving tasks

# Looking at examples of the a teacher using the planning tool.....

Skills, Knowledge and Concepts		NC expectations – Year 2
Identify number sentence needed and show solution on a number line.	Identify number sentence needed and show solution on an unstructured number line and a bar model.	Solve problems with addition and subtraction: <ul style="list-style-type: none"> <li>• using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> <li>• apply their increasing knowledge of mental and written methods.</li> </ul> Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from <i>Measurement</i> ).
Use bar models to solve missing box calculations, eg $26 + ? = 30$ , $39 = 41 - ?$ .	Use bar models to find all possibilities, eg $8 = ? + ?$ .	



# Year 5 September work

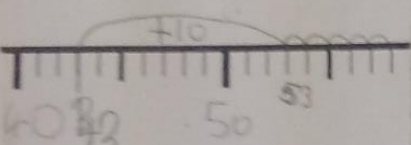
27.09.19 ✓✓  
L.O: Use concrete resources, and structured number lines to solve addition calculations (TU+TU) using + and = signs  
Identify addition number sentence to solve a simple word problem 0-100  
APPLY

Charlie builds a tower using 1cm cubes that is 43cm tall. He adds 15cm to his tower.  
How tall is the tower now?

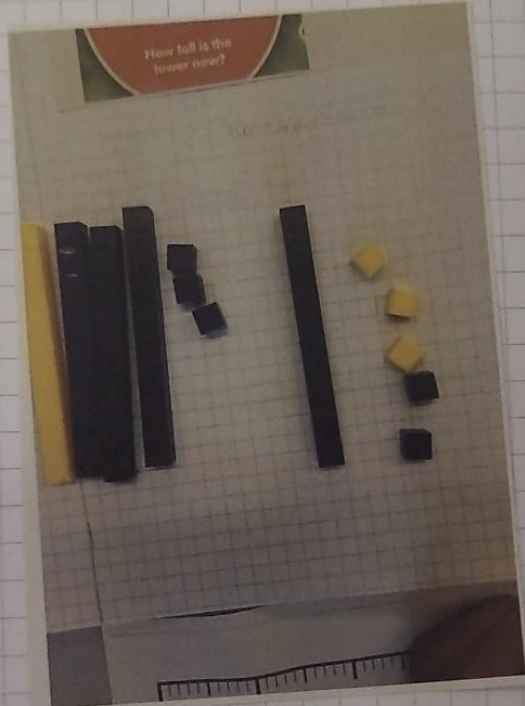
$43 + 15 = 58\text{cm}$

$10\text{cm} + 43\text{cm} + 15\text{cm} = 58\text{cm}$

$43 + 15 =$



How tall is the tower now?



Reasoning task – **variation of whole class work**

CPA approach

Continue to use knowledge and skills related to previous unit on NPV

Pupil organises images on page

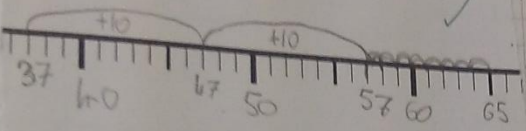


# Year 5 September work

Charlie builds a tower using 1cm cubes that is 37cm tall. He adds 28cm to his tower.

How tall is the tower now?

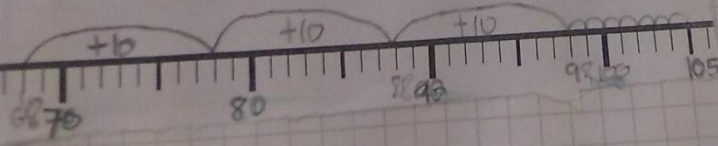
$1\text{cm} \times 37\text{cm} + 28\text{cm} = 65\text{cm}$




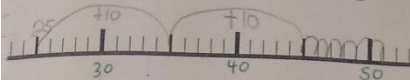
$1\text{cm} \times 68\text{cm} + 37\text{cm} = 105$

Charlie builds a tower using 1cm cubes that is 68cm tall. He adds 37cm to his tower.

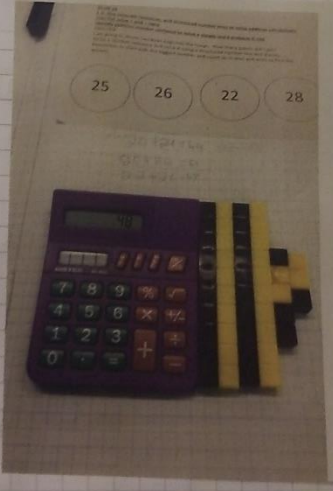
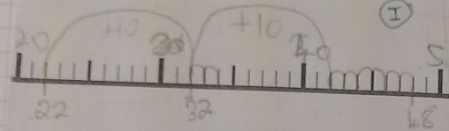
How tall is the tower now?



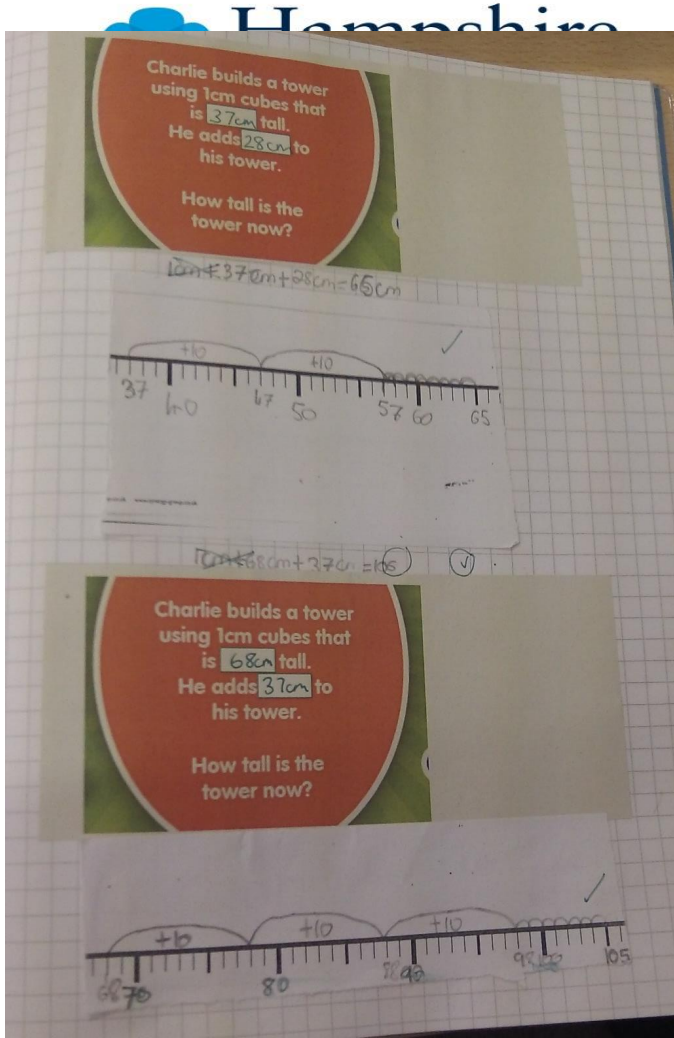
$25 + 26 = 51$



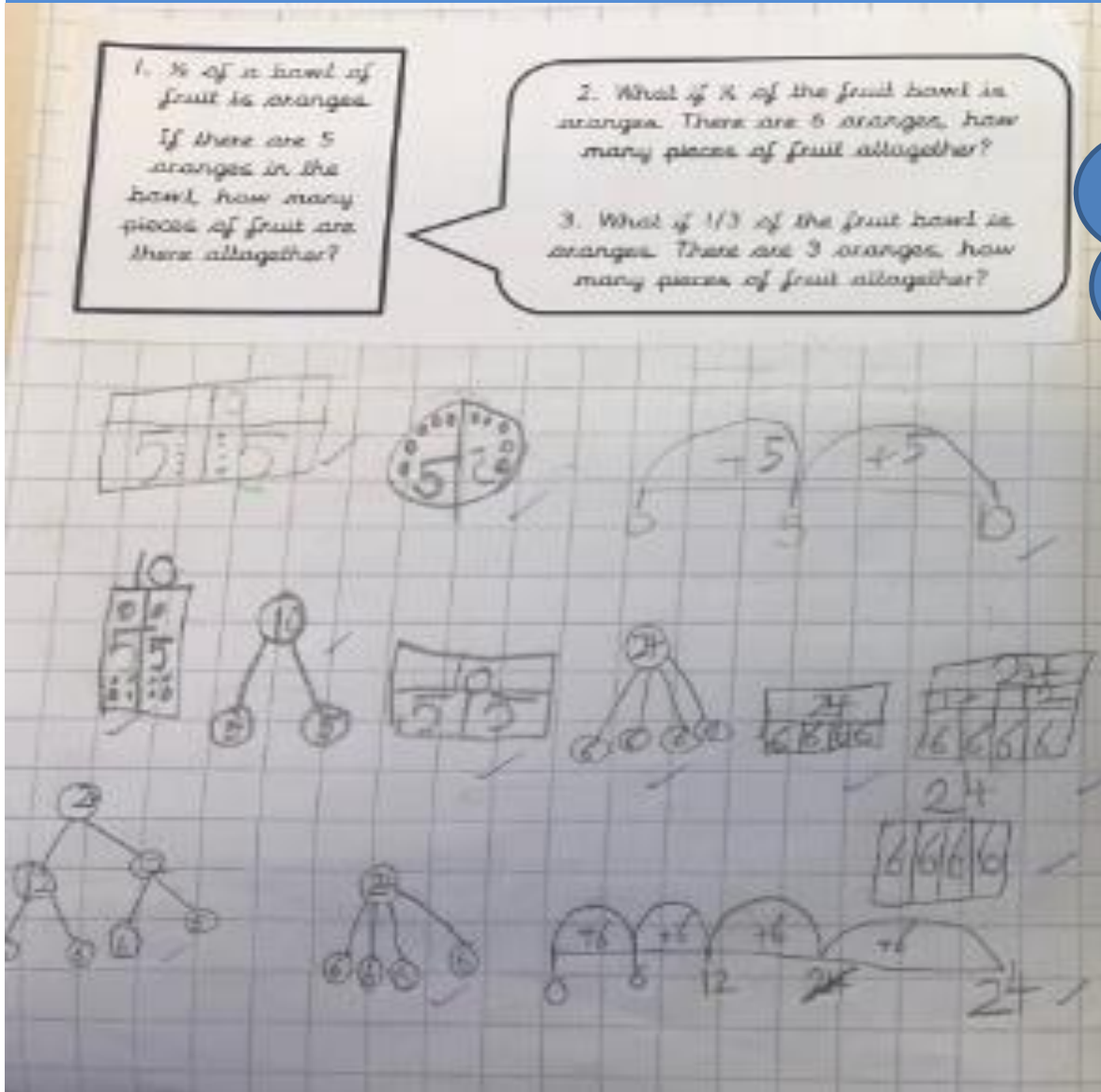
$22 + 26 = 48$



Skills, Knowledge and Concepts		NC expectations – Year 2
Identify number sentence needed and show solution on a number line.	Identify number sentence needed and show solution on an unstructured number line and a bar model.	Solve problems with addition and subtraction: <ul style="list-style-type: none"> <li>using concrete objects and pictorial representations, including those involving numbers, quantities and measures</li> <li>apply their increasing knowledge of mental and written methods.</li> </ul> Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change (copied from <i>Measurement</i> ).
Use bar models to solve missing box calculations, eg $26 + ? = 30$ , $39 = 41 - ?$ .	Use bar models to find all possibilities, eg $8 = ? + ?$ .	



# What about task design to enable a pupil to become secure:



$\frac{1}{2}$  of a bowl of fruit is orange. If there are 5 oranges in the bowl, how many pieces of fruit are there altogether?

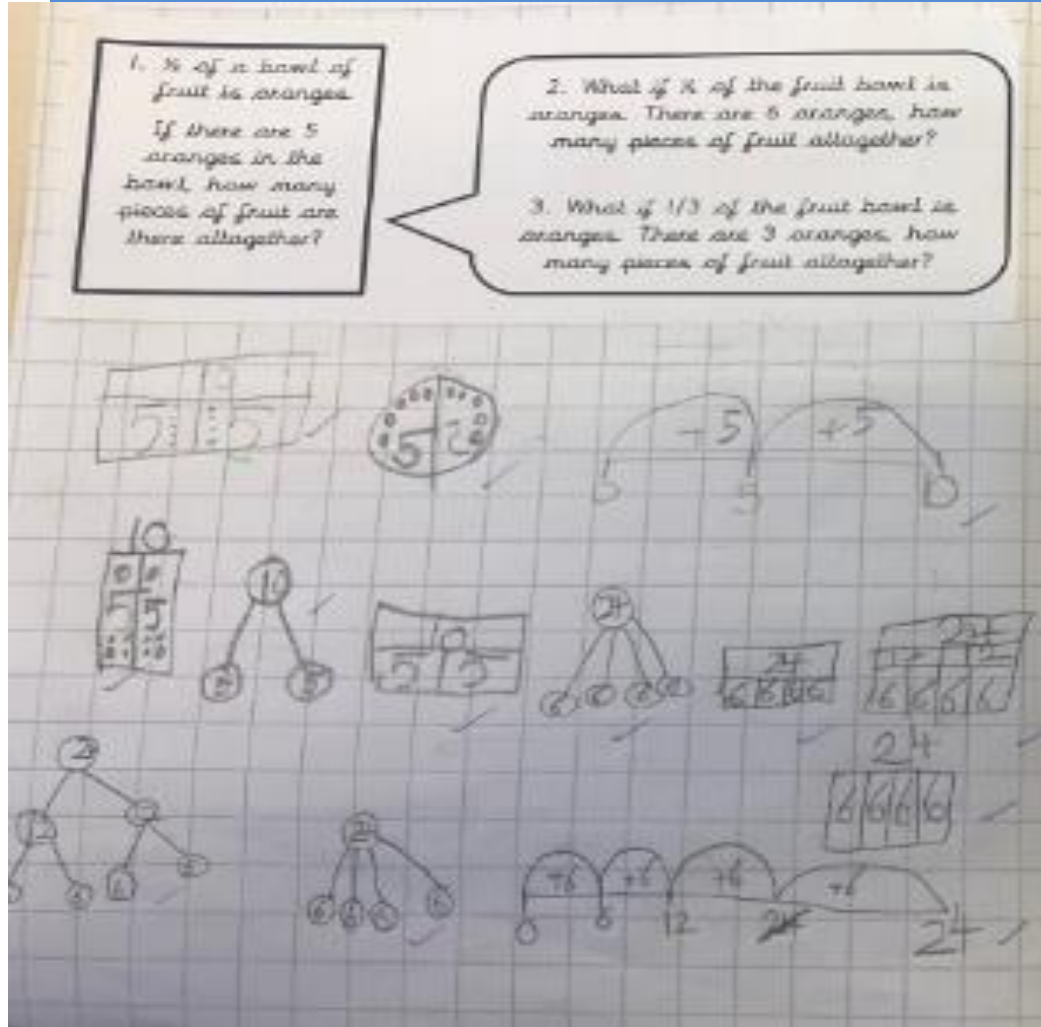
What if  $\frac{1}{4}$  were oranges and there were 6 oranges?

What if  $\frac{1}{3}$  were oranges and there were 3 oranges?

**Thoughts?**

- Clarity around learning
- Lessen the cognitive load
- Slow down – teach less but teach it well
- 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 can apply with some independence

# Adapting the task:



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.
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).

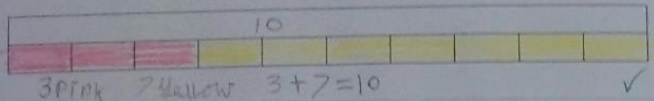
## ELG 11 Numbers

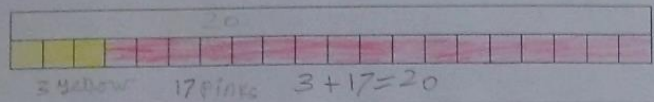
- Children count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number.
- Using quantities and objects, they add and subtract 2 single-digit numbers and count on or back to find the answer.
- They solve problems, including doubling, halving and sharing.
- Recognise, find and name a half as one of two equal parts of an object, shape or quantity.
- Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity.



# Year 5 – An example

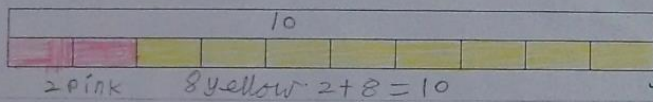
L.O. To recall number bonds to 10 and 20.  
 3110 Lily-Rose → Looking for links between number bonds to 10 and 20

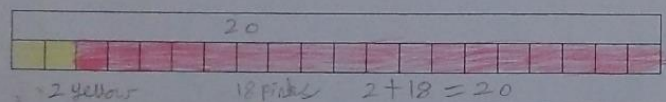
(S)  ✓  
 3 pink 7 yellow 3 + 7 = 10

 ✓  
 3 yellow 17 pink 3 + 17 = 20

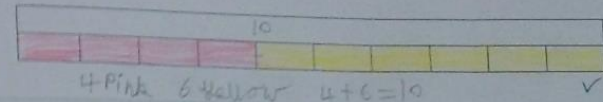
"They both have the same number of ones"

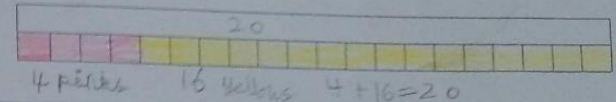
(S)  $3 + 7 = 10$   
 $3 + 17 = 20$

 ✓  
 2 pink 8 yellow 2 + 8 = 10

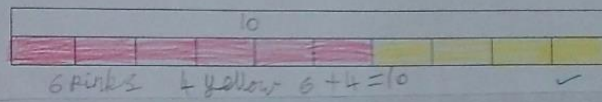
 ✓  
 2 yellow 18 pink 2 + 18 = 20

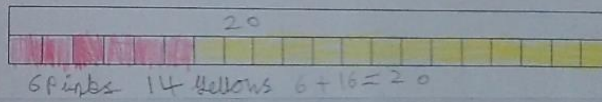
(I) "They both number 2 in it and the similar one is that in the 10 column for 8 + 2 it has 10 in it and for 2 + 18 it does has 10 in it."  
 $2 + 8 = 10$

(S)  ✓  
 4 pink 6 yellow 4 + 6 = 10

 ✓  
 4 pink 16 yellow 4 + 16 = 20

"they both have number 4 in it and it is similar that they have 4 + 6 = 10  
 4 + 16 = 20 ✓

 ✓  
 6 pink 4 yellow 6 + 4 = 10

 ✓  
 6 pink 14 yellow 6 + 14 = 20

"they both have the same number of ones"  
 $6 + 4 = 10$   
 $6 + 14 = 20$

great vocab!

**Look carefully at how this task enables the child to develop in confidence and work independently.**



# Year 5

Handwritten work on a notebook page showing bar models and arithmetic problems.

Top bar model: 10 pinks, 0 yellows,  $10 + 0 = 10$

Second bar model: 10 pinks, 10 yellows,  $10 + 10 = 20$

Text: "They both have the same numbers in ones"

Third bar model: 1 pink, 9 yellows,  $1 + 9 = 10$

Fourth bar model: 11 pinks, 9 yellows,  $11 + 9 = 20$

Text: "they both"

Text: "Applying previous practice to see connections"

Text: "bar models"

$10 - \boxed{7} = 3$	$13 + \boxed{7} = 20$	$20 - \boxed{7} = 13$
$10 - \boxed{5} = 5$	$15 + \boxed{5} = 20$	$20 - \boxed{5} = 15$
$10 - \boxed{2} = 8$	$16 + \boxed{4} = 20$	$20 - \boxed{4} = 16$

✓/tc

It is evident that the pupil is now moving from the pictorial images to the abstract.

The progression of skills have been well thought out.



A ride at the funfair has ten seats in each carriage. There are eight children in the first carriage. Six more children get on. How many children are there altogether?

8 + 6 = 14

2 4

10 + 4 = 14

Fantastic use of number bonds

2

## NOT work of a Pupil with SEND Year 2 pupil

Scaffolding started in October 2018

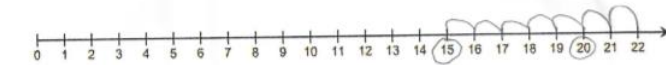
Tuesday 29th October 2018

LO: Subtract a 1 digit number from a 2-digit number (crossing tens)

22 - 7 = 15

7

2 5



24 - 8 = 16

8

4 4



12 - 4 = 8

12 - 4 = 8

12 - 2 = 10  
10 - 2 = 8  
12 - 4 = 8

12 - 4 = 8

10 - 4 = 6  
6 + 2 = 8  
12 - 4 = 8

I have twelve paintbrushes to wash. I have washed three already. How many more do I have to wash?

12 - 3 = 9

2 1

12 - 2 = 10  
10 - 1 = 9

There are fifteen apples in a bowl. Paddington class eat nine apples. How many are left?

15 - 9 = 6

5 4

15 - 5 = 10  
10 - 4 = 6

15 - 9 = 6

10 5

10 - 9 = 1  
1 + 5 = 6

**NOT work of a pupil with SEND**

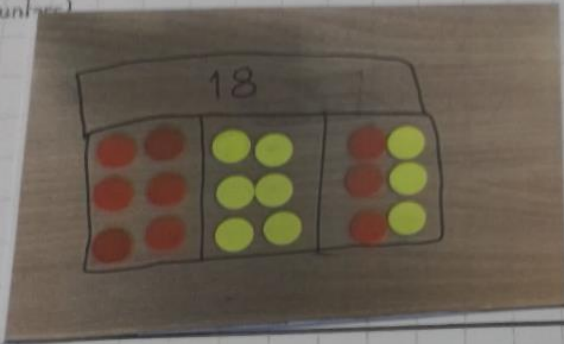
$\begin{array}{r} 40 \\ 30 \\ \hline 70 \end{array} + \begin{array}{r} 30 \\ 50 \\ \hline 80 \end{array} = 78$	$\begin{array}{r} 20 \\ 40 \\ \hline 50 \end{array} + \begin{array}{r} 30 \\ 30 \\ \hline 60 \end{array} = 57$
$\begin{array}{r} 50 \\ 50 \\ \hline 100 \end{array} + \begin{array}{r} 10 \\ 40 \\ \hline 50 \end{array} = 69$	$\begin{array}{r} 40 \\ 30 \\ \hline 70 \end{array} + \begin{array}{r} 30 \\ 90 \\ \hline 120 \end{array} = 79$
$\begin{array}{r} 40 \\ 20 \\ \hline 60 \end{array} + \begin{array}{r} 30 \\ 40 \\ \hline 70 \end{array} = 78$	$\begin{array}{r} 20 \\ 70 \\ \hline 90 \end{array} + \begin{array}{r} 30 \\ 20 \\ \hline 50 \end{array} = 59$
$\begin{array}{r} 30 \\ 40 \\ \hline 70 \end{array} + \begin{array}{r} 50 \\ 40 \\ \hline 90 \end{array} = 88$	$\begin{array}{r} 40 \\ 30 \\ \hline 70 \end{array} + \begin{array}{r} 20 \\ 30 \\ \hline 50 \end{array} = 66$ <p>Grasped quickly.</p>



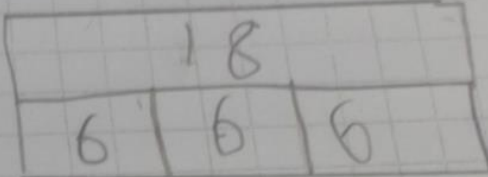
# A sequence of lessons in Year 6:

Say it Find:  $\frac{1}{3}$  of 18

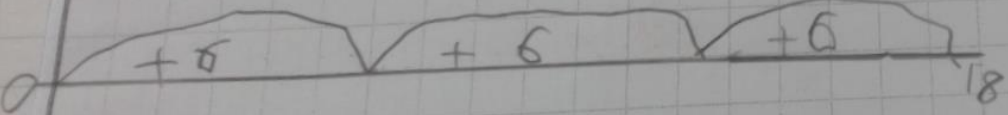
Make it (counters)



Draw it (bar model)



Draw it (number line)



Solve it

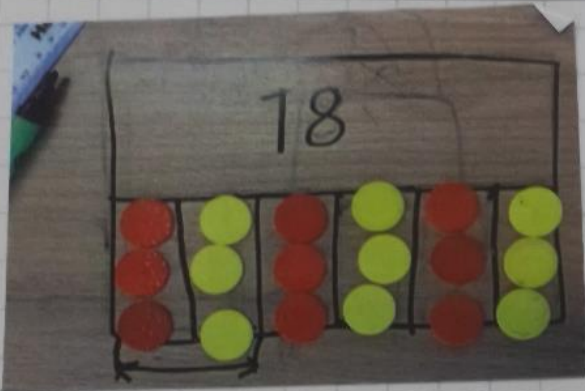
$$18 \div 3 = 6$$


Say it

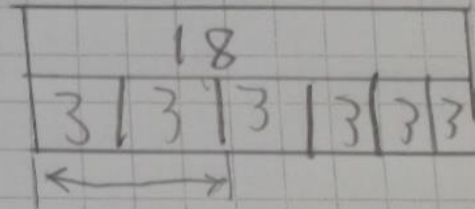
Find:

$$\frac{2}{6} \text{ of } 18 = 6$$

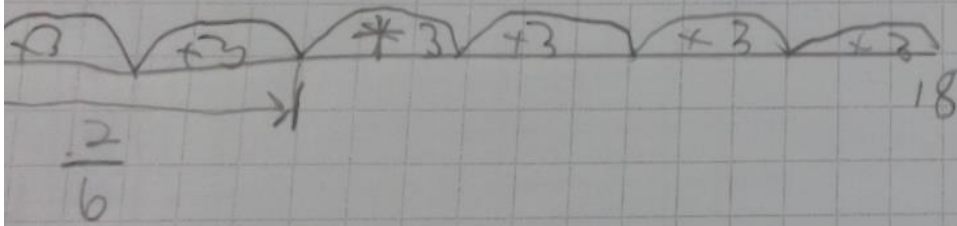
Make it (counters)



Draw it (bar model)



Draw it (number line)



Solve it

$$18 \div 3 = 6$$

$$3 \times 6 = 18$$

HR

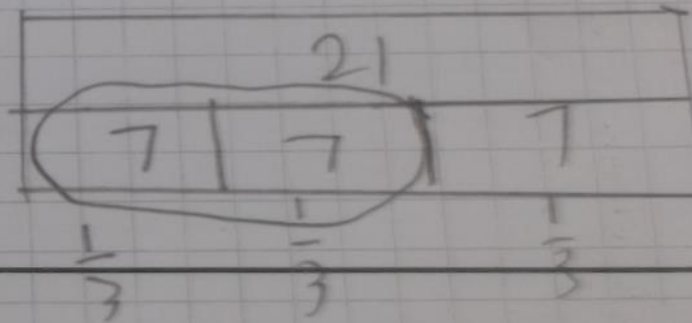


Say it

The Fur Tribe live 21km from Eska and Flint.  
They are driving the sledge to see them and are  $\frac{2}{3}$  of the way there. How far have they driven so far?

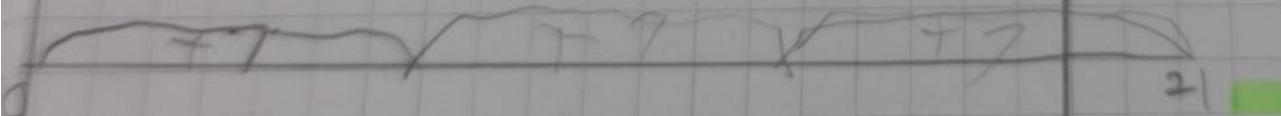
Make it (counters)

Draw it (bar model)



Draw it (number line)

Solve it



$\frac{2}{3}$  of 21 = 14 km

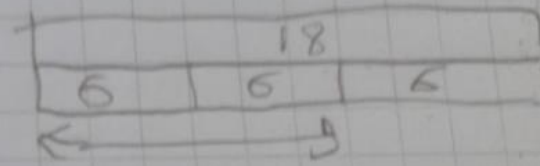
Say it

The Fur Tribe live 18km from Eska and Flint.  
They are driving the sledge to see them and are  $\frac{2}{3}$  of the way there. How far have they driven so far?

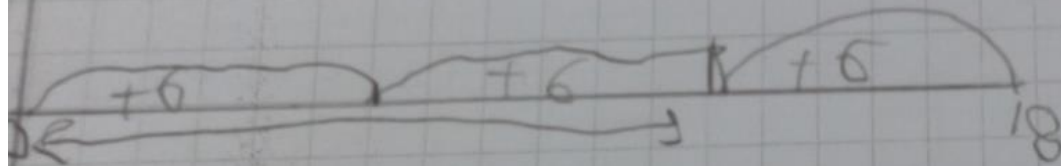
Make it (counters)



Draw it (bar model)



Draw it (number line)



Solve it

$$\frac{2}{3} \text{ of } 18 = 12$$

MR





$$156 - 8 =$$

Can the pupil:

- count accurately to at least 200?
- Read the calculation using different vocabulary?
- Recall number bonds for 8?
- Draw and use a representation (s) to help them keep track of their reasoning?
- Use their knowledge of number bonds to make this calculation easier than counting back in ones on their fingers?
- ?

Possible variations

$$50 - 8$$

$$58 - 8$$

$$150 - 8$$

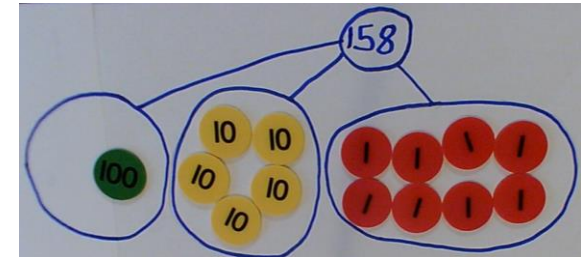
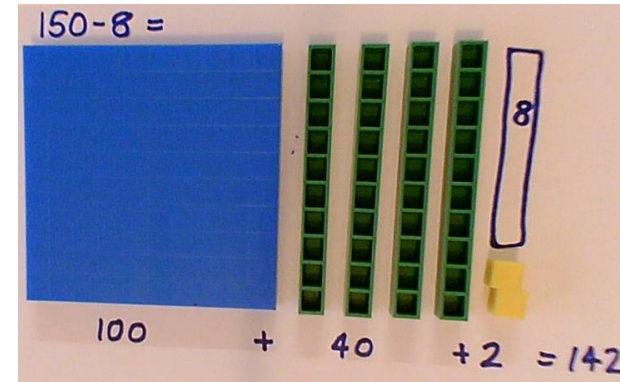
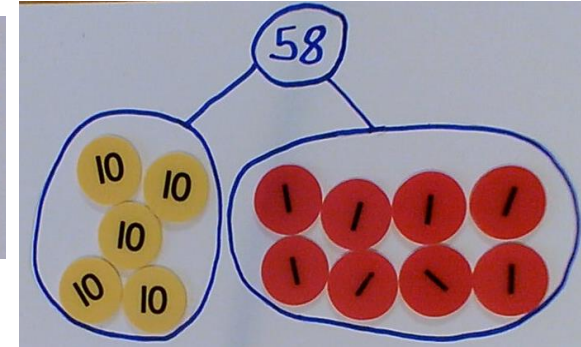
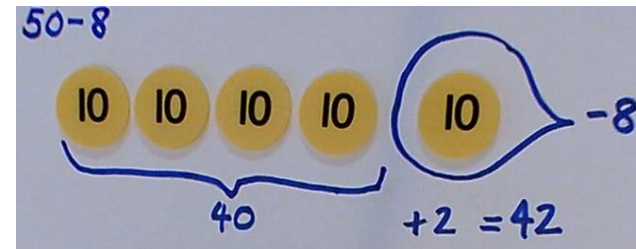
$$158 - 8$$

$$57 - 8$$

$$157 - 8$$

$$156 - 8$$

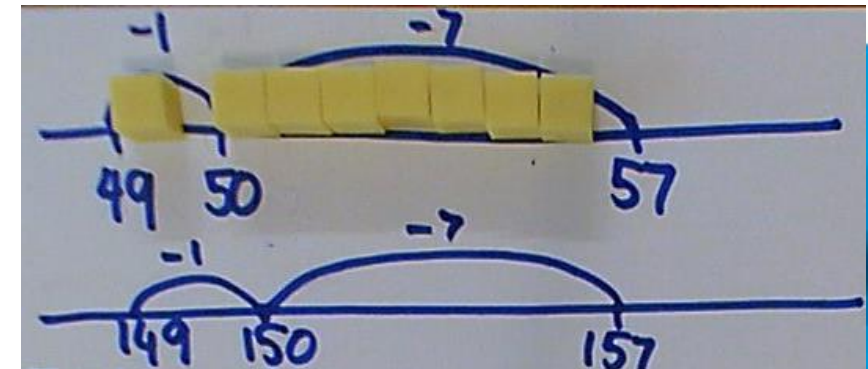
Scaffolding needed until fluent with the underlying ideas.



Can the pupil see a link with

$$156 + 8 =$$

What strategies will be used to support and develop pupil talk?



# Varying a rich task:

A model you have seen before.

Farmer Large has 42 cows.  
He buys 6 more cows at market.  
How many cows does he have now?

Farmer Large has 48 cows.

He buys 16 more cows at market.  
How many cows does he have now?

Farmer Large has 48 cows and 26 pigs.  
He buys 16 more cows and 7 more pigs at market. How many animals has he got altogether?

Farmer Large has 4 cows.  
He buys 5 more cows at market.  
How many cows does he have now?

Farmer Large has 14 cows.  
He buys 5 more cows at market.  
How many cows does he have now?



# Word Problems

**The postman has 157 cards to deliver. The postman has already delivered eight. How many did he have left to deliver?**

Can the pupil:

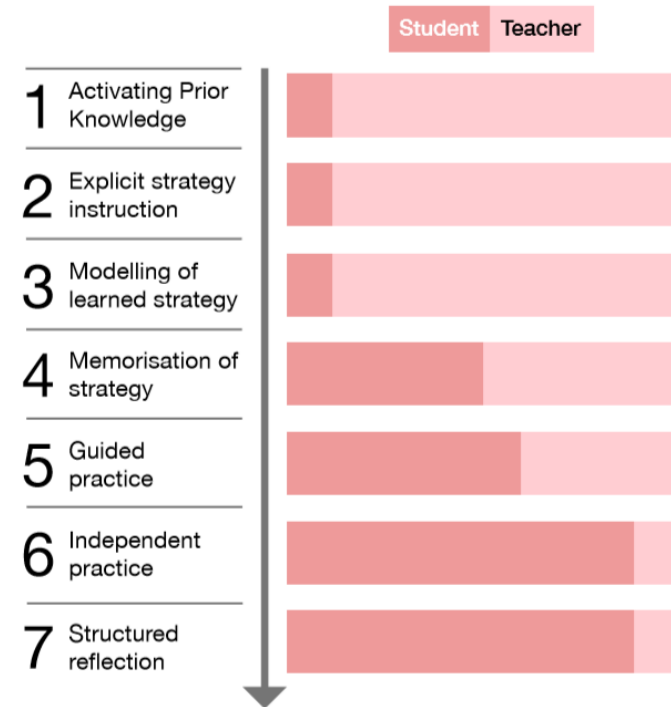
- Read the problem independently
- Explain the problem accurately
- Draw a representation of the problem?
- Identify the first step?
- Identify the expression or equation needed
- Identify a calculation strategy?
- Decide whether their answer is reasonable?



- **Identify the explicit teaching needed**
- **Provide a bespoke scaffold**
- **Use 7 step journey to securing understanding**

**What are some of the potential challenges?**

- Several bits of information
- Vocab: 'deliver' 'delivered' related to a maths operation
- Number as word
- The 'question' not separated from the rest of the information



The postman has 157 cards to deliver.  
The postman has already delivered eight.  
How many did he have left to deliver?

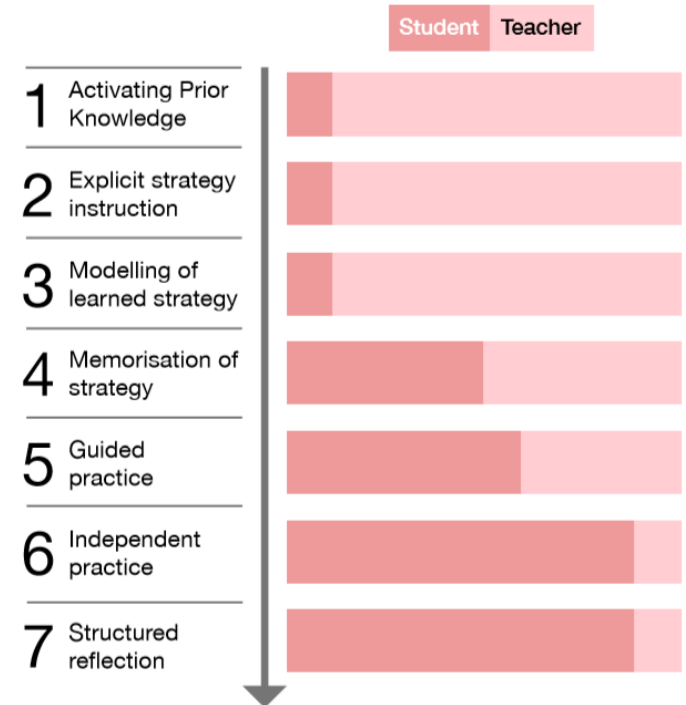


**There are 157 cards to deliver. The postman delivered eighteen in the first road and 12 cards in the next road. How many cards are still left to be delivered?**

This two –step problem is more accessible if I have successfully understood the previous one

Can the pupil:

- Read the problem independently
- Explain the problem accurately
- Draw a representation of the problem?
- Identify the steps needed?
- Identify the expression or equation needed for each step
- Identify a calculation strategy?
- Decide whether their answer is reasonable?
- Consider an alternative solution?



# Managing whole class and SEN

How will you ensure

- SEN pupils develop independence even though they might have an adult to support them?
- CT work in partnership with other adults supporting pupils with SEN, maintain an overview of their progress and attainment and set appropriate goals
- Pupils with SEN are supported to maintain links with whole class unit of work as far as possible

# Recording progress: day to day

Pupils need opportunities to develop reasoning through:

- Talking and sharing their thinking with peers and adults
- Using concrete resources, both 'small world' and structured mathematical resources
- Pictures, models and images
- Self reflection

Teachers

- Qualitative notes/ annotations on pupil work

# Sharing the Planning Tool

## How will you...

- Disseminate the key principles to all of the staff using the document?
- Ensure that all teachers are confident in how to use/ apply it?
- Overcome barriers and problems that teachers may experience when planning/ teaching children with SEND?
- Share successes and best practice?
- Track the progress of children with SEND?



# Ideas

- Lesson study – a collaborative plan/teach/review cycle focusing on just the pupils with SEND
- A snowball model – train some members of staff up to be experts, then they support others
- A cascade model – share with everyone and then monitor successes by providing opportunities for feedback/ review
- A pilot – trial the planning tool with a small group of teachers for a given period of time then meet to share any barriers/ best practice before sharing with others



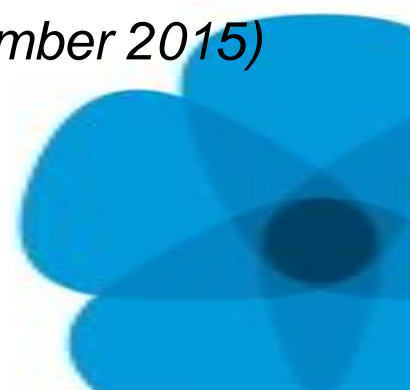


The challenge for schools: create an approach for day to day (formative) assessment

“...which works for pupils with special education needs, some of whom may be following an alternative curriculum..”

“Any assessment methods and tools used should reflect this and support a personalised approach.”

*(Final report of the Commission on Assessment without levels, p16, September 2015)*



# Action Planning: Teaching and learning; management

- Teaching and learning for a pupil
- Communicating with colleagues (SENCO, CTs, LSAs)
- Refer to summary of Code of Practise
  - Chapter 6: graduated approach



# SEN Support: The graduated Approach



‘...take action to remove barriers to learning and put effective special educational provision in place. **This SEN support should take the form of a four-part cycle through which earlier decisions and actions are revisited, refined and revised with a growing understanding of the pupil’s needs and of what supports the pupil in making good progress and securing good outcomes. This is known as the graduated approach.** It draws on more detailed approaches, more frequent review and more specialist expertise in successive cycles in order to match interventions to the SEN of children and young people’

# The graduated approach (CoP ch 6)

## Assess (review regularly)

- Class teacher, subject teacher and SENCO
- draws on teacher's assessment and experience of the pupil,
- previous progress and attainment
- the individual's development in comparison to their peers and national data,
- the views and experience of parents,
- the pupil's own views,
- if relevant, advice from external support services.
- Schools should take seriously any concerns raised by a parent.

## Plan

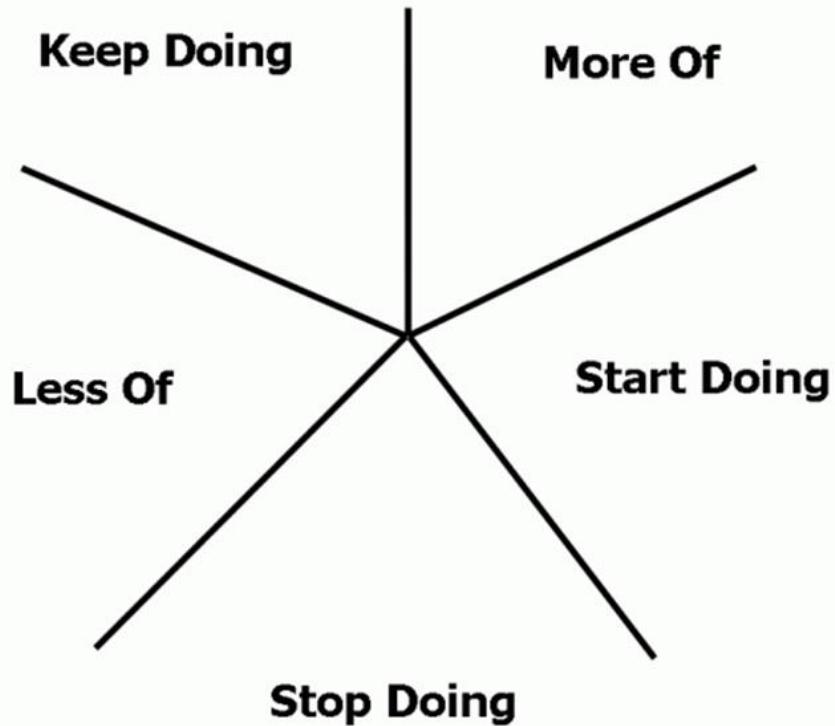
- All teachers and support staff who work with the pupil should be made aware of their needs, the outcomes sought, the support provided and any teaching strategies or approaches that are required. This should also be recorded on the school's information system.
- The support and intervention provided should be selected to meet the outcomes identified for the pupil, based on reliable evidence of effectiveness, and should be provided by staff with sufficient skills and knowledge

## Do

- The class or subject teacher should remain responsible for working with the child on a daily basis.
- Where the interventions involve group or one-to-one teaching away from the main class or subject teacher, they should still retain responsibility for the pupil. They should work closely with any teaching assistants or specialist staff involved, to plan and assess the impact of support and interventions and how they can be linked to classroom teaching.
- The SENCO should support the class or subject teacher in the further assessment of the child's particular strengths and weaknesses, in problem solving and advising on the effective implementation of support.

# Actions

National Centre  
for Excellence in the  
Teaching of Mathematics



**What are your next steps?**

**How will you share the planning tool with staff members?**

**How will you give time to the completion of the planning tool through the use of daily assessment and the diagnostic questions?**

**What do you hope to see in books and by when?**

