Beeston Primary School: Progression in Subtraction

These notes show the stages in building up to a formal written method for subtraction. Our aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they choose an appropriate written method which they can use accurately and with confidence. Time must be taken building up to the formal written method to ensure complete understanding at each stage.

Common Misconceptions

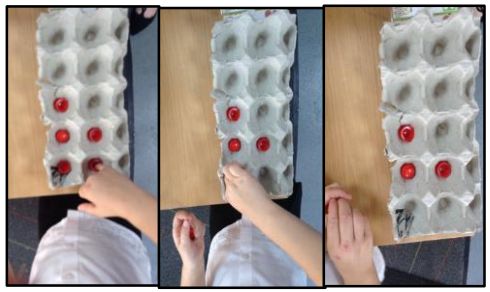
- **Always take the smaller number away from the bigger number**
- **You can't do 3 - 7**

Stage 1 - Practical Subtraction

Children should be able to take away objects from a group of objects and be able to say how many they started with, how many they took away and how many they have left. Children should not be exposed to number sentences at this stage.

e.g. The child starts with 3 dinosaurs, removes one and knows that there are two left.

Children start with 5 counters in ten frame, remove 2 to know there are 3 left.



Children should:

1. Use practical objects such as dinosaurs, toy cars, toy sheep etc.
2. Use mathematical representation of number e.g. Numicon and number tracks

Children need to be able to:

Foundation

- Have one to one correspondence.
- Reliably count objects to 20.
- Recognise numerals up to 20.
- Count backwards from 10.
- Say one less than any number up to 20.
- Subitise up to 5 objects (instantly recognise how many there are without counting).

Key Vocabulary:

Take, take away, less than, fewer than, how many left, equals.

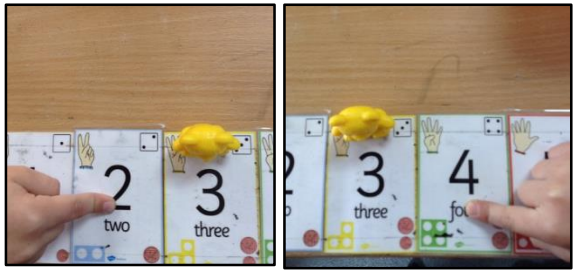
Think: Can I do this in my head? Can I use a jotting? Do I need a formal strategy?

Stage 1 Continued – More than/less than

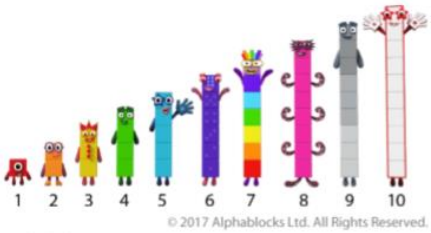
Children should be able to count back using a numbered number line. This should first be in ones first using resources such as the 'multilink staircase', number tracks and Numicon. Children should encouraged to make links between quantities, names (e.g. 'four') and numerals (e.g. '4')

Stem Sentences:

- **How many more is___than___**
- **What is one less than____**

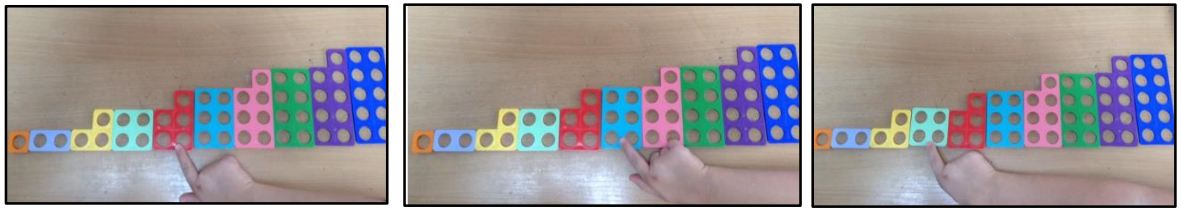


Numberblocks (1–10):



Multilink 'staircase':

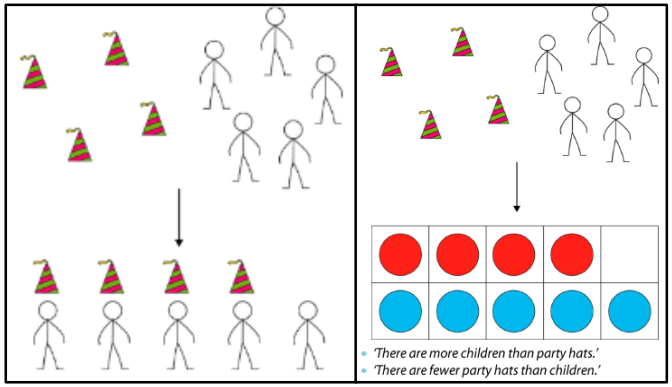
Numicon

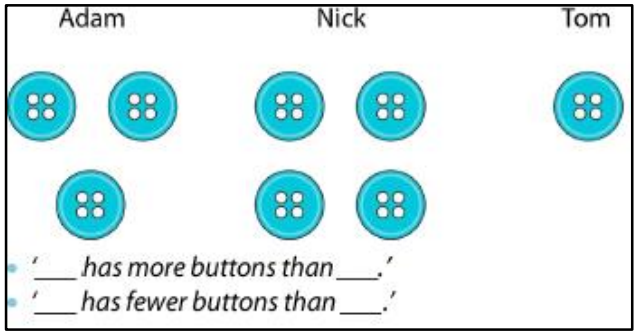


Comparisons

Allow children to move on to comparing objects. This can be done by providing pictures that can then be rearranged into rows in a ten frame.

Stem Sentences: There are fewer ____than____

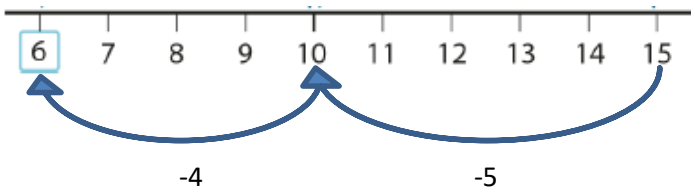




Stage 2 – Subtraction using Number Lines

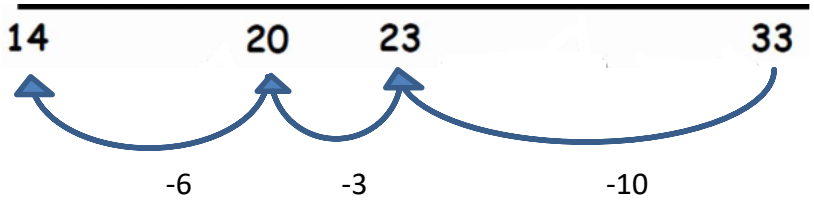
1. Numbered number lines

   Children should be able to count back using a numbered number line. This should be first done in ones, tens and then other numbers. e.g. 15 – 9 = 6

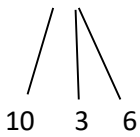


2. Empty number lines

   Children should then move onto using empty number lines. They can be taught to bridge through using multiples of 10 e.g. 33 – 19



Children can use partitioning to support them with this calculation: 33 - 19



Children need to be able to:

Key Stage 1: Year 1/2

- Read and write numbers to 100 in numerals.
- Recall number bonds to 20 and subtraction facts within 20.
- Understand that subtraction can not be done in any order.
- Recognise that subtraction is the inverse of addition.
- Have secure place value of two digit numbers.
- Partition and recombine numbers.
- Solve one-step problems involving subtraction.

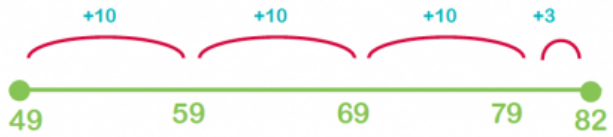
Key Vocabulary:

Take, take away, fewer than, how many left, equals, partition, difference between, count back, less than, subtract, minus, tens, ones.

Think: Can I do this in my head? Can I use a jotting? Do I need a formal strategy?

Stage 2 Continued– Difference between

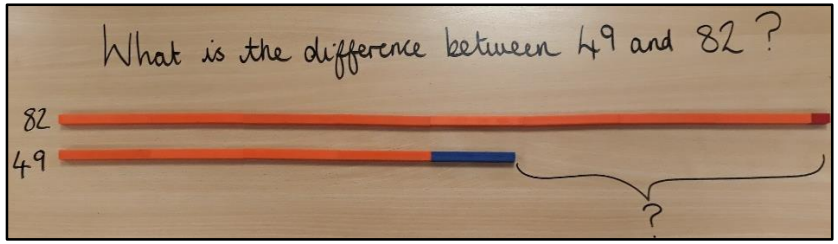
1. Number line
   Number lines can also be used to show difference between e.g. What is the difference between 49 and 82? 33

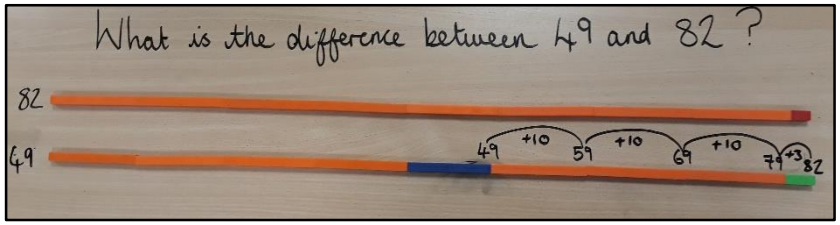


10 + 10 + 10 + 3 = 33

The difference between 49 and 82 is 33.

This can also be shown using cuisinaire rods:



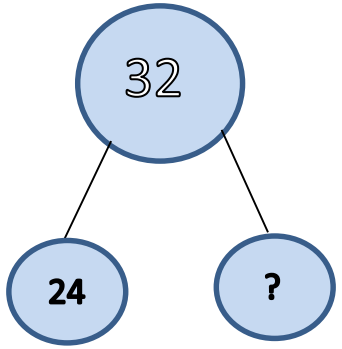


10 + 10 + 10 + 3 = 33

The difference between 49 and 82 is 33.

Children should be exposed to a range of representations to understanding ‘difference between’ e.g. bar models, part whole models and missing box questions.

32	
24	?



32 - ☐ = 24 24 = 32 - ☐

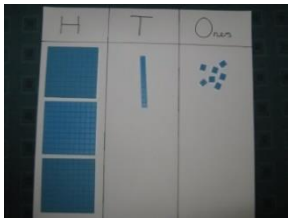
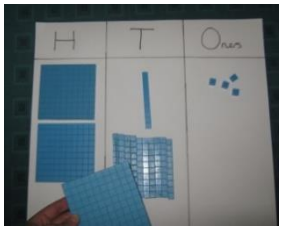
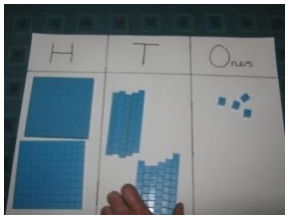
Stage 3 - Expanded column method

NB: Children should be taught to use expanded column method with no exchange first. This is to ensure children understand the format of the method.

Exchange:

The expanded column method is a stepping stone towards the compact column method. It should be taught practically, using base ten apparatus, before children start to record it. Include numbers where zero is a placeholder (e.g. 504 – 173).

e.g. 317 – 263 = 54

	H T Ones 300 10 7 - 200 60 3	Children create the number that they will be taking away from, using base ten and place it on a place value mat.
	H T Ones 200 ~~300~~ 110 7 - 200 60 3 4	Starting with the ones, children take away 3 from the 7 ones. Moving onto the tens, children realise that they cannot take six tens from one ten so they exchange a hundred for ten tens. It is important that children do this physically.
	H T Ones 200 ~~300~~ 110 7 - 200 60 3 0 50 4	Children can now remove 6 tens from 11 tens and then remove the two hundreds. Children will be left with their answer.

Progression

1. Subtract 2 two digit number, without exchange.
2. Subtract 2 two digit number, with exchange.
3. Subtract 3 digit numbers with and without exchange (only one lot of exchange at this stage).

Children need to be able to:

Lower Key Stage 2: Year 3/4

- Have a secure understanding of place value up to 1000.
- Estimate answers.
- Understand subtraction as the inverse of multiplication.
- Read and write numbers in words and numerals up to 1000.
- Solve two-step problems involving subtraction.
- Subtract multiples of ten from one another.

Key Vocabulary:

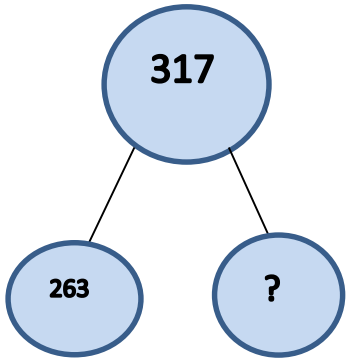
Take, take away, less, fewer, how many left, equals, partition, difference, count back, count on, less than, subtract, minus, exchange, decrease, tens, ones.

Think: Can I do this in my head? Can I use a jotting? Do I need a formal strategy?

Stage 3 Continued – Difference Between

Children should be exposed to a range of representations to understanding 'difference between' e.g. bar models, part whole models and missing box questions.

317	
263	?



317 - ☐ = 263

263 = 317 - ☐

Possible questioning:

Raj spent £391, Timmy spent £186.
How much more did Raj spend?

Calculate the difference between 391 and 186.

Stage 4 - Compact column method

This is the formal standard method of subtraction. This should only be taught when children are completely confident in using the expanded column method and can prove this using base ten apparatus.

563 – 271 = 292

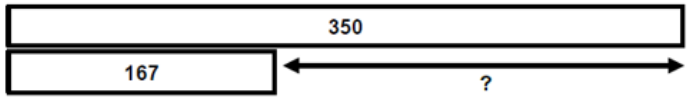
$$\begin{array}{r} {}^{4}\cancel{5}{}^{1}6\ 3 \\ -\ 2\ 7\ 1 \\ \hline 2\ 9\ 2 \end{array}$$

It is important that children say "16 tens take 7 tens" not "16 -7". Use the term "exchange" not borrow.

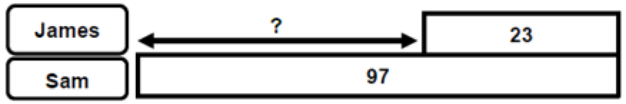
Difference between

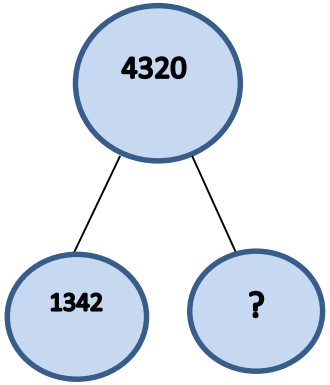
Children should be exposed to a range of questions representations to understand finding the 'difference between' two numbers e.g. bar models, part whole models and empty box questions.

There are 350 pages in Amber's book. On Tuesday, she reads 167 pages of her book. On Wednesday, she reads the rest of the book. How many pages did she read on Wednesday?



James has collected 23 fewer football stickers than Sam. Sam has collected 97. How many football stickers has James collected?





3342 - ☐ **= 2342** ☐ + 1475 = 6224

Progression

1. Subtraction of a three digit number, 2 lots of exchange required.
2. Subtraction involving decimal numbers with up to 3 decimal places in a variety of contexts including money.

Note

Students should be able to perform calculations across zero into negatives (a number should be used to support this process).

Children need to be able to:
Upper Key Stage 2: Year 5/6

- Have a secure understanding of the expanded column method.
- Have a secure understanding of place value to 10 000 000.
- Have a secure understanding of decimal numbers to 3 decimal places.
- Understand addition as the inverse of subtraction.
- Solve complex multi-step problems involving subtraction (including missing number problems).
- Estimate answers and use this to check answer.
- Have fluent mental subtraction skills.

Key Vocabulary:

Take, take away, less, fewer, how many left, equals, partition, difference, less than, subtract, minus, exchange, decrease, tens, ones.

Think: Can I do this in my head? Can I use a jotting? Do I need a formal strategy?